


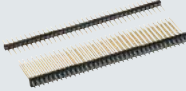
















Connectors

product catalog no. 27




Product Group		Specification	Target Markets
	Colibri		Embedded: Industrial Automation, Medical, Transportation, Gaming, Military, Avionics, Datacom, Instrumentation
	One27	-	Industrial Automation, Medical, Transportation, Instrumentation
	DIN41612	IEC 60603-2 	Backplane: Industrial Automation, Medical, Transportation, Communication, Military, Avionics, Datacom, Instrumentation
	flexilink	-	Industrial Automation, Transportation
	VarPol	-	Industrial Automation, Medical, Transportation, Instrumentation
	PC/104 PC/104-Plus		Industrial Automation, Medical, Transportation, Communication, Military, Instrumentation
	TCA		Communication, Datacom
	hm2.0	IEC 61076-4-101 	Backplane: Industrial Automation, Medical, Transportation, Communication, Military, Avionics, Datacom, Instrumentation
	Velox	VITA46 	Transportation, Military, Avionics
	Power Terminals	-	Industrial Automation, Medical, Transportation, Instrumentation

Product Group	Specification	Pitch (mm)	Mating Configuration					Termination			Application	
												
	Colibri COM Express®	0.5	✓					✓			✓ 10 Gbit/s	
	One27 -	1.27	✓	✓	✓			✓	✓			
	DIN41612 IEC 60603-2 VMEbus Technology	2.54 / 5.08	✓	✓	✓			✓	✓	✓ 1.5 A bis 15 A		
	flexilink -	2 / 2.54	✓		✓				✓	✓ 11 A		
	VarPol -	2 / 2.54	✓	✓					✓	✓ 1.9 A		
	PC/104 PC/104-Plus PC/104	2 / 2.54	✓						✓	✓ 1.7 A bis 1.9 A		
	TCA ATCA® μTCA®	0.75 / 3		✓		✓			✓	✓ 12 A bis 16 A 12.5 Gbit/s		
	hm2.0 IEC 61076-4-101 CompactPCI®	2		✓					✓	✓ bis 3 Gbit/s		
	Velox VITA46 VPX™	1.8		✓					✓	✓ 10 Gbit/s		
	Power Terminals -	5.08						✓	✓	✓ 15 A bis 45 A		



Mating Configuration

-  Parallel
-  Perpendicular
-  Horizontal
-  Card Edge
-  Cable

Anschluss-technik

-  SMT
-  Press-fit
-  Through-Hole

Anwendungen

-  Power
-  High Speed

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One 27® 1.27 mm SMT for Board-to-Board	30
DIN 41612 / IEC 60603-2 High Variety - Reliable - Well-proven	56
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flexilink jumper Reliable Connector for LED and more	170
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Welcome to ept



Claus Guglhör Associate
Bernhard Guglhör Associate
Founder of ept
Thomas Guglhör Associate

As the owners and Managing Directors of ept, we are pleased to welcome you to ept.

ept designs, produces and distributes electronic connectors for high-quality applications. Founded by Bernhard Guglhör over 40 years ago, we have managed to remain an independent and fully family owned company. Today, we employ over 950 people at six locations worldwide.

Over decades we build trusting and successful partnerships with our customers, who take the center stage of our actions. Our products and competences are used in high-level applications, such as

- Industrial Automation
- Medical Technology
- Instrumentation
- Aerospace and Transportation
- Telecom / Datacom
- and Automotive Electronics.

With our device „Precision with Passion“ ept stands for highest quality and absolute reliability under a personal and individual touch of dedicated employees.

We cordially invite you to visit us at ept.

Precision with Passion

Our customers value ept as a leading provider in the field of electrical connection technology. With creative product ideas and superior production technologies we result efficient solutions that boast an outstanding price-performance ratio.

More than 40 years of precision

The unwavering precision and consummate reliability of our products and services fulfill your every requirement regarding quality, functionality, quantity, and delivery dates, all while providing an outstanding ratio of price to performance.

As a family owned and operated company with more than 40 years of successful history, we build long-term relationships based on trust with our customers and business partners.

All services under one roof

ept has distinctive, highly specialized knowledge at its fingertips, knowledge

that not only sets standards in research and development, but also comes into play when providing our customers with comprehensive and competent consultation for various applications.

We offer you a full range of services from a single source: Product development, design, equipment manufacture, production, delivery, and comprehensive support services. We develop and produce our products and services in accordance with the state of the art.

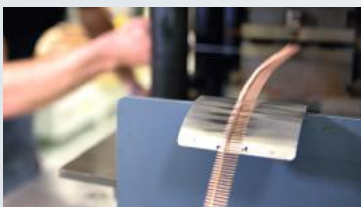
Advantages through standardization

ept is an active member of various industrial associations, including VITA, PICMG and PC/104, which work together to develop specifications for high-performance electronics applications. The goal of standardization is to make it easy to combine and exchange different components from different manufacturers.

Certified and environmentally conscious

ept is certified in line with ISO/TS 16949 and ISO 9001. We employ Advanced Product Quality Planning as a project management method when developing products, production processes, and customer-specific projects.

We protect our environment by making economical use of natural resources. That is why we adhere to the standards of DIN EN ISO 14001 and have introduced a comprehensive environmental management system.



International Presence - the ept Locations

ept's roots are located in the scenic landscape of southern Bavaria and from there ept has set out to become an international company. With production locations and sales offices in several countries as well as competent partners

all over the world, ept is able to offer its connectors and solutions worldwide.

ept – your global partner



For your local contact please refer to www.ept.de/localcontact

Peak Performance

ept offers everything you need in a connector: from idea to finished product. For standard products, we're your efficient, reliable supplier. And for product and process development, we're your innovative, trustworthy partner. Let our expertise play an integral part in your production value chain.

In its annual customer satisfaction survey, the market research firm Bishop & Associates has repeatedly confirmed ept's outstanding performance in recent years. In past surveys of over 500 European users of connectors, ept consistently ranked among the top four out of 40 producers of connectors.

In particular, ept received outstanding ratings and more than a few perfect scores in the following categories:

- highest product quality
- consistent adherence to delivery dates
- short delivery times
- outstanding price-performance ratio
- best technical support through-out the duration of the project
- excellent customer service
- short response times

The outstanding results can largely be attributed to ept's high depth of production, which enables us to act with the highest possible degree of flexibility. With a high level of industry experience, far-reaching technical knowledge, operational readiness, and last but not least the 'personal touch' of our employees, ept is one of the world's leading manufacturers of connectors.



Areas of Application



Industrial Automation



Energy Technologies



Measuring Technology



Transportation



Medical



Aerospace

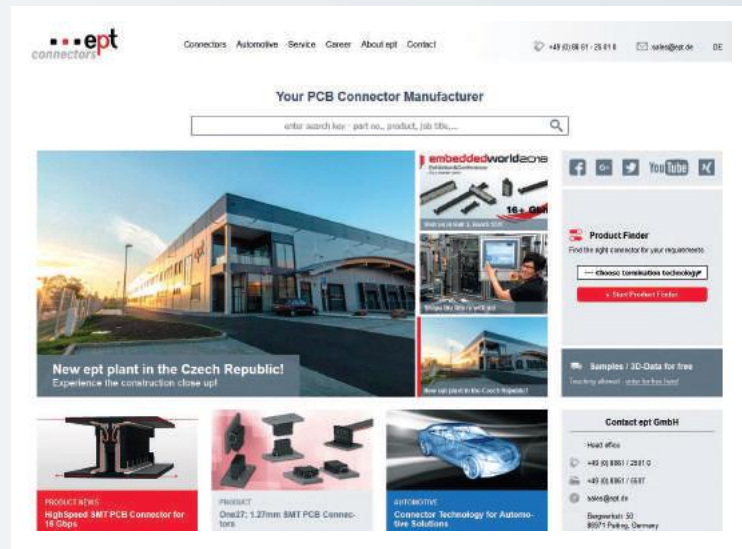
ept connectors are employed in a myriad of high-end applications. For many years, ept has proved its worth as a reliable supplier and partner. Because it has a high depth of production, ept is able to make products available for an extremely long time, so that we can offer components of the highest quality to our customers throughout the entire lifecycle of a product.

Our high production depth also enables us to offer a broad range of possibilities for developing modifications and derivatives of existing products for use in special applications. This puts us in an ideal position to meet specific requirements and exert an optimal influence on special developments.

3D-Data and Search Function at www.ept.de

On our recently redesigned website, **www.ept.de**, we offer a broad range of information, downloads, and interactive search functions for our connectors:

- component data that can be downloaded in 3D format (IGES, STEP) and 2D format (PDF)
- a product finder for choosing connectors based on your individual requirements
- ordering of free product samples
- technical information, recommendations for processing
- drawings of individual products in PDF format



Product Samples

You can receive product samples from ept quickly, easily, and free of charge, either by making a quick and easy selection at www.ept.de, or by contacting us directly and discussing your needs with us personally, especially if you have specific requirements, such as modifications. For detailed discussion and individual consultation, you can speak to our sales representative in your area, our service staff in Peiting, our local business partner or retailer as well as selected catalog distributors.

We are standing by to advise you!



Good to know - General Terms


Air gap / Clearance

The shortest distance between current carrying conductors in the air.

Capacity between two adjacent contacts

The value of the capacity with two electrical conductors which are isolated by a dielectric (insulating insert).

CE marking

 Electronic components such as connectors cannot be marked with the CE mark. This is defined in the guidelines of the European Commission for the low-voltage and EMC directive.

Connection methods. Process for connecting electromechanical components through press-fit, solder, crimp, IDC and wire wrap connections.

Press-fit connection according to EN 60352-5 Surface contacting SMT



The press-fit connection is implemented by pressing a flexible or solid (rigid) pin into the metalized hole of a printed circuit board. Gas-tight zones are created at the contact points between the press-fit pin and hole wall (see page 14).



SMT stands for "surface-mounted technology". Alternatively, SMD stands for "surface-mounted device". Connectors are soldered directly onto a printed circuit board using solderable contact surfaces.

Crimp connection

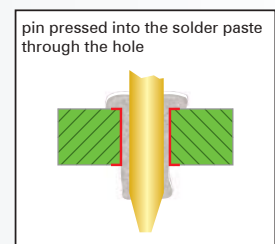
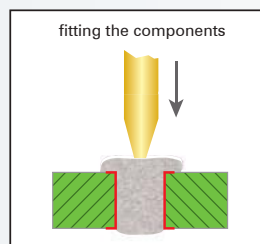
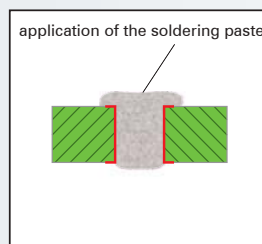


Crimping means that a permanent, solderless, electrical connection is created. The connection area of the contact element is deformed using a crimping tool, thus a permanent, gas-tight connection with the conductor is established.

Soldered through connection THT



(Through Hole Technology). The printed circuit board features metalized drill holes into which the connector can be inserted. Contacting of the connectors can be implemented by means of wave, reflow or manual soldering. The reflow variant is also named Pin-in-Paste, THR or THTR.



Picture refers to „Soldered through connection THTR“

IDC



Using a special tool, the cable cores and their insulation are pressed into cutting clamps. The insulation of the core is cut open and an electro-conductive connection is created.

Wire wrap



Rigid single-core lines are mechanically wrapped around a sharp-edged pin. The high contact pressure at the pin edges results in oxide-free, gas-tight contact points by means of cold welding.



Contact resistance

In accordance with EN 60352-3 + 60352-5: The electrical resistance in a plugged-in contact pair measured via the connection points under specified measuring conditions.

The contact resistance is the sum of the contact resistance (male + female) and the specific electrical resistance of the material used in the male and female connector.

Creepage distance

The shortest distance between two current carrying conductors on the surface of the insulator.

Durability

The durability of connectors is the number of mating cycles which result in a maximum increase of the contact resistance (e.g. due to abrasion of the contact surface).

Electromagnetic interferences

Undesired electromagnetic interferences in the connecting cables or in the environment of connectors is prevented by means of shielding.

Engaging and separating force

The force required to mate or un-mate a connector. For geometrical reasons, the engaging force is usually slightly higher (approx. 10–20 %) than the separating force.

The equation for the separating force of a connector is as follows:

$$\text{Separating force} = n \times F \times \mu \text{ [N]}$$

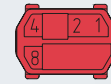
n = Number of friction surfaces
 F = Contact force
 μ = Friction coefficient

Since the friction coefficient usually has wider tolerances (e.g. greased or dry contact surfaces), very different engaging or separating forces are possible, especially when multi-position connectors are used. Only maximum values must be considered when designing devices.

Insulation resistance

Resistance of the insulation between two conductive parts. Insulation capacity of a material that isolates two adjacent contacts or a contact to ground as highly resistive as possible. Measuring and test procedure according to DIN EN 60512-3-1.

Keying



Arrangement where similar connectors are equipped differently to prevent that the wrong connector is used. This prevents, e.g., that the wrong modules are plugged into the backplane.

Lead-free with ept

We confirm that our products are RoHS compliant and that the following materials are not contained in our products in concentrations above the ones stipulated.

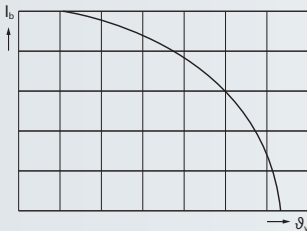
- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chrome (Cr VI)
- Polybromated biphenyl (PBB)
- Polybromated diphenyl ether

Leakage current

Current that flows between two current carrying connectors via the surface of an insulating insert, especially if it is polluted with conductive deposits (dust, humidity).

Operating temperature range

The temperature range which a component can be operated with without permanently changing the technical specifications. If the component is operated at temperatures outside of the temperature range, the specifications might not be fulfilled during this period. The maximum operating temperature is also dependent on the electric current, which can be determined using the following derating diagram:



Operational current

The current limit is the maximum permissible current at which the device can operate continuously without thermal overload.

Maximum permissible continuous current I_b that can flow through a connector contact pair. The thermal load capacity θ_p of the materials used limits the permissible current carrying capacity for the contact elements and their terminals as well as the insulating parts. This results in a dependency on the ambient temperature θ_v and selfheating $\Delta \theta$. The measuring procedure for the current carrying capacity is defined

in IEC 60512-5-2. With this measuring procedure, the temperature at the measuring point θ_v (e.g. the hottest point) of the component and the temperature in the immediate environment θ_v is measured at different currents I .

Operational voltage

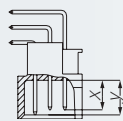
The defined voltage which is applied to the device/contacts in long term operation. The operational voltage is dependant on the creepage and clearance, the isolation's CTI value, the level of contamination and the overvoltage category of the target application.

Pitch



Uniform distance between the individual contact points of the connector on the printed circuit board.

Pre- and late-mating contact



Pre- and late-mating contacts are used for safety reasons or hot swap functionality. In this case defined contacts are mating earlier or unmate later during the mating process of the connector.

Press-fit pin



In the press-fit technology, this pin is required to create solder-free electrical connections. A press-fit pin is pressed into the metalized hole (through connection) of a printed circuit board. The main feature is the fact that the cross-section of the pin has a larger diameter than the hole in the printed circuit board.

REACH

European chemicals directive for the Registration, Evaluation, Authorization and Restriction of Chemicals.

Reflow soldering

Reflow soldering is often used in electrical engineering to solder SMD components. It involves applying a solder paste to a circuit board using a paste printer. The components are then put in place. The paste is warmed in a reflow oven and a connection is created between the contacts and the circuit board.

RoHS



(Restriction of the use of certain Hazardous Substances) is the directive for restricting the use of certain hazardous substances in electrical and electronic equipment.

Spring contact



Flexible contact element of a female connector, connects with the rigid blade contacts of male connectors. An advantage offers the electromechanical contact where two separate contact points ensure the electrical connection, e.g. a spring contact with two opposite contact spring elements.

WEEE

(Waste from Electrical and Electronic Equipment) defines how waste electrical and electronic equipment is to be scrapped and recycled.

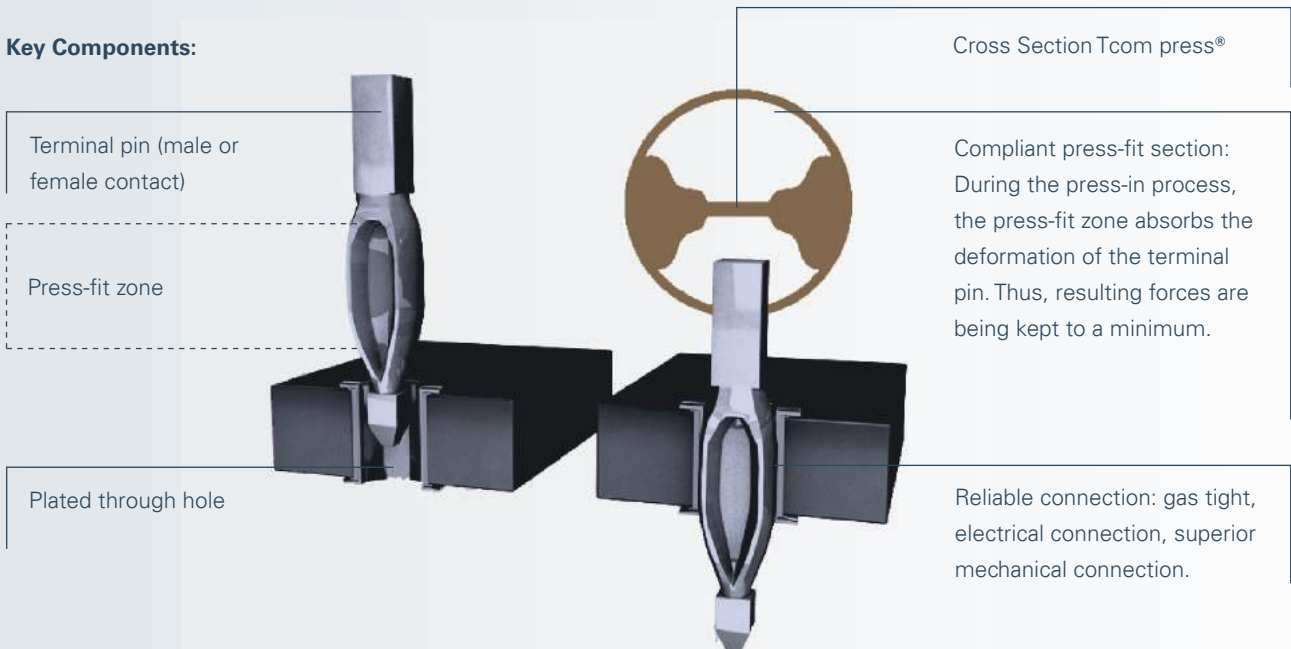
Press-fit Technology from one Source

Press-fit technology has evolved over three decades to what it is today: a widely recognized, solderless connection between electrical contacts and plated through holes of a PCB, applied in various applications. With ept as partner in your press-fit technology project, you can count on

broad knowledge and highest experience, especially in the subareas of **press-fit zone** and **processing equipment**. The subareas of **application** and **PCB** are covered with more than 25 years of experience and Know-How thru numerous project in many different industries such as

automotive, industrial, telecom, medical, military and others. Our professional project management with committed and experienced employees will lead your press-fit project to a success, as we have proven for the benefit of many customers.

Key Components:



For press-fit connectors, ept offers suitable **processing machines** and **tools for processing**. These are used to mount press-fit connectors on circuit boards by means of a pressing operation – without additional steps. In ept you have a supplier who offers you a full spectrum of press-fit solutions, from knowledgeable consultation to functional processing.



Our processing machines for press-fit technology can be found on page 362.

One-Stop-Supplier for Customer Specific Connectors

With its exceptional experienced employees, in-house tool-shop and high vertical integration of manufacturing processes, ept is the perfect partner for customer specific connector solutions. Over the last 40 years, ept has proven to successfully develop and manufacture customized connectors in a variety of designs in different applications.

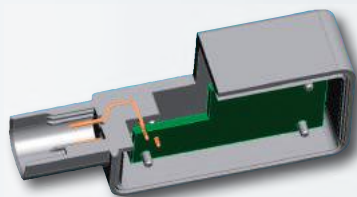
You benefit from

- cost efficiency in product design and production processes
- fulfillment of the highest quality standards for tools and components
- knowledgeable consultation
- unparalleled flexibility and rapid response times due to high depth of production
- professional product management with more than 40 years of experience

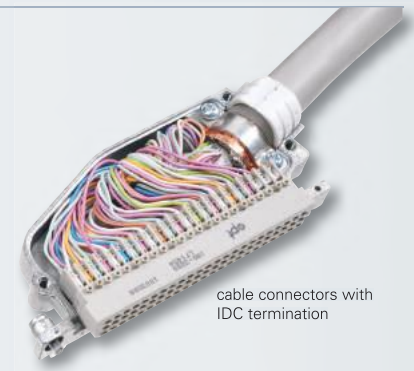
Share your applications or connector ideas with us. We are happy to analyze your concept and provide you with a feasibility study and an initial cost estimation.



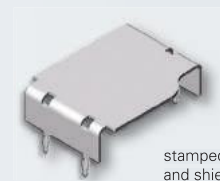
Male- & Female connectors in Press-fit, SMT, THR termination



overmolded & potted connectors



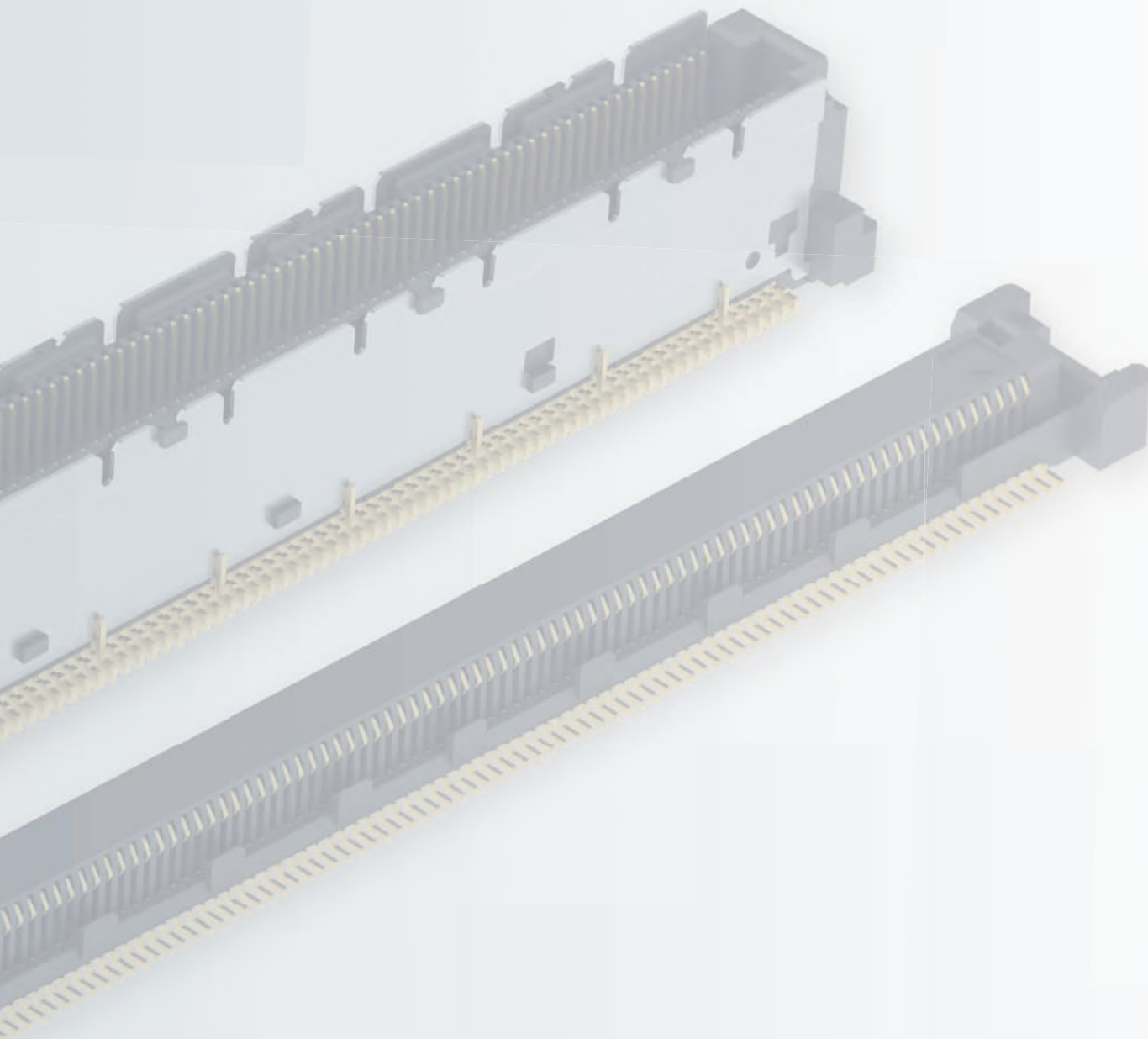
cable connectors with IDC termination



stamped terminal pins, sockets and shields



0.5 mm SMT for 10+ Gbit/s Applications



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Colibri Receptacle (Female Connector / COM Module)	24
Colibri Plug (Male Connector) additional pin counts	26
Colibri Receptacle (Female Connector) additional pin counts	28

Colibri – 0.5 mm SMT for 10+ Gbit/s Applications

Connectors for COM Express®

ept's Colibri connector is a shielded, 2-row, SMT interconnect system in 0.5 mm pitch.

It is designed to meet the requirements according to specifications not only of PICMG COM Express®, but also of SFF-SIG Core Express® and nano-ETXexpress and can be used in high-speed applications with 10 Gbit/s and more. Furthermore Colibri® products are compatible with all common connectors available on the market and have been tested extensively.

The connector system is available with 8 mm and 5 mm stacking heights plus 40 - 440 pins. Colibri® connectors are packaged in „Tape and Reel“ to allow fully automated processing.

Additional versions with flexible pin count as well as multiple stacking heights are available on request.

Key Features:

- for applications with 10+ Gbit/s
- meets the requirements of PICMG COM Express® and SFF-SIG CoreExpress®
- intermatability with available connectors in the market
- robust connector design
- integrated Pick & Place area
- packed in Tape & Reel

Applications:

- COM Express®
- CoreExpress®
- mezzanin board-to-board

Termination



SMT

Mating configuration



Parallel
5 or 8 mm

Application





High Speed



High Density

Overview

Type		Number of pins	Board type	Mating connector	Page reference
	Colibri Plug	40 / 80 / 120 / 160 / 200 / 220 / 440	COM Express® Base Board	Colibri Receptacle	22 26
	Colibri Receptacle	40 / 80 / 120 / 160 / 200 / 220 / 440	COM Express® COM Module	Colibri Plug	24 28

Watch the new Colibri movie:

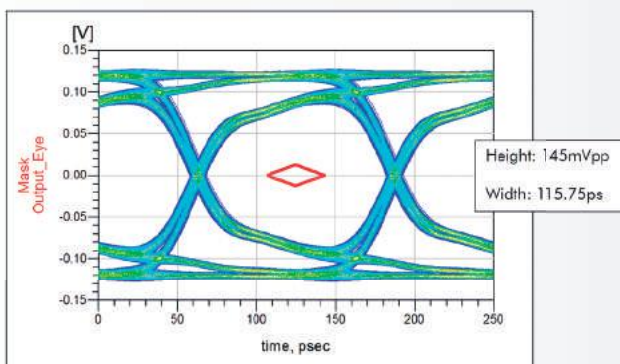


<https://youtu.be/rBry52V774Y>

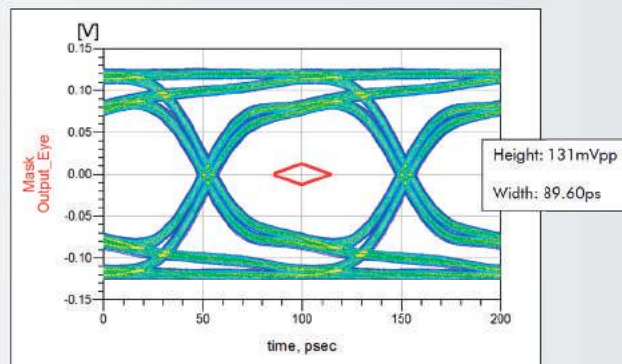
Your Com Express® Application needs more Speed? Colibri Connectors manage 10 Gbit/s and more!

Colibri® connectors are specially designed for High Speed applications. Looking at the eye diagrams below, you can see that the connectors still show a very high signal quality at 10 Gbit/s compared to 8 Gbit/s. They are therefore highly suitable for High Speed applications with 10 Gbit/s and more.

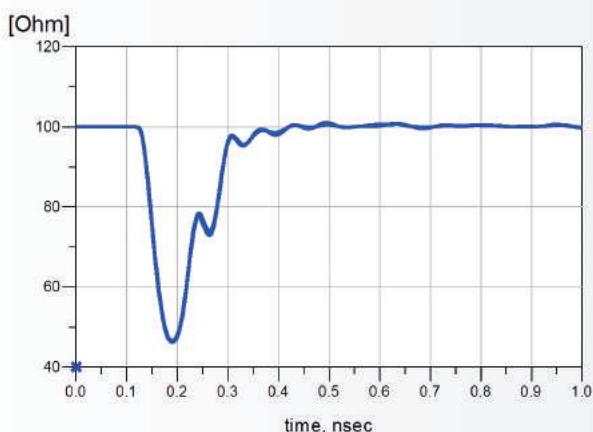
8 Gbit/s, 2x50mm PCB trace length, 100Ω impedance, simulated according to PCIe Gen 3



10 Gbit/s, 2x50mm PCB trace length, 100Ω impedance, simulated according to 10GBase-KR



Differential Impedance of a Colibri Connector Set



A differential signal was inserted into the plug side of the connector with a 25ps rise time.

A detailed report about the simulation with 10 Gbit/s as well as S-parameters for the simulation of your own design are available on request.

COM Express®

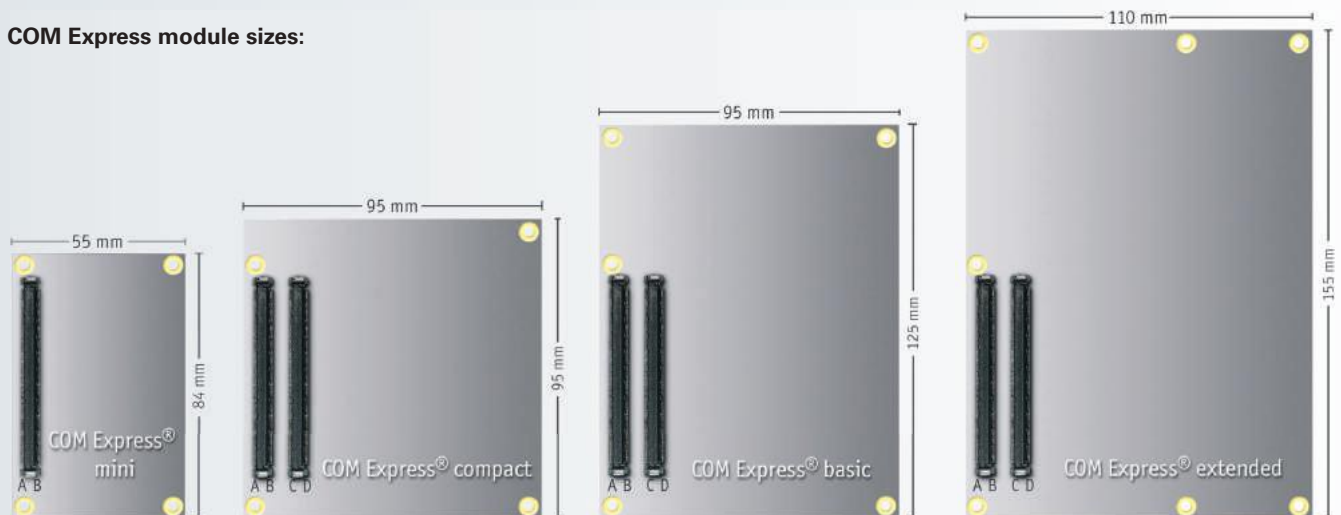
COM Express®, a computer-on-module (COM) form factor, was developed and is maintained by PICMG (PCI Industrial Computer Manufacturers Group). The standard defines not only the physical dimensions and placement of the module on the carrier board, but also the connectors used to plug the COM with the carrier board. COM Express modules integrate the core functionalities of a bootable PC, such as

CPU, RAM and standard interfaces on a module that is plugged by either one or two connectors on an individually designed carrier board. ept's Colibri connectors are specified in the latest release of the PICMG Design Guide for COM Express.

The ability to plug a COM Express module onto a carrier board reduces time and cost to develop a product, as

the user does not need to understand the often complex details associated with high speed signaling or the latest chip sets. Furthermore, product lifetime can be increased, as newer COM Express modules can simply be plugged onto the carrier board to improve performance.

COM Express module sizes:

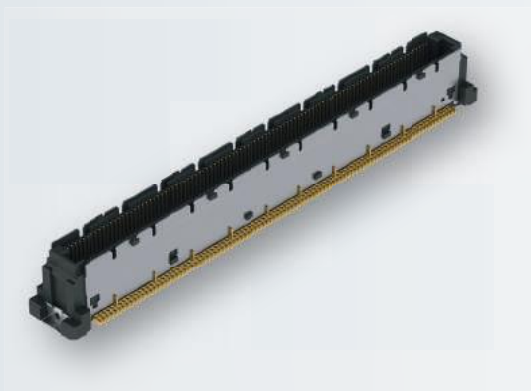


Typical applications:

- Industrial Automation
- POS-systems
- Medical
- Instrumentation
- Consumer electronics & Gaming
- Transportation
- Building Technology

Technical Specifications

Colibri® for COM Express®		
Technical Specification	Testing Standard	0.5 mm SMT Board-to-Board connector system
Basics		
Specification		PICMG COM.0
Number of pins		40 / 80 / 120 / 160 / 200 / 220 / 440
Termination		SMT
Operating temperature range		-40°C to +125°C
Material		
Insulator material		LCP
Contact material		Copper alloy
Contact surface		Au over Ni
Mechanical		
Pitch		0.5 mm
Mating force per pin		max. 0.9 N
Separating force per pin		min. 0.1 N
Durability	IEC 60512-9-1:2010	30 mating cycles
Coplanarity		max. 0.1 mm
Electrical		
Operational current	IEC 60512-5-2:2002	max. 0.5 A
Operating voltage		50 VAC
Contact resistance	IEC 60512-2-1:2002	max. 75 mΩ
Insulation resistance	IEC 60512-3-1:2002	> 100 MΩ
Test voltage	IEC 60512-4-1:2003	200 VAC
Data transfer rate		10 Gbit/s
Processing		
Soldering temperature		260°C according to J-STD-020
MSL		1
Packaging		Tape and Reel or Tray
Assembly		Pick and place
Approval		
UL file		E130314
Environment		RoHS compliant



Type: Plug (Base Board)

Number of pins: 220, 440

Pitch: 0.5 mm

Data transfer rate: 10 Gbit/s

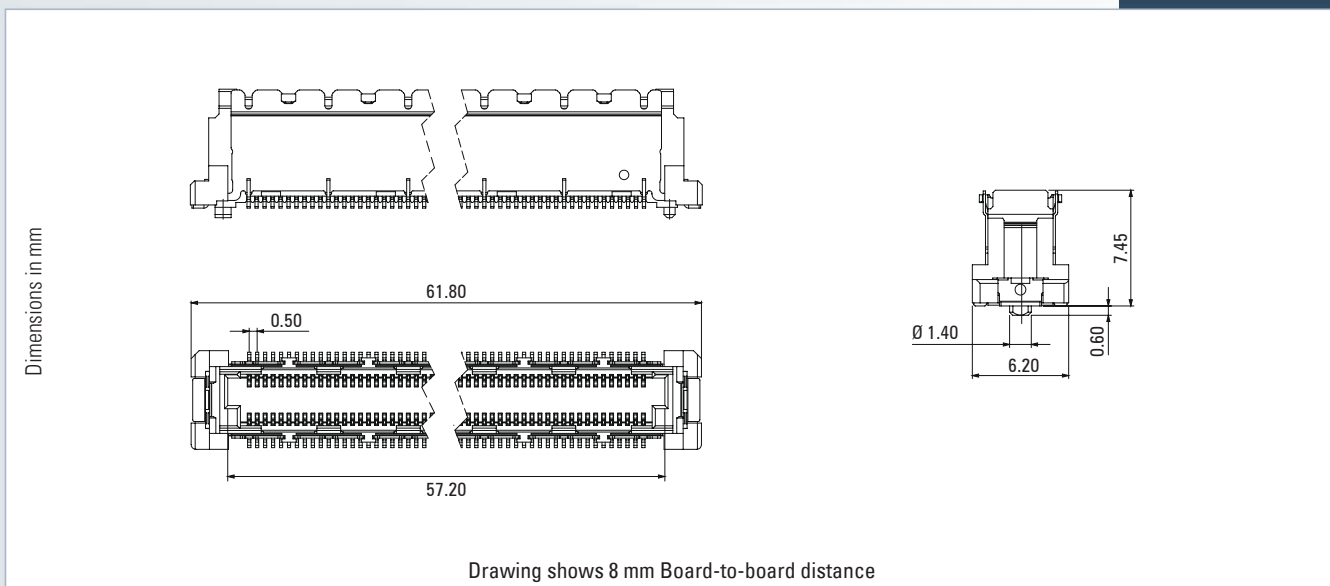
Packaging: Tape & Reel, Tray

Standards: PICMG COM.0



Technical Specification on page 21

For drawings and technical data visit www.ept.de



Note

All Colibri connectors also available with heavy gold plating (see ordering note on p. 23)

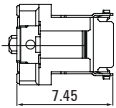
Mating connector / Application:



Colibri Receptacle (p. 24)



8 mm board-to-board distance . . .

	Colibri [®] Plug			
				
	Packaging			
	Tape & Reel		Tray	
Number of pins	Part number	PU	Part number	PU
220	401-55101-51	600	401-55101-51VP1	336
440	401-55501-51	240	401-55501-51VP1	168

Ordering note


All pin numbers are also available with heavy gold plating; therefore please use the ending „52“ instead of 51 in the part number

On request

- other board-to-board distances
- alternative contact surface
- with pick & place cap



5 mm board-to-board distance . . .

	Colibri [®] Plug			
				
	Packaging			
	Tape & Reel		Tray	
Polzahl	Part number	PU	Part number	VPE
220	401-51101-51	875	401-51101-51VP1	336
440	401-51501-51	350	401-51501-51VP1	168



Type: Receptacle (COM Module)

Number of pins: 220, 440

Pitch: 0.5 mm

Data transfer rate: 10 Gbit/s

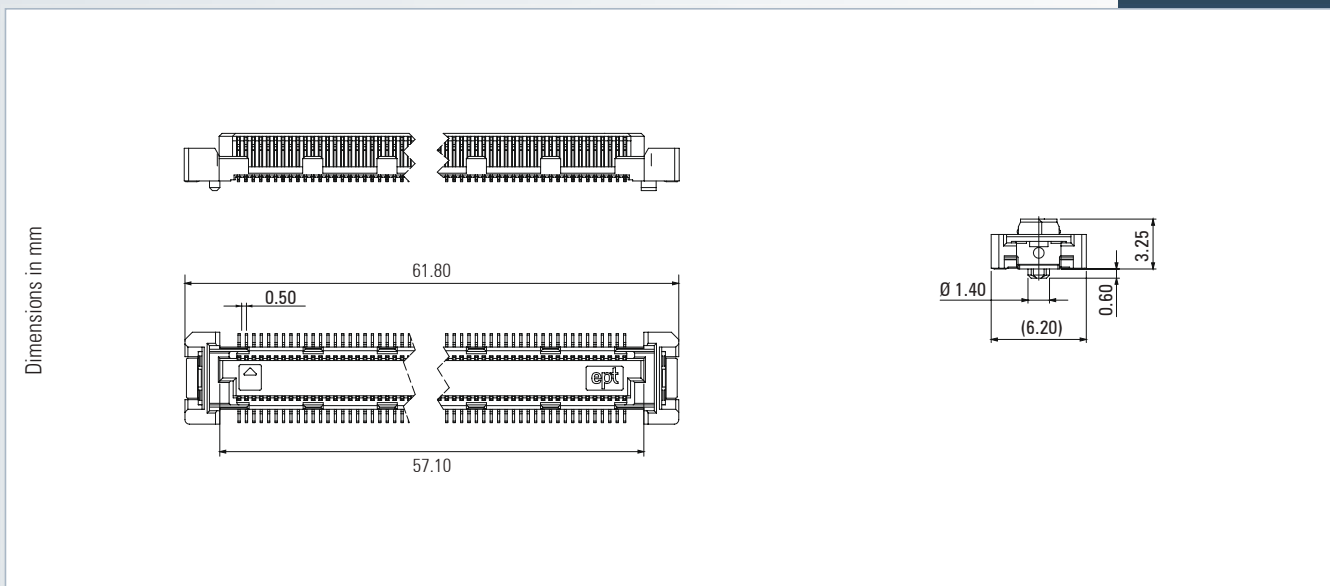
Packaging: Tape & Reel, Tray

Standards: PICMG COM.0



Technical Specification on page 21

For drawings and technical data visit www.ept.de



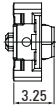
Hint

All Colibri connectors also available with heavy gold plating (see ordering note on p. 25)

Mating connector / Application:



Colibri Plug 5 mm & 8 mm (p. 22)

Colibri® Receptacle				
				
Packaging				
Tape & Reel		Tray		
Number of pins	Part number	PU	Part number	PU
220	402-51101-51	1050	402-51101-51VP1	336
440 with pick & place cap	402-51501-51	400	402-51501-51VP1	168

Ordering note

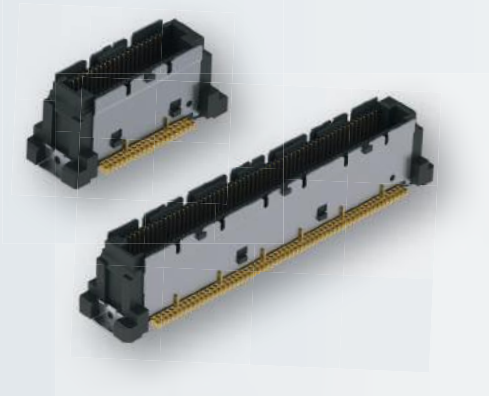
All pin numbers are also available with heavy gold plating; therefore please use the ending „52“ instead of 51 in the part number

On request

- alternative contact surface

Colibri ■ ■ ■

Plug Male Connector



Type: Plug

Number of pins: 40, 80, 120, 160, 200

Pitch: 0.5 mm

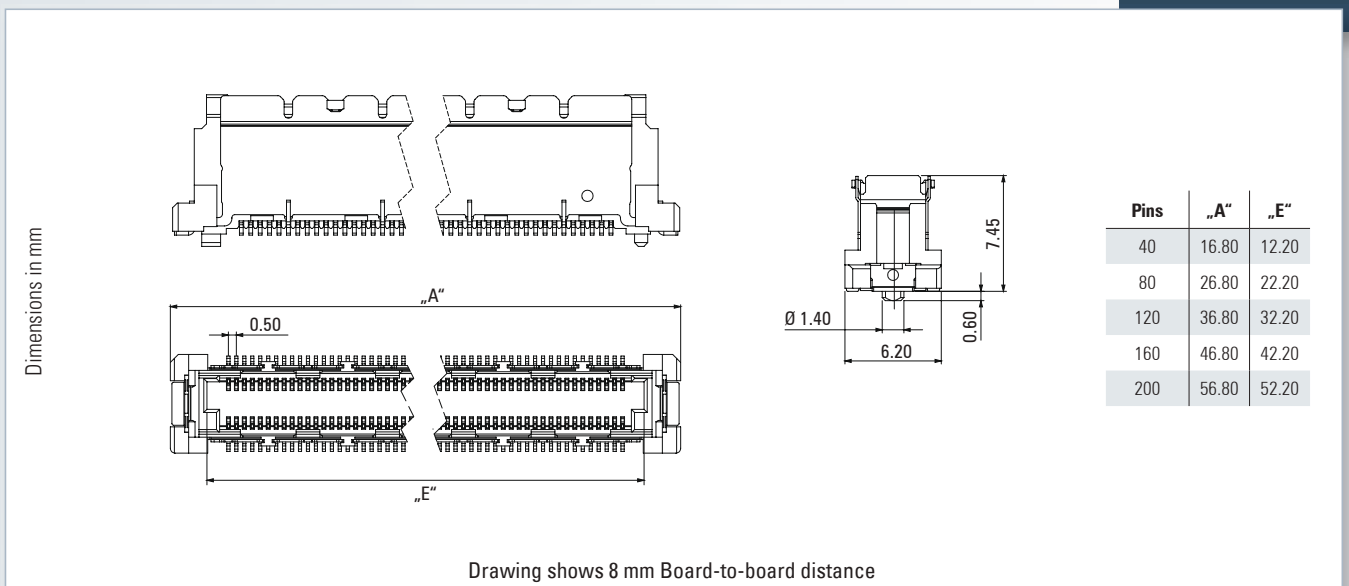
Data transfer rate: 10 Gbit/s

Packaging: Tape & Reel

Approval:  **US RoHS COMPLIANT**

Technical Specification on page 21

For drawings and technical data visit www.ept.de



Hint

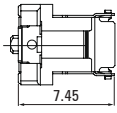
All Colibri connectors also available with heavy gold plating (see ordering note on p. 27)

Mating connector / Application:

 Colibri Receptacle (p. 28)



8 mm board-to-board distance

Colibri® Plug		
		
Number of pins	Part number	PU (Tape & Reel)
40	401-55701-51	600
80	401-55601-51	
120	401-55401-51	
160	401-55301-51	
200	401-55201-51	

Ordering note


All pin numbers are also available with heavy gold plating; therefore please use the ending „52“ instead of 51 in the part number

On request

- other board-to-board distances
- alternative contact surface
- with pick & place cap



5 mm board-to-board distance

Colibri® Plug		
		
Number of pins	Part number	PU (Tape & Reel)
40	401-51701-51	875
80	401-51601-51	
120	401-51401-51	
160	401-51301-51	
200	401-51201-51	

Receptacle Female Connector



Type: Receptacle (COM Module)

Number of pins: 40, 80, 120, 160, 200

Pitch: 0.5 mm

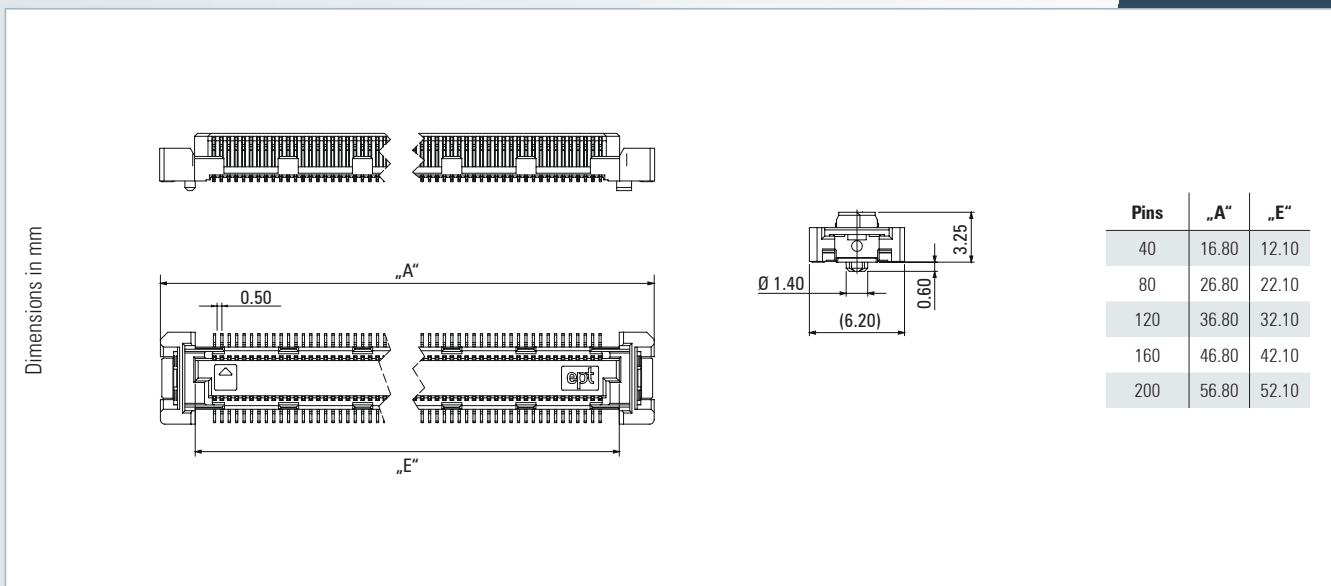
Data transfer rate: 10 Gbit/s

Packaging: Tape & Reel

Approval: 

Technical Specification on page 21

For drawings and technical data visit www.ept.de



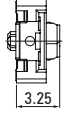
Hint

All Colibri connectors also available with heavy gold plating (see ordering note on p. 29)

Mating connector / Application:



Colibri Plug 5 mm & 8 mm (p. 26)

Colibri® Receptacle		
		
Number of pins	Part number	PU (Tape & Reel)
40	402-51701-51	1050
80	402-51601-51	
120	402-51401-51	
160	402-51301-51	
200	402-51201-51	

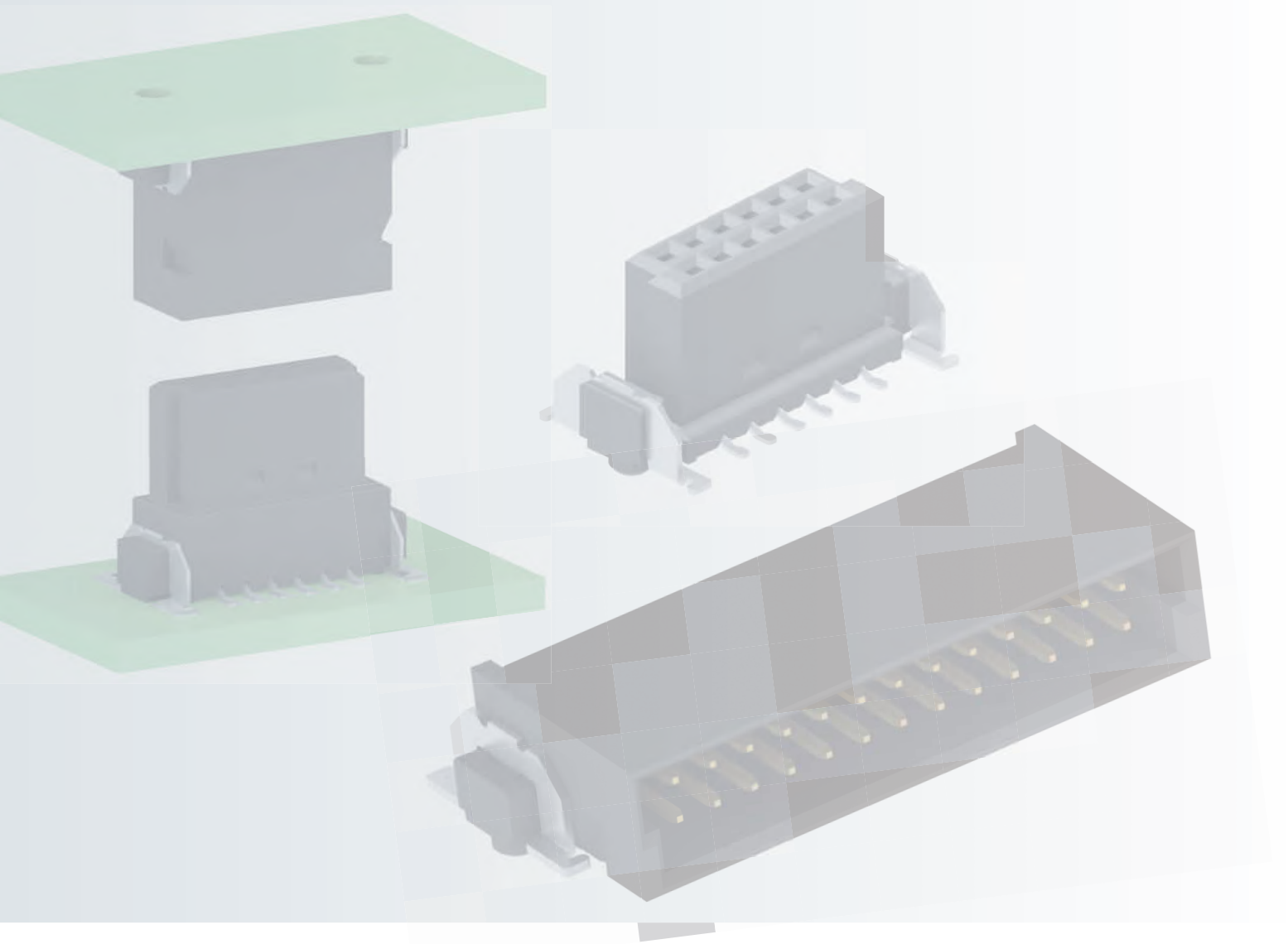
Ordering note

All pin numbers are also available with heavy gold plating; therefore please use the ending „52“ instead of 51 in the part number

On request

- alternative contact surface

One27® 1.27 mm SMT for Board-to-Board



Introduction	32
Overview	33
Your Advantages	34
PCB Distances	36
Mating Conditions	37
Technical Specification	39
Male connector low-profile	40
Male connector mid-profile	42
Male connector gewinkelt	44
Female connector low-profile	46
Female connector mid-profile	48
Female connector gewinkelt	50
Female connector IDC	52
Female IDC pre-assembled with cable	54

One27 – 1.27 mm SMT for Board-to-Board Applications

Versatile, Robust, Compact

ept's new series of One27 provides connectors that are highly flexible in design options for board-to-board applications, offering highest reliability of interconnections. The product family is based upon a pitch of 1.27 mm.

There are available many different connector types including straight and angled versions, as well as flat cable connections. The pin count ranges from 12 to 80. The One27 female IDC is available separately or pre-assembled with a cable. ept's One27 connectors are fully compatible with already available products in the market.

The design of ept's One27 connectors was focused upon a highest demand for functionality, robustness, and ease of use.

Key Features:

- 12 to 80 pins
- 1.4 A operational current
- 500 mating cycles
- reliable contact
- tested compatibility with other suppliers
- female IDC separately or pre-assembled with a cable available
- packed in Tape & Reel

Applications:

- board-to-board (mezzanine) from 8 mm up to 13.8 mm
- parallel and perpendicular connection
- IDC-connection with ribbon cable

Termination

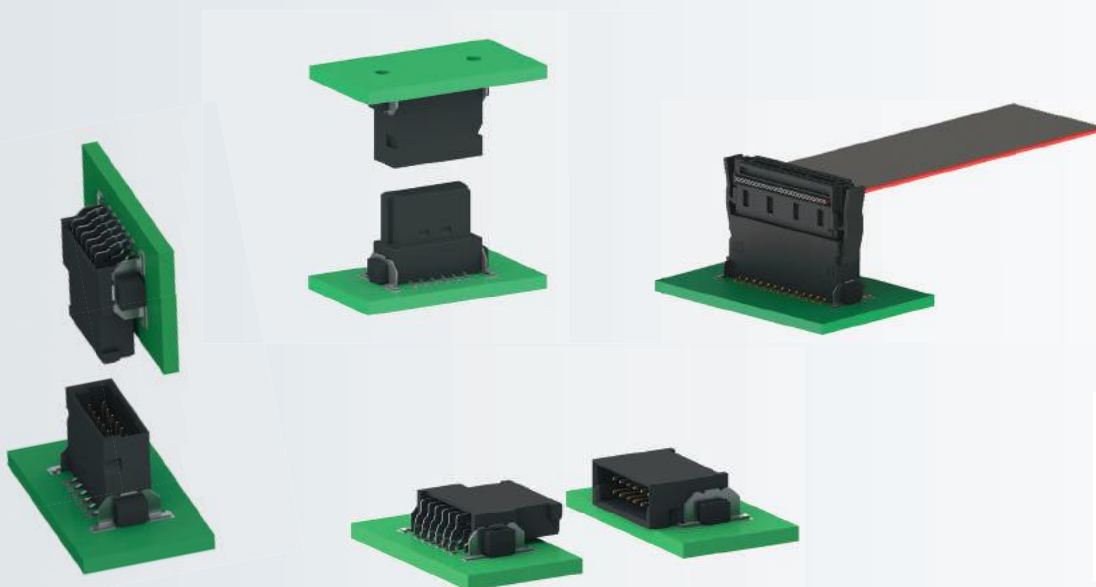


SMT

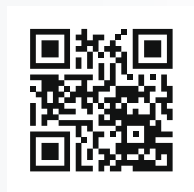
Application



High Density



Watch the new
One27 movie:

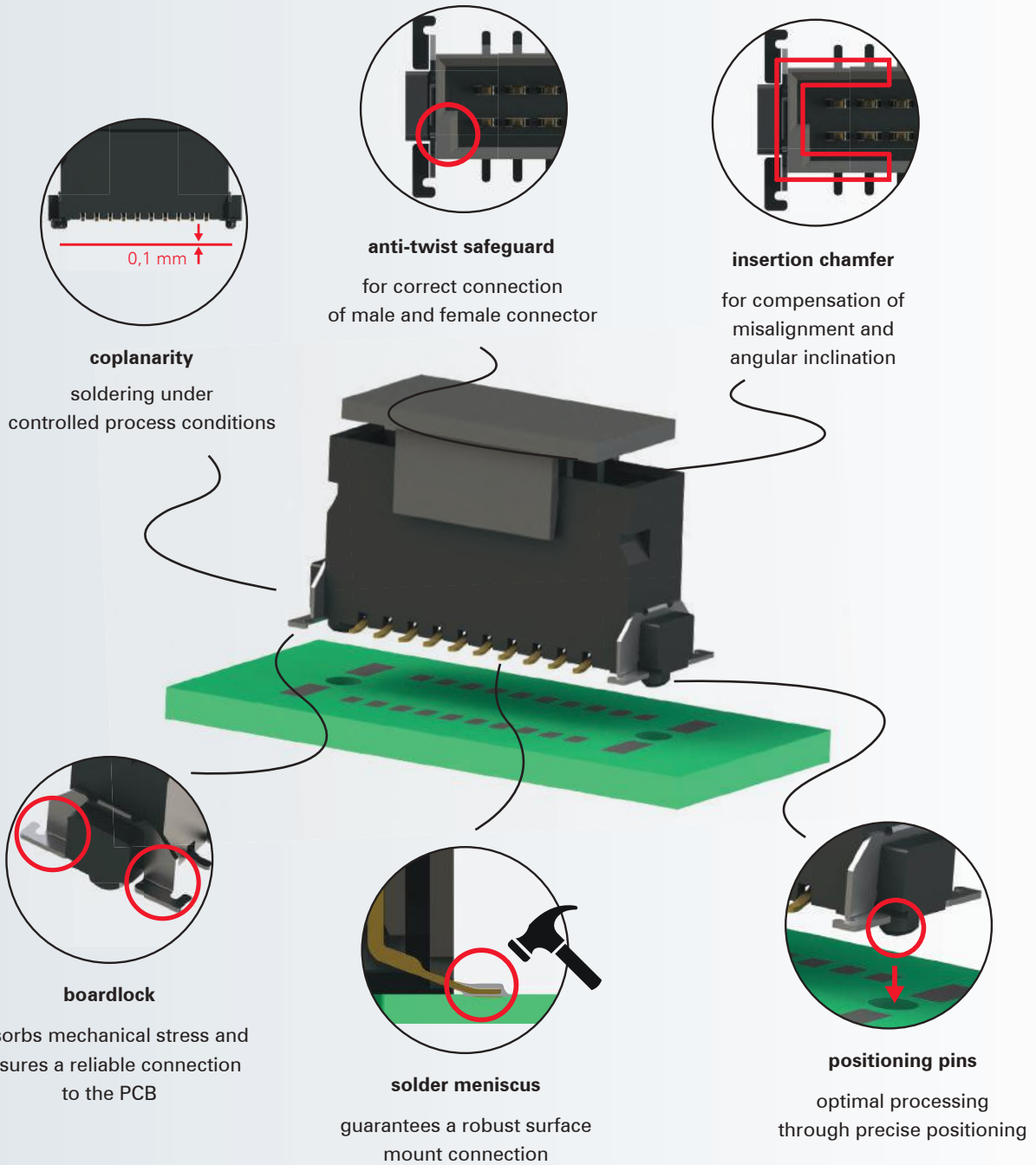


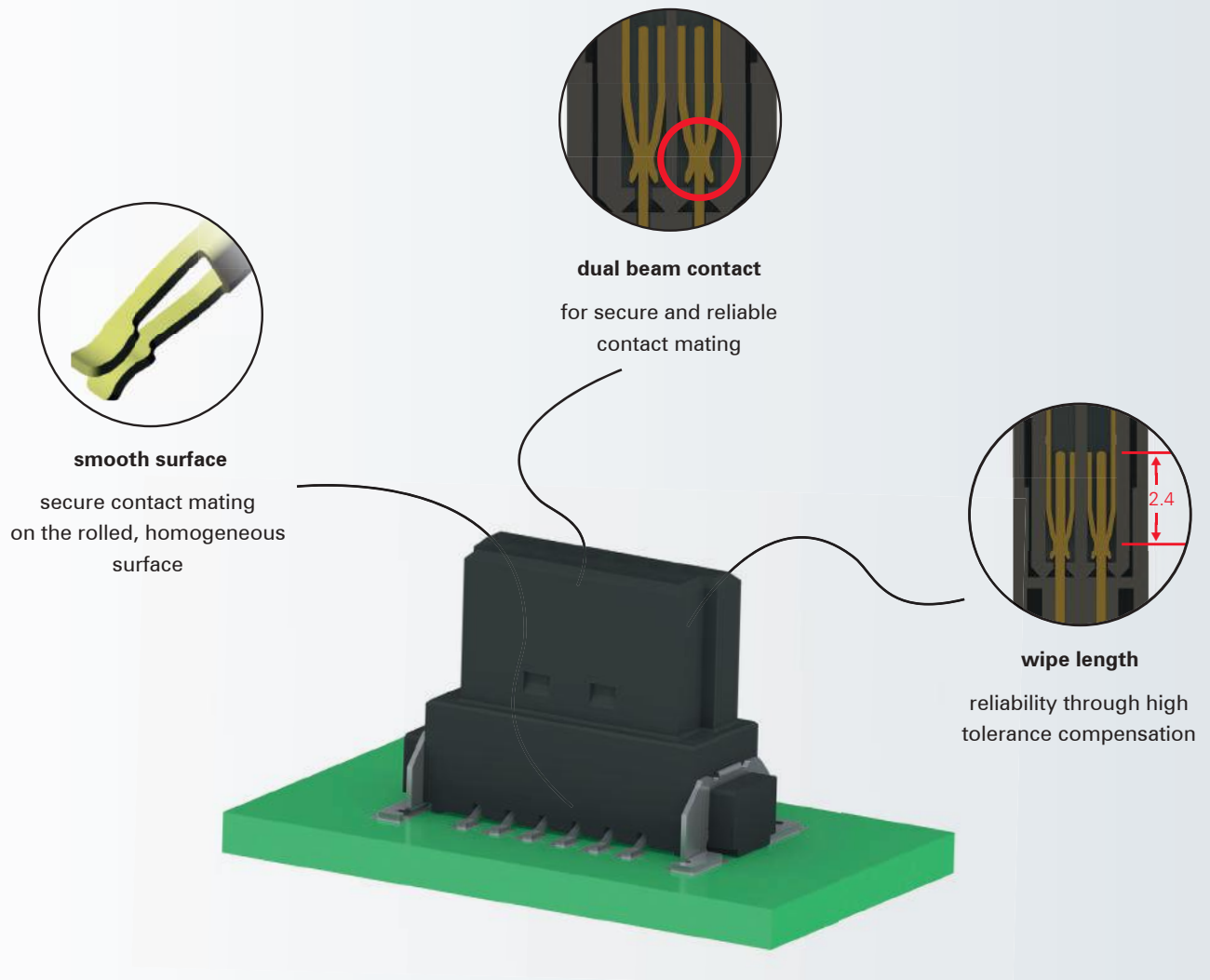
<https://youtu.be/k2i09m5eC-E>

One27 – Product Overview

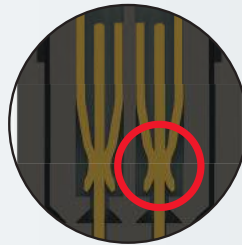
Type of One27 connector	Height	Number of pins	Mating configuration				Page
			 Parallel	 Horizontal	 Perpendicular	 Cable	
	Male low-profile 1.75 mm	12 ... 80	✓		✓	✓	40
	Male mid-profile 3.25 mm	12 ... 80	✓		✓	✓	42
	Male angled	12 ... 80		✓	✓	✓	44
	Female low-profile 6.25 mm	12 ... 80	✓		✓		46
	Female mid-profile 9.05 mm	12 ... 80	✓		✓		48
	Female angled	12 ... 80		✓	✓		50
	Female IDC	12 ... 80				✓	52
	Female IDC pre-assembled with cable	12 ... 80				✓	54

Advantages of One27

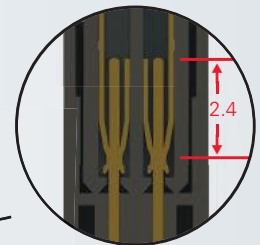




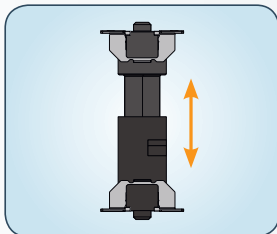
smooth surface
secure contact mating
on the rolled, homogeneous
surface



dual beam contact
for secure and reliable
contact mating



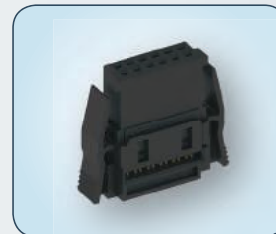
wipe length
reliability through high
tolerance compensation



Test reports prove the compatibility with other connectors available on the market

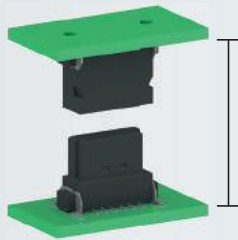


Tape & Reel packaging for automatic assembly



IDC connector available without ribbon cable for individual cable lengths

PCB Distances Board-to-Board

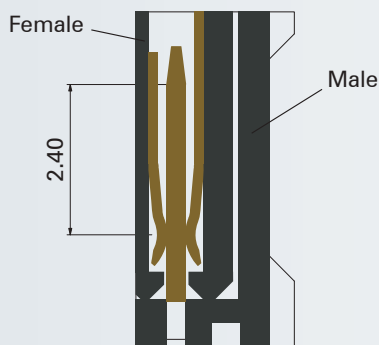


8.00 - 13.8 mm

Board-to-board distances of 8.00 mm up to 13.8 mm can be achieved using One27 connectors.

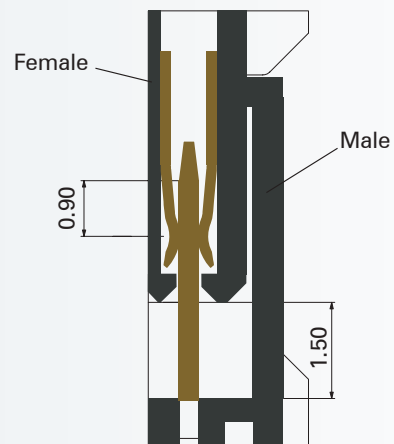
PCB distance (min. - max.)	8.00 - 9.50 mm	9.50 - 11.00 mm	10.80 - 12.30 mm	12.30 - 13.80 mm
Female connector height	low-profile 6.25 mm (see p. 46)	low-profile 6.25 mm (see p. 46)	mid-profile 9.05 mm (see p. 48)	mid-profile 9.05 mm (see p. 48)
Male connector height	low-profile 1.75 mm (see p. 40)	mid-profile 3.25 mm (see p. 42)	low-profile 1.75 mm (see p. 40)	mid-profile 3.25 mm (see p. 42)

Connection for min. PCB distance



The minimum possible board-to-board distance is achieved by plugging the connector all the way in to the stop position.

Connection for max. PCB distance

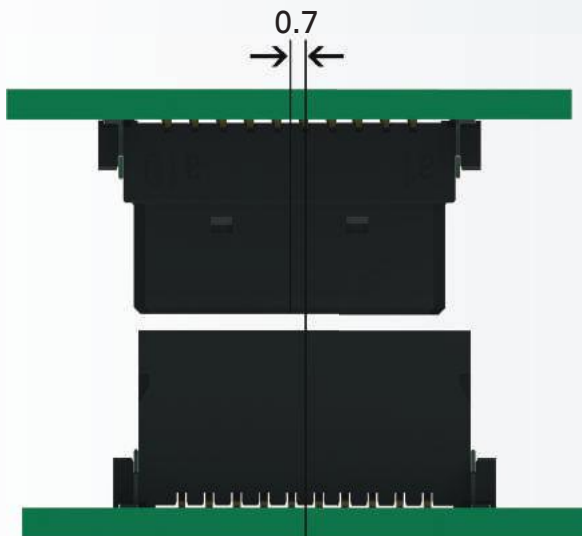


The male and female can be inserted anywhere within a range of 1.5 mm, thus allowing for the maximum possible board-to-board distance. The remaining 0.9 mm ensures secure contact mating.

Misalignment One27 Connectors

Allowed misalignment tolerances

longitudinal: ± 0.7 mm



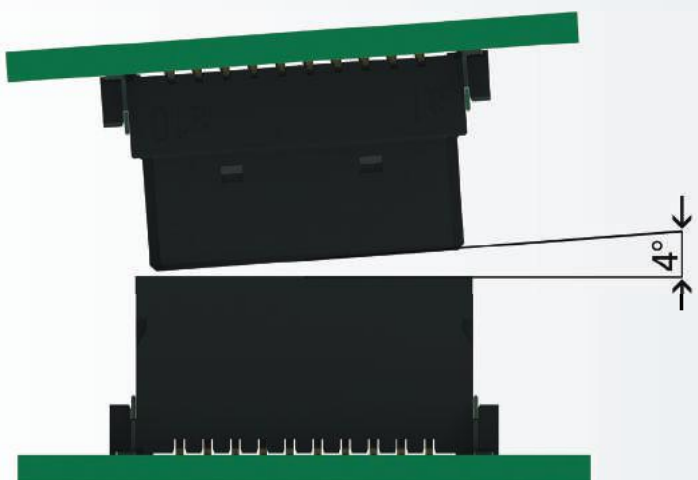
transverse: ± 0.7 mm



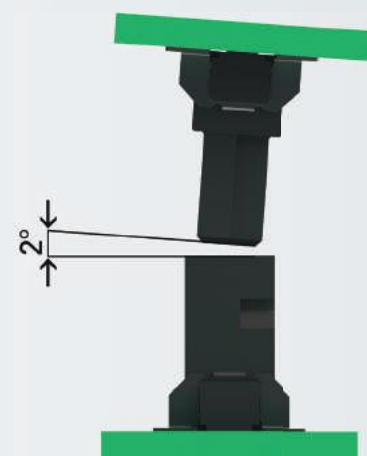
Angular Inclination One27 Connectors

Allowed angular inclination tolerances

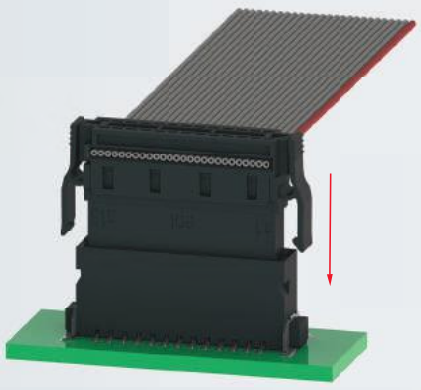
longitudinal: $\pm 4^\circ$



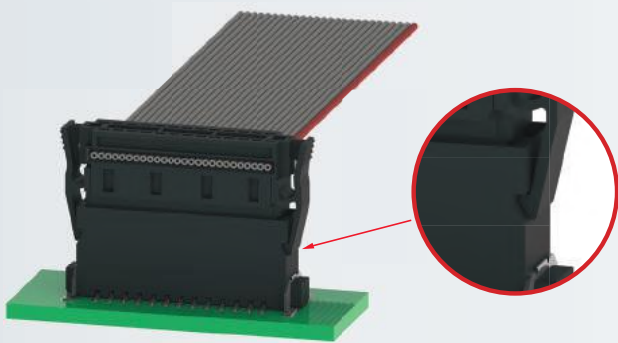
transverse: $\pm 2^\circ$



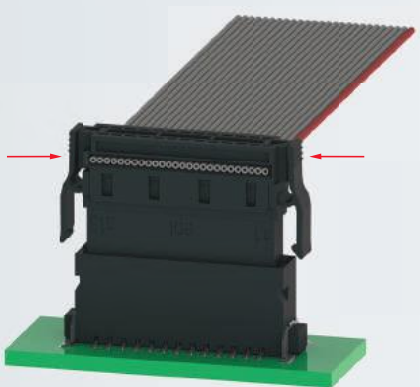
Locking of One27 IDC-Female Connector



While inserting the IDC-female connector into the male connector the snap-fits are locking automatically into the slots.



If the snap-fits are visibly locked into the slots, the connection between female and male connector is secured.



For disconnection: simply press the snap-fits together.

Technical Specification

Technical specification	One27	
	Test Standard	1.27 mm SMT Board-to-Board Connectors; IDC Cable Assembly
Basics		
Number of pins		12 / 16 / 20 / 26 / 32 / 40 / 50 / 68 / 80
Termination		SMT
Operating temperature range		-55°C to +125°C (Board-to-Board Connectors)
Material		
Insulator material		LCP
CTI value	IEC 60112	175
Contact material		Copper alloy
Contact surface		Au over PdNi over Ni / Au over NiP over Ni
Termination area		Sn
Mechanical		
Pitch		1.27 mm
Mating force per pin		0.5 N
Seperating force per pin		0.5 N
Durability	IEC 60512-9-1:2010	Performance level I: 500 mating cycles
Coplanarity		max. 0.1 mm
Vibration, sinusoidal	IEC 60512-6-4:2002	10 - 200 Hz 20 g
Contact mating problems if vibrations occur, sinusoidal	IEC 60512-2-5:2003	< 1 µs
Shock, semi-sinusoidal	IEC 60512-6-3:2002	50 g 11 ms
Contact mating problems if shocks occur, semi-sinusoidal	IEC 60512-2-5:2003	< 1 µs
Electrical		
Operational current	IEC 60512-5-2:2002	max. 1.4 A at 20°C (50 pins)
Contact resistance	IEC 60512-2-1:2002	max. 25 mΩ max. 10 mΩ (Female IDC assembled with cable)
Clearance and creepage		min. 0.4 mm
Insulation resistance	IEC 60512-3-1:2002	max. 10 GΩ
Test voltage	IEC 60512-4-1:2003	500 VAC
Processing		
Soldering temperature	JEDEC J-STD-020E	max. SMT reflow soldering temperature 20 - 40 s at 260°C
MSL	JEDEC J-STD-020E	1
Packaging		Tape and Reel, Tray (IDC female connector)
Assembly		Pick and place
Approval		
UL file		E130314
Environment		RoHS compliant



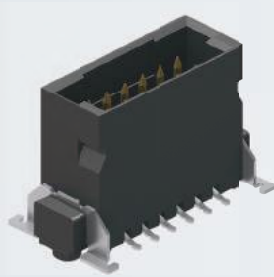
Male connector low-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	403-52012-51	280
16	403-52016-51	
20	403-52020-51	
26	403-52026-51	
32	403-52032-51	
40	403-52040-51	
50	403-52050-51	
68	403-52068-51	
80	403-52080-51	

On request

- different number of pins
- other performance level

Male connector mid-profile



Type: Male connector straight mid-profile
3.25 mm unmated

Number of pins: 12 to 80

Pitch: 1.27 mm

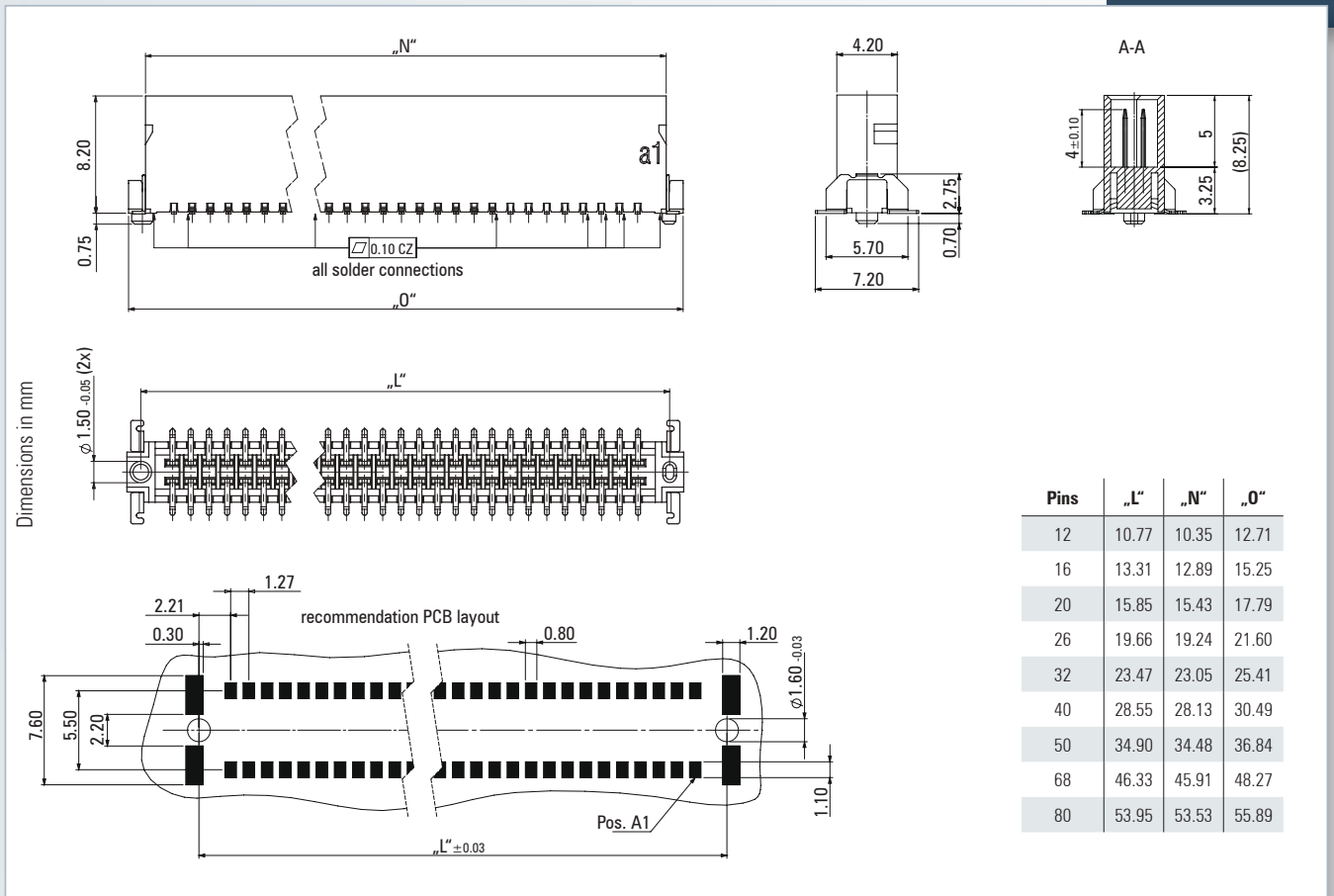
Operational current: 1.4 A at 20°C (50 pins)

Packaging: Tape & Reel




Approval:  

Technical Specification on page 39

For drawings and technical data visit www.ept.de



Mating connector / Application:

-  for parallel applications (p. 46-49)
-  for perpendicular applications (p. 50-51)
-  for applications with cable (p. 52-55)



Male connector mid-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	403-53012-51	280
16	403-53016-51	
20	403-53020-51	
26	403-53026-51	
32	403-53032-51	
40	403-53040-51	
50	403-53050-51	
68	403-53068-51	
80	403-53080-51	

On request

- different number of pins
- other performance level

Male connector angled



Type: Male connector angled

Number of pins: 12 to 80

Pitch: 1.27 mm

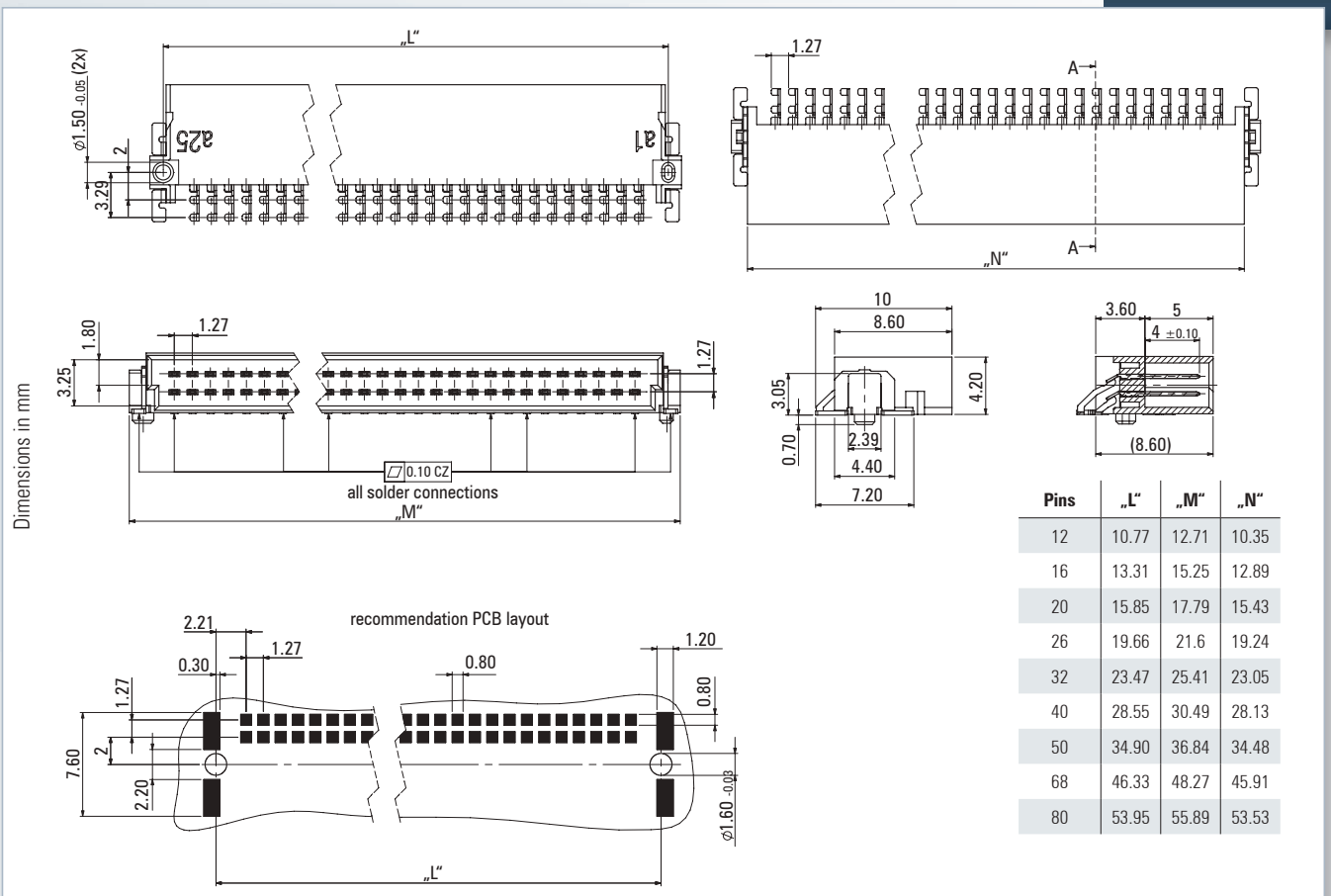
Operational current: 1.4 A at 20°C (50 pins)

Packaging: Tape & Reel

Approval: RoHS COMPLIANT

Technical Specification on page 39

For drawings and technical data visit www.ept.de



Mating connector / Application:

- for horizontal applications (p. 50-51)
- for perpendicular applications (p. 46-49)
- for applications with cable (p. 52-55)



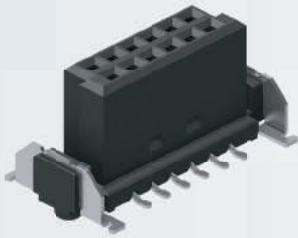
Male connector angled - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	403-51012-51	560
16	403-51016-51	
20	403-51020-51	
26	403-51026-51	
32	403-51032-51	
40	403-51040-51	
50	403-51050-51	
68	403-51068-51	
80	403-51080-51	

On request

- different number of pins
- other performance level

Female connector low-profile



Type: Female connector straight low-profile
6.25 mm unmated

Number of pins: 12 to 80

Pitch: 1.27 mm

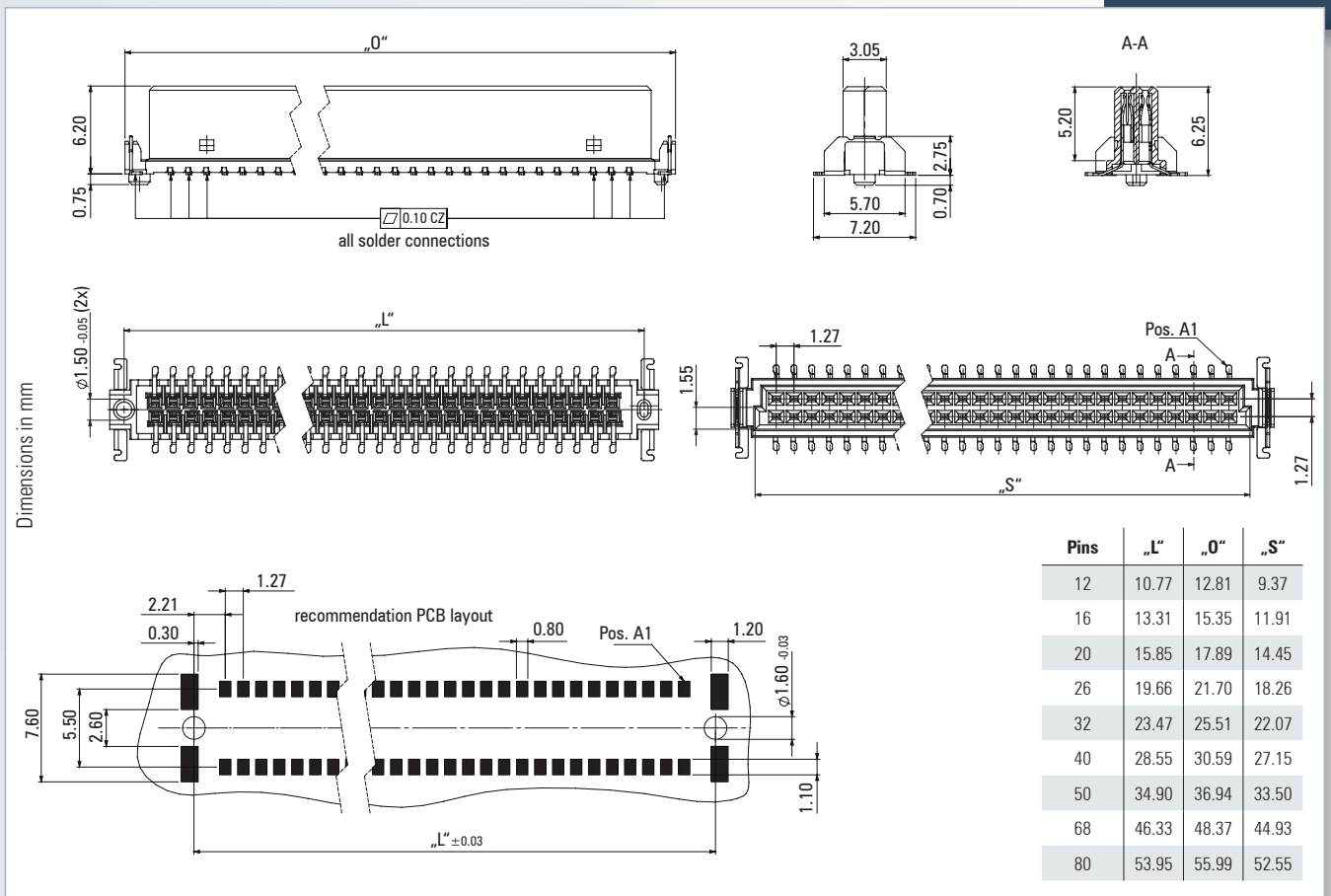
Operational current: 1.4 A at 20°C (50 pins)

Packaging: Tape & Reel

Approval:

Technical Specification on page 39

For drawings and technical data visit www.ept.de



Mating connector / Application:

for parallel applications (p. 40-43)

for perpendicular applications (p. 44-45)



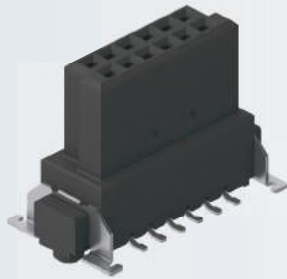
Female connector low-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	404-52012-51	280
16	404-52016-51	
20	404-52020-51	
26	404-52026-51	
32	404-52032-51	
40	404-52040-51	
50	404-52050-51	
68	404-52068-51	
80	404-52080-51	

On request

- different number of pins
- other performance level

Female connector mid-profile



Type: Female connector straight mid-profile
9.05 mm unmated

Number of pins: 12 to 80

Pitch: 1.27 mm

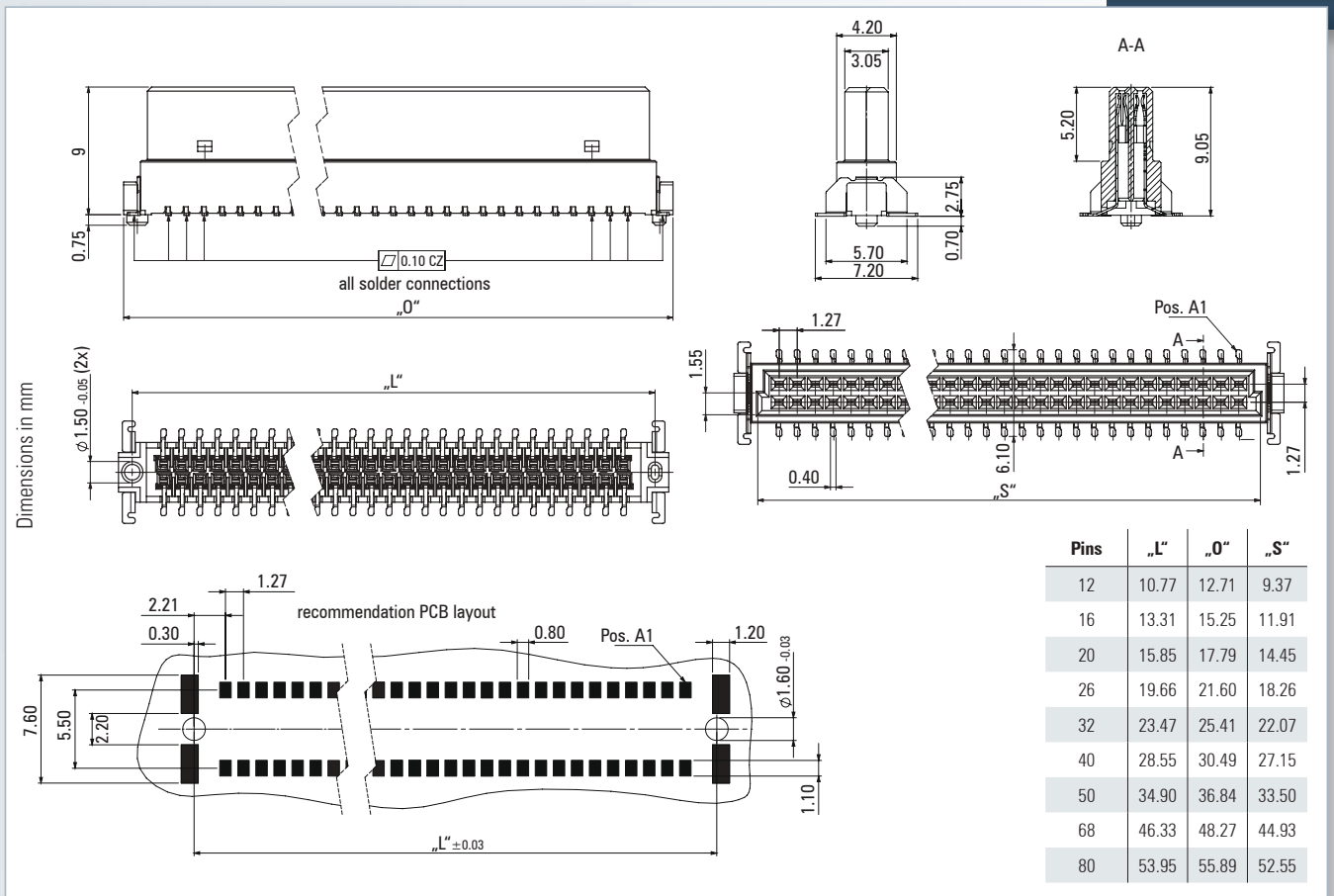
Operational current: 1.4 A at 20°C (50 pins)

Packaging: Tape & Reel

Approval: RoHS COMPLIANT

Technical Specification on page 39

For drawings and technical data visit www.ept.de



Mating connector / Application:

for parallel applications (p. 40-43)

for perpendicular applications (p. 44-45)



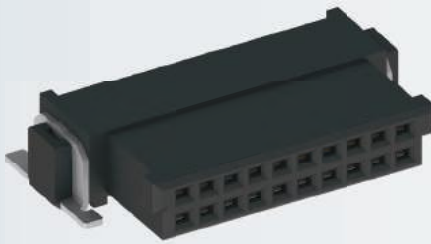
Female connector mid-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	404-53012-51	280
16	404-53016-51	
20	404-53020-51	
26	404-53026-51	
32	404-53032-51	
40	404-53040-51	
50	404-53050-51	
68	404-53068-51	
80	404-53080-51	

On request

- different number of pins
- other performance level

Female connector angled



Type: Female connector angled

Number of pins: 12 to 80

Pitch: 1.27 mm

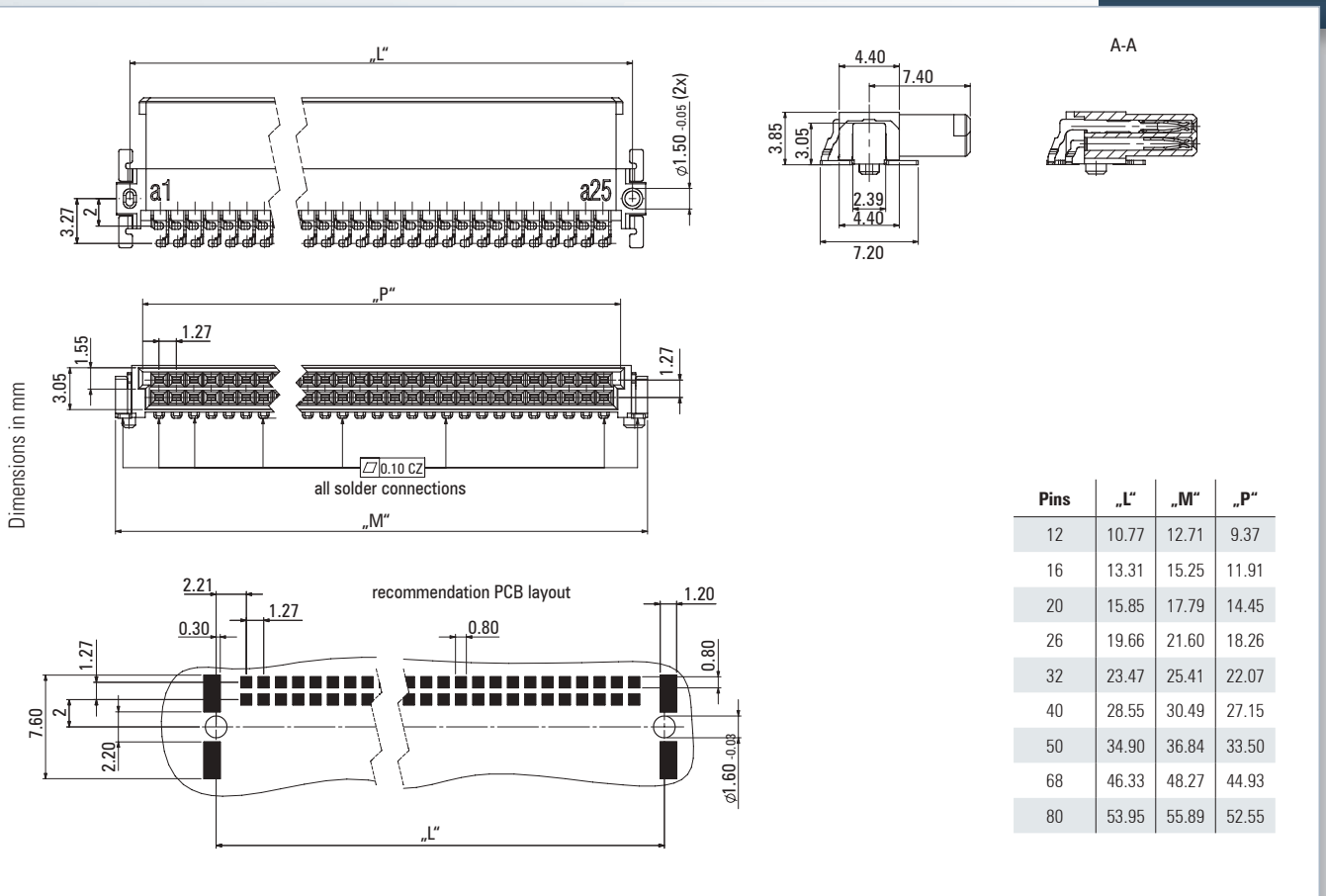
Operational current: 1.4 A at 20°C (50 pins)

Packaging: Tape & Reel

Approval:

Technical Specification on page 39

For drawings and
technical data visit
www.ept.de



Mating connector / Application:

for horizontal applications (p. 44-45)

for perpendicular applications (p. 40-43)



Female connector angled - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	404-51012-51	560
16	404-51016-51	
20	404-51020-51	
26	404-51026-51	
32	404-51032-51	
40	404-51040-51	
50	404-51050-51	
68	404-51068-51	
80	404-51080-51	

On request

- different number of pins
- other performance level

Female connector IDC



Type: Female connector IDC

Number of pins: 12 to 80

Pitch: 1.27 mm

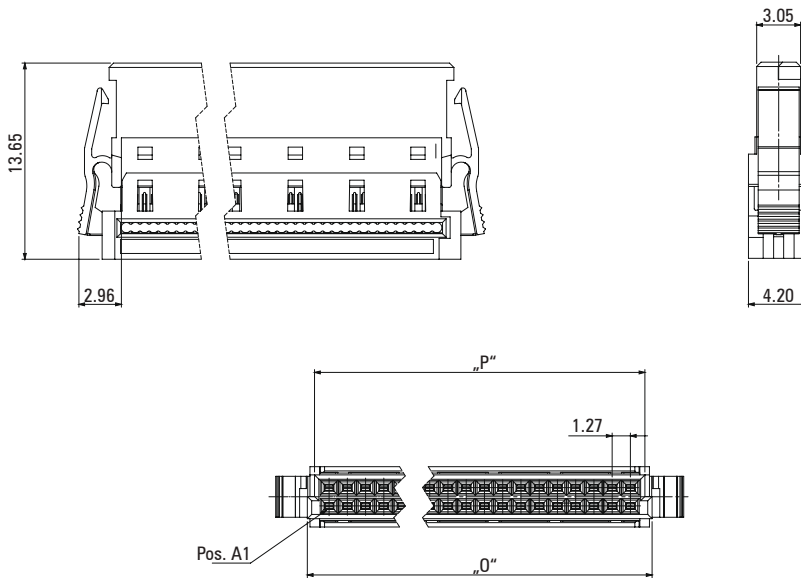
Packaging: Tray

Approval:

Technical Specification on page 39

For drawings and technical data visit www.ept.de

Dimensions in mm



Pins	„P“	„O“
12	7.67	9.37
16	10.21	11.91
20	12.75	14.45
26	16.56	18.26
32	20.37	22.07
40	25.45	27.15
50	31.80	33.50
68	43.23	44.93
80	50.85	52.55

Note

The female IDC is designed to be reused for cable assembly. Observe the recommendations for processing at www.ept.de.

Mating connector / Application:

- Mating connector straight (p. 40-43)
- Mating connector angled (p. 44-45)
- Cable assembly for female IDC (p. 54-55)



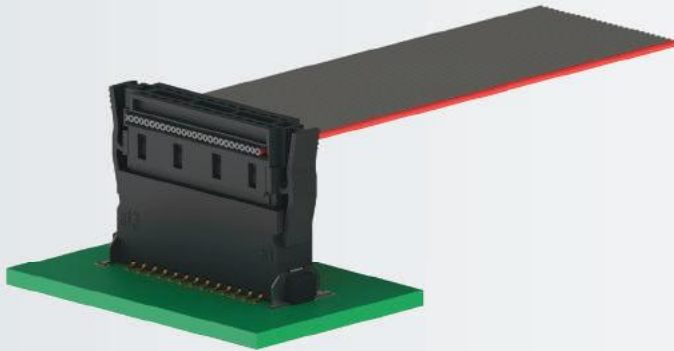
Female connector IDC - Performance level I

Number of pins	Part number	PU (Tray)
12	404-59012-61	60/480
16	404-59016-61	50/400
20	404-59020-61	45/360
26	404-59026-61	35/280
32	404-59032-61	30/240
40	404-59040-61	25/200
50	404-59050-61	20/160
68	404-59068-61	15/120
80	404-59080-61	15/120

On request

- different number of pins
- other performance level
- pre-assembled with cable (p. 26-27)

One27 Female IDC pre-assembled with cable



- female connector IDC see p. 24 and 25
- user defines orientation of connectors, number of pins and cable length
- Cable AWG 30/7 - cross section 0.06 mm²
- assembly in insulation displacement connectors (IDC)
- type of cable PVC: -30°C to +105°C (in idle state)
- colored lead on a1

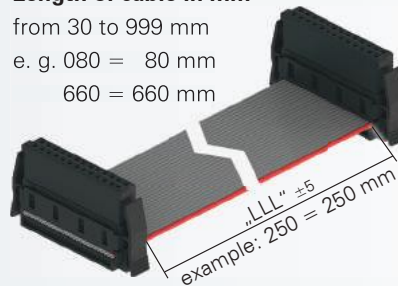
Product key

404 - 61NN - LLL - CCC - 1

see next page

Length of cable in mm

from 30 to 999 mm
e. g. 080 = 80 mm
660 = 660 mm



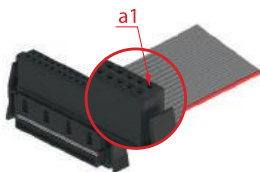
Number of pins

12, 16, 20, 26, 32, 40, 50, 68, 80

Assembled versions

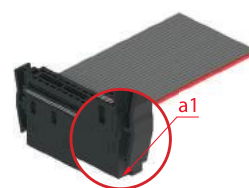
Assembled version 100

Part number
404-61NN-LLL-100-1



Assembled version 400

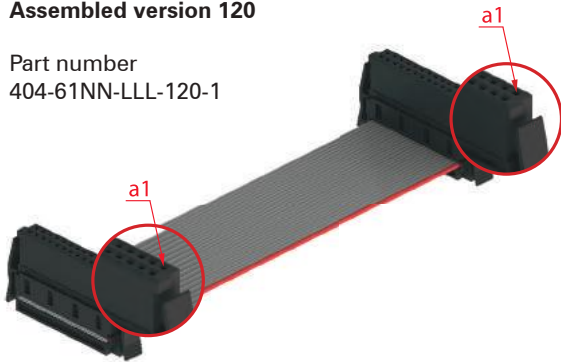
Part number
404-61NN-LLL-400-1



Assembled versions

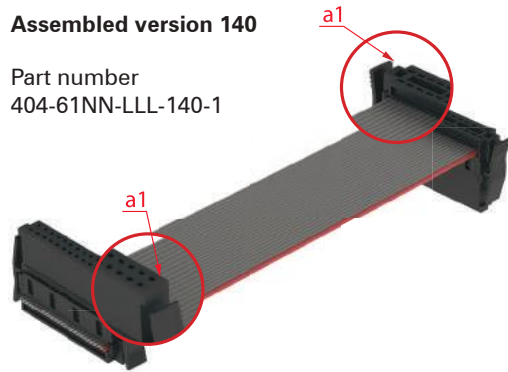
Assembled version 120

Part number
404-61NN-LLL-120-1



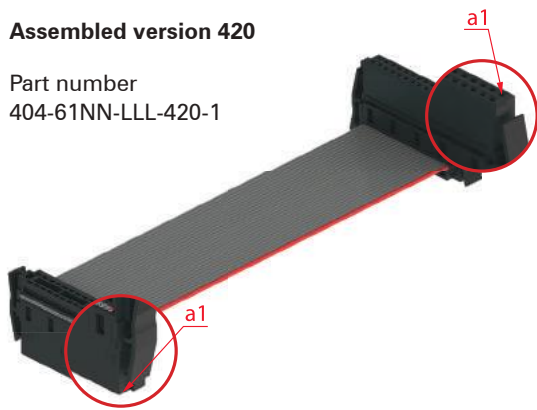
Assembled version 140

Part number
404-61NN-LLL-140-1



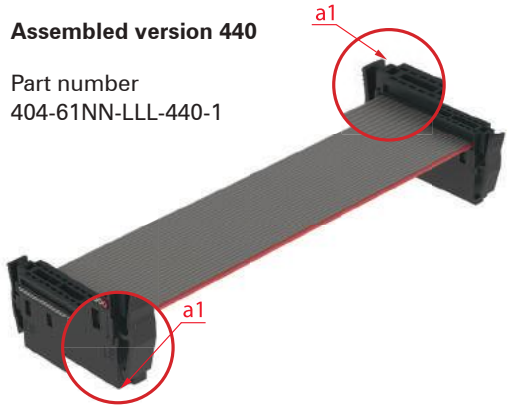
Assembled version 420

Part number
404-61NN-LLL-420-1



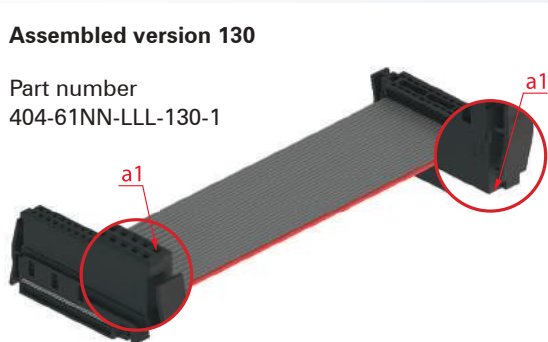
Assembled version 440

Part number
404-61NN-LLL-440-1



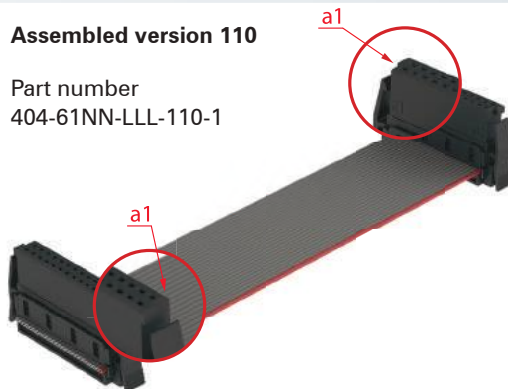
Assembled version 130

Part number
404-61NN-LLL-130-1



Assembled version 110

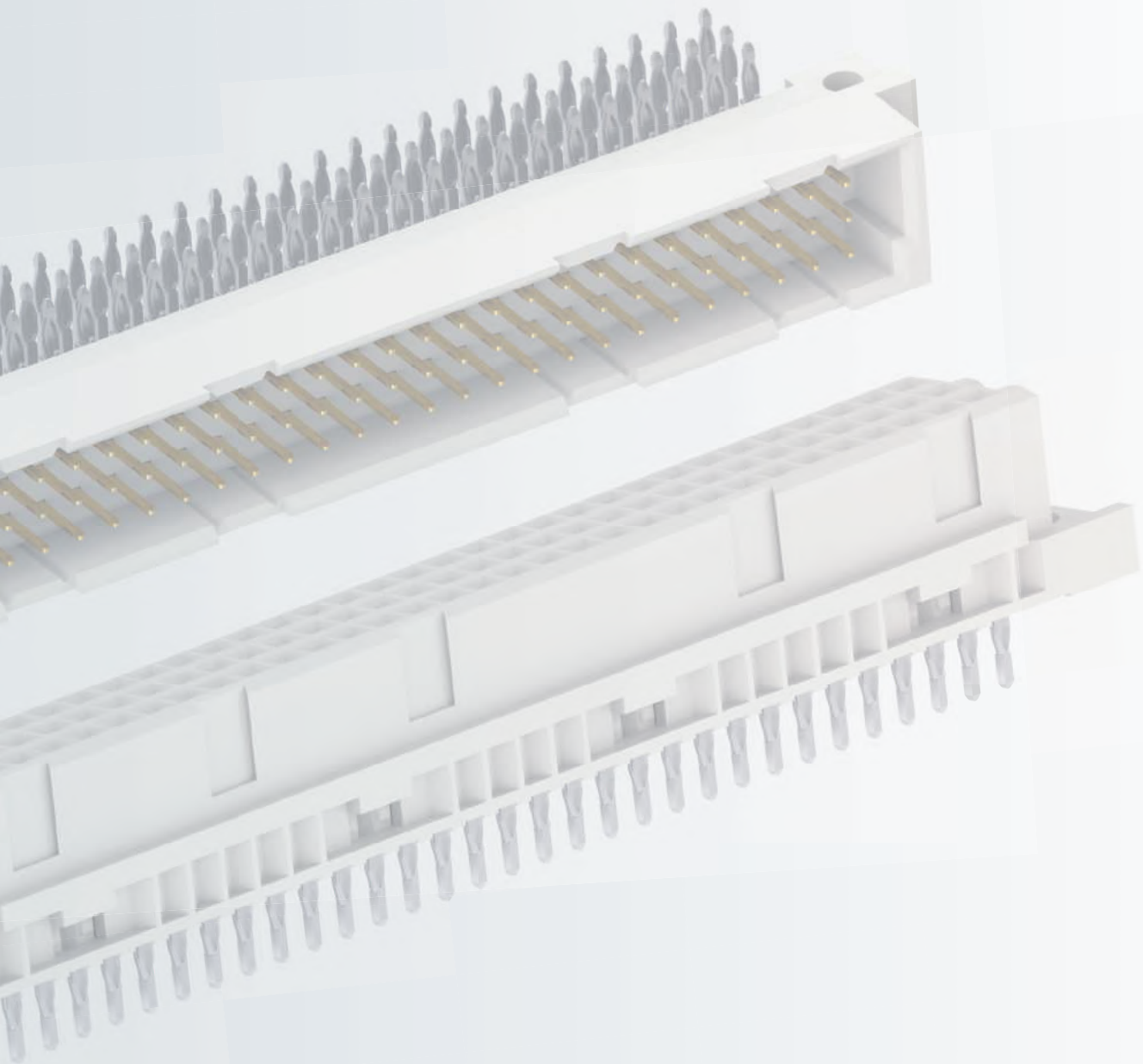
Part number
404-61NN-LLL-110-1



On request

- on request we can also provide
- other assembled versions
- cable length > 1.000 mm

Connectors according to DIN 41612/IEC 60603-2



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Connectors according to DIN 41612 / IEC 60603-2

High Variety and well proven

The DIN 41612/IEC 60603-2 product series consists of 12 basic types and other supplementary versions with a 2.54 mm or 5.08 mm pitch. The choices range from signal connectors with a current rating of up to 1.5 A to power connectors that can handle up to 5.6 A or even 15 A. The wealth of variants makes it possible to use this family of connectors for a very wide range of applications. Standardization ensures that the connectors are compatible with products from different manufacturers.

DIN 41612 connectors from ept are available in a range of termination technologies. Pre- and late mating contacts, pre-centering, board locks, and codes provide developers and users with additional safety and a wide range of possible applications.

Key Features:

- a tried and proven connection system
- we also offer to perform special assembly for small batches
- supports pre-mating and late-mating contacts
- available in a variety of termination lengths
- a range of accessories, such as shrouds, board locks and coding keys
- switching connector for daisy chaining

Applications:

- Backplane - Daughtercard, 19-inch Technology (VME)
- Board-to-Board, horizontal or parallel
- high current



Terminations



Press-fit



Through-Hole



THTR



IDC

Mating Configuration



Perpendicular



Horizontal



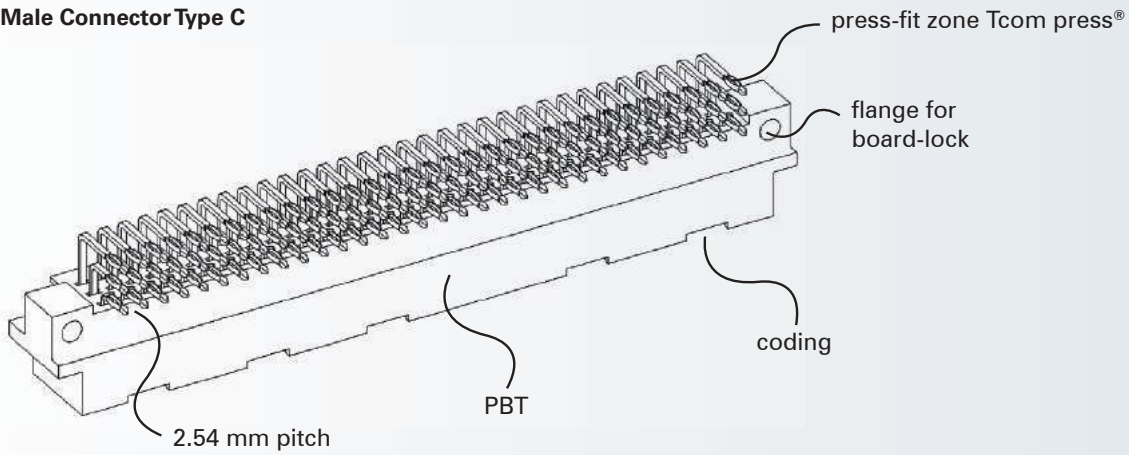
Parallel

Application

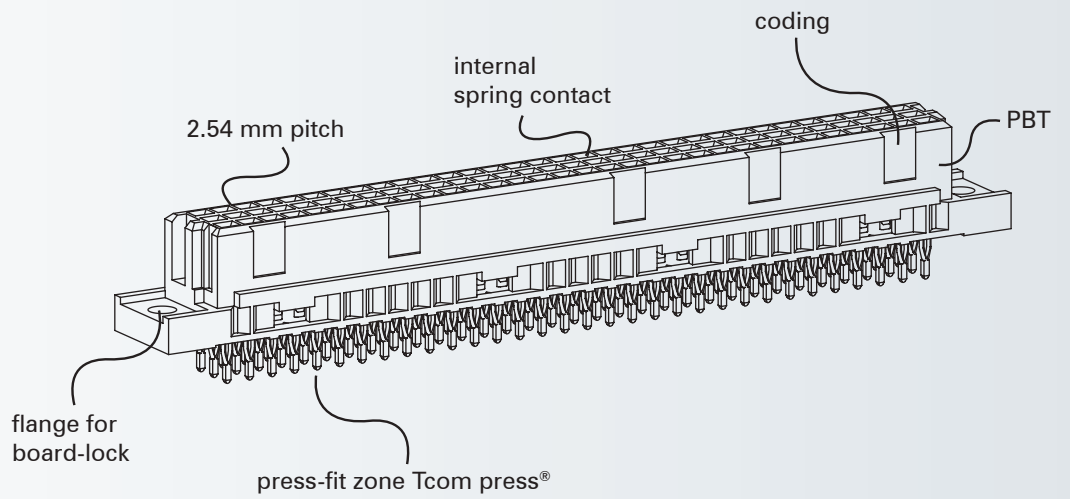


Power












Male Connector Type C

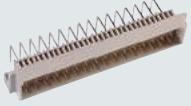
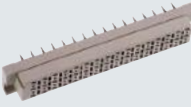


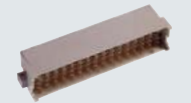










Female Connector Type C





	Type		Pitch (mm)	max. no. of contacts	Signal or power	Termination	Mating connector	Page reference
B		B, B/2, B/3 Male	2.54	64 / 32 / 20	Signal 1.5 A	Press-fit, solder, THTR	B, B/2, B/3 Q, Q/2 Female	start on p. 70
		B, B/2, B/3 Female	2.54	64 / 32 / 20	Signal 1.5 A	Press-fit, solder, THTR	B, B/2, B/3 Q, Q/2 Male	
		B IDC	2.54	64	Signal 1.0 A	IDC	B, Q Male	start on p. 156
C		C, C/2, C/3 Male	2.54	96 / 48 / 30	Signal 1.5 A	Press-fit, solder, THTR	C, C/2, C/3 R, R/2, R/3 Female	start on p. 82
		C, C/2, C/3 Female	2.54	96 / 48 / 30	Signal 1.5 A	Press-fit, solder, THTR	C, C/2, C/3 R, R/2, R/3 Male	
		C IDC	2.54	96	Signal 1.0 A	IDC	C, R Male	start on p. 156
M		M Male	2.54	78	Signal 1.5 A	solder	M Female	start on p. 94
		M, M/2, M/3 Female	2.54	78 / 30 / 12	Signal 1.5 A	Press-fit, solder	M Male	
Q		Q, Q/2 Male	2.54	64 / 32	Signal 1.5 A	solder	Q, Q/2 B, B/2 Female	start on p. 102
R		R, R/2, R/3 Male	2.54	96 / 48 / 30	Signal 1.5 A	Press-fit, solder, THTR	R, R/2, R/3 C, C/2, C/3 Female	start on p. 106
		R, R/2, R/3 Female	2.54	96 / 48 / 30	Signal 1.5 A	Press-fit, solder, THTR	R, R/2, R/3 C, C/2, C/3 Male	
D		D Male	5.08	32	Power 5.6 A	solder	D Female	start on p. 118
		D Female	5.08	32	Power 5.6 A	Press-fit, solder	D Male	

	Type		Pitch (mm)	max. no. of contacts	Signal or Power	Termination	Mating connector	Page reference
E		E Male	5.08	48	Power 5.6 A	solder	E Female	start on p. 122
		E Female	5.08	48	Power 5.6 A	Press-fit, solder	E Male	
F		F Male	5.08 x 3.81	48	Power 5.6 A	solder, THTR	F Female	start on p. 126
		F,F low profile Female	5.08 x 3.81	48	Power 5.6 A	Press-fit, solder	F Male	
G		G Male	5.08 x 3.81	64	Power 5.6 A	solder	G Female	start on p. 132
		G,G low profile Female	5.08 x 3.81	64	Power 5.6 A	Press-fit, solder	G Male	
H		H11 Male	7.62	11	Power 15 A	solder	H11 Female	start on p. 138
		H11, H11 low profile Female	7.62	11	Power 15 A	Faston, solder	H11 Male	
		H15 Male	5.08 x 6	15	Power 15 A	solder	H15 Female	start on p. 142
		H15, H15 low profile Female	5.08 x 6	15	Power 15 A	Faston, solder	H15 Male	
		H7/F24 Male	5.08 x 3.81	7+24	Power 15 A	solder	H7/F24 Female	start on p. 146
VMEx		VME64x Female	2.54	160	Signal 1.5 A	Press-fit	-	start on p. 148
Schalter		Switching connector	2.54	96	Signal 1.5 A	Press-fit	C Male	start on p. 152

The Standard 41612 / IEC 60603-2

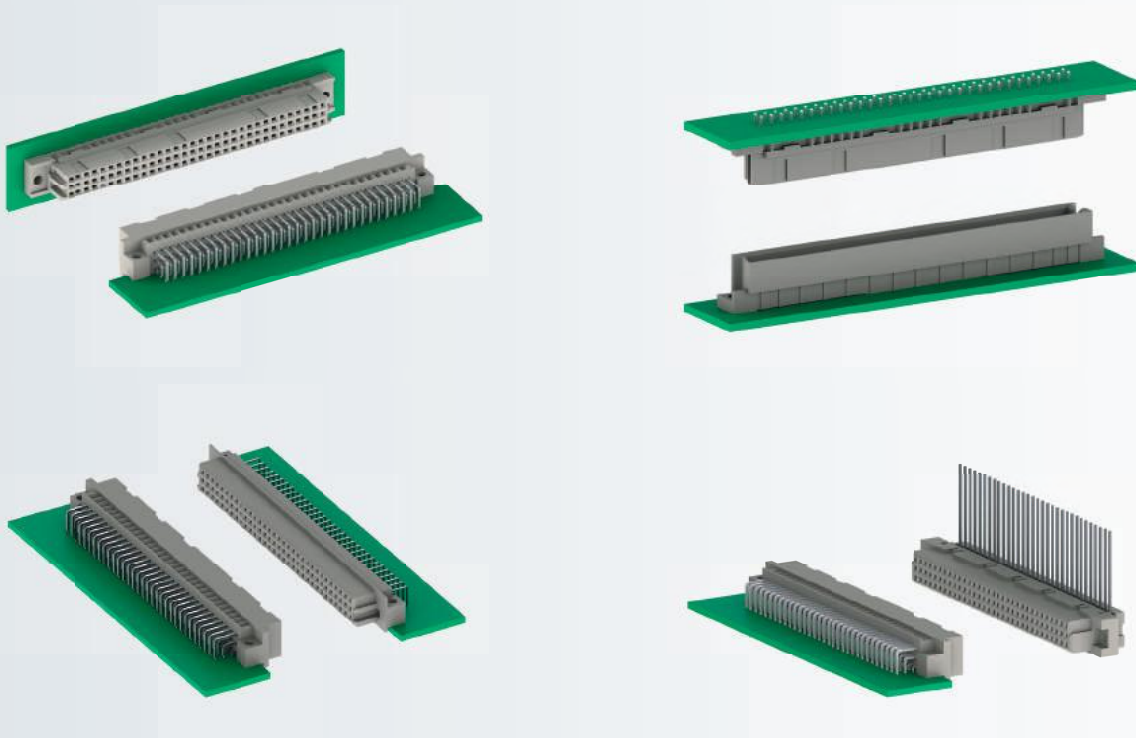
DIN 41612, which was replaced by the European IEC 60603-2 standard in 1999, defines 13 different types of connectors. DIN 41612/IEC 60603-2 connectors are used to establish a connection between the plug-in card and backplane (for 19-inch racks, etc.). DIN 41612 connectors are also commonly known as VG connectors.

The wide variety of different types combined with the high level of reliability enable flexible use of the DIN 41612 connectors, for example, for connections:

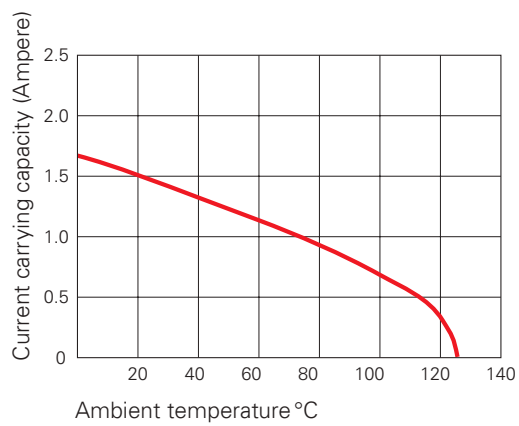
- between plug-in card and backplane
- between vertically-stacked circuit boards
- between horizontally-stacked circuit boards
- over long distances using ribbon cable
- for signal transmission up to 1.5 A
- for power transmission up to 5.6 A or 15 A

Different connector configurations, such as pre- and late-mating contacts, make it possible to support the special functions of an assembly. The connecting contacts can be implemented as press-fit connection, as a soldering connection for wave soldering or reflow technology (THTR or Pin-in-Paste).

You can prevent from mismatching types by coding special types. DIN 41612 connectors in soldering technology are also offered with mounting clips known as board locks. Board locks make it possible to efficiently mount the connectors on the circuit board in order to enable safe soldering and significantly improve strain relief of the connector during the mating/unmating process.

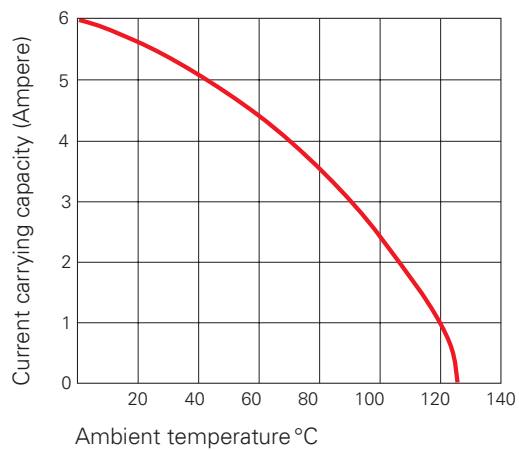


Derating Diagrams



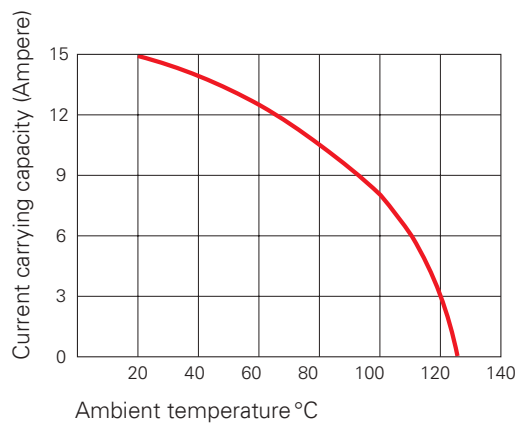
Type B, Q, C, R

20 °C	1.5 A
70 °C	1.1 A
100 °C	0.7 A



Type D, E, F, G

20 °C	5.6 A
70 °C	4.0 A
100 °C	2.5 A



Type H

20 °C	15 A
70 °C	11 A
100 °C	8 A

THTR-Connectors from ept

As manufacturers move to one step solder process using reflow techniques, normal through hole components don't meet the temperature demands required.

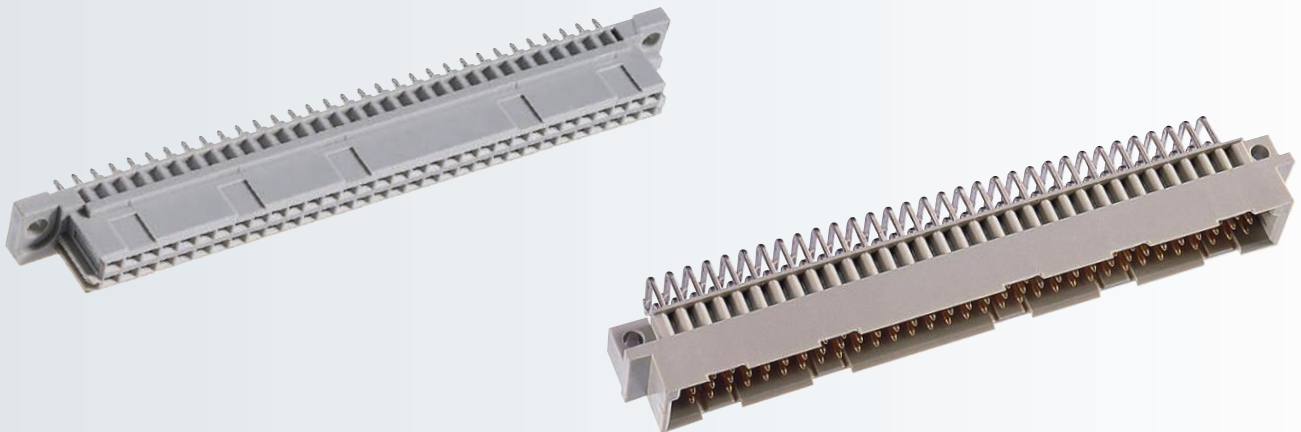
ept is pleased to announce the introduction of our high temp DIN 41612 connector series, THTR. The connectors are designed to withstand reflow temperatures and be soldered in the same production batch as other surface mount components on the PCB. This eliminates the need for additional solder operations like wave solder or press-fit.

In the past, the SMD components had to be assembled and reflow soldered, before in an additional process step the connector had been pressed into the PCB. Now the male or female connectors are soldered fully automated with the other components in the standard SMT process.

ept connectors in THTR are made from a high temperature resistant plastic, which fulfils the requirements of J-STD-020D (Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface-Mount Devices).

In accordance with RoHS compliance specifications, ept's THTR connectors are suitable for any lead free reflow solder process and are rated to a temperature peak up to 260°C.

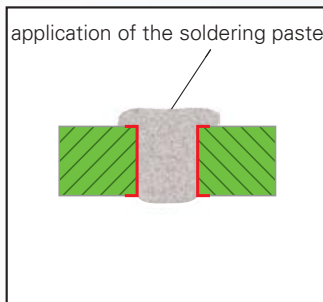
DIN connectors are widely used in many manufacturing environments with various termination methods to the PCB. ept also offers additional DIN 41612 connectors for electronic applications, including press-fit technology.



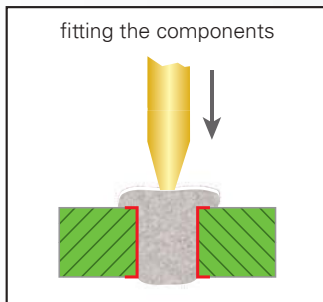
High Temp Connectors allow One Step Reflow Solder Process

THTR-Connectors from ept for easy and cost efficient manufacturing of PC boards.

THTR (Through Hole Technology Reflow) involves the following manufacturing steps:

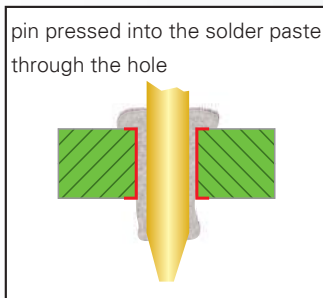


First, the solder paste is applied to the PCB. This is done either with a silk print process, a dispenser, or a solder preform.



The SMD components are then placed onto the PCB. Finally, the connectors are placed into the holes, which are filled with solder paste.

In order to insure a quality reflow solder process, a uniform heat distribution is necessary to all solder locations.



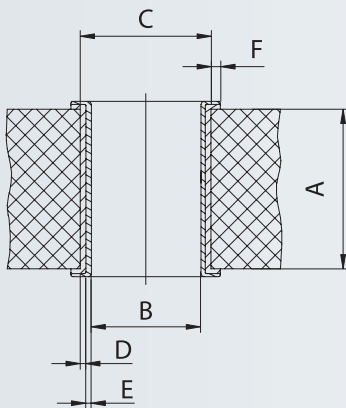
Although the connectors have a higher volume and mass as other SMD components, a longer solder time is not required. ept's high temp THTR connectors are as completely reliable as conventional wave solder connections. Additionally, all visual inspection requirements of the international standards are met.

Technical Specifications

Technical Specifications	DIN 41612 Signal Connectors 1.5 A			
	B, B/2, B/3	C, C/2, C/3	M, M/2, M/3	VME 64x
Inverted Type	Q, Q/2	R, R/2, R/3		
Basics				
Standard	IEC 60603-2			
Number of contacts	64/32/20	96/48/30	78/30/12	160
Contact row designation of male and female connectors	a b	a b c		z a b c d
				a b c
Termination	Press-fit, solder, THTR		Press-fit, solder	Press-fit
Operating temperature range	-55°C to +125°C			
Material				
Insulator material	PBT glass filled PA glass filled			
Mechanical				
Engaging and separating force for the complete, fully equipped connector	64 pol. < 60 N 32 pol. < 30 N 20 pol. < 18 N	96 pol. < 90 N 48 pol. < 45 N 30 pol. < 28 N		160 N
Separating force per contact (test measuring device)	> 0.15 N			
Durability according to DIN EN 60603-2 Performance level I Performance level II Performance level III	500 Mating cycles 400 Mating cycles 50 Mating cycles		500 Mating cycles 250 Mating cycles -	
Electrical				
max. operational current	1.5 A @ +20°C			
Contact resistance	< 20 mΩ		< 20 mΩ	< 30 mΩ
Clearance	1.2 mm		1.2	1.0
Creepage	1.2 mm		1.2	1.0
Insulation resistance	> 10 ⁶ MΩ		> 10 ⁴ MΩ	
Test voltage 50 Hz, 1 min	contact/contact	1000 V		1000 V
	contact/ground	1550 V		1550 V
Processing				
Soldering temperature	up to 260°C (depending on the way of soldering)			
Approval / Compliance				
Flammability	UL (file: E130314)			
Environment	RoHS compliant			

Technical Specifications

Technical Specifications	DIN 41612 Power Connectors 5.6 A				15 A	
	D	E	F	G	H	
Basics						
Standard	IEC 60603-2					
Number of contacts	32	48	48	64	11	15
Contact row designation of male and female connectors	a c	a c e	z b d	z b d f	b	z d
Termination	Press-fit, solder				solder, Faston	
Operating temperature range	-55°C to +125°C				-65°C to +125°C	
Material						
Insulator material	PBT glass filled PC glass filled, not combustible					
Mechanical						
Engaging and separating force for the complete, fully equipped connector	< 40 N	< 60 N	< 75 N	< 100 N	< 80 N	< 90 N
Separating force per contact (test measuring device)	> 0.15 N		> 0.2 N	> 0.2 N	> 0.2 N	> 0.2 N
Durability according to DIN EN 60603-2	Performance level I = 500 mating cycles Performance level II = 400 mating cycles Performance level III = 50 mating cycles					
Electrical						
max. operational current	5.6 A @ +20°C				15 A @ +20°C	
Contact resistance	< 15 mΩ				< 8mΩ	
Clearance	3.0 mm			1.6 mm	4.5 mm	4.5 mm
Creepage	3.0 mm		1.6 mm	3.0 mm	8.0 mm	8.0 mm
Insulation resistance	> 10 ⁶ MΩ					
Test voltage 50 Hz, 1 min						
contact/contact	1550 V		1550 V		3100 V	
contact/ground	1550 V		2500 V		3100 V	
Processing						
Soldering temperature	up to 260°C					
Approval / Compliance						
Flammability	UL (file: E130314)					
Environment	RoHS compliant					



Hole Specifications Press-fit Technology

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

		B/C/D/R/M/F low profile/ G low profile/VME64x	D/E/F/G
Nominal hole		Ø 1.0 mm	Ø 1.6 mm
imm. Sn printed circuit boards			
A	PCB thickness	min. 1.6 mm	min. 1.6 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	imm. Sn plating	max. 1.5 µm	max. 1.5 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm
Ni, Au printed circuit boards			
A	PCB thickness	min. 1.6 mm	min. 1.6 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au more than 2.5 – 5 µm Ni	0.05 – 0.2 µm Au more than 2.5 – 5 µm Ni
F	Annular ring	min. 0.1 mm	min. 0.1 mm
pure Cu printed circuit boards			
A	PCB thickness	min. 1.6 mm	min. 1.6 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	OSP*	e.g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm	e.g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm
HAL Sn printed circuit boards			
A	PCB thickness	min. 1.6 mm	min. 1.6 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	HAL Sn	5 – 15 µm	5 – 15 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm

* OSP = Organic Solderability Preservatives

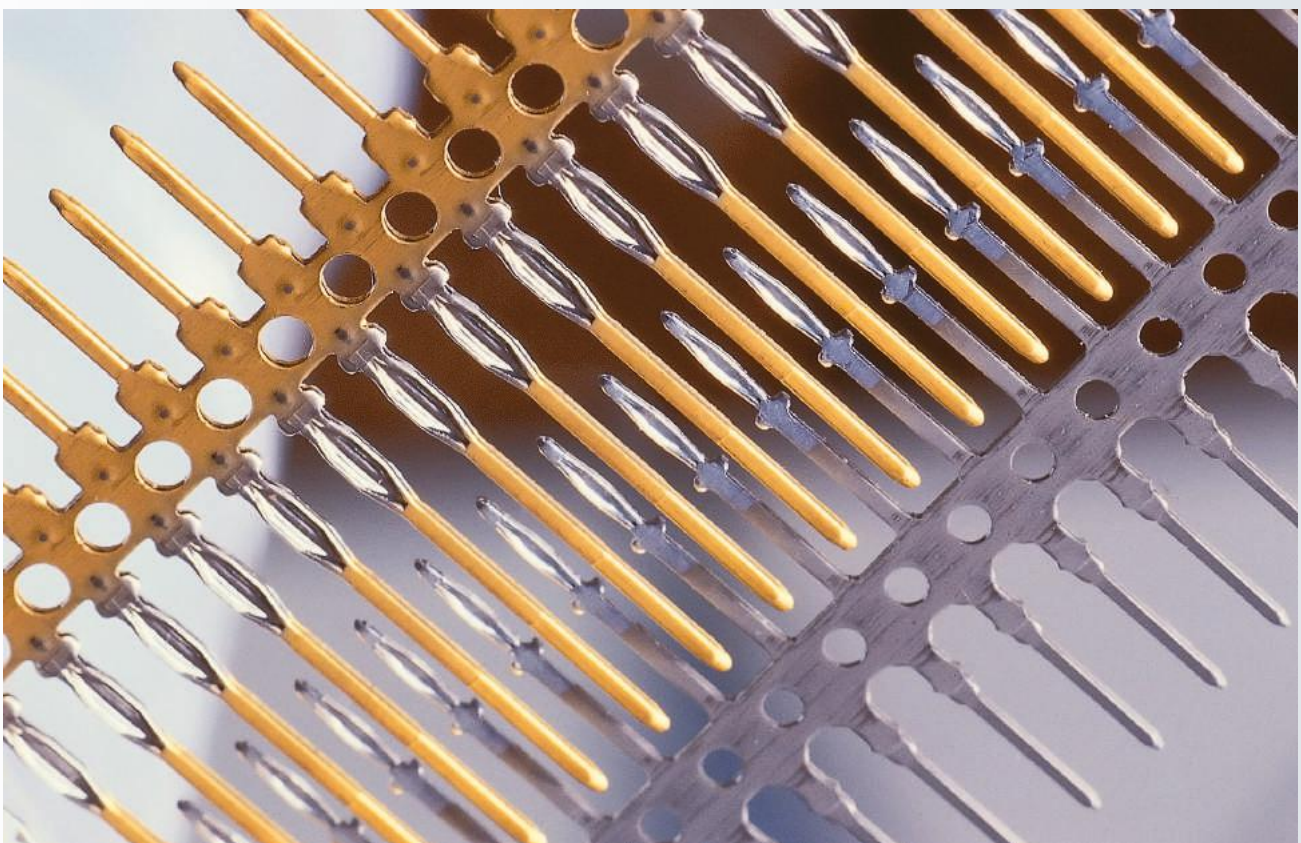
Technical Information to Press-fit Technology

PCB thickness

For connectors according to DIN 41612 / IEC 60603-2 (DIN connectors), ept offers three Tcom press® press-fit zone variants for different printed circuit board thicknesses. Therefore the functionality of the Press-fit connection is optimally given for every application.

Part numbers key

Type	PCB thickness 1.5 to 2.0 mm	PCB thickness 2.0 to 2.8 mm	PCB thickness > 2.8 mm
B, B/2, B/3 (female connectors)	102-xxxxx-01	102-xxxxx-02	102-xxxxx-03
C, C/2, C/3 (female connectors)	104-xxxxx-01	104-xxxxx-02	104-xxxxx-03



Tcom press® Press-fit Technology

DIN 41612



Type B Male Connector



Type: Male connector 90° with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 64

Pitch: 2.54 mm

Operational current: 1.5 A

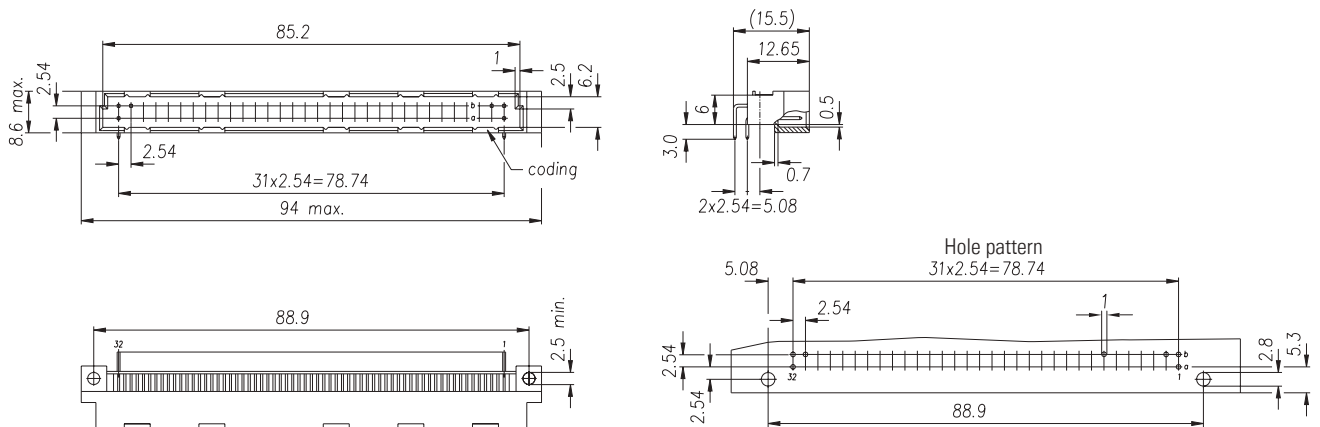
Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66

Dimensions in mm



For detailed drawings visit www.ept.de

Accessories

- Processing tools p. 332
- Coding p. 160





Mating connector / Application:



Type B Female connector (p. 72)



Press-fit - Performance level II 




No. of contacts	Contact arrangement	Termination length L 			
		3.4 mm		13 mm	
		Part number	PU (Tube)	Part number	PU (Tube)
32		101-60004	32/512	101-65005	18/180
32		101-60014		101-65015	
64		101-60064		101-65065	

On request

- performance level I + III or customized
- special contact length
- contact arrangement



Solder - Performance level II 




No. of contacts	Contact arrangement	Termination length L 				
		3.0 mm angled	3.0 mm straight	PU (Tube)	13 mm angled	PU (Tube)
		Part number		Part number	Part number	Part number
32		101-40024	101-40025	32/512	101-40044	18/180
64		101-40064	101-40065		101-40074	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II 

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm angled	
		Part number	PU (Tube)
32		101-40024TH	32/512
64		101-40064TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type B Female Connector



Type: Female connector straight with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 64

Pitch: 2.54 mm

Operational current: 1.5 A

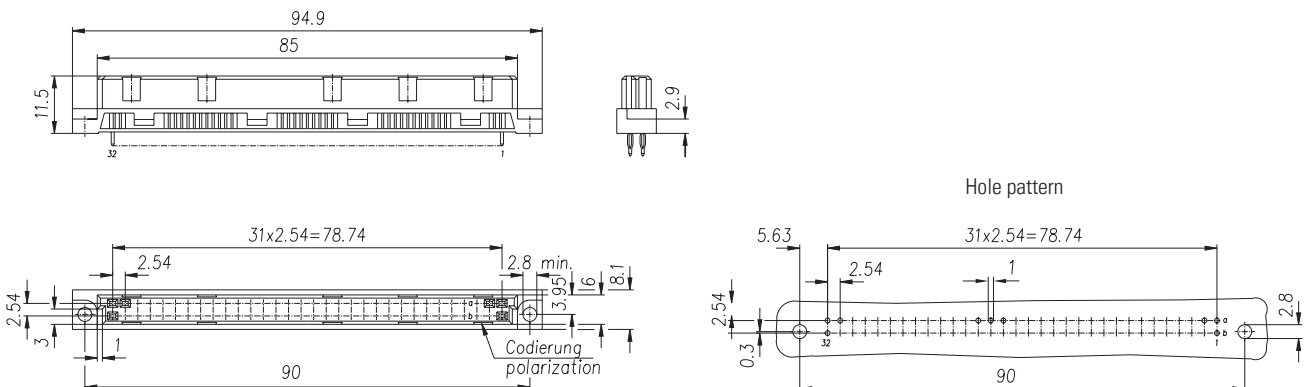
Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66

Dimensions in mm



For detailed drawings visit www.ept.de

Accessories

- Processing tools p. 334
- Coding p. 160

Note / Options

- Type B in IDC p. 156

Mating connector / Application:

 Type B Male connector (p. 70)

 Type Q Male connector (p. 102)



Press-fit - Performance level II •••

No. of contacts	Contact arrangement	PCB thickness	Termination length L				PU (Tube)
			3.2 mm	4.6 mm	13 mm	17 mm	
			Part number				
32		> 1.5 mm	-	302-63014-02	302-65015-03	302-65016-04	33/396
32		1.5 - 2.0 mm	102-63024-01	-	102-65025-01	102-65026-01	
		2.0 - 2.8 mm	-	102-63024-02	102-65025-02	102-65026-02	
		> 2.8 mm	-	102-63024-03	102-65025-03	102-65026-03	
64		> 1.5 mm	-	302-63064-02	302-65065-03	302-65066-04	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface
Sn e. g. for WireWrap
- without flange
- contact arrangement



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L					PU (Tube)
		2.5 mm	3.4 mm	4.6 mm	13 mm	5.5 mm <small>manual soldering with solder lug</small>	
		Part number					
32		102-40024	-	-	102-40026	102-40044	33/396
64		302-40064-05	302-40064-01	302-40064-02	302-40065-03	102-40074	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			PU (Tube)
		2.5 mm	3.4 mm	4.6 mm	
		Part number			
32		102-40024TH	-	-	33/396
64		302-40064-05TH	302-40064-01TH	302-40064-02TH	

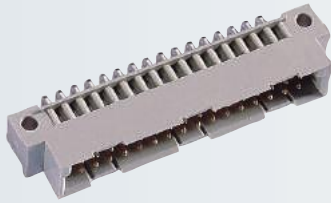
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type B/2 Male Connector



Type: Male connector 90° with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 16, 32

Pitch: 2.54 mm

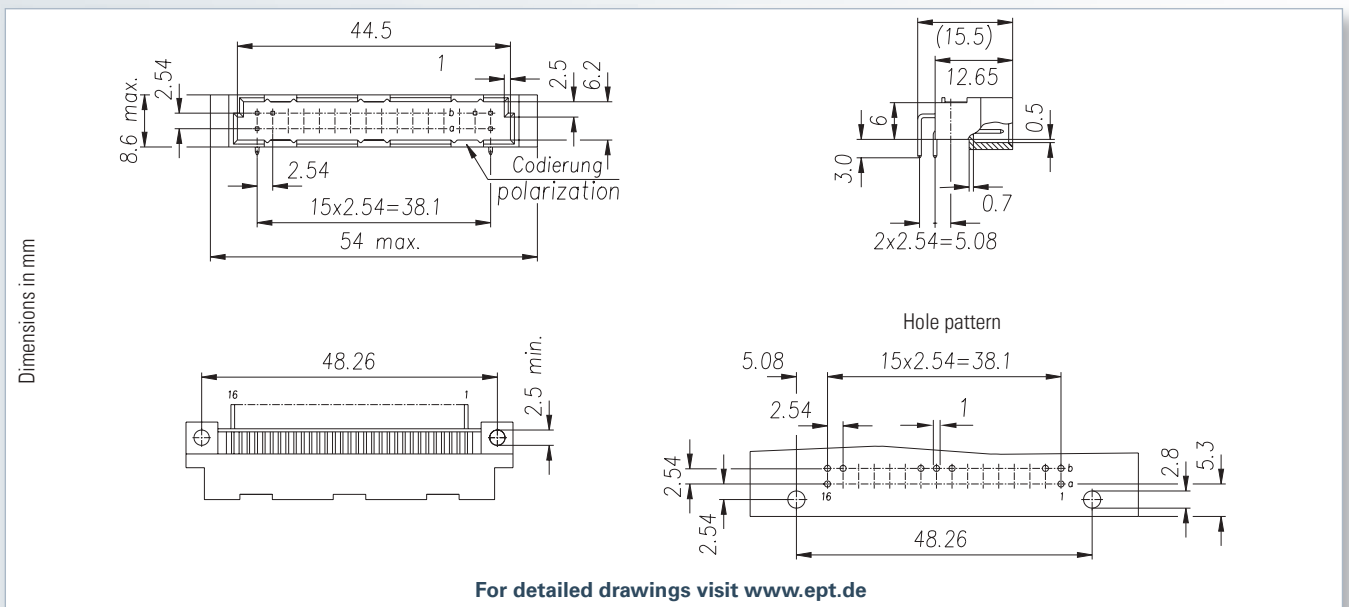
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332
- Coding p. 160

Mating connector / Application:



Type B/2 Female connector (p. 76)



Press-fit - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			
		3.4 mm		13 mm	
		Part number	PU (Tray)	Part number	PU (Tray)
16		101-69004	54/540	101-79006	27/270
32		101-69014		101-79016	

On request

- performance level I + III or customized
- special contact length
- contact arrangement



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L				
		3.0 mm angled	3.0 mm straight	PU (Tray)	13 mm angled	PU (Tray)
		Part number		Part number	Part number	Part number
16		101-90004	101-90115	54/540	101-90006	27/270
32		101-90014	101-90105		101-90016	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II •••

No. of contacts	Contact arrangement	Termination length L	
		3.0 mm angled	
		Part number	PU (Tray)
16		101-90004TH	54/540
32		101-90014TH	

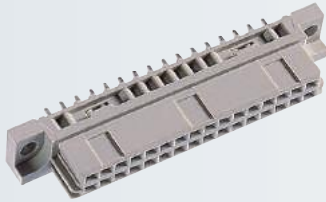
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type B/2 Female Connector



Type: Female connector straight with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 16, 32

Pitch: 2.54 mm

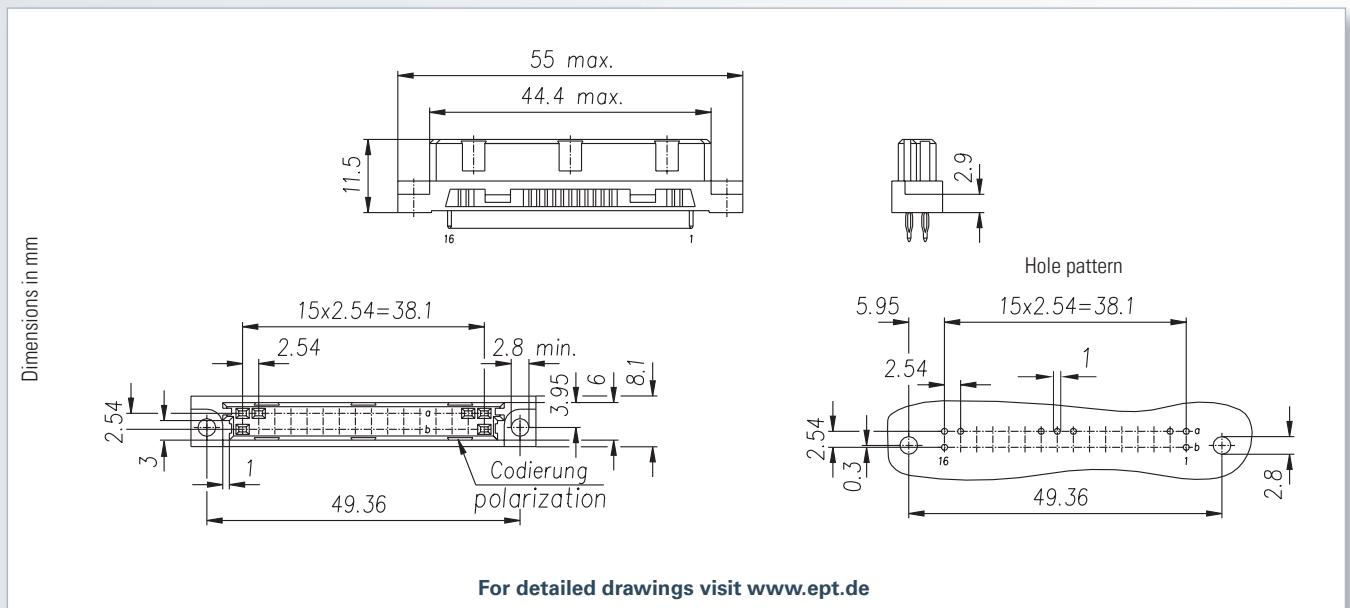
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2





Technical Specifications on page 66



Accessories


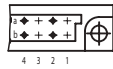

- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

-  Type B/2 Male connector (p. 74)
-  Type Q/2 Male connector (p. 104)



Press-fit - Performance level II


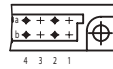

No. of contacts	Contact arrangement	PCB thickness	Termination length L 					
			3.2 mm	4.6 mm	PU (Tray)	13 mm	17 mm	PU (Tray)
			Part number			Part number		
16		1.5 - 2.0 mm	102-69004-01	-	45/765	102-79006-01	102-79106-01	21/357
		2.0 - 2.8 mm	-	102-69004-02		102-79006-02	102-79106-02	
		> 2.8 mm	-	102-69004-03		102-79006-03	102-79106-03	
32		1.5 - 2.0 mm	102-69064-01	-		102-79066-01	102-79166-01	
		2.0 - 2.8 mm	-	102-69064-02		102-79066-02	102-79166-02	
		> 2.8 mm	-	102-69064-03		102-79066-03	102-79166-03	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface Sn e. g. for WireWrap
- without flange
- contact arrangement



Solder - Performance level II


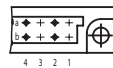

No. of contacts	Contact arrangement	Termination length L 					
		2.5 mm	4 mm	PU (Tray)	13 mm	5.5 mm <small>Manual soldering with solder lug</small>	PU (Tray)
		Part number			Part number		
16		102-90004	102-90005	45/765	102-90006	102-90025	21/357
32		102-90064	102-90065		102-90066	102-90075	

On request

- performance level I + III or customized
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L 		
		2.5 mm	4 mm	PU (Tray)
		Part number		
16		102-90004TH	102-90005TH	45/765
32		102-90064TH	102-90065TH	

On request

- performance level I + III or customized
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 10, 20

Pitch: 2.54 mm

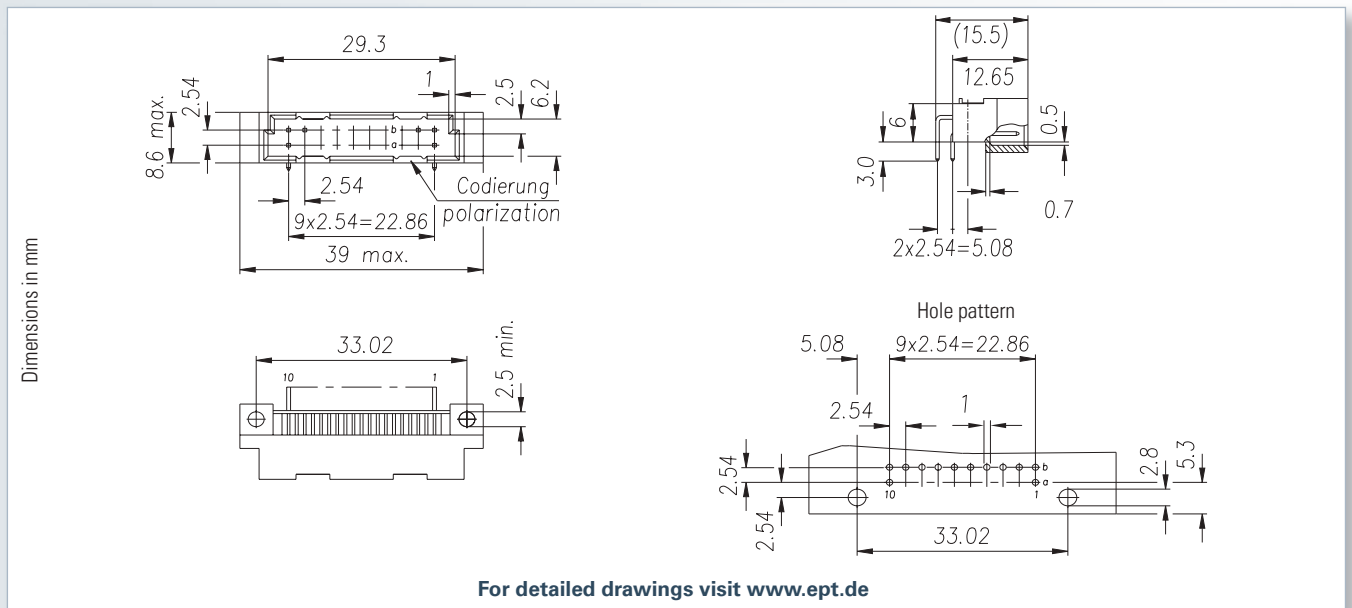
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332
- Coding p. 160

Mating connector / Application:



Type B/3 Female connector (p. 80)



Press-fit - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			
		3.4 mm		13 mm	
		Part number	PU (Tray)	Part number	PU (Tray)
20		101-68014	54/540	101-78016	27/270

On request

- performance level I + III or customized
- special contact length
- contact arrangement



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L				
		3.0 mm angled	3.0 mm straight	PU (Tray)	13 mm angled	PU (Tray)
		Part number			Part number	
10		101-80004	101-80105	54/540	101-80006	27/270
20		101-80014	101-80115		101-80016	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement

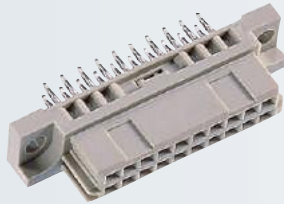


THTR - Performance level II •••

No. of contacts	Contact arrangement	Termination length L	
		3.0 mm angled	
		Part number	PU (Tray)
10		101-80004TH	54/540
20		101-80014TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Female connector straight with 2 rows

Termination: Press-fit, solder, THTR

Number of contacts: 10, 20

Pitch: 2.54 mm

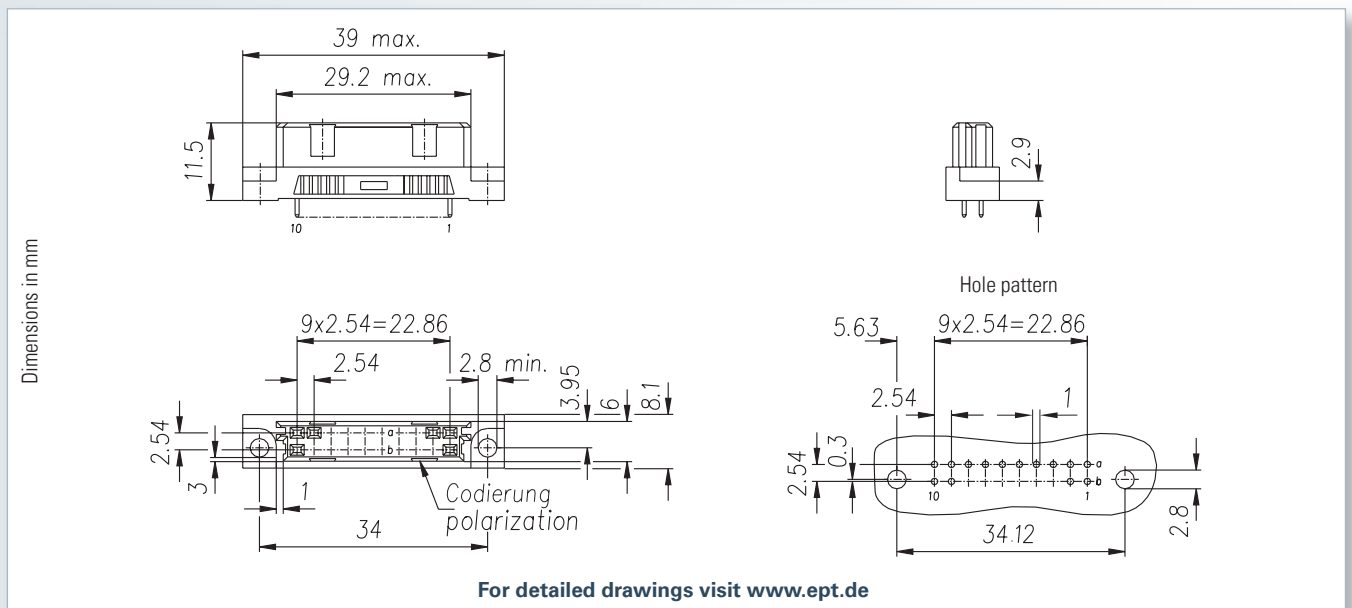
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 334
- Coding p. 160



Mating connector / Application:



Type B/3 Male connector (p. 78)



Press-fit - Performance level II


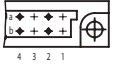

No. of contacts	Contact arrangement	PCB thickness	Termination length L 					
			3.2 mm	4.6 mm	PU (Tray)	13 mm	17 mm	PU (Tray)
			Part number			Part number		
20		1.5 - 2.0 mm	102-68014-01	-	45/765	102-78016-01	102-78116-01	21/357
		2.0 - 2.8 mm	-	102-68014-02		102-78016-02	102-78116-02	
		> 2.8 mm	-	102-68014-03		102-78016-03	102-78116-03	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface Sn e. g. for WireWrap
- without flange
- contact arrangement



Solder - Performance level II


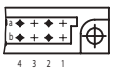

No. of contacts	Contact arrangement	Termination length L 					
		2.5 mm	4 mm	PU (Tray)	13 mm	5.5 mm <small>Manual soldering with solder lug</small>	PU (Tray)
		Part number			Part number		
10		102-80004	102-80005	45/765	102-80006	102-80025	21/357
20		102-80064	102-80065		102-80066	102-80075	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement

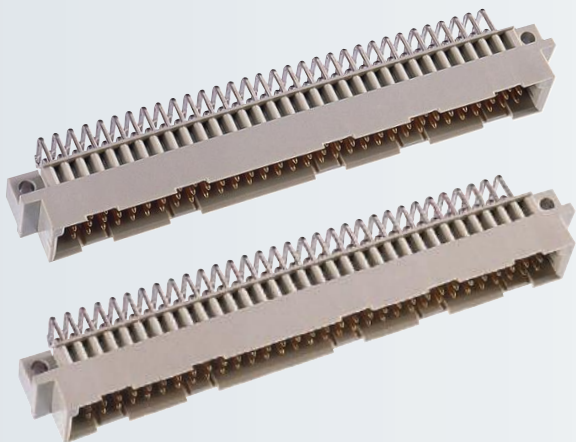


THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L 		
		2.5 mm	4 mm	PU (Tray)
		Part number		
10		102-80004TH	102-80005TH	45/765
20		102-80064TH	102-80065TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48, 64, 96

Pitch: 2.54 mm

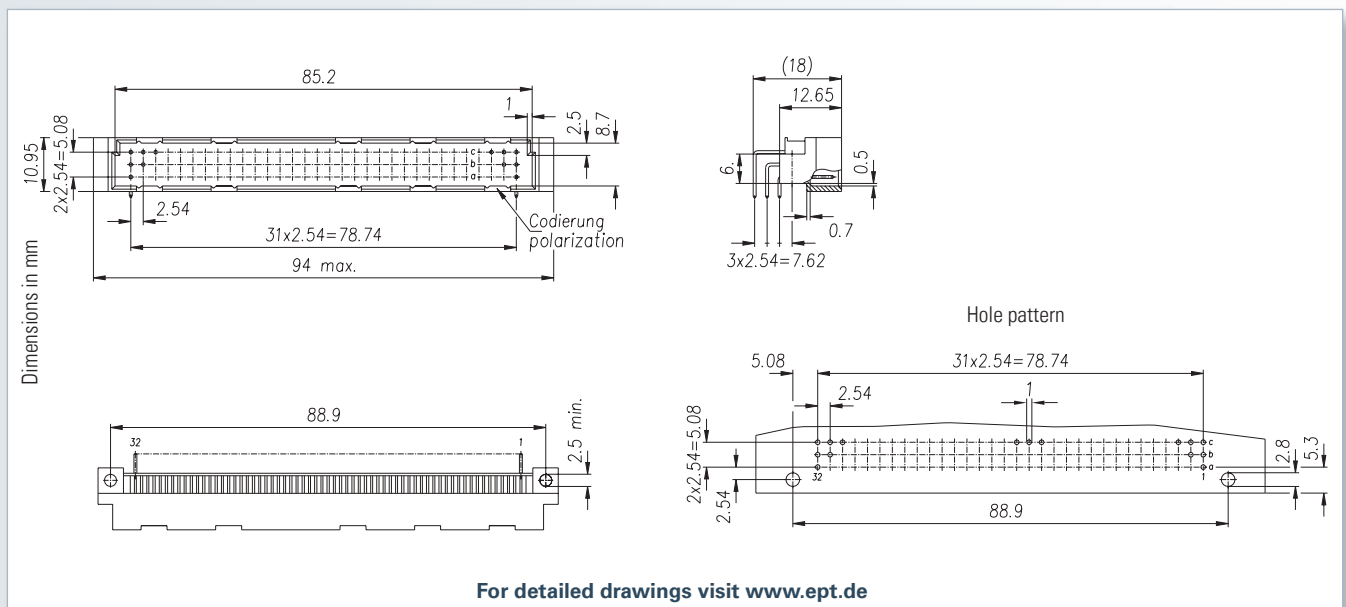
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332
- Coding p. 160

Mating connector / Application:

- Type C Female connector (p. 84)
- Type R Female connector (p. 108)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L			
		3.4 mm		13 mm	
		Part number	PU (Tube)	Part number	PU (Tube)
32		103-60014	25/400	103-65015	18/180
48		103-60044		103-65045	
64		103-60054		103-65055	
96		103-60064		103-65065	



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L	
		3.0 mm angled	
		Part number	PU (Tube)
32		103-40014TH	25/400
48		103-40024TH	
64		103-40034TH	
96		103-40064TH	

On request

- performance level I + III or customized
- special contact length
- contact arrangement

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

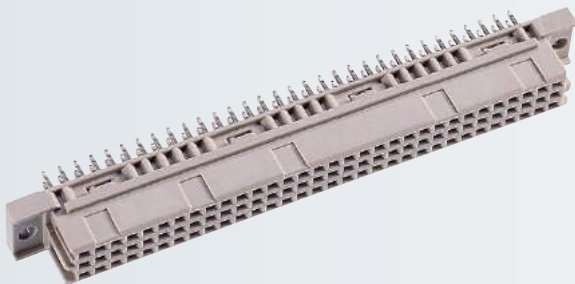


Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L				
		3.0 mm angled	3.0 mm straight	PU (Tube)	13 mm angled	PU (Tube)
		Part number			Part number	
32		103-40014	103-40015	25/400	103-40194	18/180
48		103-40024	103-40025		103-40144	
64		103-40034	103-40035		103-40154	
96		103-40064	103-40065		103-40174	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



Type: Female connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48, 64, 96

Pitch: 2.54 mm

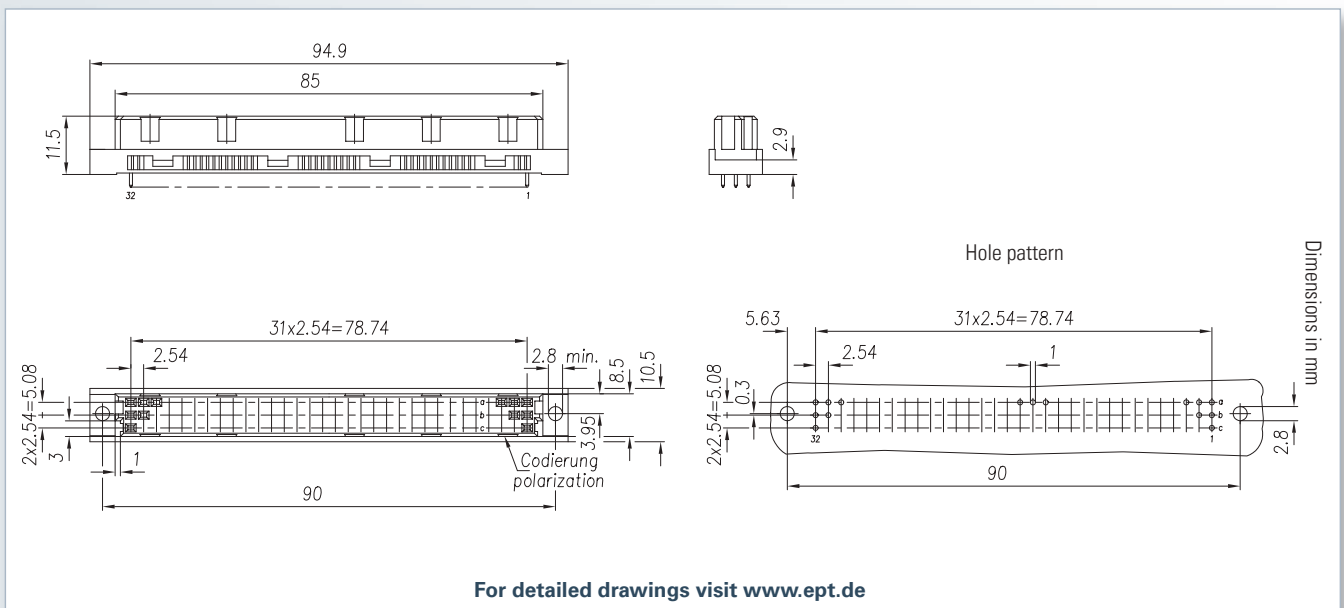
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 334
- Coding p. 160
- Shroud p. 151

Similar products

- Type C with switching function see on p. 152
- VMEx see on p. 148
- Type C in IDC see on p. 156

Mating connector / Application:

Type C Male connector (p. 82)

Type R Male connector (p. 106)



Press-fit - Performance level II •••

No. of contacts	Contact arrangement	PCB thickness	Termination length L				PU (Tube)
			3.2 mm	4.6 mm	13 mm	17 mm	
			Part number				
32		1.5 - 2.0 mm	104-60014-01	-	104-65015-01	104-65016-01	25/300
		2.0 - 2.8 mm	-	104-60014-02	104-65015-02	104-65016-02	
		> 2.8 mm	-	104-60014-03	104-65015-03	104-65016-03	
48		1.5 - 2.0 mm	104-60044-01	-	104-65045-01	104-65046-01	
		2.0 - 2.8 mm	-	104-60044-02	104-65045-02	104-65046-02	
		> 2.8 mm	-	104-60044-03	104-65045-03	104-65046-03	
64		> 1.5 mm	-	304-60054-02	304-65055-03	304-65056-04	
96		> 1.5 mm	-	304-60064-02	304-65065-03	304-65066-04	

On request

- contact arrangement
- without flange
- performance level I + III or customized
- special contact length
- alternative contact surface
Sn e. g. for WireWrap



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L					PU (Tube)
		2.5 mm	3.4 mm	4.6 mm	13 mm	Solder lug	
		Part number					
32		104-40014	-	-	104-40016	-	25/300
48		104-40044	-	-	104-40046	-	
64		304-40054-05	304-40054-01	304-40054-02	304-40055-03	104-40115	
96		304-40064-05	304-40064-01	304-40064-02	304-40065-03	104-40075	

On request

- contact arrangement
- Board-Lock p. 159
- performance level I + III or customized
- special contact length

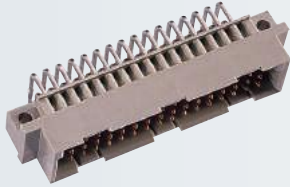


THTR - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			PU (Tube)
		2.5 mm	3.4 mm	4.6 mm	
		Part number			
64		304-40054-05TH	304-40054-01TH	304-40054-02TH	25/300
96		304-40064-05TH	304-40064-01TH	304-40064-02TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 16, 32, 48

Pitch: 2.54 mm

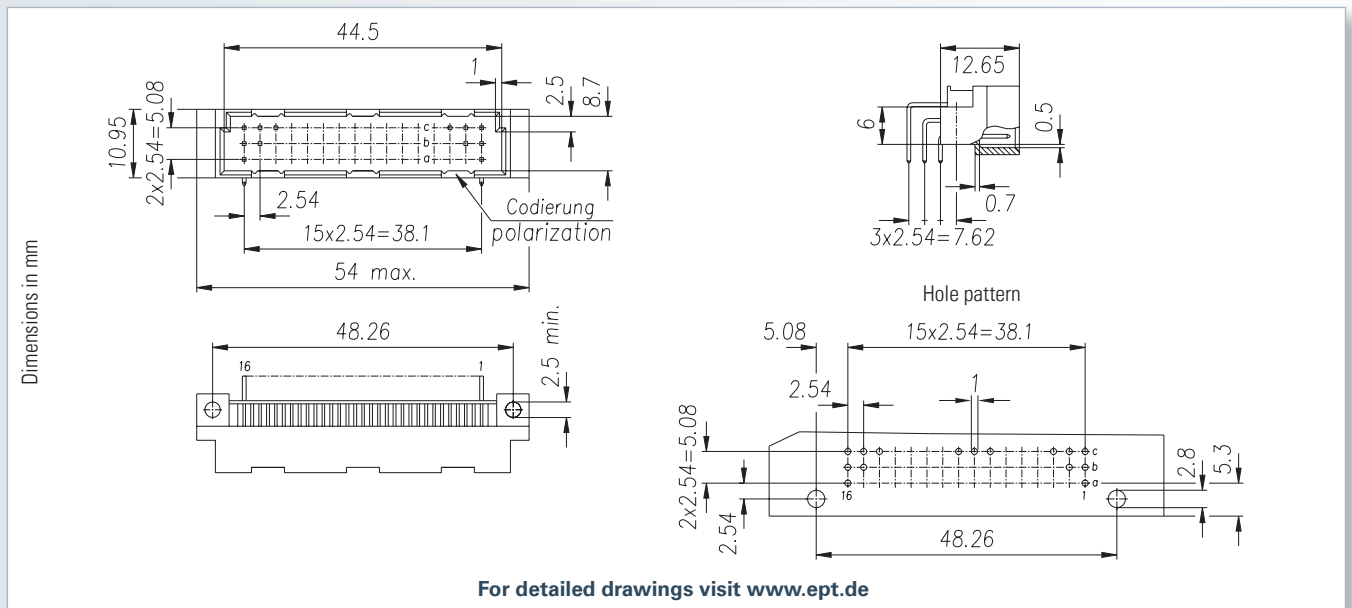
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2





Technical Specifications on page 66



Accessories

- Processing tools p. 332
- Coding p. 160

Mating connector / Application:

-  Type C/2 Female connector (p. 88)
-  Type R/2 Female connector (p. 112)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L			
		3.4 mm		13 mm	
		Part number	PU (Tray)	Part number	PU (Tray)
16		103-69004	54/540	103-79006	27/270
32		103-69014		103-79016	
48		103-69064		103-79066	

On request

- performance level I + III or customized
- special contact length
- contact arrangement



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L				
		3.0 mm angled	3.0 mm straight	PU (Tray)	13 mm angled	PU (Tray)
		Part number			Part number	
16		103-90004	103-90105	54/540	103-90006	27/270
32		103-90014	103-90115		103-90016	
48		103-90064	103-90165		103-90066	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L	
		3.0 mm angled	
		Part number	PU (Tray)
16		103-90004TH	54/540
32		103-90014TH	
48		103-90064TH	

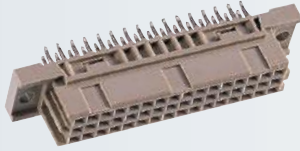
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type C/2 Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 16, 32, 48

Pitch: 2.54 mm

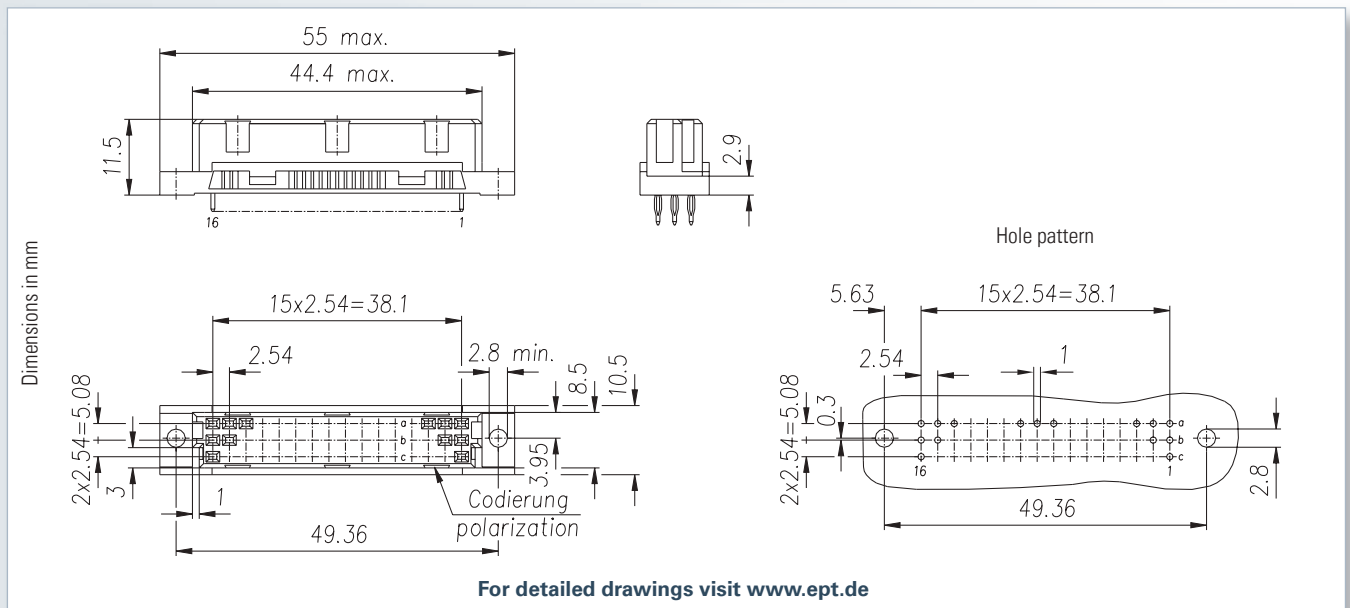
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2





Technical Specifications on page 66



Accessories


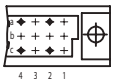
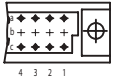
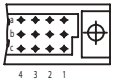
- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

-  Type C/2 Male connector (p. 86)
-  Type R/2 Male connector (p. 110)



Press-fit - Performance level II


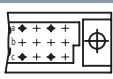
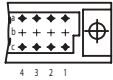
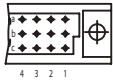
No. of contacts	Contact arrangement	PCB thickness	Termination length L 					
			3.2 mm	4.6 mm	PU (Tray)	13 mm	17 mm	PU (Tray)
			Part number		Part number			
16		1.5 - 2.0 mm	104-69004-01	-	45/765	104-79006-01	104-79106-01	21/357
		2.0 - 2.8 mm	-	104-69004-02		104-79006-02	104-79106-02	
		> 2.8 mm	-	104-69004-03		104-79006-03	104-79106-03	
32		> 1.5 mm	-	304-69014-02		304-79016-03	304-79116-04	
		48		> 1.5 mm		-	304-69064-02	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface Sn e. g. for WireWrap
- without flange
- contact arrangement



Solder - Performance level II


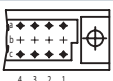
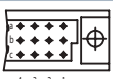
No. of contacts	Contact arrangement	Termination length L 						
		2.5 mm	3.4 mm	4.6 mm	PU (Tray)	13 mm	5.5 mm <small>Manual soldering with solder lug</small>	PU (Tray)
		Part number			Part number			
16		104-90004	-	-	45/765	104-90006	104-90025	21/357
32		304-90014-05	304-90014-01	304-90014-02		304-90016-03	104-90035	
48		304-90064-05	304-90064-01	304-90064-02		304-90066-03	104-90075	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L 			
		2.5 mm	3.4 mm	4.6 mm	PU (Tray)
		Part number			
32		304-90014-05TH	304-90014-01TH	304-90014-02TH	45/765
48		304-90064-05TH	304-90064-01TH	304-90064-02TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 20, 30

Pitch: 2.54 mm

Operational current: 1.5 A

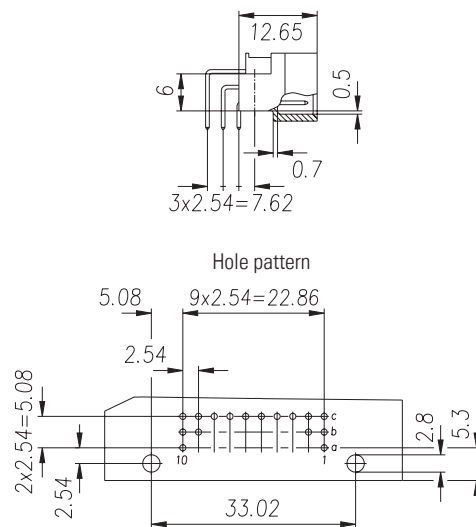
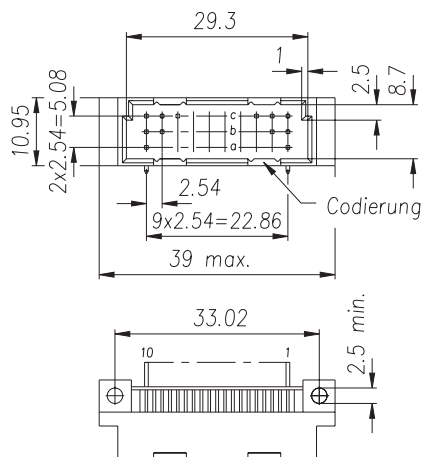
Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66

Dimensions in mm





For detailed drawings visit www.ept.de

Accessories




- Processing tools p. 332
- Coding p. 160

Mating connector / Application:

-  Type C/3 Female connector (p. 92)
-  Type R/3 Female connector (p. 116)



Press-fit - Performance level II 




No. of contacts	Contact arrangement	Termination length L 			
		3.4 mm		13 mm	
		Part number	PU (Tray)	Part number	PU (Tray)
20		103-68004	54/540	103-78006	27/270
30		103-68014		103-78016	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II 




No. of contacts	Contact arrangement	Termination length L 				
		3.0 mm gewinkelt	3.0 mm gerade	PU (Tray)	13 mm gewinkelt	PU (Tray)
		Part number			Part number	
20		103-80014	103-80255	54/540	103-80016	27/270
30		103-80004	103-80265		103-80006	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II 

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm gewinkelt	
		Part number	PU (Tray)
20		103-80014TH	54/540
30		103-80004TH	

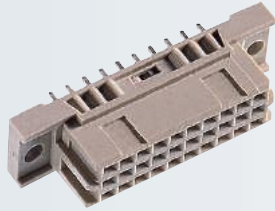
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type C/3 Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 20, 30

Pitch: 2.54 mm

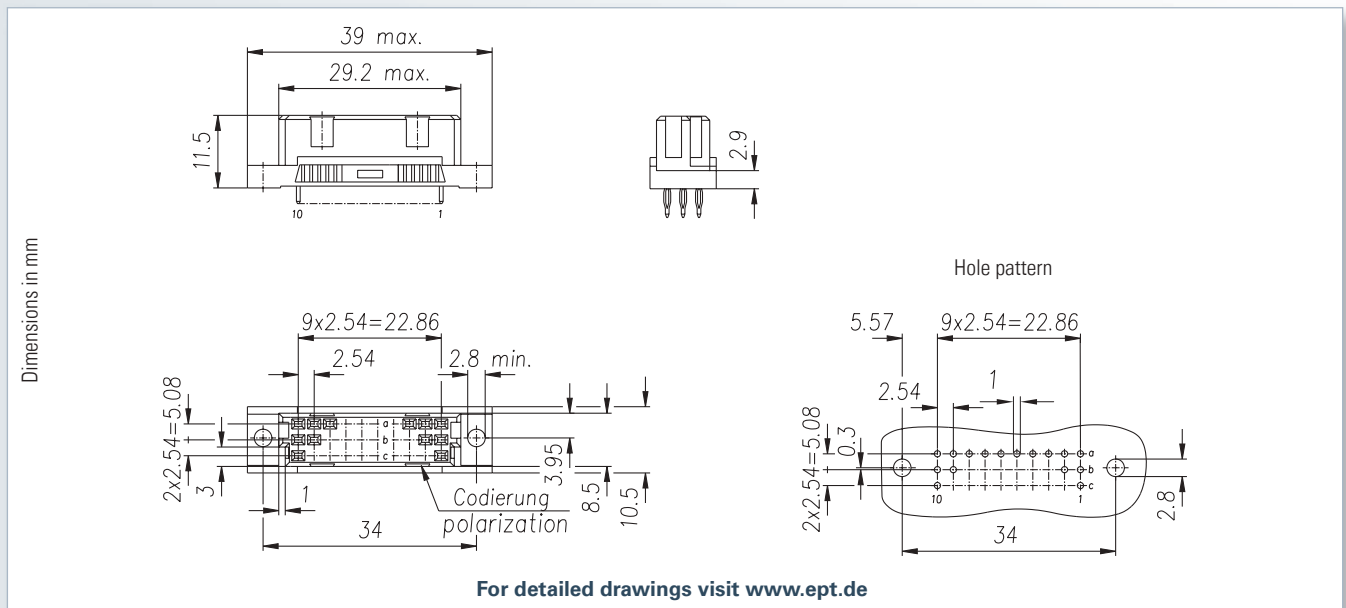
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2





Technical Specifications on page 66



Accessories

- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

-  Type C/3 Male connector (p. 90)
-  Type R/3 Male connector (p. 114)



Press-fit - Performance level II • • •

No. of contacts	Contact arrangement	Termination length L				
		4.6 mm	PU	13 mm	17 mm	PU
		Part number	(Tray)	Part number		(Tray)
20		304-68004-02	45/765	304-78006-03	304-78106-04	21/357
30		304-68014-02		304-78016-03	304-78116-04	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface
Sn e. g. for WireWrap
- without flange
- contact arrangement



Solder - Performance level II • • •

No. of contacts	Contact arrangement	Termination length L						
		2.5 mm	3.4 mm	4.6 mm	PU	13 mm	5.5 mm	PU
		Part number			(Tray)	Part number		(Tray)
20		304-80014-05	304-80014-01	304-80014-02	45/765	304-80016-03	104-80035	21/357
30		304-80064-05	304-80064-01	304-80064-02		304-80066-03	104-80075	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement

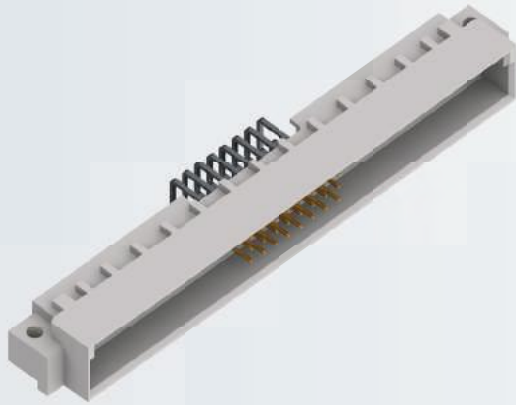


THTR - Performance level II • • •

No. of contacts	Contact arrangement	Termination length L			
		2.5 mm	3.4 mm	4.6 mm	PU
		Part number			(Tray)
20		304-80014-05TH	304-80014-01TH	304-80014-02TH	45/765
30		304-80064-05TH	304-80064-01TH	304-80064-02TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 3 rows

Termination: Solder

Number of contacts: 78+2, 60+4, 42+6, 24+8

Pitch: 2.54 mm

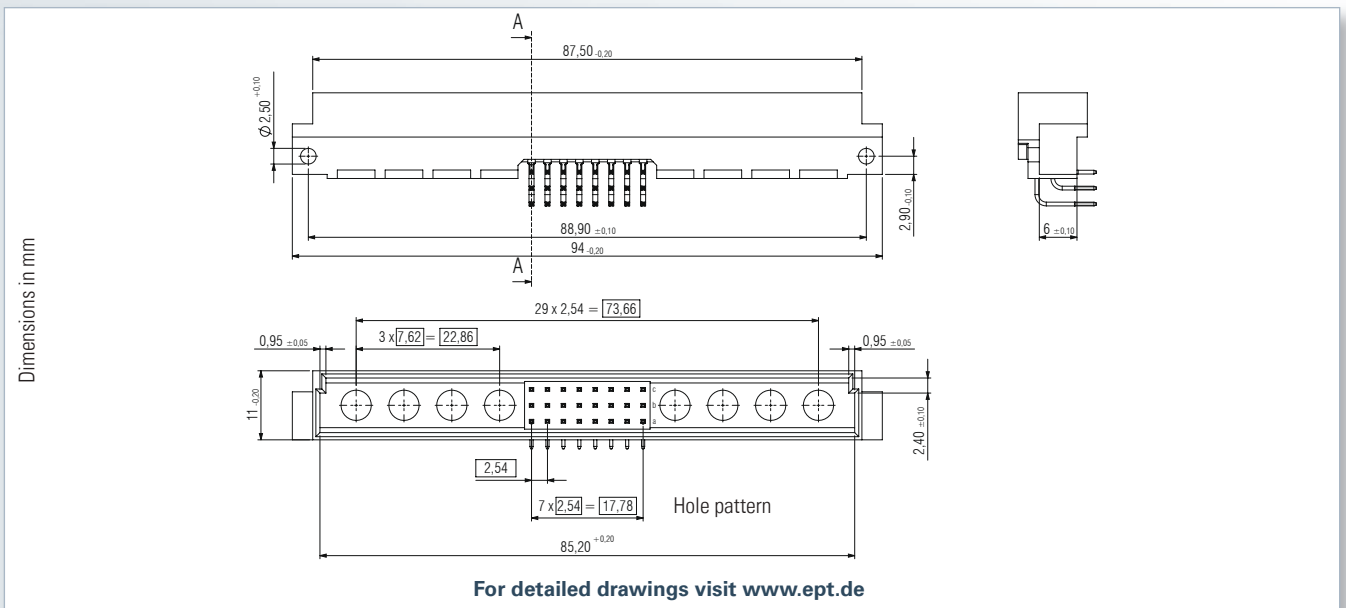
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



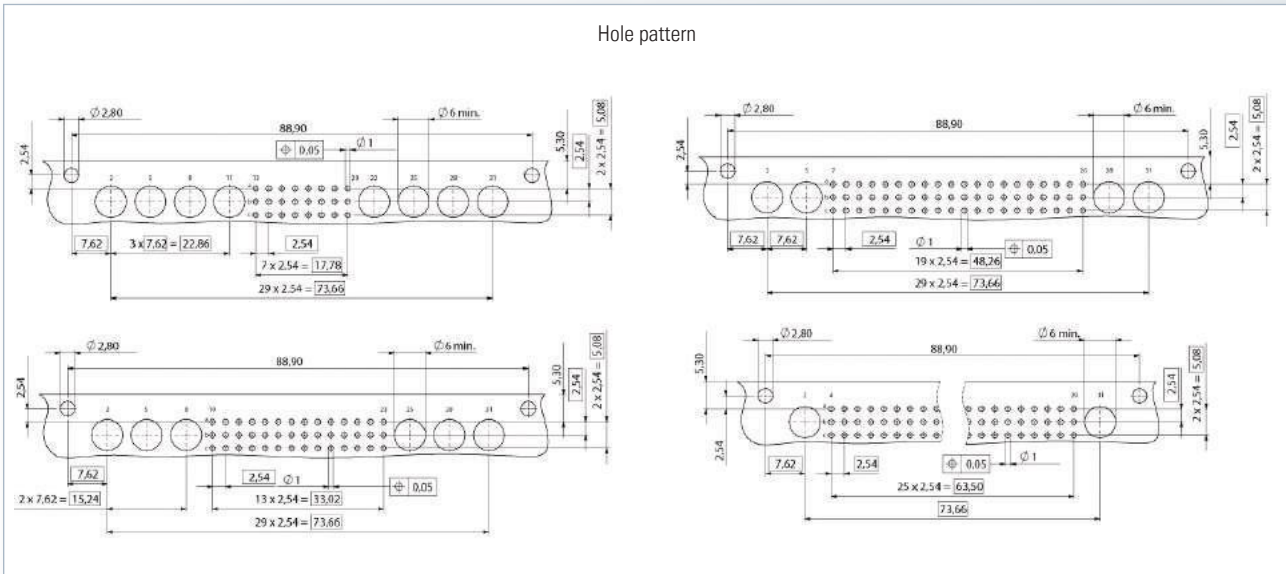
Technical Specifications on page 66



Mating connector / Application:



Type M Female connector (p. 96)



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L	
		3.0 mm	
		Part number	PU (Box)
24/8		123-40181-00	25/400
42/6		123-40161-00	
60/4		123-40141-00	
78/2		123-40121-00	

On request

- performance level I + III or customized

DIN 41612



Type M Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder

Number of contacts: 6+10, 78+2, 60+4, 42+6, 24+8

Pitch: 2.54 mm

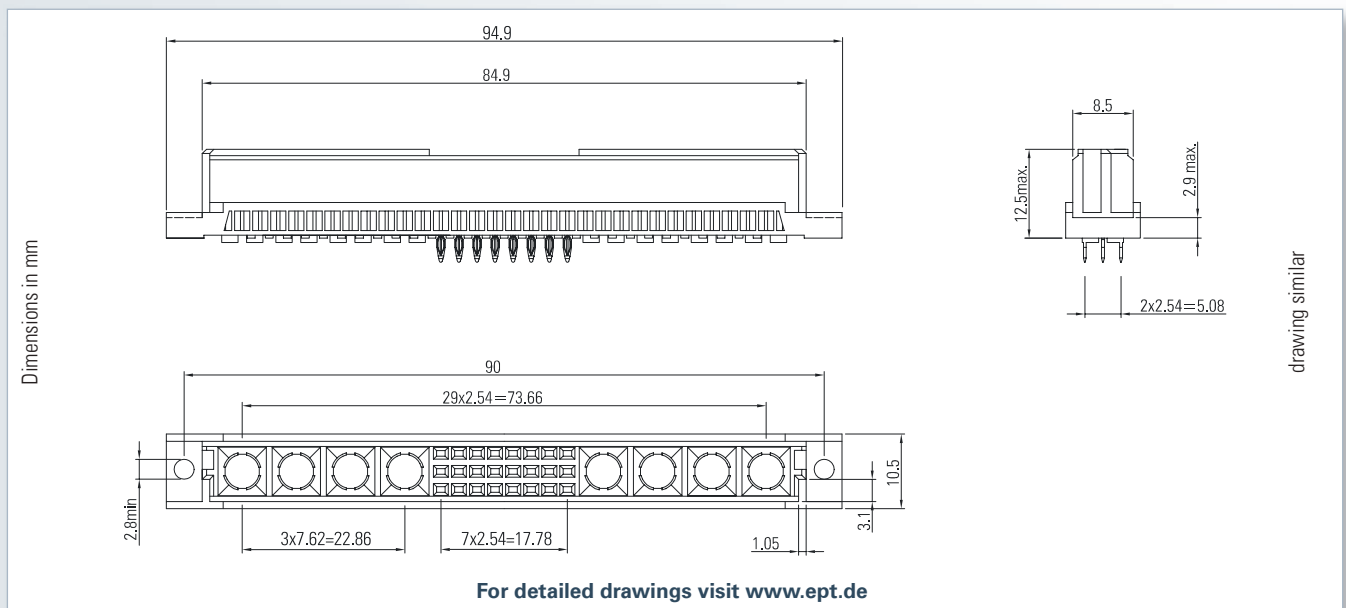
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



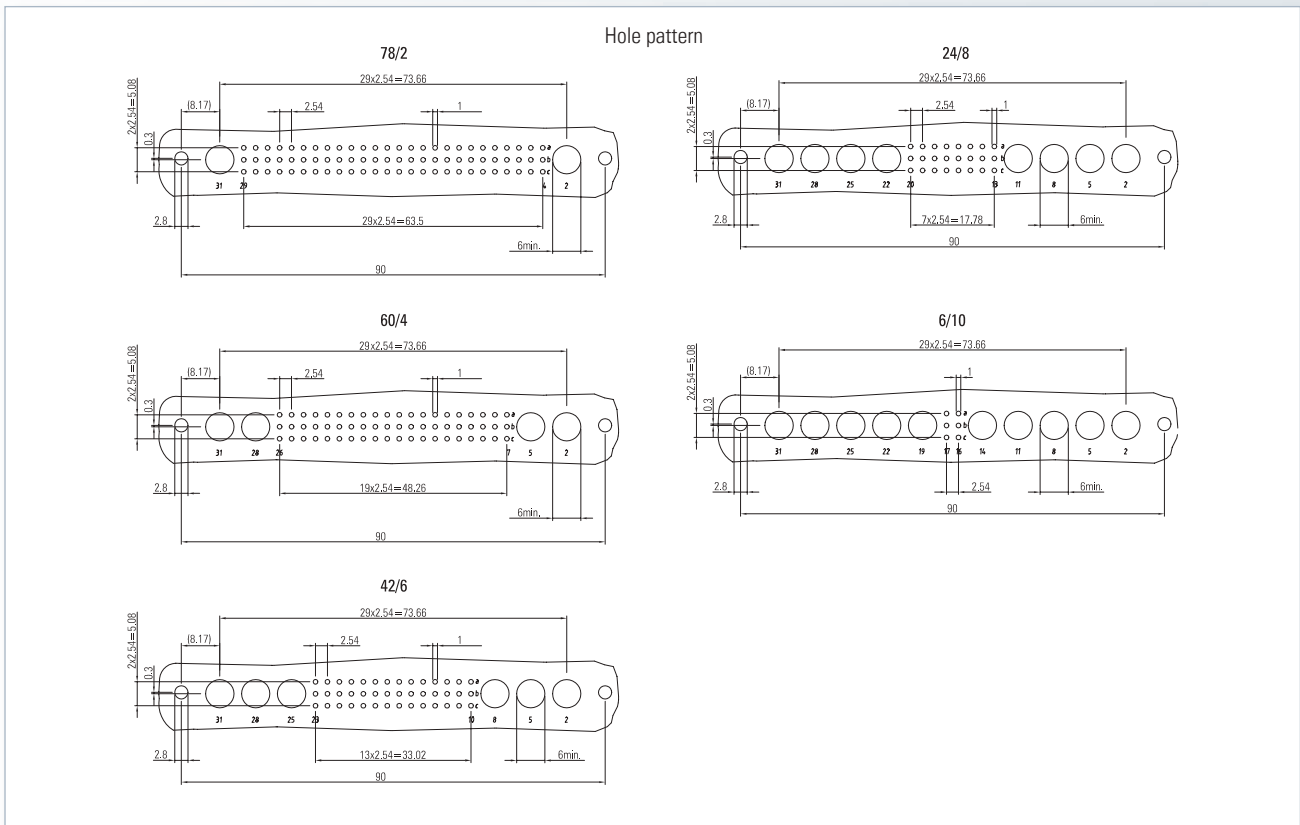
Note

Female connectors must be screwed or riveted onto the printed circuit at the flange.

Mating connector / Application:



Type M Male connector (p. 94)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L	
		4.6 mm	
		Part number	PU (Tube)
6/10		124-60112-00	25/300
24/8		124-60182-00	
42/6		124-60162-00	
60/4		124-60142-00	
78/2		124-60122-00	



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L	
		4.6 mm	
		Part number	PU (Tube)
6/10		124-40112-00	25/300
24/8		124-40182-00	
42/6		124-40162-00	
60/4		124-40142-00	
78/2		124-40122-00	

On request

- performance level I + III or customized
- special contact length
- processing tools

DIN 41612

Type M Female Connector for special Contacts in Press-fit



Type: Female connector straight with 3 rows

Termination: Press-fit

Number of contacts: 6+10, 78+2, 60+4, 42+6, 24+8

Pitch: 2.54 mm

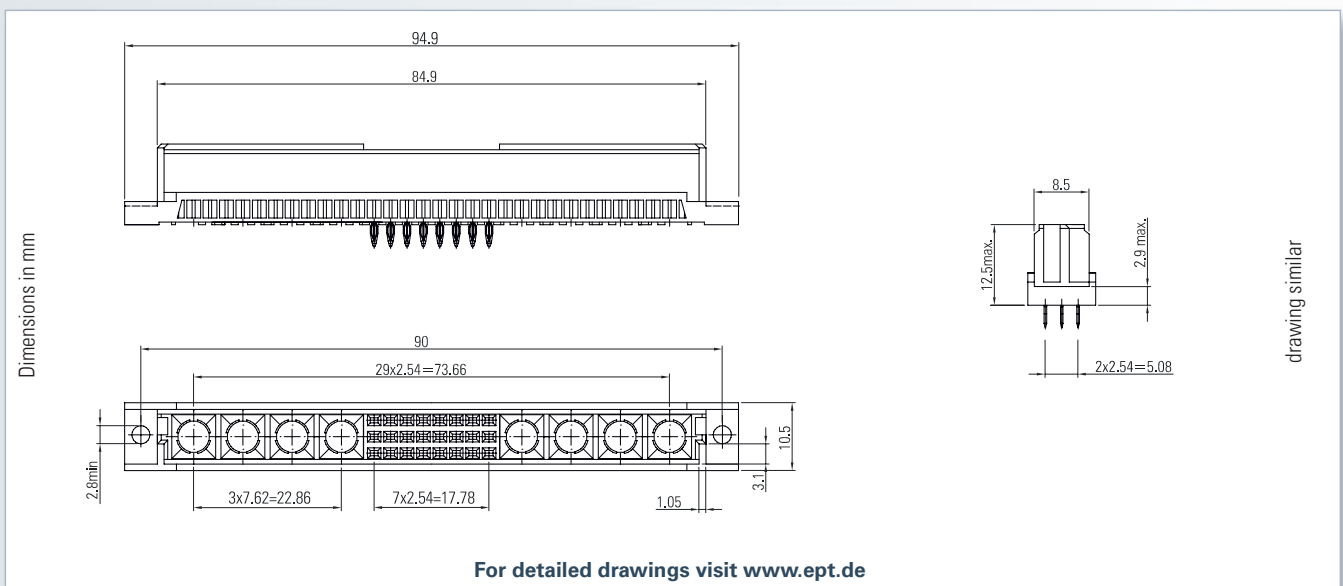
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- High-current contact (Part number 916-61002)

Note

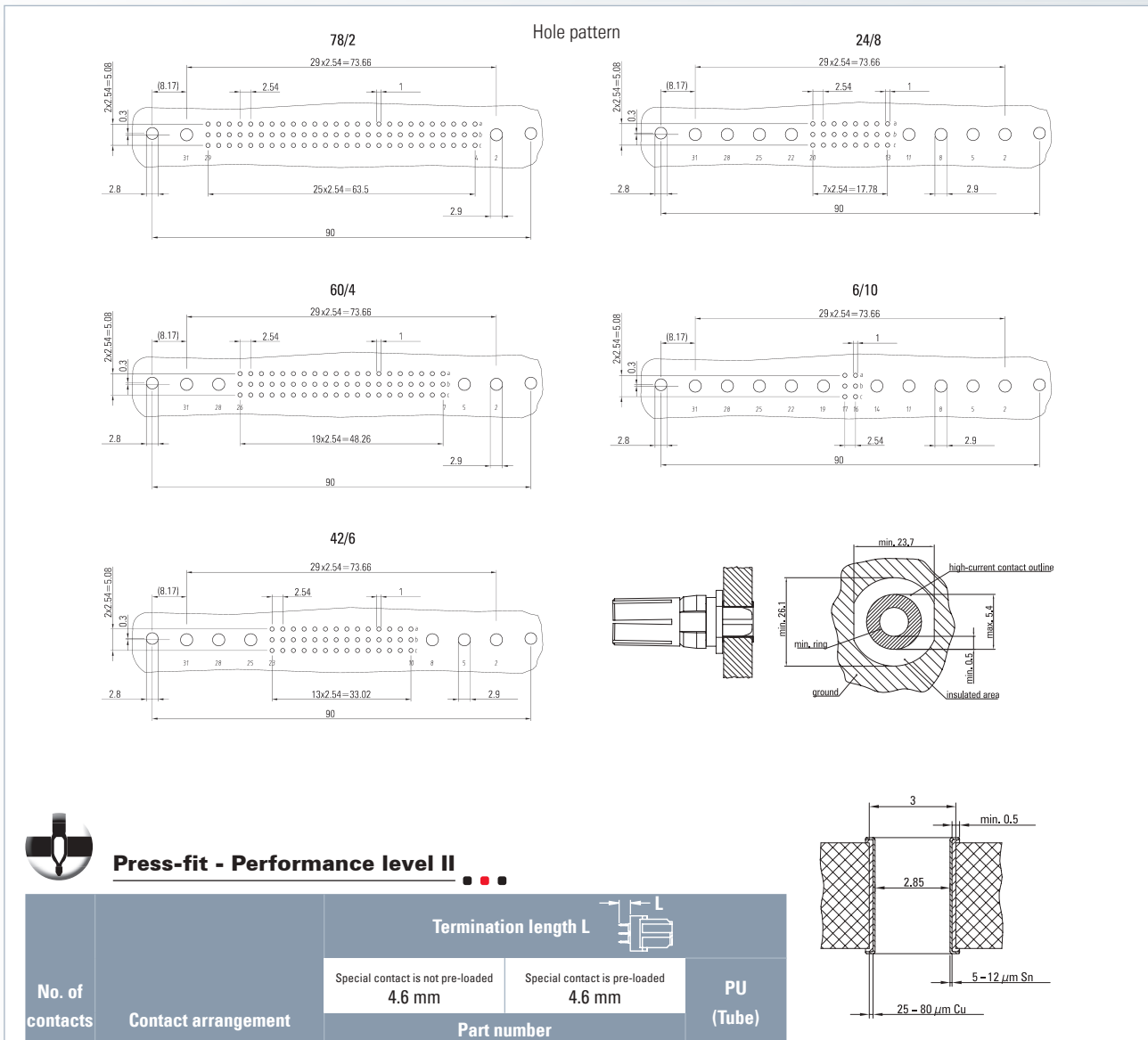
Female connectors must be screwed or riveted onto the printed circuit at the flange.

Mating connector / Application:



Type M Male connector (p. 94)

Type M Female Connector for special Contacts in Press-fit



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L		PU (Tube)
		Special contact is not pre-loaded 4.6 mm	Special contact is pre-loaded 4.6 mm	
		Part number		
6/10		124-60012-00	124-60012-02	25/300
24/8		124-60082-00	124-60082-02	
42/6		124-60062-00	124-60062-02	
60/4		124-60042-00	124-60042-02	
78/2		124-60022-00	124-60022-02	

On request

- performance level I + III or customized
- special contact length
- processing tools
- contact arrangement

DIN 41612

Type M/2, M/3 Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder

Number of contacts: 30+2, 12+2

Pitch: 2.54 mm

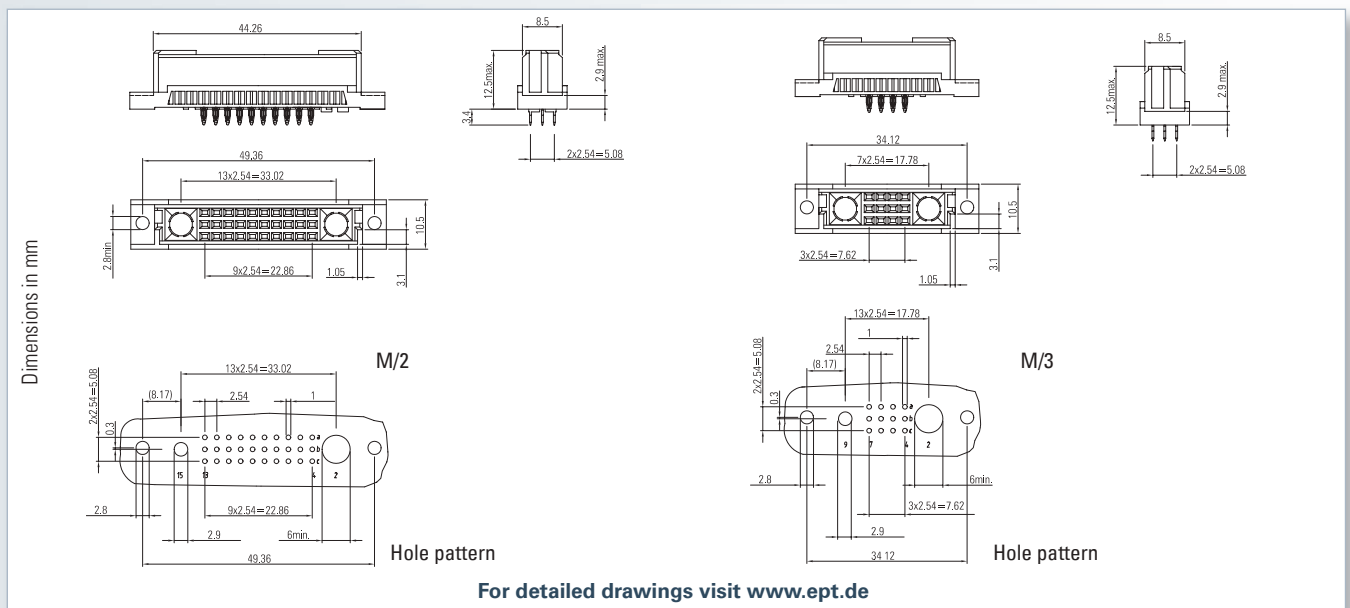
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66






Note

Female connectors must be screwed or riveted onto the printed circuit at the flange.

You couldn't find something suitable or have questions? We will be pleased to help you! Call us: +49 8861 / 25010.



Press-fit - Performance level II




No. of contacts	Contact arrangement	Termination length L 	
		4.6 mm	
		Part number	PU (Tray)
M/2 30/2		124-69122-00	45/765
M/3 12/2		124-68122-00	

On request

- performance level I + III or customized
- special contact length
- processing tools



Solder - Performance level II




No. of contacts	Contact arrangement	Termination length L 	
		4.6 mm	
		Part number	PU (Tray)
M/2 30/2		124-99122-00	45/765
M/3 12/2		124-88122-00	

On request

- performance level I + III or customized
- special contact length
- processing tools



Press-fit with special contact - Performance level II

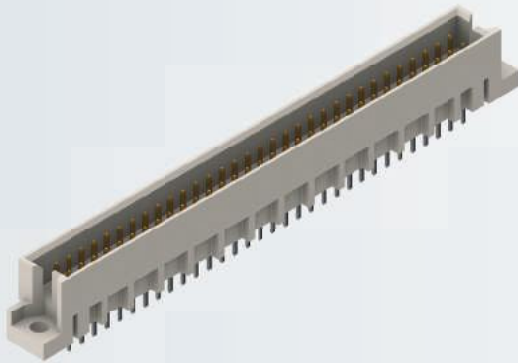
No. of contacts	Contact arrangement	Termination length L 		PU (Tray)
		4.6 mm Special contact is not pre-loaded	4.6 mm Special contact is pre-loaded	
		Part number		
M/2 30/2		124-69022-00	124-69022-02	45/765
M/3 12/2		124-68022-00	124-68022-02	

On request

- performance level I + III or customized
- special contact length
- processing tools
- contact arrangement

DIN 41612

Type Q Male Connector



Type: Male connector straight with 2 rows

Termination: Solder

Number of contacts: 64

Pitch: 2.54 mm

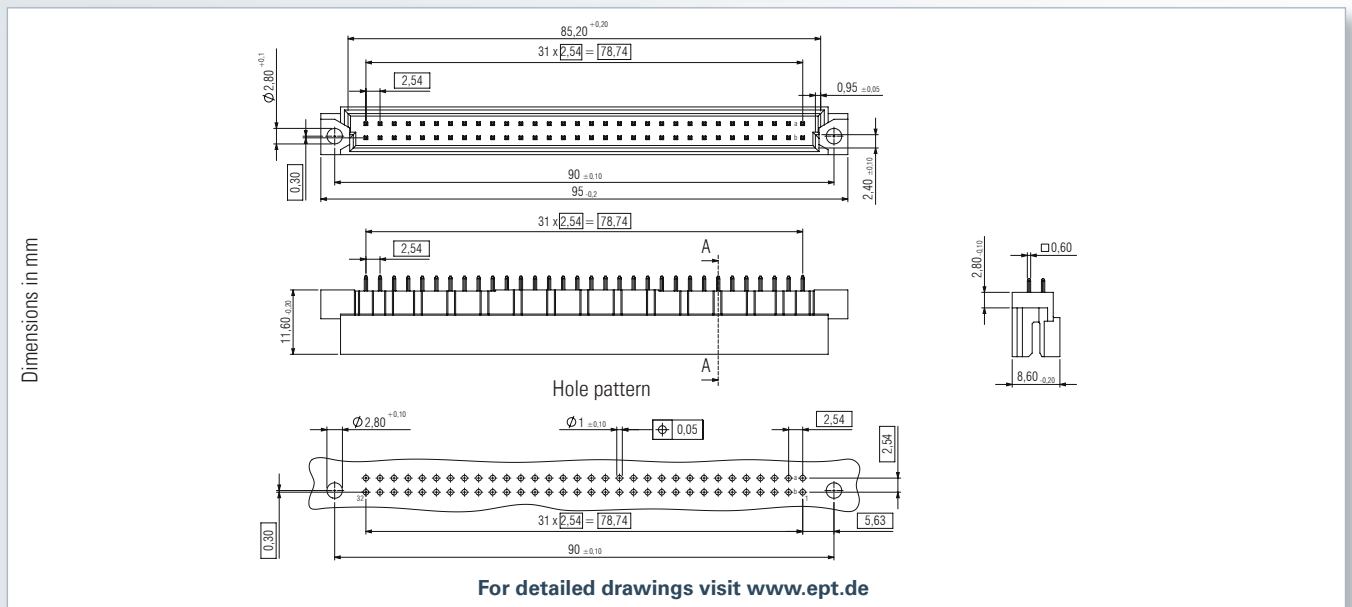
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L		VPE (Karton)
		2.5 mm	4.0 mm	
		Part number		
64		119-40065	119-40074	34/476

On request

- performance level I + III or customized
- Board-Lock p. 159

Mating connector / Application:

Type B Female connector (p. 72)

Type Q Female connector (p. 103)



Type: Female connector 90° with 2 rows

Termination: Solder

Number of contacts: 32

Pitch: 2.54 mm

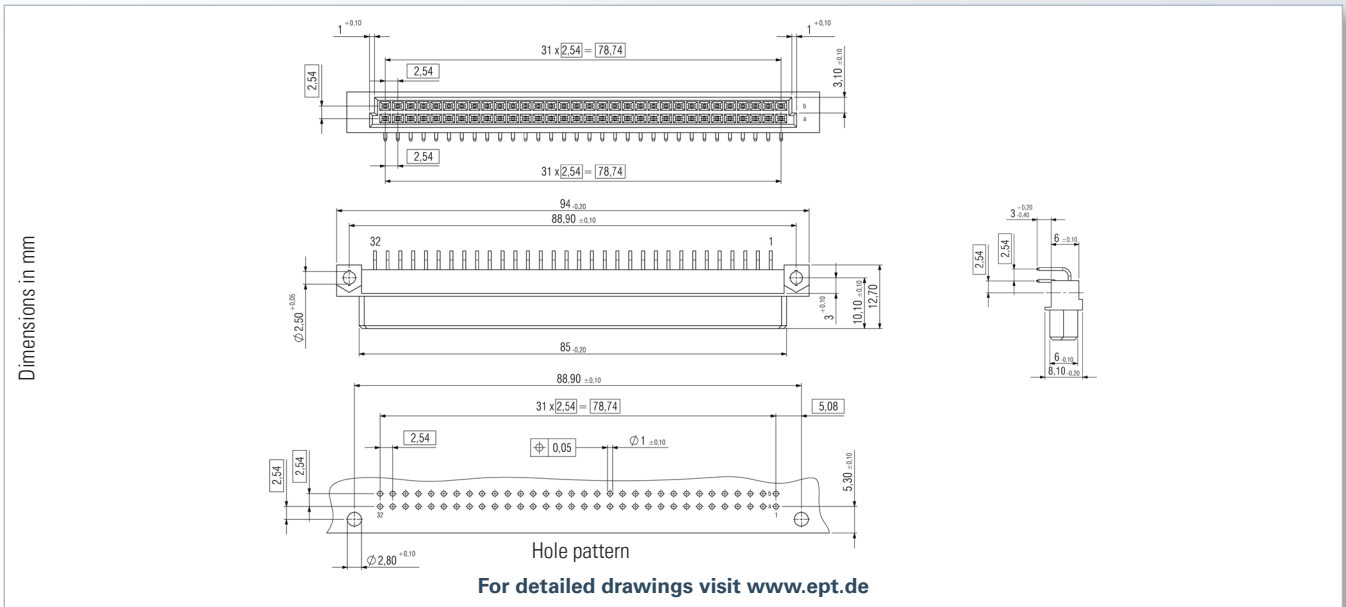
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L
		3.0 mm
		Part number
64	 4 3 2 1	120-40074

On request

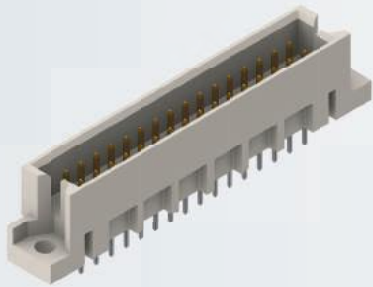
- performance level I + III or customized
- Board-Lock p. 159

Mating connector / Application:

- Type B Male connector (p. 70)
- Type Q Male connector (p. 102)

DIN 41612

Type Q/2 Male connector



Type: Male connector straight with 2 rows

Termination: Solder

Number of contacts: 32

Pitch: 2.54 mm

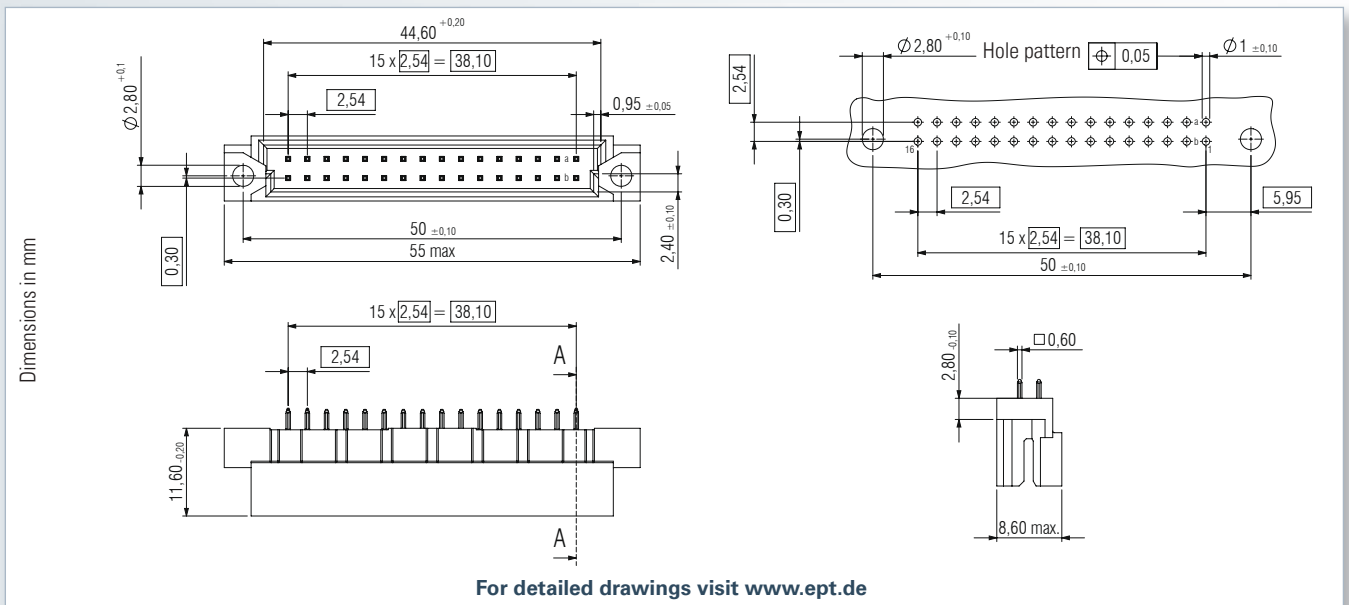
Operational current: 1.5 A

Packaging: Box


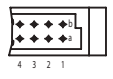
Standard: IEC 60603-2



Technical Specifications on page 66



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L 	
		2.5 mm	4.0 mm
		Part number	
32		119-90064	119-90065

On request

- performance level I + III or customized
- Board-Lock p. 159

Mating connector / Application:

 Type B/2 Female connector (p. 76)

 Type Q/2 Female connector (p. 105)



Type: Female connector 90° with 2 rows

Termination: Solder

Number of contacts: 32

Pitch: 2.54 mm

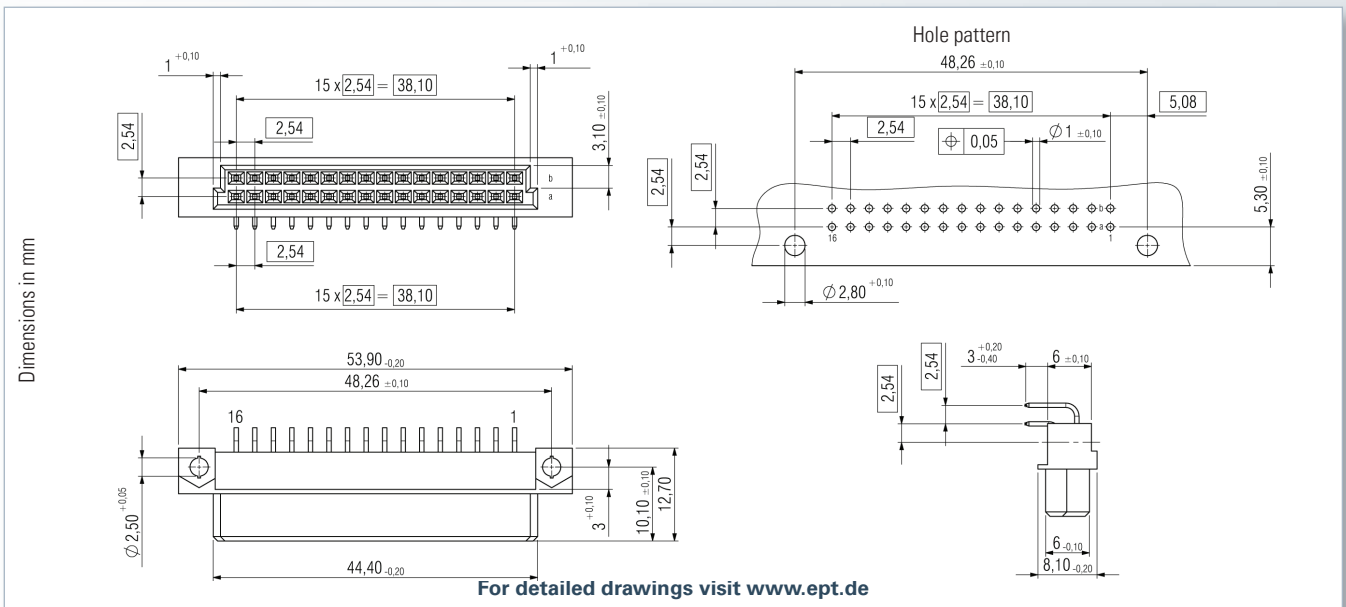
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Löttechnik - Gütestufe II

No. of contacts	Contact arrangement	Termination length L
		3.0 mm
		Part number
32		120-90064

On request

- performance level I + III or customized
- Board-Lock p. 159

Mating connector / Application:

- Type B/2 Male connector (p. 74)
- Type Q/2 Male connector (p. 104)

DIN 41612



Type R Male Connector



Type: Male connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48, 64, 96

Pitch: 2.54 mm

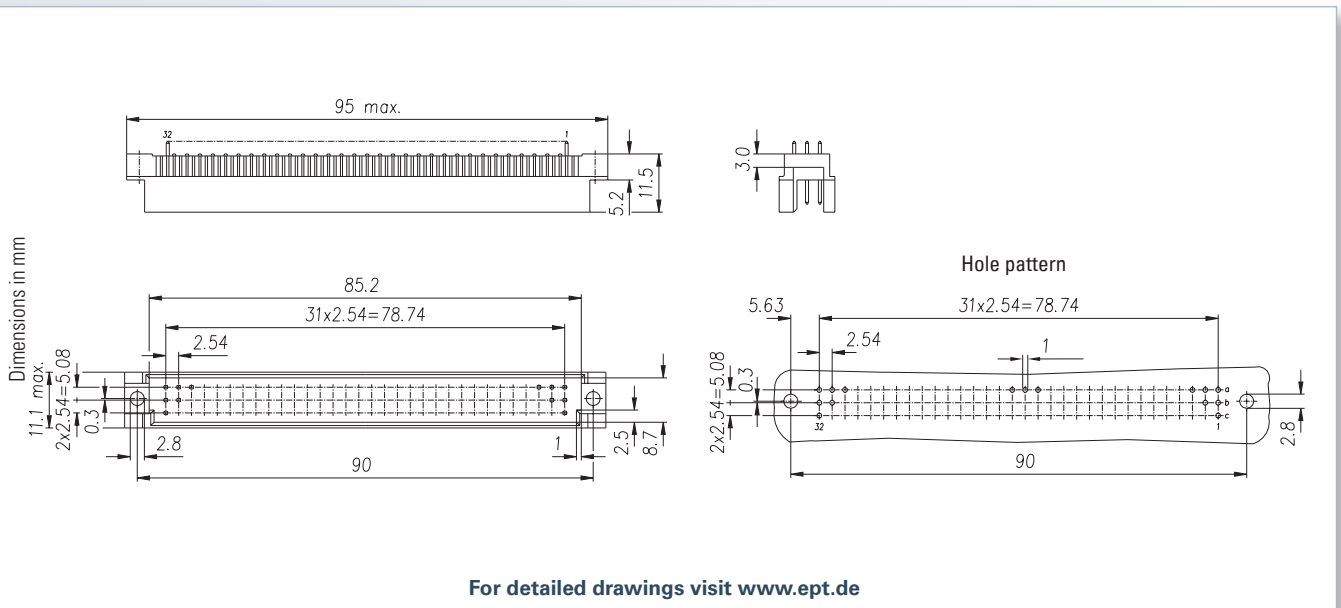
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332
- Shroud p. 151

Mating connector / Application:

 Type R Female connector (p. 108)

 Type C Female connector (p. 84)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L			PU (Tube)
		4.6 mm	13 mm	17 mm	
		Part number			
32		115-60014	115-65015	115-65016	25/300
48		115-60044	115-65045	115-65046	
64		115-60054	115-65055	115-65056	
96		115-60064	115-65065	115-65066	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface
Sn e. g. for WireWrap
- contact arrangement



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L			PU (Tube)
		2.5 mm	4 mm	5.5 mm Handlöt mit Lötöse	
		Part number			
32		115-40015	115-40046	—	25/300
48		115-40026	115-40025	—	
64		115-40035	115-40054	115-40036	
96		115-40065	115-40074	115-40066	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L		PU (Tube)
		2.5 mm	4 mm	
		Part number		
32		115-40015TH	115-40046TH	25/300
48		115-40026TH	115-40025TH	
64		115-40035TH	115-40054TH	
96		115-40065TH	115-40074TH	

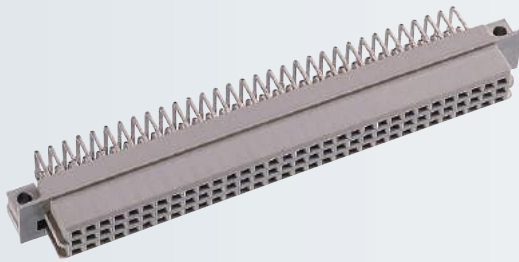
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type R Female Connector



Type: Female connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48, 64, 96

Pitch: 2.54 mm

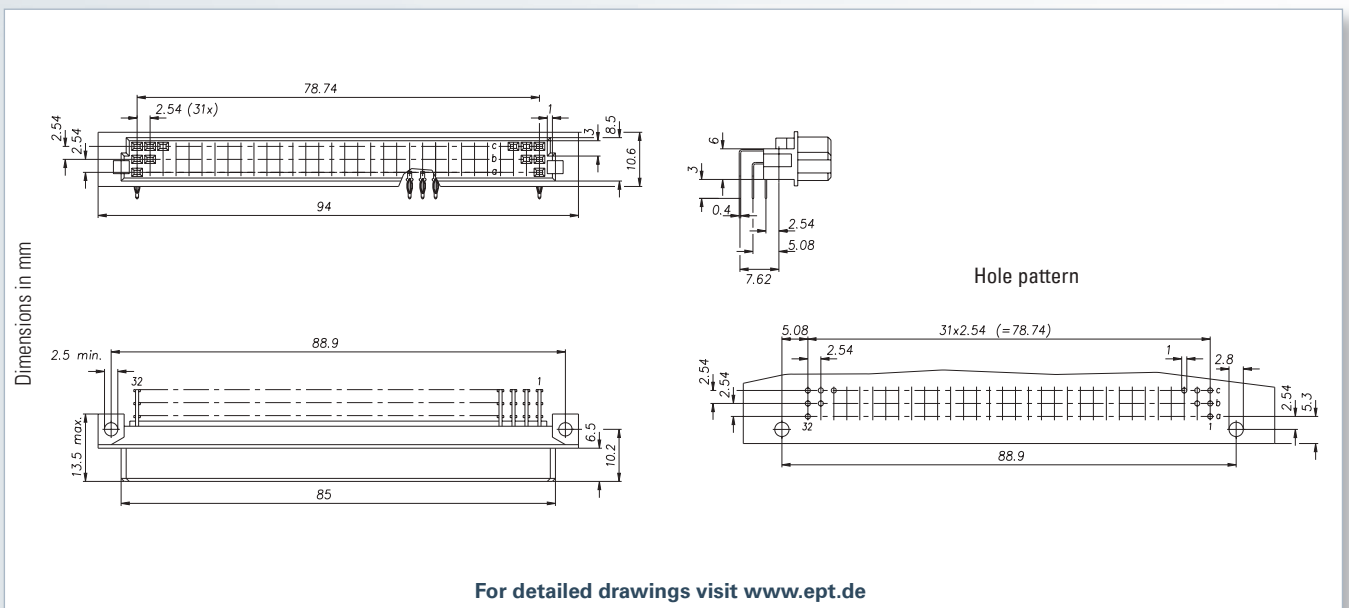
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 36



Accessories

- Processing tools p. 336


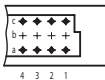
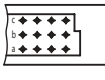
Mating connector / Application:

 Type R Male connector (p. 106)

 Type C Male connector (p. 82)



Press-fit - Performance level II 


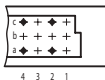
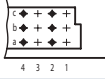
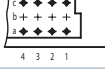

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tube)
64		116-60054	27/432
96		116-60074	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II 


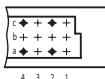
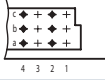
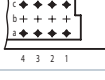

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tube)
32		116-40034	27/432
48		116-40044	
64		116-40054	
96		116-40074	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II 

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tube)
32		116-40034TH	27/432
48		116-40044TH	
64		116-40054TH	
96		116-40074TH	

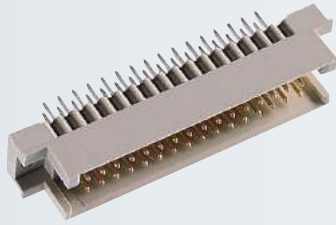
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type R/2 Male Connector



Type: Male connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48

Pitch: 2.54 mm

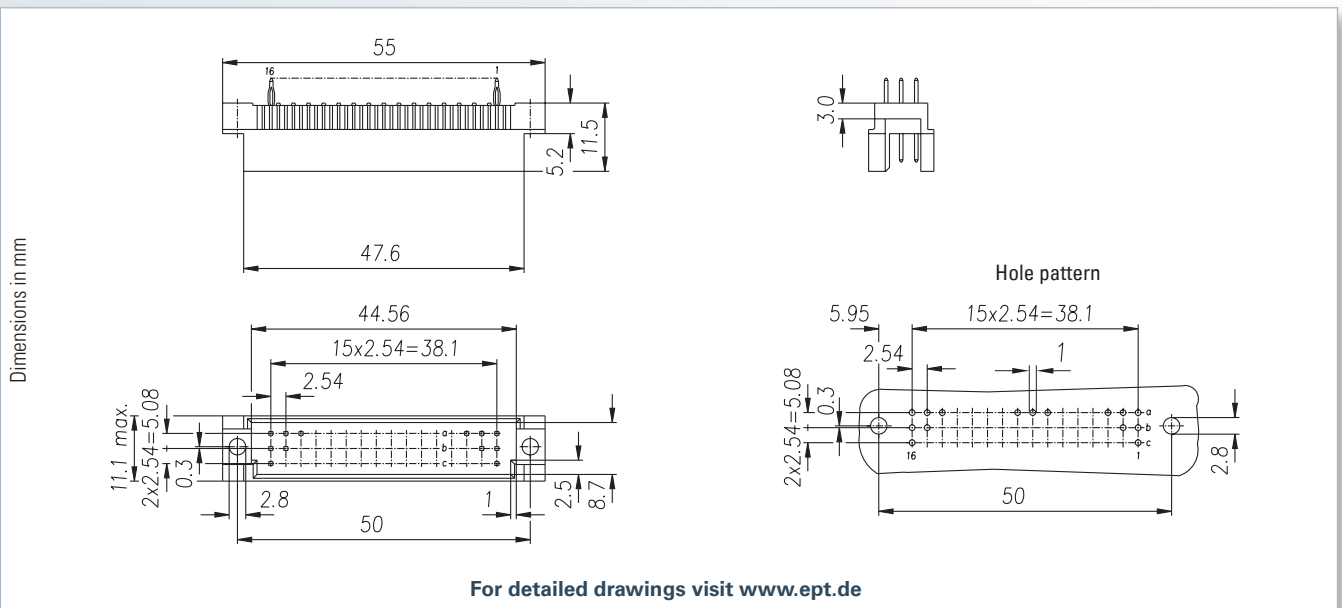
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332

Mating connector / Application:

 Type R/2 Female connector (p. 112)

 Type C/2 Female connector (p. 88)



Press-fit - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			PU (Box)
		4.6 mm	13 mm	17 mm	
		Part number			
32		115-69054	115-79055	115-79056	26/468
48		115-69064	115-79065	115-79066	

On request

- performance level I + III or customized
- special contact length
- alternative contact surface
Sn e. g. for WireWrap
- contact arrangement



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L		PU (Box)
		2.5 mm	4.0 mm	
		Part number		
32		115-90014	115-90015	26/468
48		115-90064	115-90065	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II •••

No. of contacts	Contact arrangement	Termination length L		PU (Box)
		2.5 mm	4.0 mm	
		Part number		
32		115-90014TH	115-90015TH	26/468
48		115-90064TH	115-90065TH	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type R/2 Female Connector



Type: Female connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 32, 48

Pitch: 2.54 mm

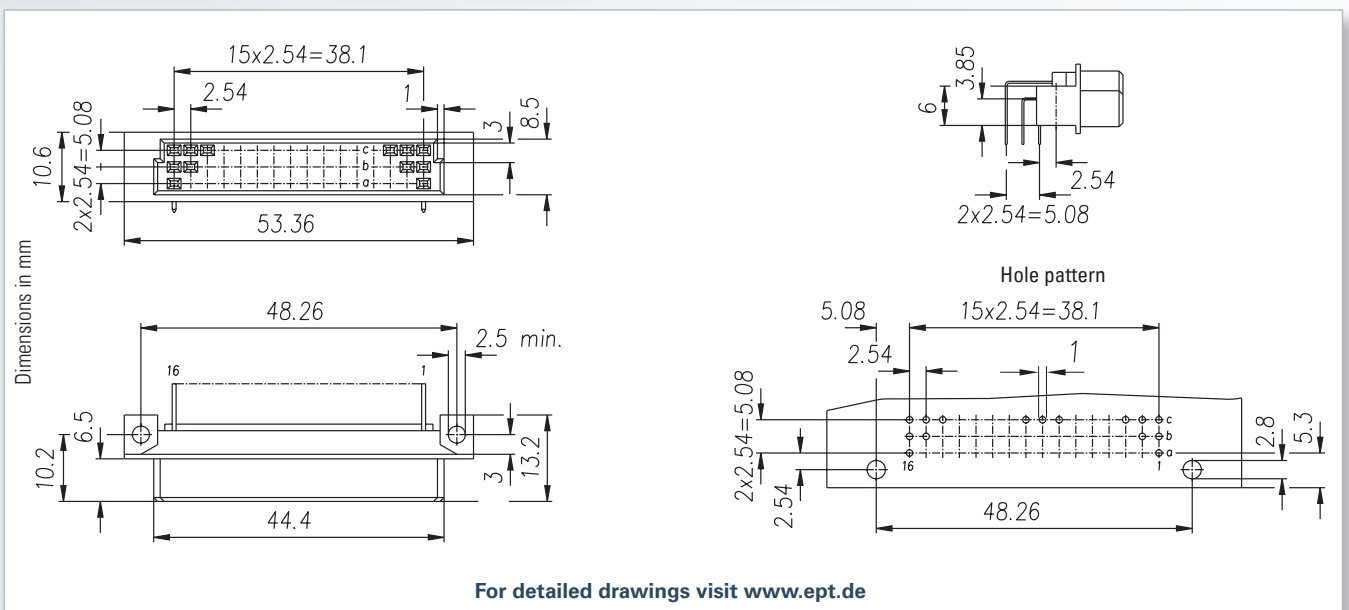
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 336


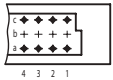
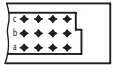
Mating connector / Application:

 Type R/2 Male connector (p. 110)

 Type C/2 Male connector (p. 86)



Press-fit - Performance level II 


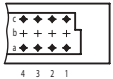
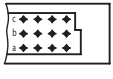
No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
32		116-69054	54/540
48		116-69064	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II 


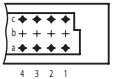
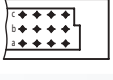
No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
32		116-90054	54/540
48		116-90064	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II 

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
32		116-90054TH	54/540
48		116-90064TH	

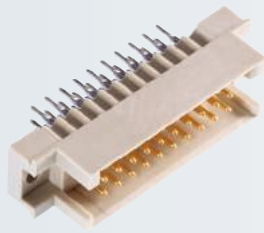
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type R/3 Male Connector



Type: Male connector straight with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 30

Pitch: 2.54 mm

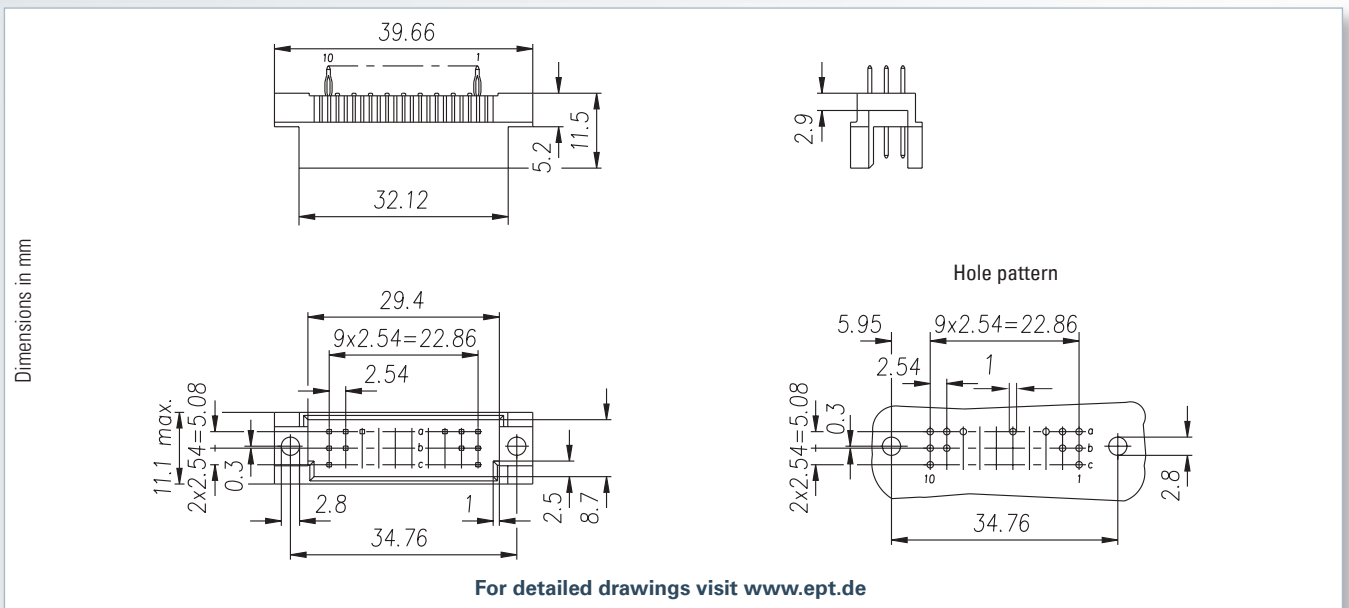
Operational current: 1.5 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 332

Mating connector / Application:

 Type R/3 Female connector (p. 116)

 Type C/3 Female connector (p. 92)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L				
		4.6 mm	PU	13 mm	17 mm	PU
		Part number	(Box)	Part number		(Box)
30		115-68014	150/1050	115-78015	115-78016	100/700

On request

- performance level I + III or customized
- special contact length
- alternative contact surface Sn e. g. for WireWrap
- contact arrangement



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L			
		2.5 mm		4.0 mm	
		Part number	PU (Box)	Part number	PU (Box)
30		115-80064	200/1400	115-80065	150/1050

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L			
		2.5 mm		4.0 mm	
		Part number	PU (Box)	Part number	PU (Box)
30		115-80064TH	200/1400	115-80065TH	150/1050

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement



Type: Female connector 90° with 3 rows

Termination: Press-fit, solder, THTR

Number of contacts: 30

Pitch: 2.54 mm

Operational current: 1.5 A

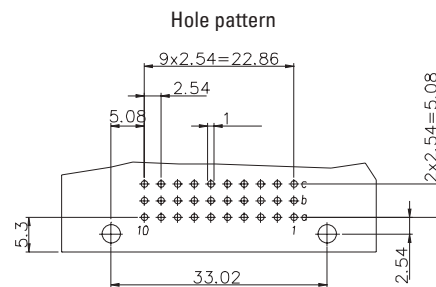
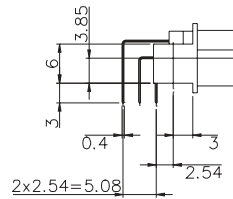
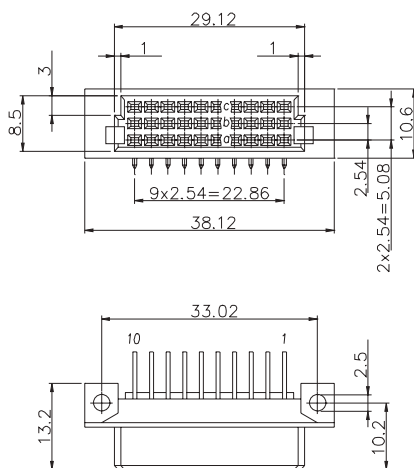
Packaging: Tray

Standard: IEC 60603-2



Technical Specifications on page 66

Dimensions in mm



For detailed drawings visit www.ept.de

Accessories

- Processing tools p. 336



Mating connector / Application:

 Type R/3 Male connector (p. 114)

 Type C/3 Male connector (p. 90)



Press-fit - Performance level II



No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
30		116-68064	54/540

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II


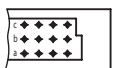
No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
30		116-80064	54/540

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II

No. of contacts	Contact arrangement	Termination length L 	
		3.0 mm	
		Part number	PU (Tray)
30		116-80064TH	54/540

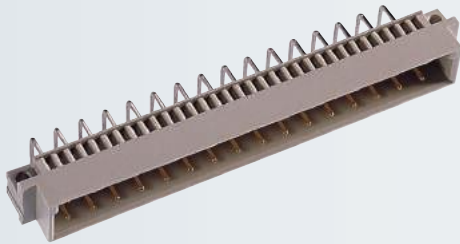
On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type D Male Connector



Type: Male connector 90° with 2 rows

Termination: Solder

Number of contacts: 16, 32

Pitch: 5.08 mm

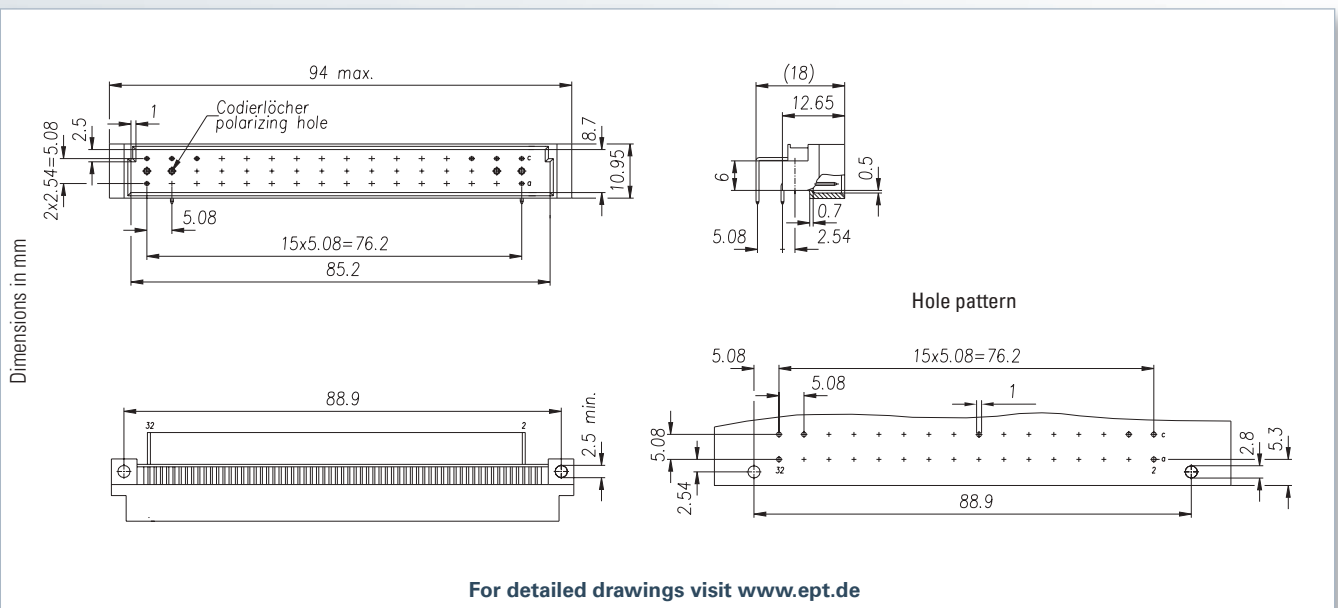
Operational current: 5.6 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:



Type D Female connector (p. 120)



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L		PU (Tube)
		3.0 mm angled	3.7 mm straight	
		Part number		
16		105-40014	105-40016	25/400
32		105-40064	105-40066	

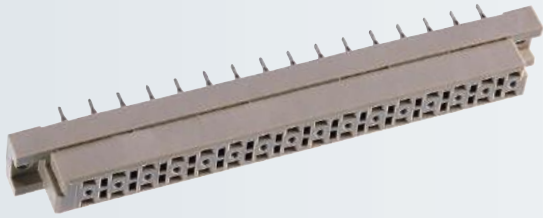
On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type D Female Connector



Type: Female connector straight with 2 rows

Termination: Press-fit, solder

Number of contacts: 32

Pitch: 5.08 mm

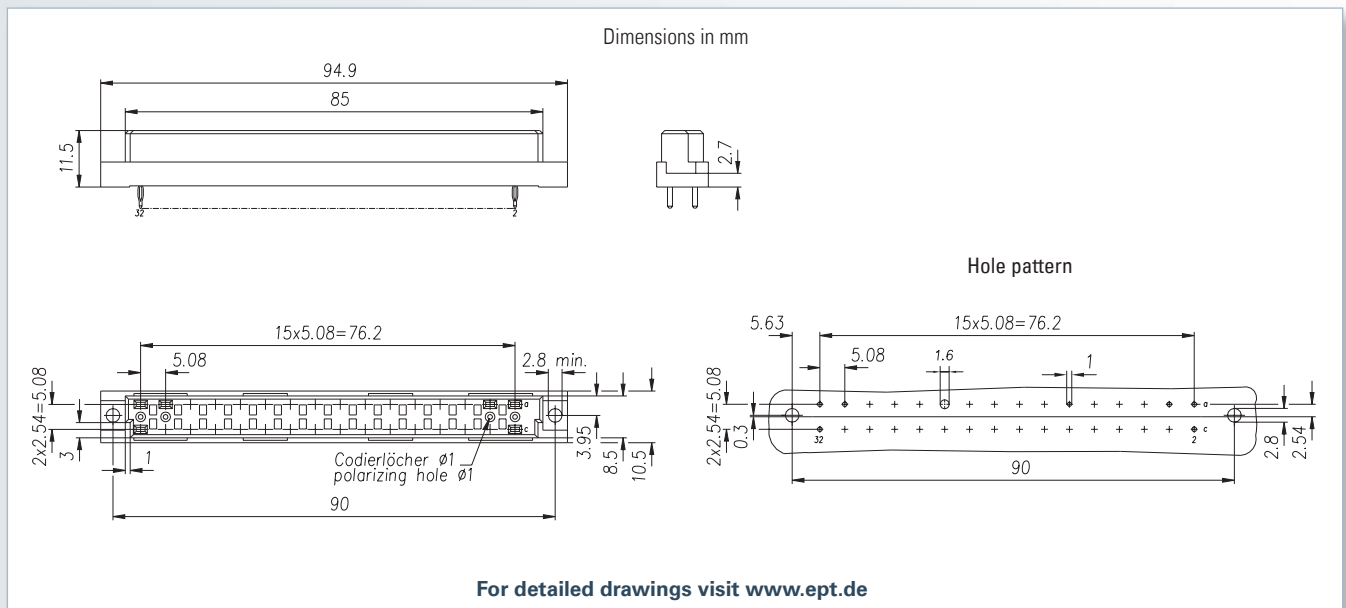
Operational current: 5.6 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories


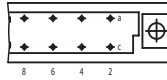
- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

 Type D Male connector (p. 118)



Press-fit - Performance level II • • •


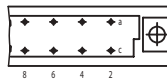
No. of contacts	Contact arrangement	Termination length L 	
		4.6 mm	PU (Tube)
		Part number	
32		106-60084 hole diameter 1.0 mm	25/300

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II • • •

No. of contacts	Contact arrangement	Termination length L 					PU (Tube)
		4.0 mm	20 mm	2.5 mm	4.6 mm	5.5 mm <small>Manual soldering with solder lug</small>	
		Part number					
32		106-40064	106-40065	106-40084	106-40075	106-40066	25/300

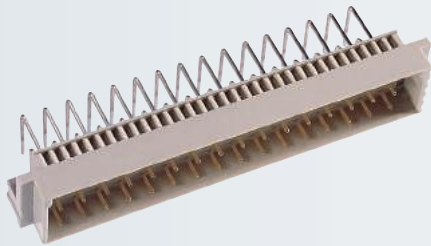
On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type E Male Connector



Type: Male connector 90° with 3 rows

Termination: Solder

Number of contacts: 32, 48

Pitch: 5.08 mm

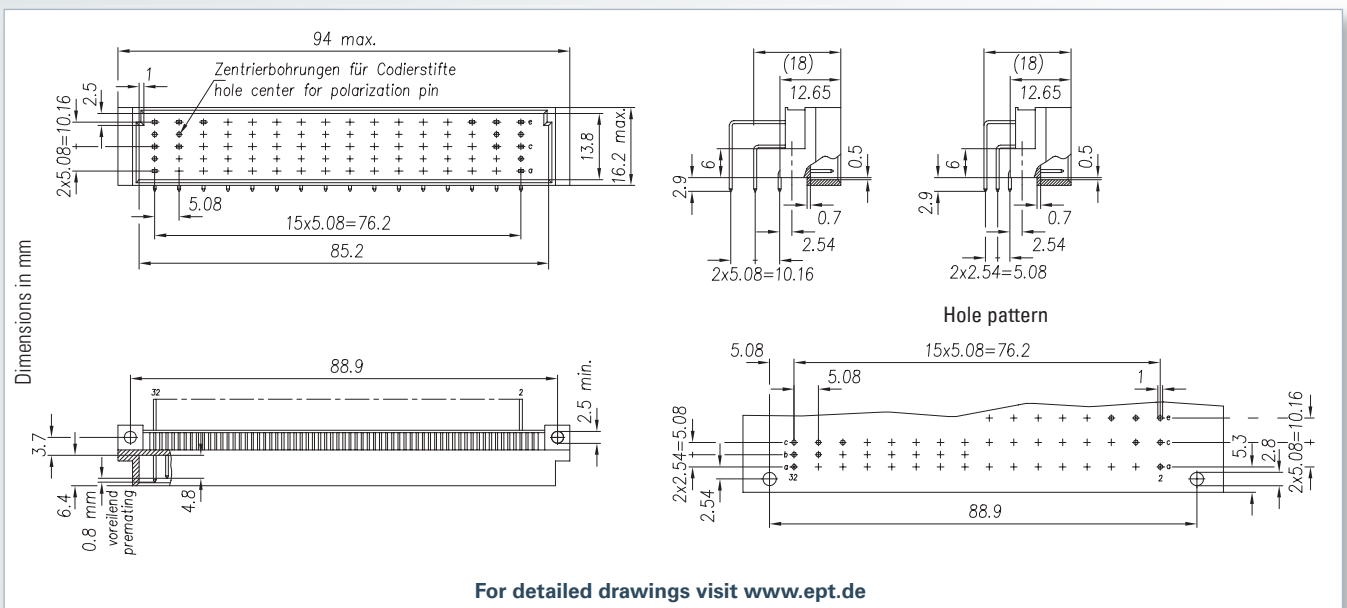
Operational current: 5.6 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:



Type E Female connector (p. 124)



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L			PU (Tube)
		2.9 mm Pitch 5.08 mm	2.9 mm Pitch 2.54 mm	3.7 mm	
		Part number			
32		107-40024	107-40025	107-40026	17/272
32		107-40014	107-40015	107-40016	
48		107-40064	107-40065	107-40066	

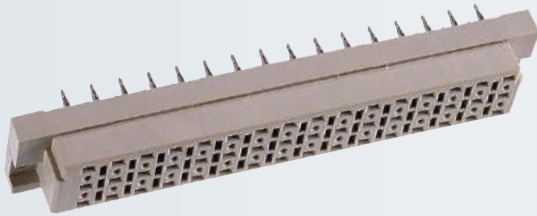
On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type E Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder

Number of contacts: 32, 48

Pitch: 5.08 mm

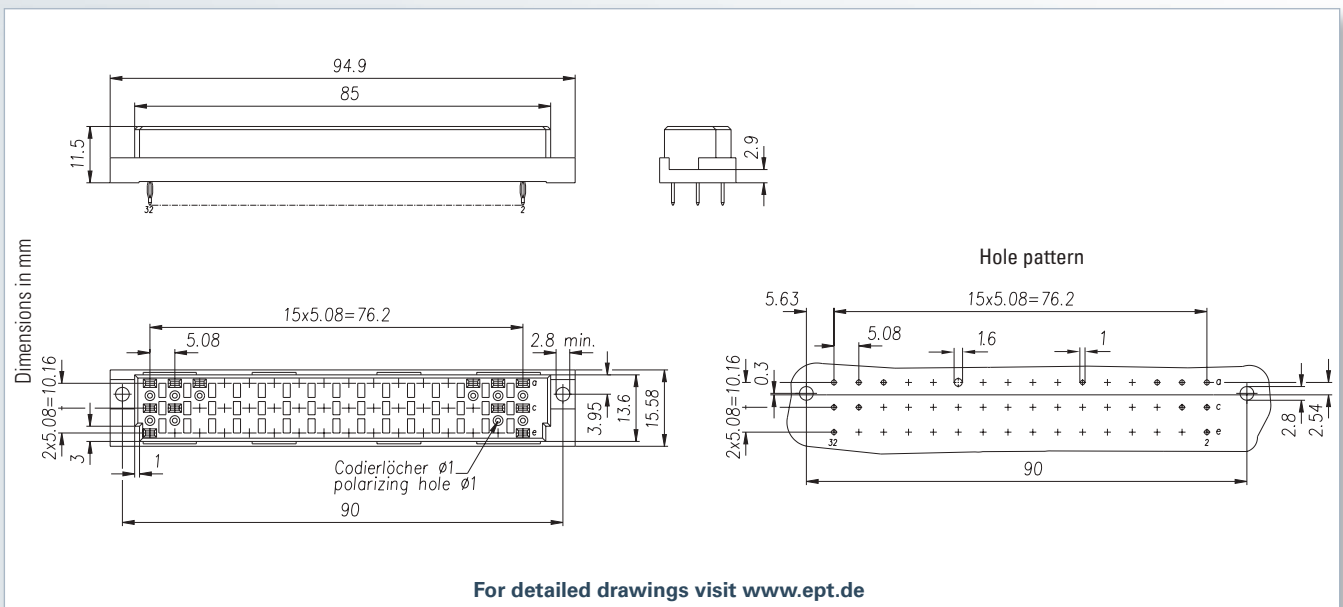
Operational current: 5.6 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 334
- Coding p. 160

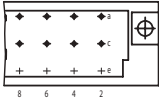
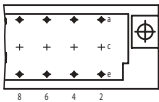
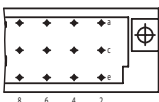
Mating connector / Application:



Type E Male connector (p. 122)



Press-fit - Performance level II • • •

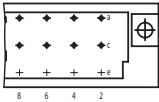
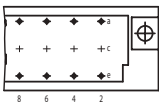
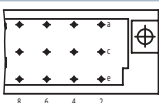
No. of contacts	Contact arrangement	Termination length L	
		4.6 mm	PU (Tube)
		Part number	
32		108-60054 Lochdurchmesser 1.0 mm	17/204
32		108-60044 Lochdurchmesser 1.0 mm	
48		108-60084 Lochdurchmesser 1.0 mm	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement

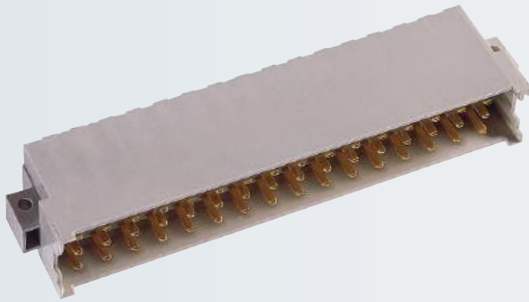


Solder - Performance level II • • •

No. of contacts	Contact arrangement	Termination length L					PU (Tube)
		4.0 mm	20 mm	2.5 mm	4.6 mm	5.5 mm <small>Manual soldering with solder lug</small>	
		Part number					
32		108-40014	108-40015	–	108-40044	108-40046	17/204
32		108-40024	108-40025	–	108-40034	108-40036	
48		108-40064	108-40065	108-40084	108-40074	108-40076	

On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement



Type: Male connector 90° with 3 rows

Termination: Solder, THTR

Number of contacts: 32, 48

Pitch: 5.08 mm x 3.81 mm

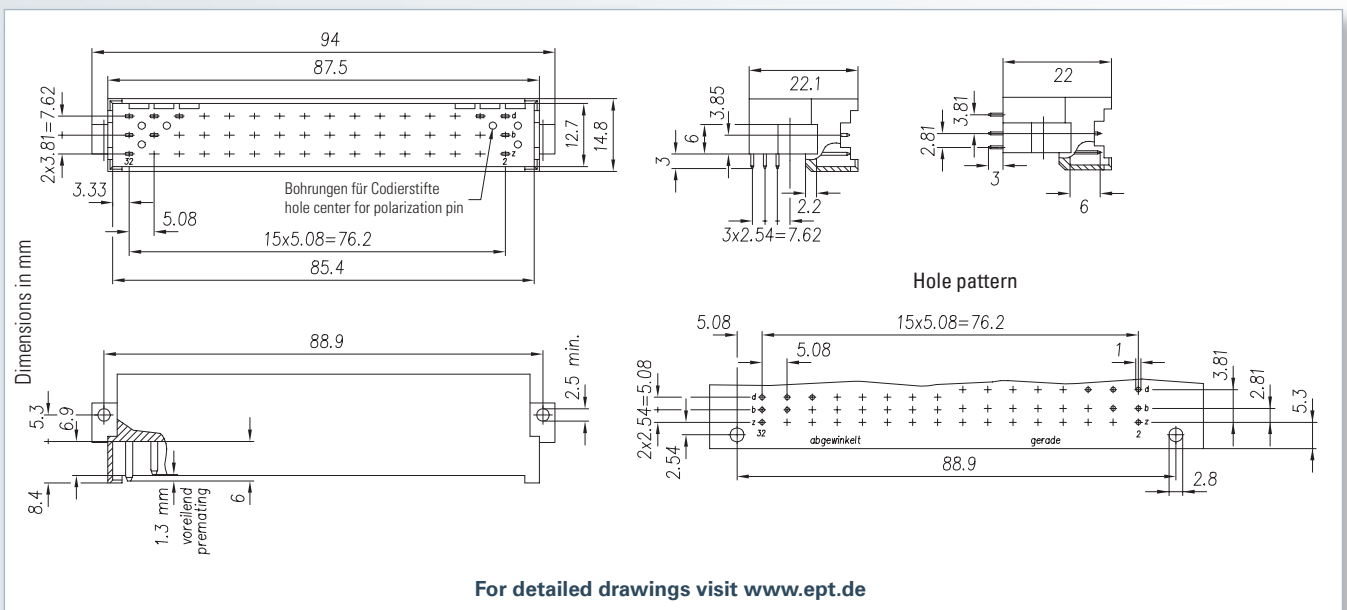
Operational current: 5.6 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:






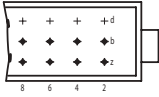
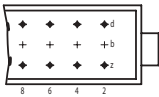
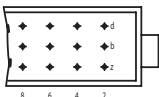
Type F Female connector (p. 128)



Type F low profile Female connector (p. 130)



Solder - Performance level II •••

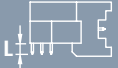

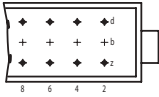
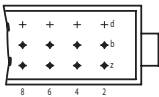
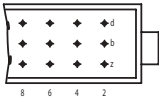
No. of contacts	Contact arrangement	Termination length			PU (Box)
					
		3 mm 3 rows below	3 mm 3 rows sideways	3 mm 2 rows below	
Part number					
32		-	109-40025	109-40024	19/266
32		109-40014	109-40015	-	
48		109-40064	109-40065	-	

On request

- performance level I + III or customized
- special contact length
- Board-Lock p. 159
- contact arrangement



THTR - Performance level II •••

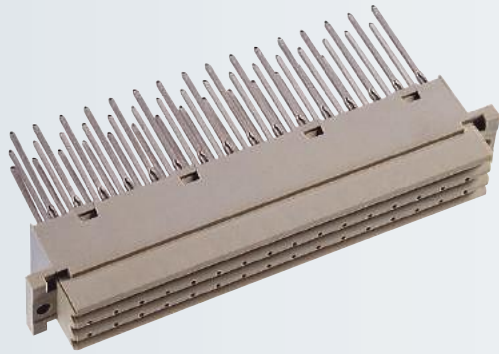
No. of contacts	Contact arrangement	Termination length		PU (Box)
				
		3 mm 3 rows angled	3 mm 2 rows straight	
Part number				
32		109-40014TH	-	19/266
32		-	109-40024TH	
48		109-40064TH	-	

On request

- performance level I + III or customized
- special contact length
- other termination lengths in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612

Type F Female Connector



Type: Female connector straight with 3 rows

Termination: Solder

Number of contacts: 32, 48

Pitch: 5.08 mm x 3.81 mm

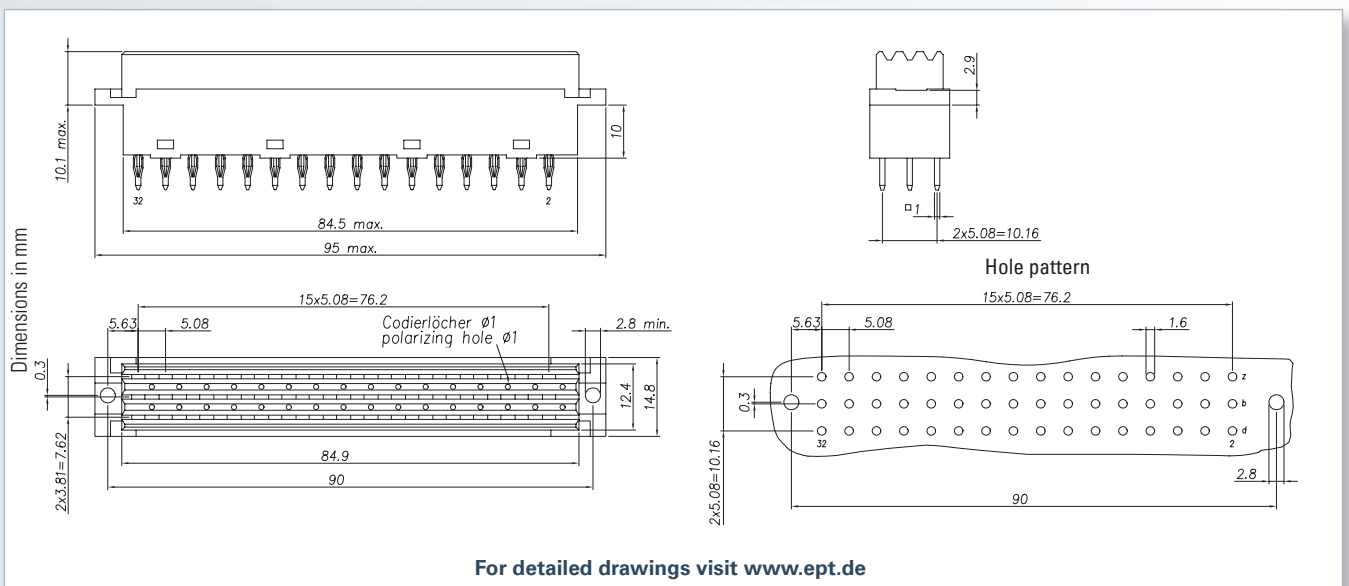
Operational current: 5.6 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:



Type F Male connector (p. 126)



Solder - Performance level II •••

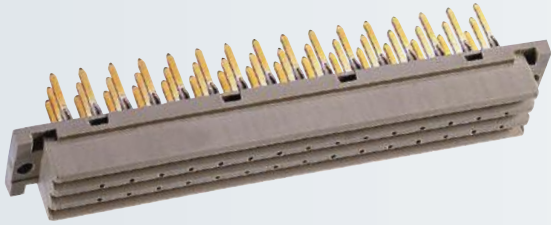
No. of contacts	Contact arrangement	Termination length L				PU (Box)
		4.5 mm Ø 1 mm	22 mm	4.5 mm Ø 0.7 mm	5.5 / 10.9 mm <small>Manual soldering with solder lug</small>	
Part number						
32		110-40025	110-40024	110-40005	110-40046	19/190
32		110-40015	110-40014	110-40004	110-40036	
48		110-40065	110-40064	110-40084	110-40076	

On request

- performance level I + III or customized
- special contact length
- also in THTR
- contact arrangement

DIN 41612

Type F low Profile Female Connector



Type: Female connector straight with 3 rows

Termination: Press-fit, solder

Number of contacts: 32, 48

Pitch: 5.08 mm x 3.81 mm

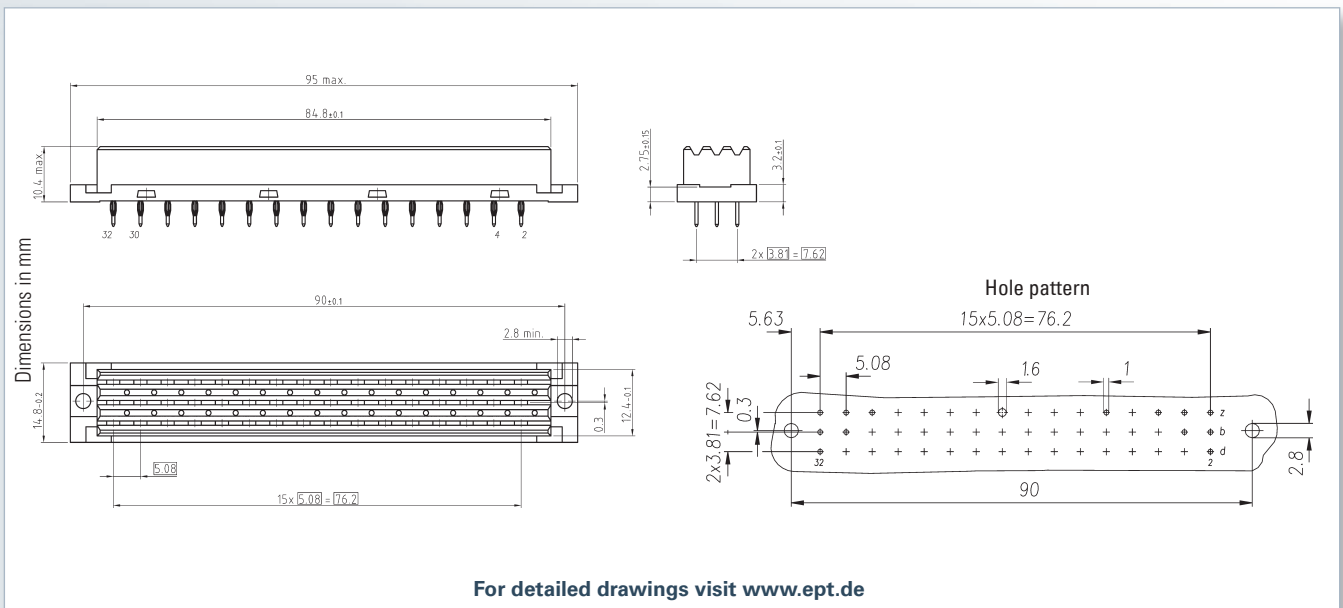
Operational current: 5.6 A

Packaging: Box, Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories


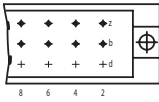
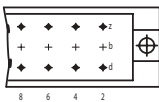
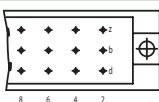
- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

 Type F Male connector (p. 126)



Press-fit - Performance level II


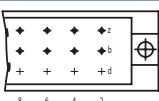
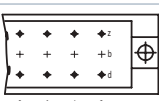
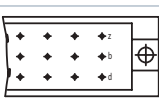
No. of contacts	Contact arrangement	Termination length L 		PU (Tube)
		4.6 mm	12.2 mm	
		Part number		
32		110-61005 Hole diameter 1.0 mm	110-66025 Hole diameter 1.6 mm	18/216
32		110-61004 Hole diameter 1.0 mm	110-66015 Hole diameter 1.6 mm	
48		110-61084 Hole diameter 1.0 mm	110-66065 Hole diameter 1.6 mm	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L 	
		4.6 mm	
		Part number	PU (Box)
32		110-40505	19/190
32		110-40504	
48		110-40584	

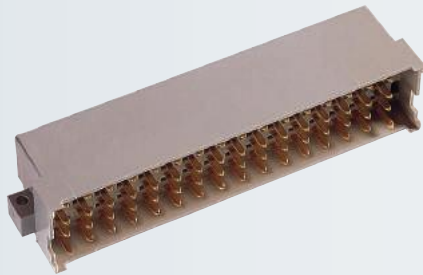
On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type G Male Connector



Type: Male connector 90° with 4 rows

Termination: Solder

Number of contacts: 64

Pitch: 5.08 mm x 3.81 mm

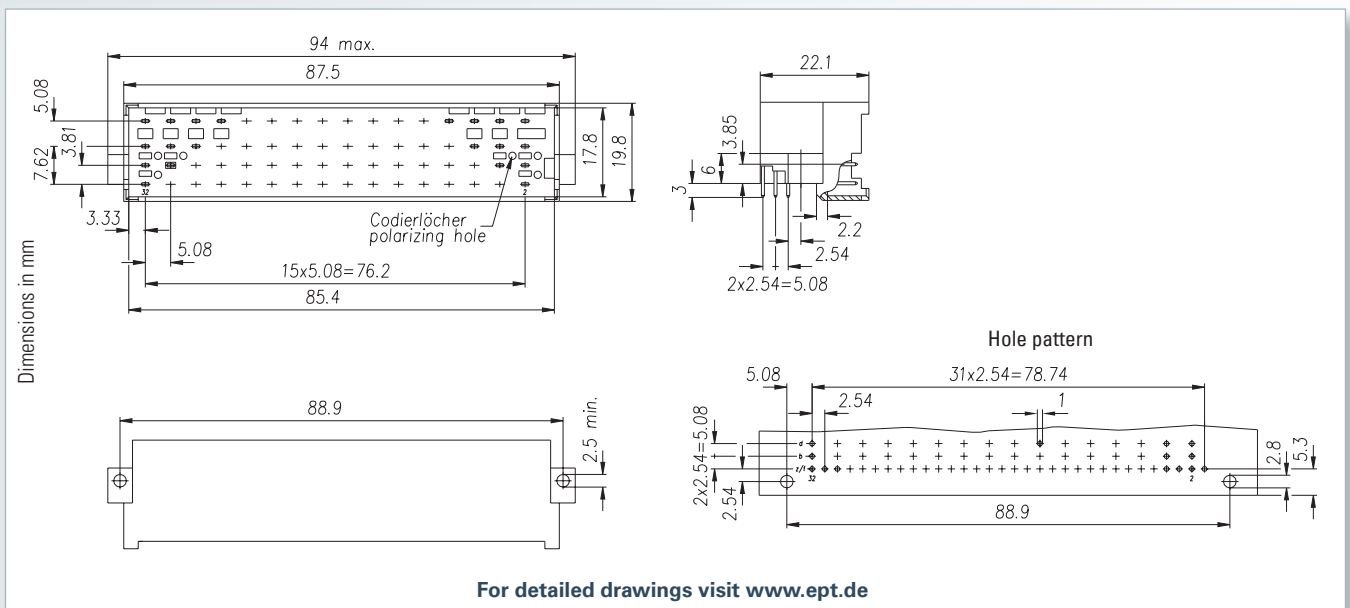
Operational current: 5.6 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:




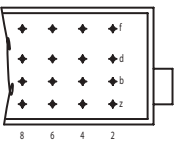
Type G Female connector (p. 134)



Type G low profile Female connector (p. 136)



Solder - Performance level II •••

No. of contacts	Pre-mating contact at position	Contact arrangement	Termination length L 	
			3.0 mm	
			Part number	PU (Box)
64	without		111-40064	14/196
64	Z 2		111-40164	
64	Z 2 and Z 32		111-40264	

On request

- performance level I + III or customized
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type G Female Connector



Type: Female connector straight with 4 rows

Termination: Solder

Number of contacts: 64

Pitch: 5.08 mm x 3.81 mm

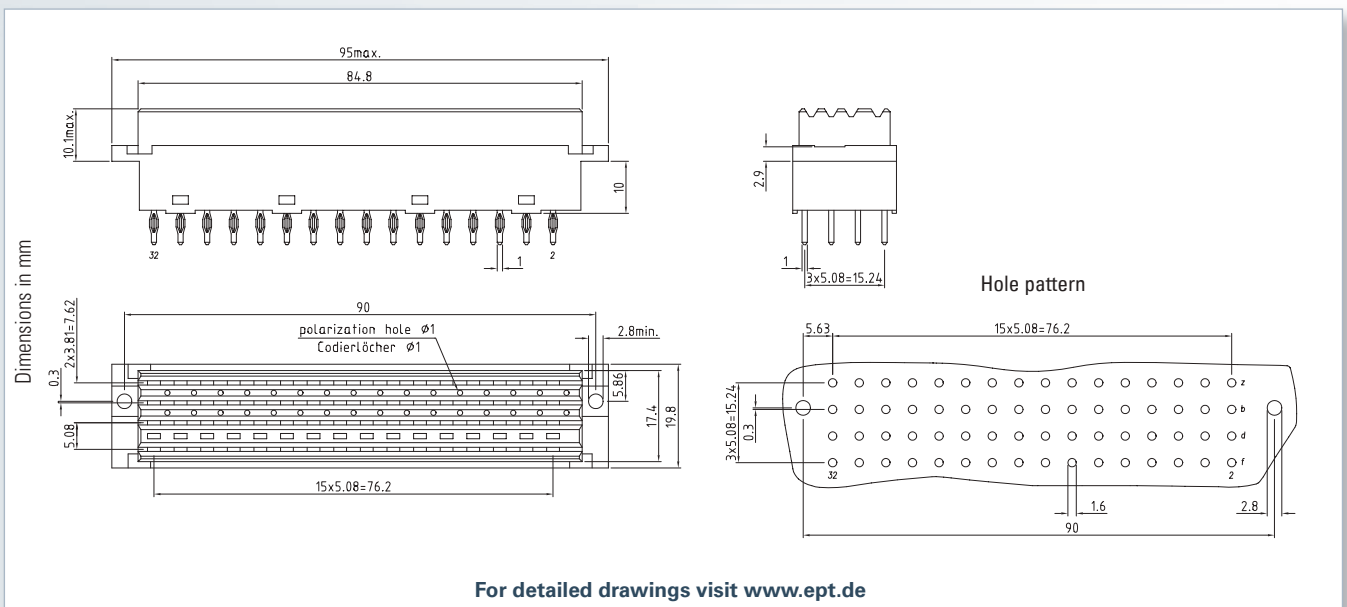
Operational current: 5.6 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Coding p. 160

Mating connector / Application:



Type G Male connector (p. 132)



Solder - Performance level II •••

No. of contacts	Contact arrangement	Termination length L				PU (Box)
		4.5 mm Ø 1 mm	22 mm	4.5 mm Ø 0.7 mm	5.5 / 10.9 mm <small>Manual soldering with solder lug</small>	
		Part number				
64		112-40064	112-40065	112-40084	112-40066	14/140

On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612

Type G low Profile Female Connector



Type: Female connector straight with 4 rows

Termination: Press-fit, solder

Number of contacts: 64

Pitch: 5.08 mm x 3.81 mm

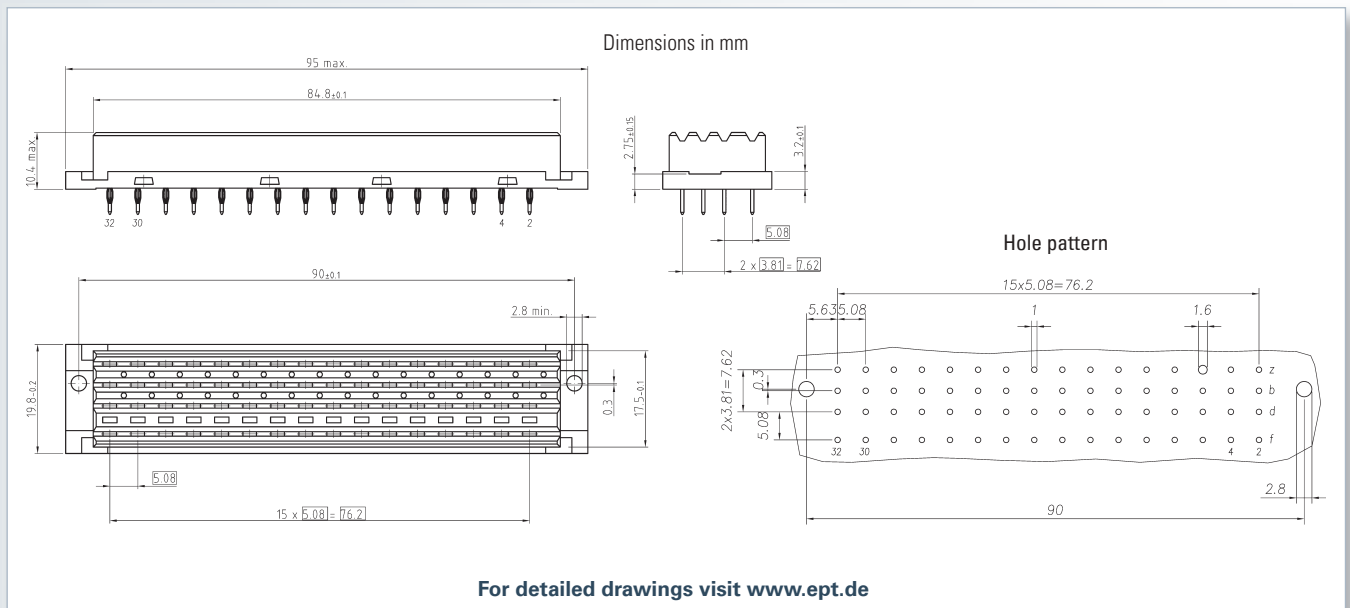
Operational current: 5.6 A

Packaging: Box, Tube

Standard: IEC 60603-2



Technical Specifications on page 66



Accessories

- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

 Type G Male connector (p. 132)



Press-fit - Performance level II

No. of contacts	Contact arrangement	Termination length L		PU (Tube)
		4.6 mm	12.2 mm	
		Part number		
64		112-61084 Hole diameter 1.0 mm	112-66065 Hole diameter 1.6 mm	13/156

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L	
		4.6 mm	
		Part number	PU (Tube)
64		112-40584	13/156

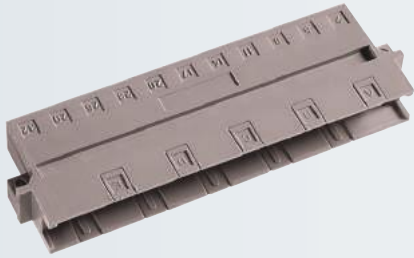
On request

- performance level I + III or customized
- special contact length
- also in THTR
- Board-Lock p. 159
- contact arrangement

DIN 41612



Type H11 Male Connector



Type: Male connector 90° with 1 row

Termination: Solder

Number of contacts: 11

Pitch: 7.62 mm

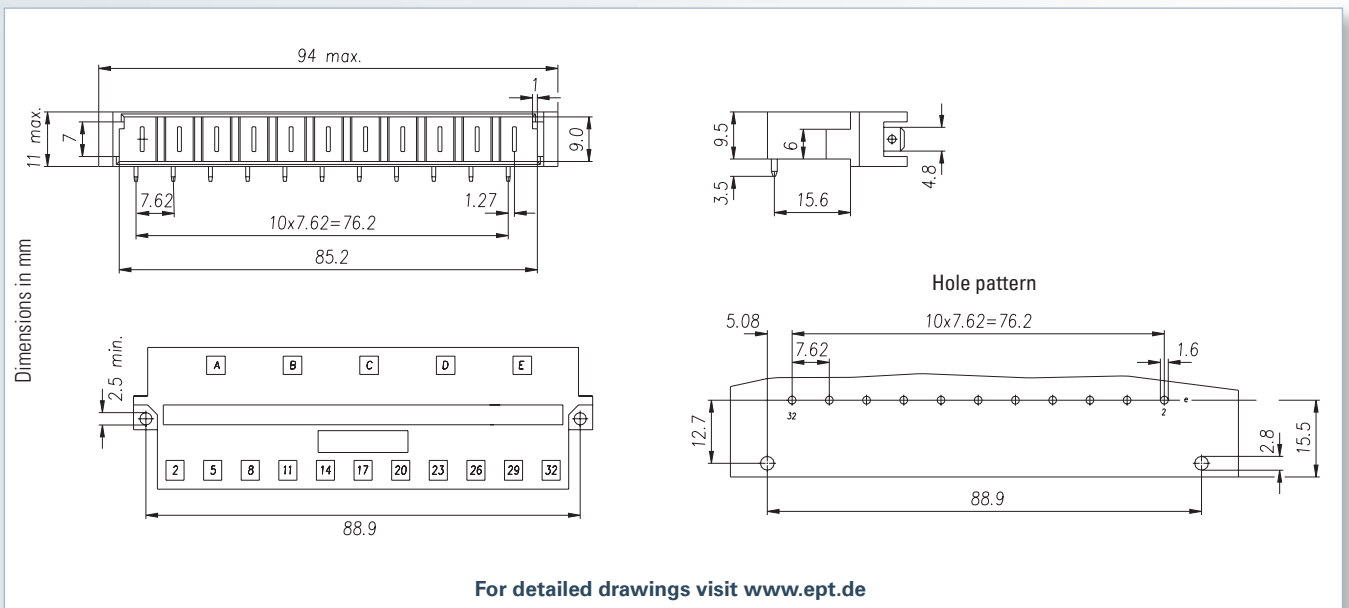
Operational current: 15 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Note

Coding possible, see on p. 160


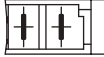
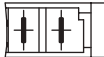
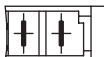
Mating connector / Application:



Type H11 Female connector (p. 140)



Solder - Performance level II •••

No. of contacts	Pre-mating contact at position	Contact arrangement	Termination length L 	
			3.5 mm	
			Part number	PU (Box)
11	without		113-40010	25/350
10+1	32		113-40015	
9+2	2; 32		113-40020	

DIN 41612

Type H11 Female Connector



Type: Female connector straight with 1 row

Termination: Faston

Number of contacts: 11

Pitch: 7.62 mm

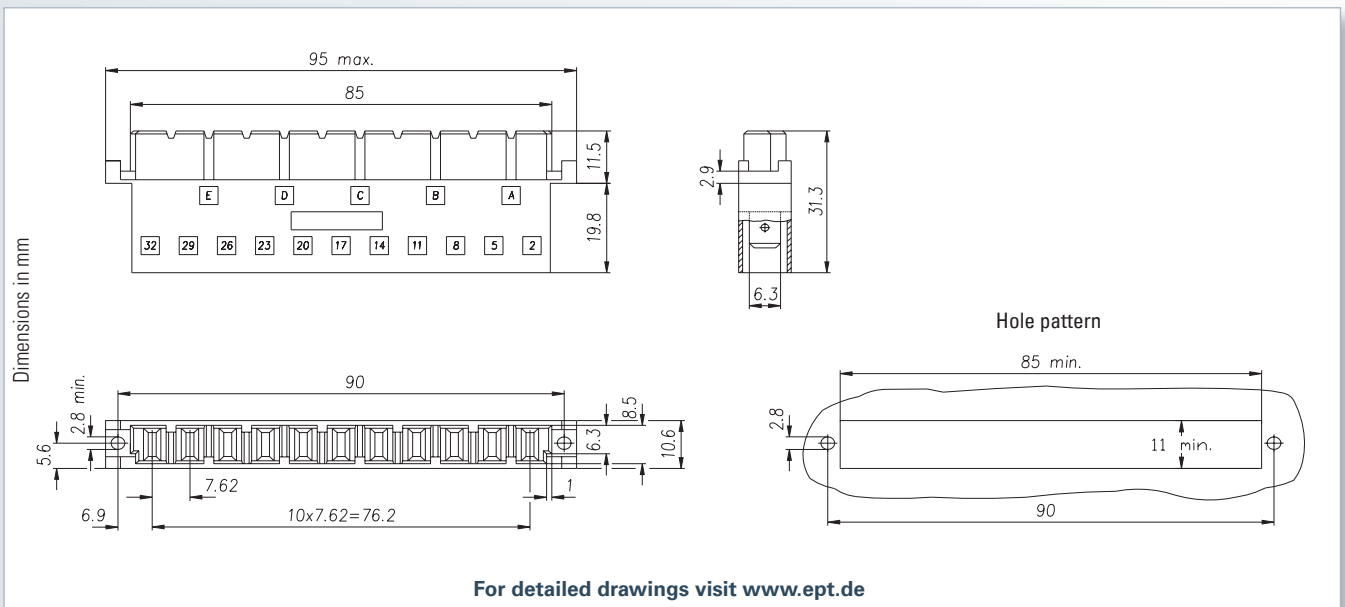
Operational current: 15 A

Packaging: Box



Standard: IEC 60603-2



Technical Specifications on page 66



Faston - Performance level II

No. of contacts	Contact arrangement	Faston contact L 	
		6.3 mm	
		Part number	PU (Box)
11		114-40040	26/260

Accessories

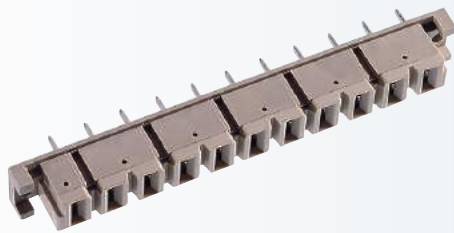
- Coding p. 160

Mating connector / Application:



Type H11 Male connector (p. 138)

Type H11 low Profile Female Connector



Type: Female connector straight with 1 row

Termination: Solder

Number of contacts: 11

Pitch: 7.62 mm

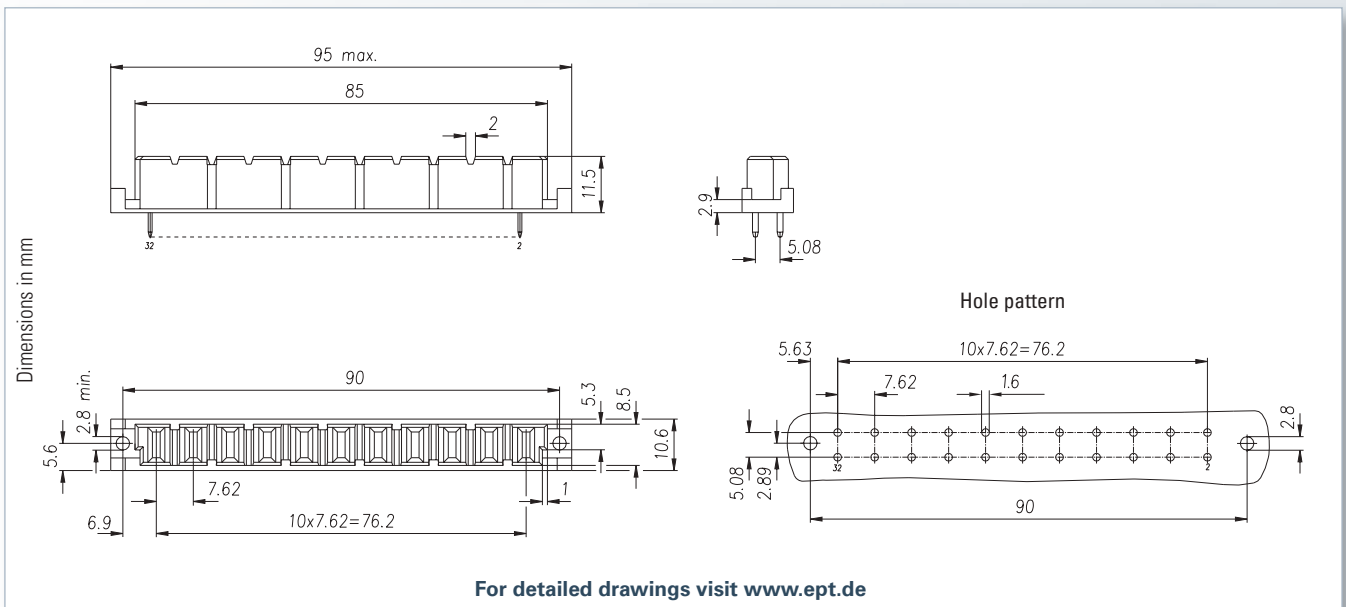
Operational current: 15 A

Packaging: Box


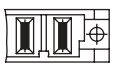
Standard: IEC 60603-2



Technical Specifications on page 66



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L 	
		Part number	PU (Box)
11		114-40050	26/260

Accessories

- Coding p. 160

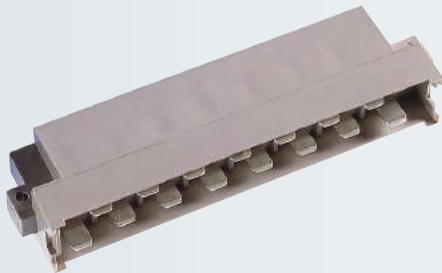
Mating connector / Application:

 Type H11 Male connector (p. 138)

DIN 41612



Type H15 Male Connector



Type: Male connector 90° with 2 rows

Termination: Solder

Number of contacts: 15

Pitch: 5.08 mm x 6.0 mm

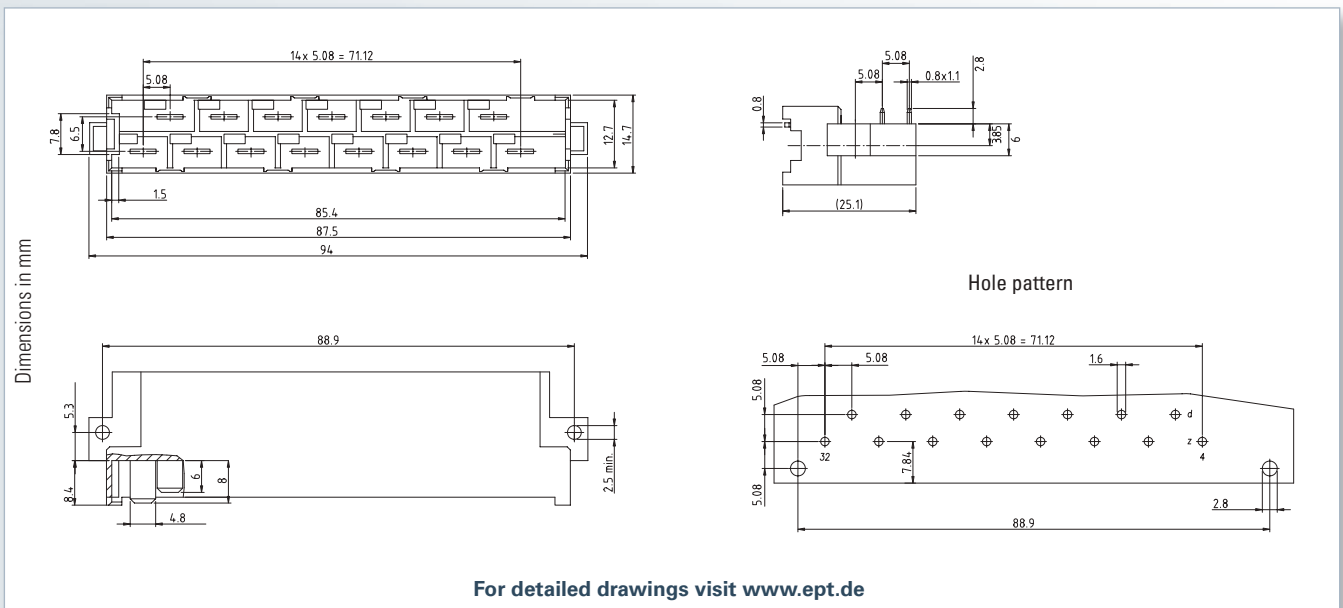
Operational current: 15 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Note

Coding possible, see on p. 160


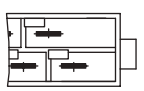
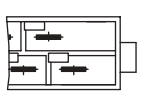
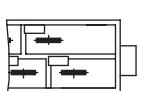
Mating connector / Application:



Type H15 Female connector (p. 144)



Solder - Performance level II •••

No. of contacts	Pre-mating contact at position	Contact arrangement	Termination length L 	
			2.8 mm	
			Part number	PU (Box)
15	Z 32		113-40060	19/266
15	Z 4 and Z 32		113-40160	
15	–		113-40061	

On request

- Board-Lock p. 159
- contact arrangement

DIN 41612

Type H15 Female Connector



Type: Female connector straight with 2 rows

Termination: Faston

Number of contacts: 15

Pitch: 5.08 mm x 6.0 mm

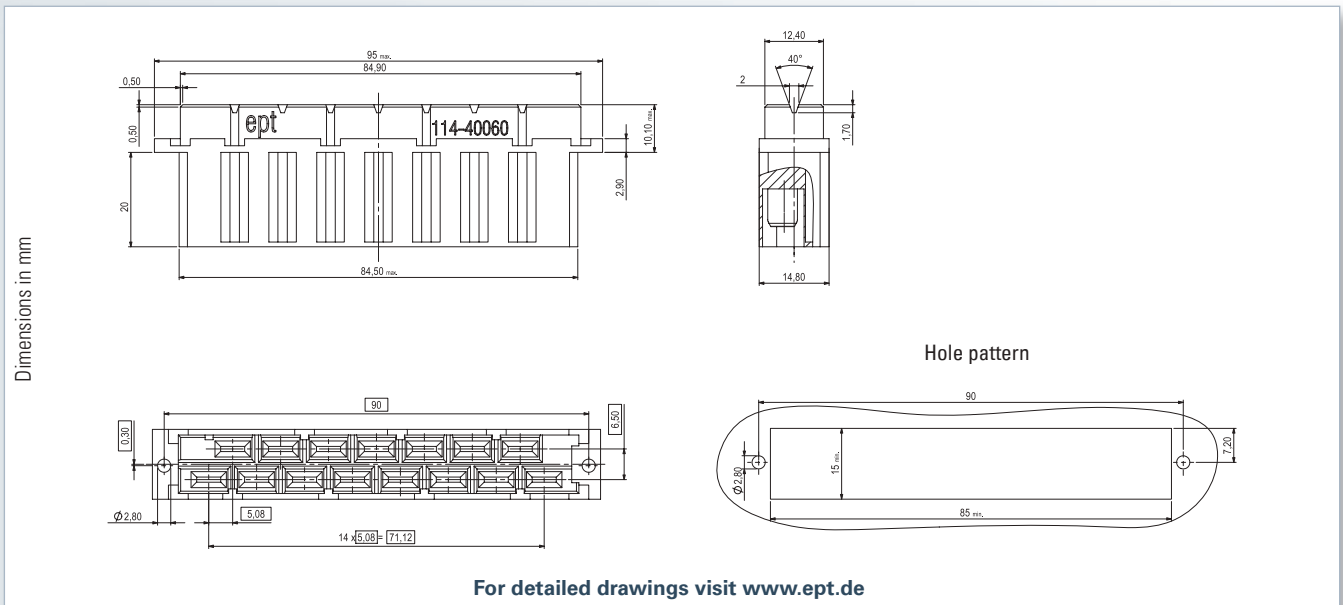
Operational current: 15 A

Packaging: Box


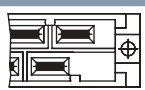
Standard: IEC 60603-2



Technical Specifications on page 66



Faston - Performance level II

No. of contacts	Contact arrangement	Faston length L 	
		0.8 mm x 6.3 mm	
		Part number	PU (Box)
15		114-40060	19/266

On request

• Board-Lock p. 159

Accessories

- Coding p. 160

Mating connector / Application:

 Type H15 Male connector (p. 142)

Type H15 low Profile Female Connector



Type: Female connector straight with 2 rows

Termination: Solder

Number of contacts: 15

Pitch: 5.08 mm x 6.0 mm

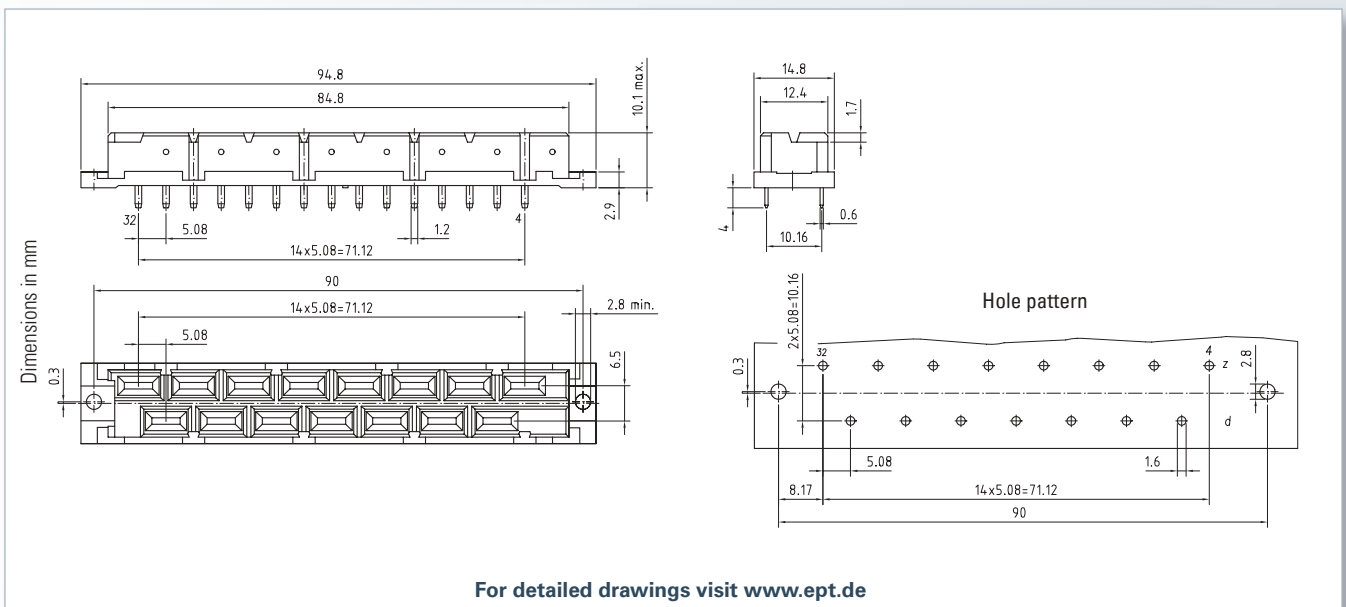
Operational current: 15 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



Solder - Performance level II

No. of contacts	Contact arrangement	Termination length L		PU (Box)
		4.0 mm	13 mm	
		Part number		
15		114-40080	114-40090	19/266

On request

• Board-Lock p. 159

Accessories

• Coding p. 160

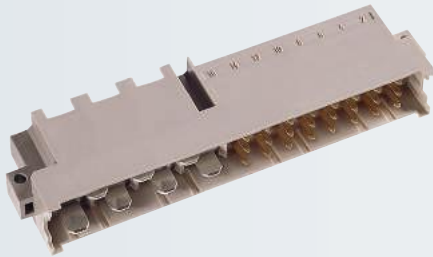
Mating connector / Application:

Type H15 Male connector (p. 142)

DIN 41612



Type H7/F24 Male Connector



Type: Male connector 90°

Termination: Solder

Number of contacts: 7+24

Pitch: 5.08 mm x 3.81 mm

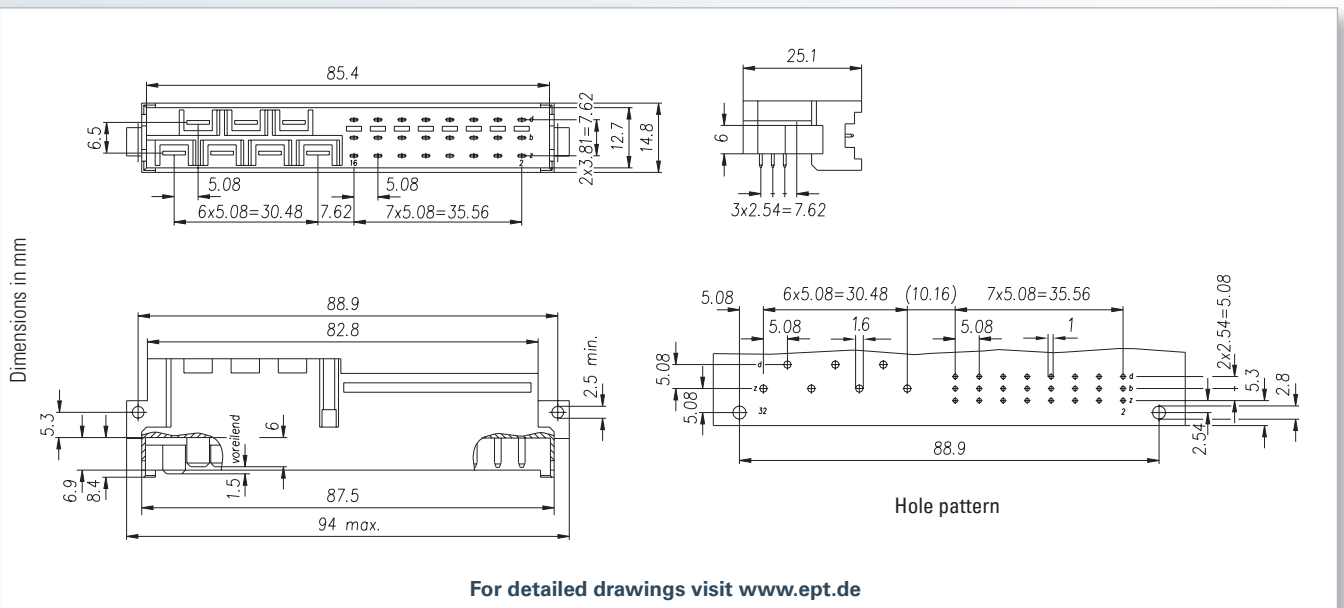
Operational current: 5.6 A, 15 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66




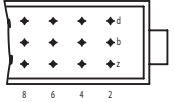
Note

What is a pre-mating contact? See on p. 160

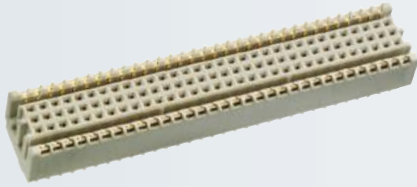
You couldn't find something suitable or have questions? We will be pleased to help you! Call us: +49 8861 / 25010.



Solder - Performance level II •••

No. of contacts	Pre-mating contact at position	Contact arrangement	Termination length L 	
			3.0 mm	
			Part number	PU (Box)
7+24	Z 32		117-40164	19/266

On request
 • Board-Lock p. 159



Type: Female connector straight with 5 rows

Termination: Press-fit

Number of contacts: 160

Pitch: 2.54 mm

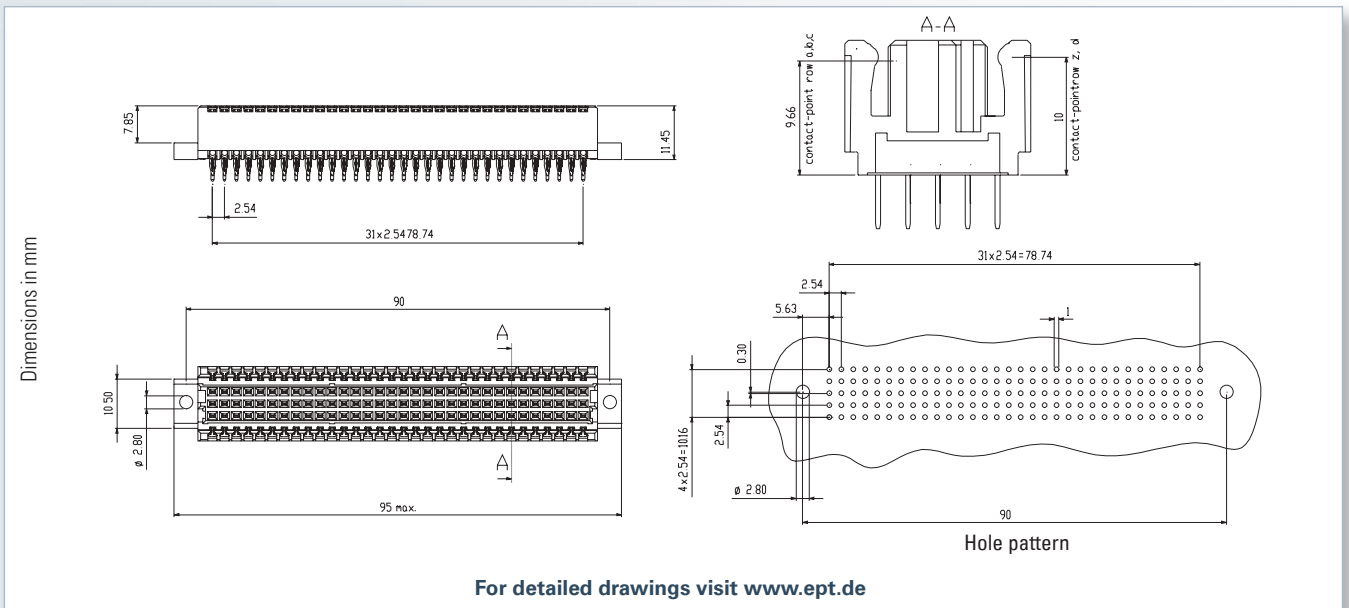
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 60603-2



Technical Specifications on page 66




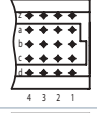
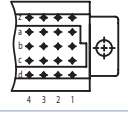
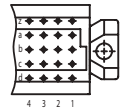
Accessories

- Processing tools p. 334
- Shroud p. 150

You couldn't find something suitable or have questions? We will be pleased to help you! Call us: +49 8861 / 25010.

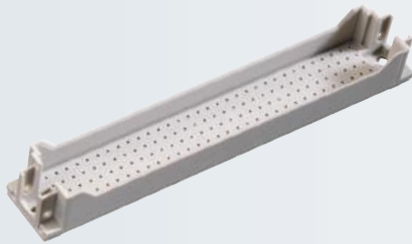


Press fit - Performance level I •••

No. of contacts	Contact arrangement	Termination length L 			
		4.6 mm		17 mm	
		Part number	PU (Tube)	Part number	PU (Tube)
160		306-61067-12	30/360	306-66069-14	14/168
160		306-60067-12	17/204	306-65069-14	17/204
160		306-62067-12		306-67069-14	

On request

- performance level II + III or customized
- special contact length



Type: Shroud with 5 rows

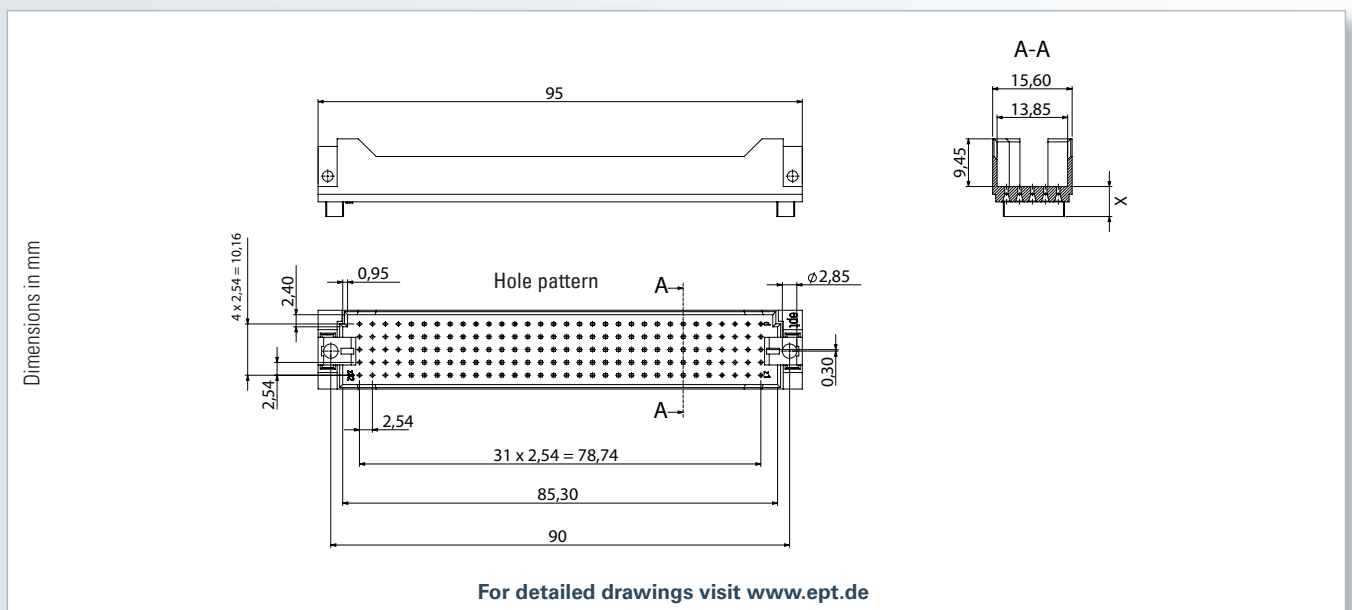
Pitch: 2.54 mm

Packaging: Bulk

Standard: IEC 60603-2



Technical Specifications on page 66



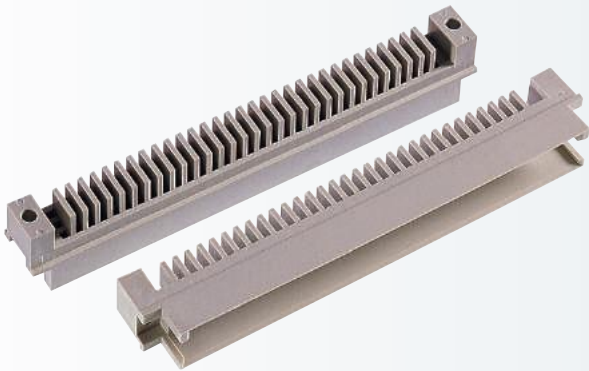
PCB thickness	X	Post length	Part number	PU (Bulk)
			VME 64	
3.4 mm	6.0 mm	17 mm	315-15401	350
4.6 mm	4.8 mm	17 mm	315-15402	

On request

- different designs and special types

Application:

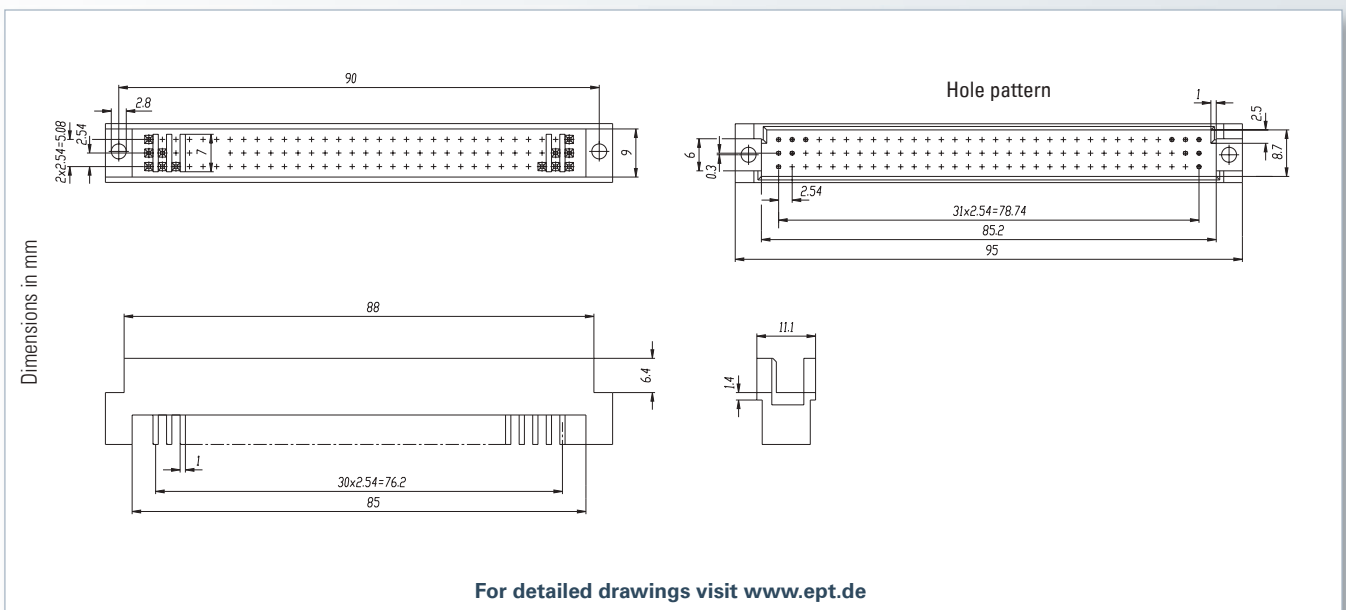
Type VME64x Female connector (p. 148)



Type: Shroud with 3 rows
Pitch: 2.54 mm
Packaging: Bulk
Standard: IEC 60603-2



Technical Specifications on page 66



PCB thickness	Post length	Part number				PU (Bulk)
		C/R with nut	C/R	C/R self-retaining	C/R self-retaining without flange	
2.4	13 mm	–	115-15401	–	–	500
2.4	17 mm	–	115-15301	–	–	
3.2	13 mm	115-15701	115-15402	115-15405	115-15408	
3.2	17 mm	115-15702	115-15302	–	–	

On request

- different designs and special types

Application:

Type C (p. 82)

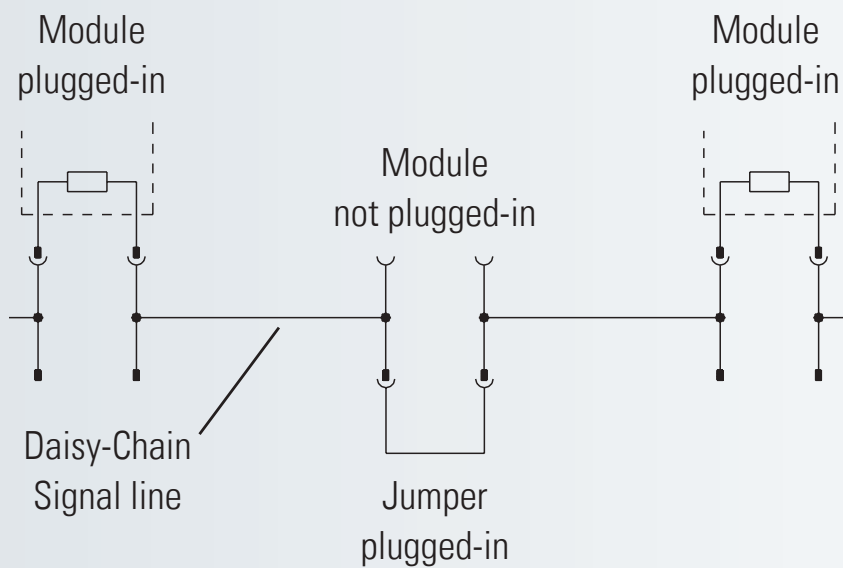
Type R (p. 106)

Switching Connector - Female Connector with integrated Switches

Problem

A principle often used for different bus systems is the looping-through of signal lines via module boards, the so-called "daisy chaining". This daisy chaining, however, leads to a new problem, which becomes obvious when one of the modules is pulled from the system: The daisy chain signal connection is broken and must be re-established using jumpers. This is not easy as the modules

are located close to each other in the rack. More often a large part of the housing must be taken apart or the whole endeavour of placing the jumper on the correct pins results in "nerve-wracking fumbling". Mistakes and therefore mispositionings can happen.



Female Connector with integrated Switches

A possible solution

The integration of switches into a standard connector according to IEC 60603-2, e.g. into a female connector type C, is a simple and elegant solution for the problem described. The contact springs of this C female connector were extended by wing-like contact tabs. A gold-plated metal disk is located between the contact springs. In rest position, with the male connector not plugged-in, the adjacent contact springs are short-circuited through placing of the contact tabs on the metal disk. With the male connector plugged-in, the contact springs are separated from each other through the contact pins of the male connector. The contact tabs of the spring are lifted off the metal disk. This interrupts the connection between the two springs. Due to the switching behavior of the C female connector, the daisy chain connection is automatically

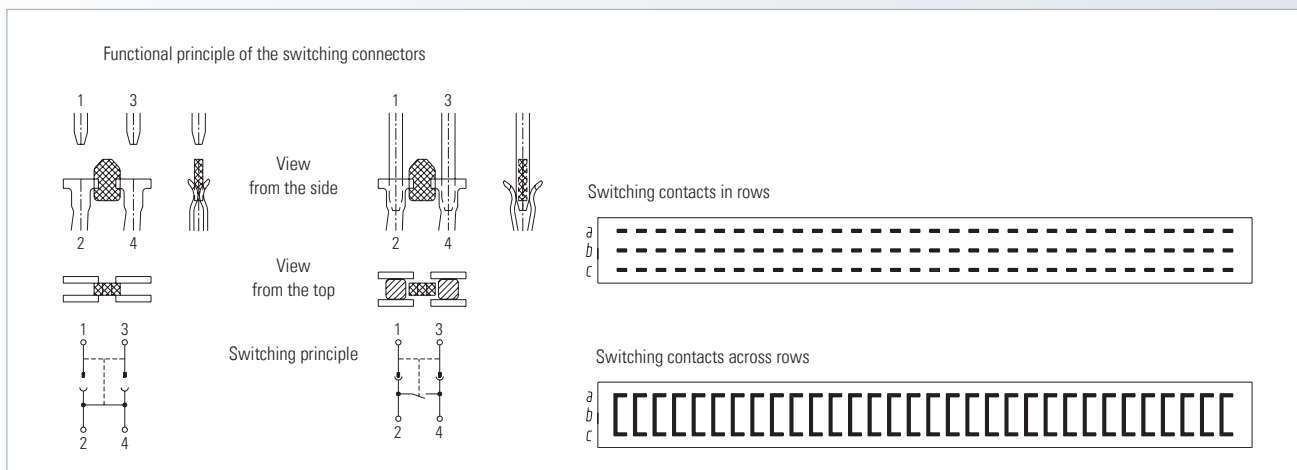
closed when the module board is pulled out. Function-wise the closed switching contact between two contact springs corresponds to a jumper automatically being plugged in when the male connector is pulled out.

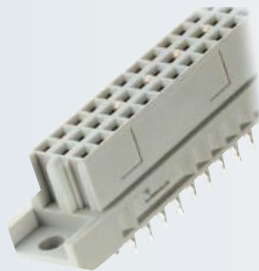
Application in the VME bus

The daisy chaining principle is used for the IACK and BG 0...3 signal lines in the VME bus. By integrating a switching function at the positions of the respective signal lines in the connector, the jumpers used so far are no longer required.

Further applications

The integrated switching function is not restricted to the positions in the C female connector stated above. A switch can be integrated between any positions in the a, b and c rows of a C female connector IEC 60603-2 and/or between the a and c rows of a C female connector IEC 60603-2. A further application for ept switching connectors are e.g. network concentrators (hubs). In this application, too, the daisy chaining is carried out fully automatically via customer-specific switching connectors.

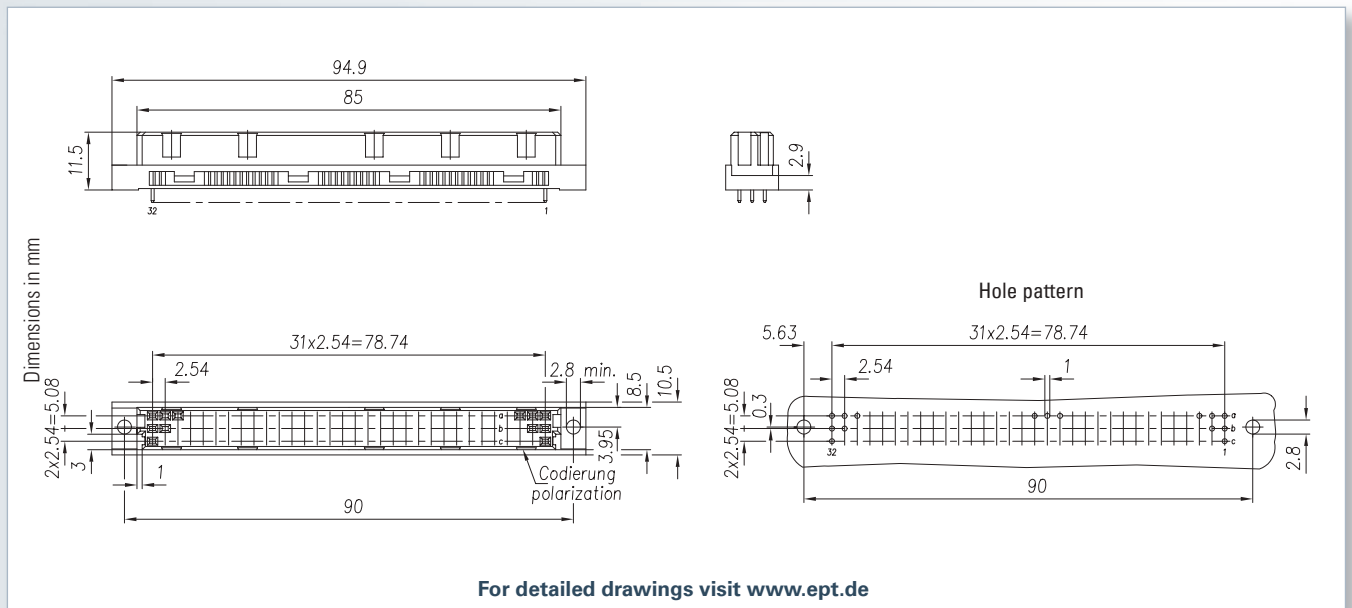




- Type:** Female connector straight with 3 rows
- Termination:** Press-fit
- Number of contacts:** 96
- Pitch:** 2.54 mm
- Operational current:** 1.5 A
- Packaging:** Tube
- Standard:** IEC 60603-2



Technical Specifications on page 66



Accessories


- Processing tools p. 334
- Coding p. 160

Mating connector / Application:

- Type C Male connector (p. 82)
- Type R Male connector (p. 106)



Press-fit - Performance level II

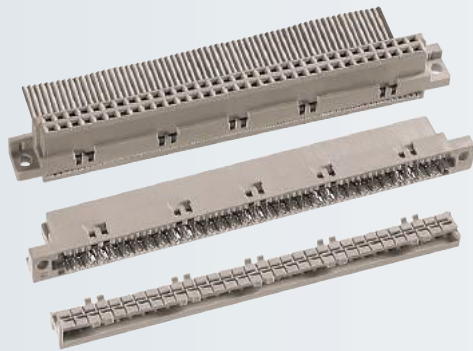
No. of contacts	Switching contacts at position	PCB thickness	Termination length L 				PU (Tube)
			3.2 mm	4.6 mm	13 mm	17 mm	
			Part number				
96	a21 – a22, b4 – b5, b6 – b7, b8 – b9, b10 – b11 for VME	1.5 - 2.0 mm	104-60464-01	-	104-65465-01	104-65466-01	25/300
		2.0 - 2.8 mm	-	104-60464-02	104-65465-02	104-65466-02	
		> 2.8 mm	-	104-60464-03	104-65465-03	104-65466-03	
96	a – c 1, 2, 3, 4, ..., 32	1.5 - 2.0 mm	104-60565-01	-	104-65565-01	104-65566-01	
		2.0 - 2.8 mm	-	104-60565-02	104-65565-02	104-65566-02	
		> 2.8 mm	-	104-60565-03	104-65565-03	104-65566-03	

On request

- performance level I + III or customized
- special contact length
- without flange
- contact arrangement
- customer-specific switching bridge positions

DIN 41612

IDC Type B Female Connector



Type: Female connector straight with 2 rows

Termination: IDC

Number of contacts: 64

Pitch: 2.54 mm

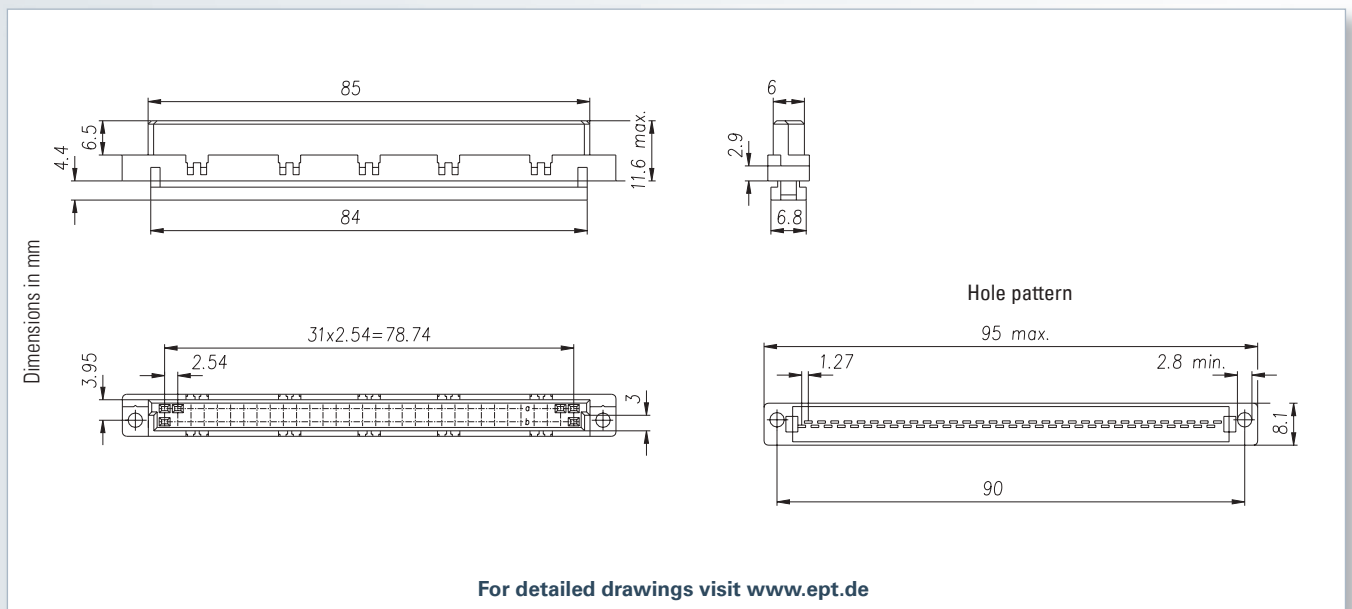
Operational current: 1.0 A

Packaging: Box

Standard: IEC 60603-2



Technical Specifications on page 66



IDC - Performance level II

No. of contacts	Contact arrangement	Part number	PU (Box)
64		102-49064	102/714

On request

- strain relief bracket
- also available in solder/press-fit (see on page 72)

Note

Additional information & Technical specifications see p. 66

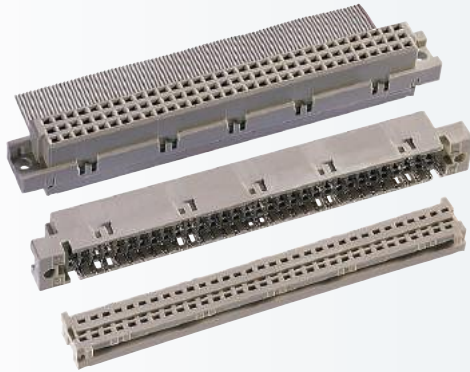
Mating connector / Application:

Type B Male connector (p. 70)

Type Q Male connector (p. 102)

DIN 41612

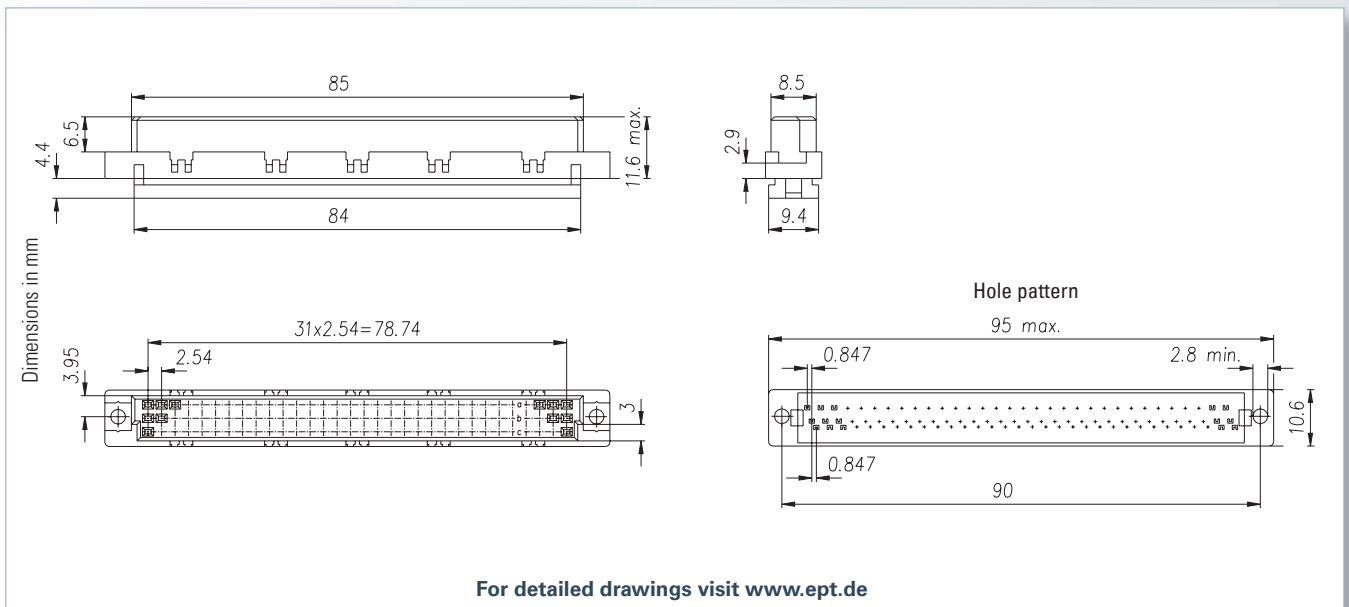
IDC Type C Female Connector



Type: Female connector straight with 3 rows
Termination: IDC
Number of contacts: 64, 96
Pitch: 2.54 mm
Operational current: 1.0 A
Packaging: Box
Standard: IEC 60603-2



Technical Specifications on page 66



IDC - Performance level II

No. of contacts	Contact arrangement	Part number	PU (Box)
64		104-49054	78/546
96		104-49064	

On request

- strain relief bracket
- also available in solder/press-fit (see on page 84)

Note

Additional information & Technical specifications see p. 66

Mating connector / Application:



Type C Male connector (p. 82)



Type R Male connector (p. 106)



IDC

Insulation displacement connection technology (IDC) is a practicable, solderless technology for connecting circuit boards. In this connection technology, wires are not stripped; instead, they are placed on the insulation displacement contacts with their insulation intact and then pressed into the contacts. The insulation is severed by the sharp edges of the

displacement contacts and the wire is connected to the contacts. Because this type of connection does not require that the insulation be removed, it results in a very secure and reliable contact closure.

Technical Specifications IDC

Connections	
Connections	IDC
Insulator material	Polyester, self-extinguishing
Temperature range	- 55 °C to + 125 °C
Capacity	approx. 0.5 – 1 pF
Operational current	1 A at 20 °C

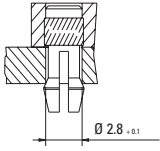
Operational voltage	220 V, 50 Hz
Test voltage	500 V/1.27 mm; 350 V/0.84 mm
Contact resistance	≤ 30 mΩ
Insulation resistance	≥ 10 ⁸ MΩ
Environment	RoHS compliant

Board-Lock

As an alternative to the rivet and/ or screw fastening of the male and/ or female connectors to the PCBs, connectors can also be mounted and held onto PCBs using board lock's. The connector with the board lock is pressed onto the PCB to be equipped. The board locks either lock into place or are under tension. The connections are strong enough to hold the connector onto the

PCB during the soldering process. Using plated mounting holes, soldering the board locks also essentially improves the strain relief of the connector during insertion and/or withdrawal.


Suitable for connectors with type B, C, D, E, F low profile, G low profile female connectors and R Male connectors



Type of insertion	Forces		
	F_m	not soldered F_h	soldered F_h
Locked	< 20 N	> 10 N	> 25 N
Under tension	< 20 N	> 5 N	> 25 N

F_m : max. mounting force per Board-Lock
 F_h : min. retention force per Board-Lock

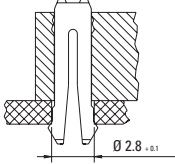
Suitable for connectors with type B, C, D, E, F low profile, G low profile Female connectors and R Male connectors



Part number	PCB thickness
xxx-xxxxxC1	1.6 mm
xxx-xxxxxC2	2.4 mm
xxx-xxxxxC3	3.6 mm

Ordering example: C-FL/LP 1.6 mm, part number 104-40014C1


Suitable for connectors with type B, C, D, E, F, G Male connectors and R Female connectors



Type of insertion	Forces		
	F_m	not soldered F_h	soldered F_h
Locked	< 30 N	> 10 N	> 20 N
Under tension	< 30 N	> 7.5 N	> 20 N

F_m : max. mounting force per Board-Lock
 F_h : min. retention force per Board-Lock

Suitable for connectors with type B, C, D, E, F, G Male connectors and R Female connectors



Part number	PCB thickness
xxx-xxxxxC1	1.6 mm
xxx-xxxxxC2	2.4 mm
xxx-xxxxxC3	3.6 mm

Ordering example: C-ML/LP 1.6 mm, part number 103-40014C1



Coding without loosing Contacts

Type B and C

The integrated coding of the connectors with type B and C prevents that the wrong modules are plugged in. For

coding, coding wedges are inserted into the female connector and matching parts are broken out of the insulator

material of the male connector with coding pliers.

Coding	Coding star (4 coding wedges)		Coding pliers
<p>1) Break-out coding</p> <p>2) Insert coding wedge into the female connector</p>			
	Part number	Packaging unit	Part number
	104-19003	25 Stars	894-301

Type D, E, F and G

With connectors with type D, E, F and G holes can be drilled into the male connector and pins can be inserted

into the female connector in matching positions.

Male connectors	Female connectors		
Drill coding hole with gauge.	Insert coding pin into the coding hole using the insertion tool.		
		Part number - coding pin	Packaging unit
		106-10001	100 items
		Part number - insertion tool	
		894-302	

Type H11 and H15

Keying plug

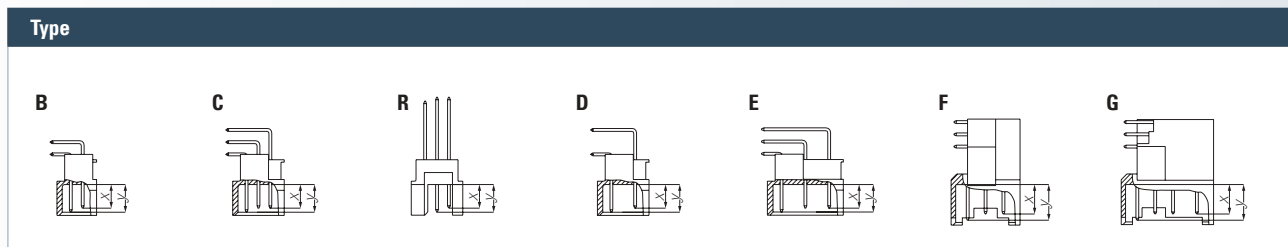
Coding	Part number
	114-30000

Pre-mating and late-mating Contacts

Pre- and late-mating contacts are used for safety reasons or hot swap functionality. In this case defined contacts are mating earlier or unmate later during the mating process of the connector. The connection is made and broken using these contacts in the first or final step.

For DIN type B, C, R, D, E, F, G

The pre-mating contact can - as special contact arrangement - be inserted into any desired position.



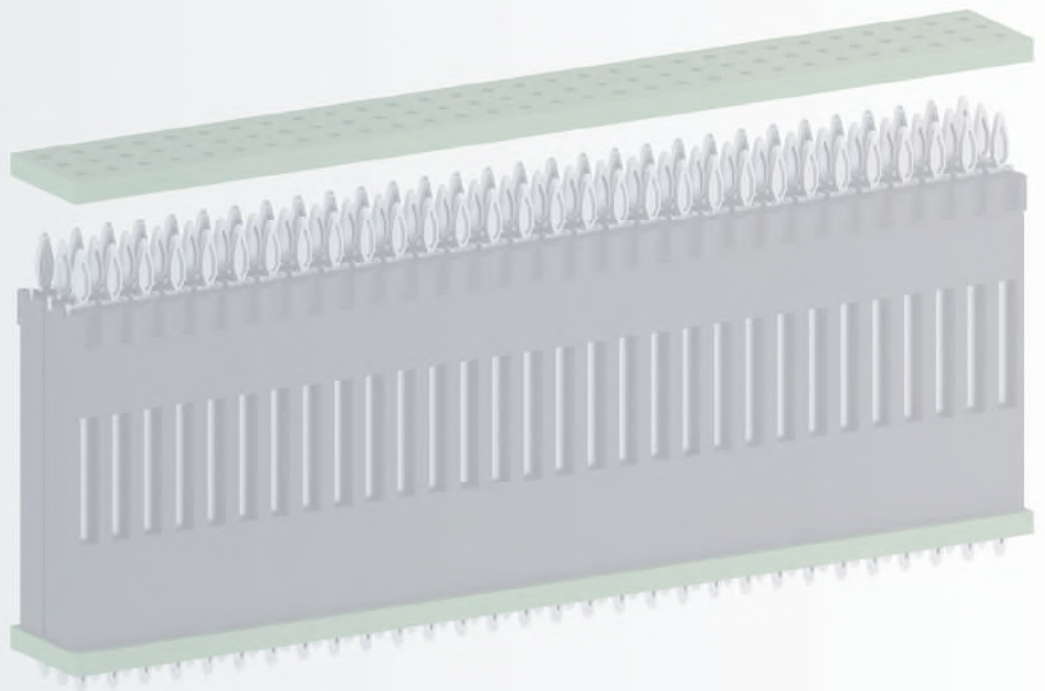
Type	Standard (X)	Pre-mating (Y)			Late-mating (Y)	
		+ 0.8 mm	+ 1.0 mm	+ 1.3 mm	- 0.4 mm	- 0.8 mm
B, B/2, B/3, C, C/2, C/3	4.9	-	5.9	-	-	4.1
R, R/2, R/3	Mating side	4.9	5.7	5.9	4.5	4.1
	Termination side	13.0	13.8	-	12.6	12.2
D	4.9	5.7	-	-	-	-
E (Pitch 2.54 mm)	4.9	5.7 Rows a, c, e	-	-	-	-
E (Pitch 5.08 mm)	4.9	5.7 Row a	-	-	-	-
F, G	6.1	-	-	7.4	-	-

On request

- other lengths possible for pre-mating and late-mating

flexilink_{b-t-b}

2.54 mm Press-fit connector



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Applications	166
Technical Specification	167
Derating Diagram	168
PCB Hole Specifications Press-fit	169

flexilink_{b-t-b} – 2.54 mm Board-to-Board Connection in Press-fit

Versatile and Reliable

flexilink is the perfect solution when you are looking for a high-quality press-fit connection between PCBs.

The advantages are obvious: with only one element you create a mechanical as well as electrical connection. Standoffs are redundant, which saves costs and space on the PCB.

In addition you can choose within a range of 5 up to 25 mm board-to-board distance and combine different rows and contact numbers.

Key Features:

- 11 A operational current per pin
- reliable mechanical and electrical connection
- space & cost saving
- only one element for one connection
- individual board-to-board distance possible
- press-fit zone Tcom press®

Applications:

- machine tools
- agriculture engineering
- automotive
- intralogistics
- crane technology
- propulsion technology

Termination



Press-fit

Mating configuration

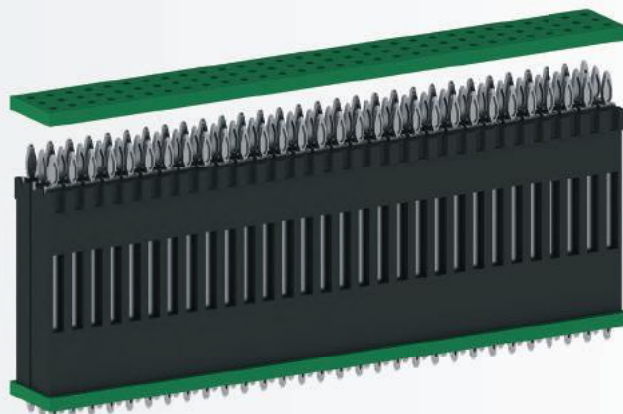


Parallel







Application

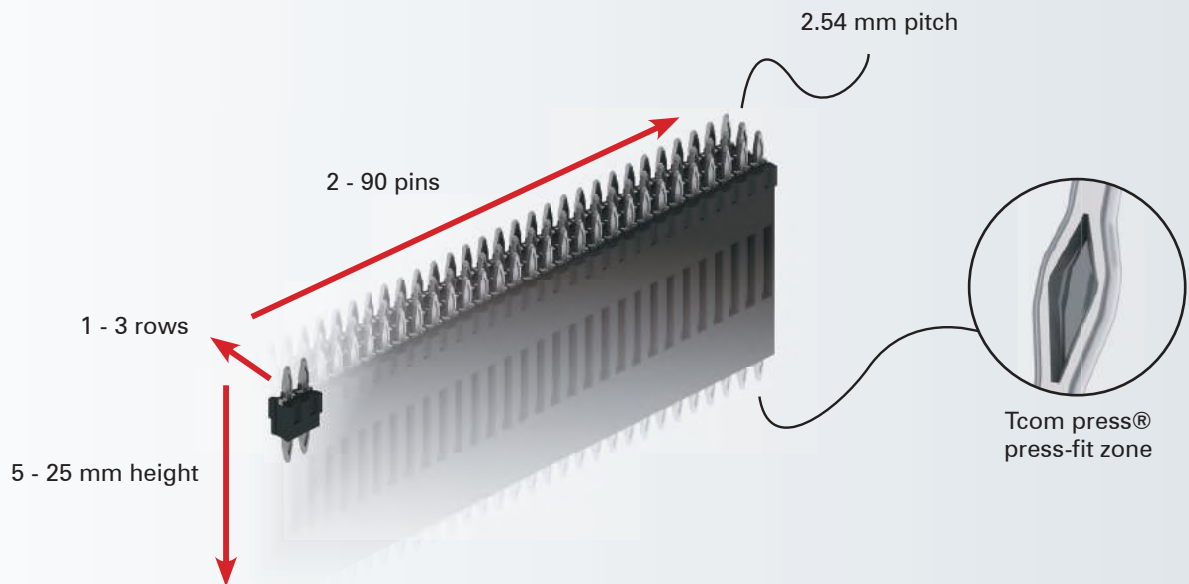


Power



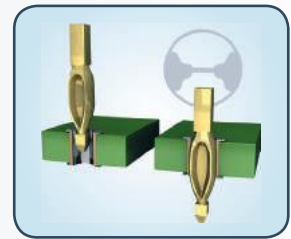
flexilink – Product Overview

Height	 Parallel	Rows	Number of pins
	5 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90
	10 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90
	15 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90
	20 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90
	25 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90
individual	5 - 25 mm	1-row	2 - 30
		2-row	4 - 60
		3-row	9 - 90

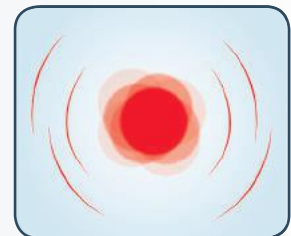


flexilink_{b-t-b} – Applications

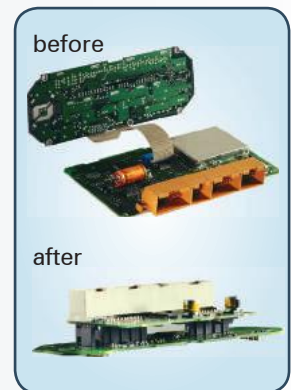
Requirement		Advantage flexilink _{b-t-b}
Ruggedized	Shock and vibration, temperature resistance, corrosive gas	<ul style="list-style-type: none"> reliable connection between contact and PCB hole permanent connection without intersection, as of no socket terminal nominal failure rate: <ul style="list-style-type: none"> - no cold soldering joints - no cracked soldering joints
Modularity	Installation of modules on carrier board at the end of assembly process	<ul style="list-style-type: none"> easy and safe processing (no soldering)
Operational current	High operational current	<ul style="list-style-type: none"> permanent connection without intersection: nominal resistance, 400% higher current capability
Potting	No influence of potting compound on the connection	<ul style="list-style-type: none"> reliable connection between contact and PCB hole
Space saving	Limited space	<ul style="list-style-type: none"> from 5mm PCB distance single part, no spacer needed
Cost savings	Best cost-value ratio per application	<ul style="list-style-type: none"> only one component reliable mechanical connection easy processing



Reliable connections to PCB through Tcom press®



Resilient mechanical & electrical connection



Small stacking height & space saving



Easy processing

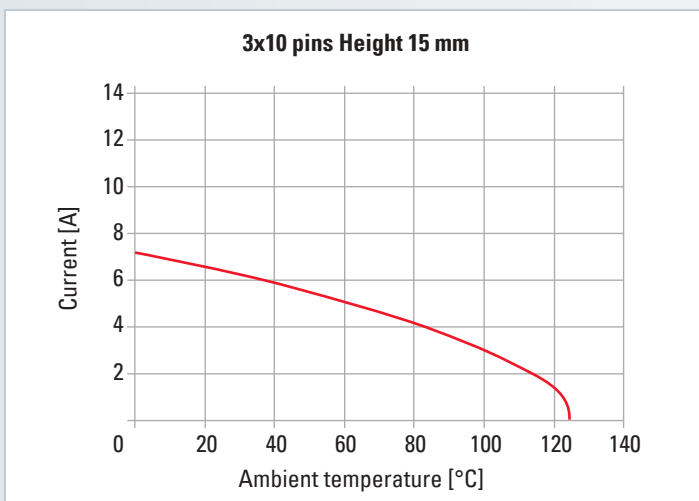
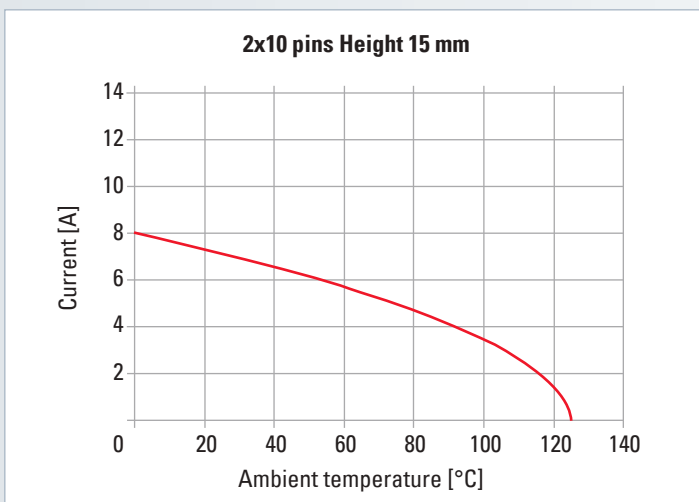
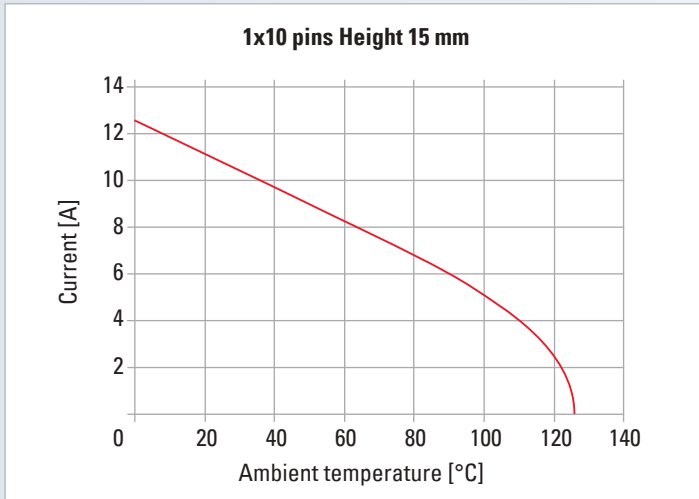
Technical Specifications

flexilink _{b-t-b}		
Technical Specifications	Testing Standard	2.54 mm PCB connector
Basics		
Number of pins		2 - 90
Termination		Press-fit
Board-to-board distance		5 - 25 mm
Operating temperature range		-55°C to +125°C
Material		
Insulator material		PBT
Contact material		Copper alloy
Contact surface		Sn
Mechanical		
Pitch		2.54 mm or individually assembled
Electrical		
Operational current	IEC 60512-5-2:2002	max. 11 A at 20°C per pin (1x10 pins, height 15 mm) max. 7 A at 20°C per pin (2x10 pins, height 15 mm) max. 6 A at 20°C per pin (3x10 pins, height 15 mm)
Contact resistance	IEC 60512-2-1:2002	< 5mΩ
Clearance and creepage		min. 0.44 mm / 0.57 mm (within row) min. 1.94 mm / 2.07 mm (between rows)
Insulation resistance	IEC 60512-3-1:2002	>10GΩ
Test voltage	IEC 60512-4-1:2003	750 VDC
Processing		
Packaging		Bulk or Tray
Assembly		manual / semi-automatic / fully automatic
Approval		
UL file		E130314
Environment		RoHS compliant

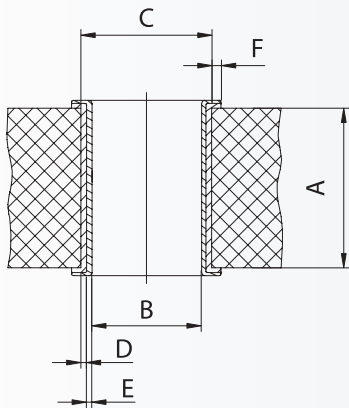
On request

- greater clearance and creepage
- Pitch 5,08 mm

Derating Diagram



PCB Hole Specifications Press-fit



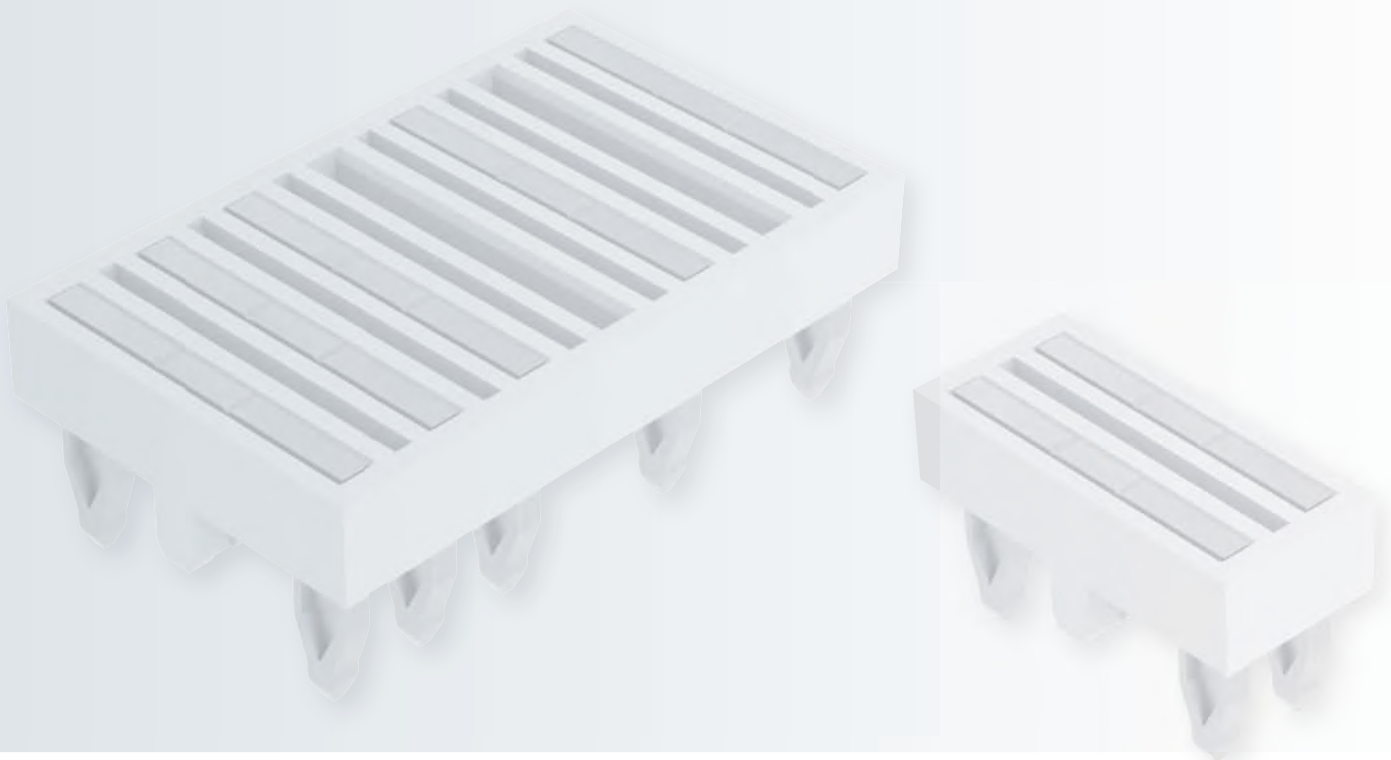
Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for many PCB surfaces.

		PCB Hole Specification	
		Nominal Hole Ø 1.0 mm	
		imm. Sn printed circuit boards	Ni, Au printed circuit boards
A	PCB thickness	min 1.4 mm	min 1.4 mm
B	Plated hole	Ø 1.0 + 0.09 / - 0.06 mm	Ø 1.0 + 0.09 / - 0.06 mm
C	Drill hole	Ø 1.15 ± 0.025 mm	Ø 1.15 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	Plating	max. 1.5 µm imm. Sn	0.05 - 0.2 µm Au; over 2.5 - 5 µm Ni
F	Annular ring	min. 0.1 mm	min. 0.1 mm

flexilink_{jumper}

Horizontal Press-fit PCB Connector



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PCB Hole Specifications	175
Horizontal PCB Connections	176

flexilink_{jumper} - Horizontal PCB Connection in Press-fit

Reliable Connection for LED and more

ept's flexilink_{jumper} is a non-matable board-to-board connection for horizontal PCB assemblies.

A gap of 1 mm between the edges of printed circuit boards and a needed footprint of only 3.8 mm per pcb allows maximum utilization of board space and makes this connector suitable for many applications, e.g. "chaining" LED boards.

The height of the connector itself is only 2 mm. By selecting spacers this connector is suitable for all board thicknesses starting at 1 mm. The pins are designed for 1mm holes according to ept hole specifications.

The connector is available with 2 to 15 contact bridges. The distance between rows is 2 or 4 mm depending on the pin configuration.

Key Features:

- 11 A operational current
- small footprint design
- easy processing without soldering
- variable 2 or 4 mm pitch
- 2 - 15 contact bridges
- reliable connection through press-fit technology
- cost saving

Applications:

- LED
- shock & vibration
- PCB chaining

Termination



Press-fit

Mating configuration

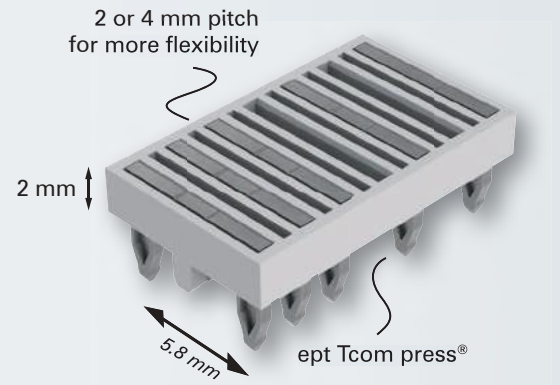
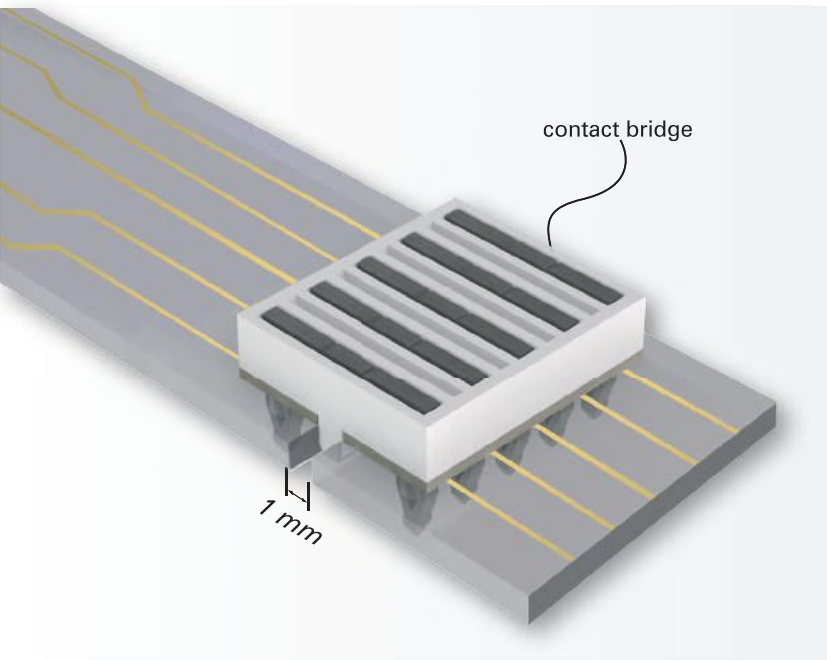


Horizontal

Application



Power



Processing Press-fit



The connector is placed at the desired position. The support tool ensures the correct alignment of the PCBs.



By using the lever of the press the connector is pressed-in with little effort. The press-fit zone absorbs the force through deformation.

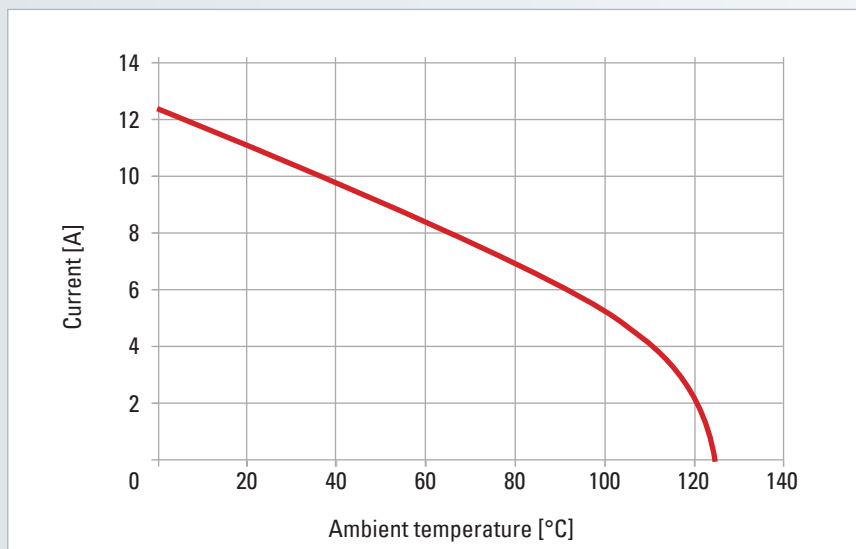


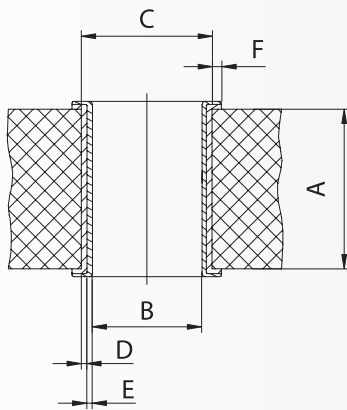
The connection is gas tight and mechanically very strong. There's no need for an additional soldering of the component.

Technical Specifications

Technical Specifications	flexilink jumper	
	Testing Standard	Horizontal PCB connections with Tcom press®
Basics		
Number of contact bridges		2 - 15
Termination		Press-fit
Operating temperature range		-55°C to +125°C
Material		
Insulator material		PBT glass filled
Colour insulator material		grey, RAL 7032 (other colours available)
Contact material		Copper alloy
Contact surface		Sn
Mechanical		
Pitch		2 / 4 mm
Electrical		
Operational current	IEC 60512-5-2:2002	11 A at 20°C (5 contact bridges) per pin
Contact resistance	IEC 60512-2-1:2002	≤ 5mΩ
Clearance and creepage		1.4 mm
Insulation resistance	IEC 60512-3-1:2002	≥ 10GΩ
Test voltage	IEC 60512-4-1:2003	1500 VDC
Approval		
UL file		E130314
Environment		RoHS compliant

Derating Diagram





PCB Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for many PCB surfaces.

		PCB Hole Specification	
		Nominal Hole Ø 1.0 mm	
		imm. Sn printed circuit boards	Ni, Au printed circuit boards
A	PCB thickness	min 1.0 mm	min 1.0 mm
B	Plated hole	Ø 1.0 + 0.09 / - 0.06 mm	Ø 1.0 + 0.09 / - 0.06 mm
C	Drill hole	Ø 1.15 ± 0.025 mm	Ø 1.15 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	Plating	max. 1.5 µm imm. Sn	0.05 - 0.2 µm Au; more than 2.5 - 5 µm Ni
F	Annular ring	min. 0.1 mm	min. 0.1 mm

Horizontal PCB Connections



Type: Horizontal PCB connector

Number of contact bridges: 2 to 15

Pitch: 2 mm or 4 mm

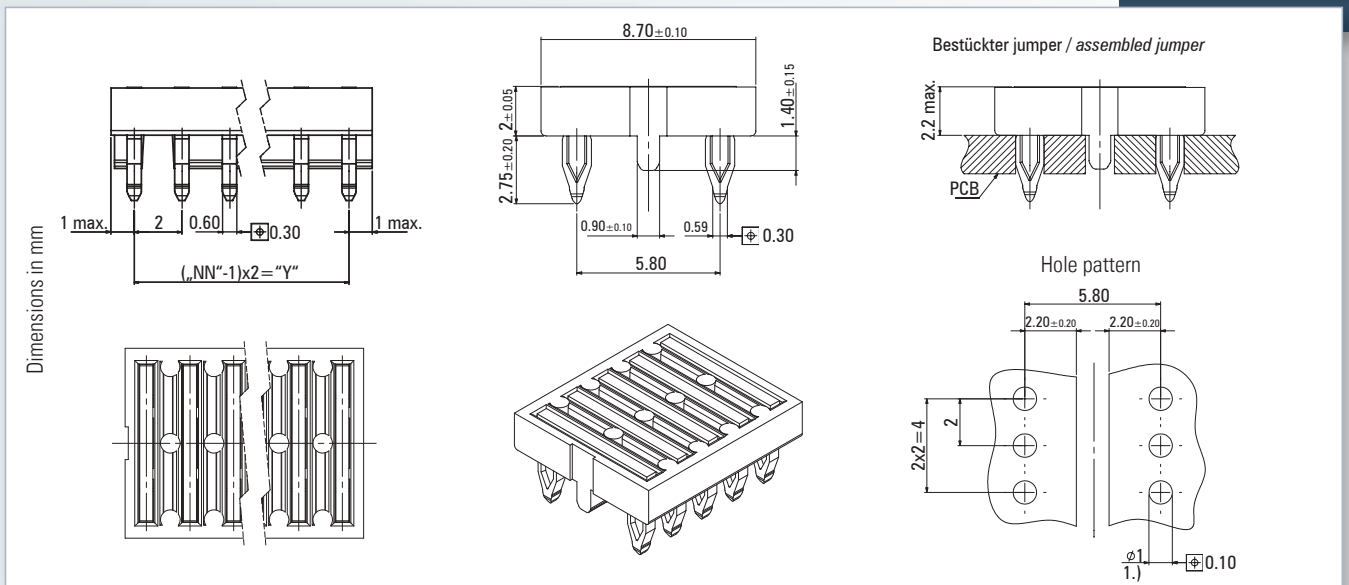
Operational current: 11 A at 20°C

Packaging: bulk

Approval:  

Technical Specification on page 174

For drawings and technical data visit www.ept.de



Couldn't find something suitable or having questions? We will be pleased to help you! Call us: +49 8861 / 25010.

Number contact bridges	Part number	PU (Bulk)
2	991-500200-11	250
3	991-500300-11	
4	991-500400-11	
5	991-500500-11	
6	991-500600-11	
7	991-500700-11	
8	991-500800-11	
9	991-500900-11	
10	991-501000-11	
11	991-501100-11	
12	991-501200-11	
13	991-501300-11	
14	991-501400-11	
15	991-501500-11	

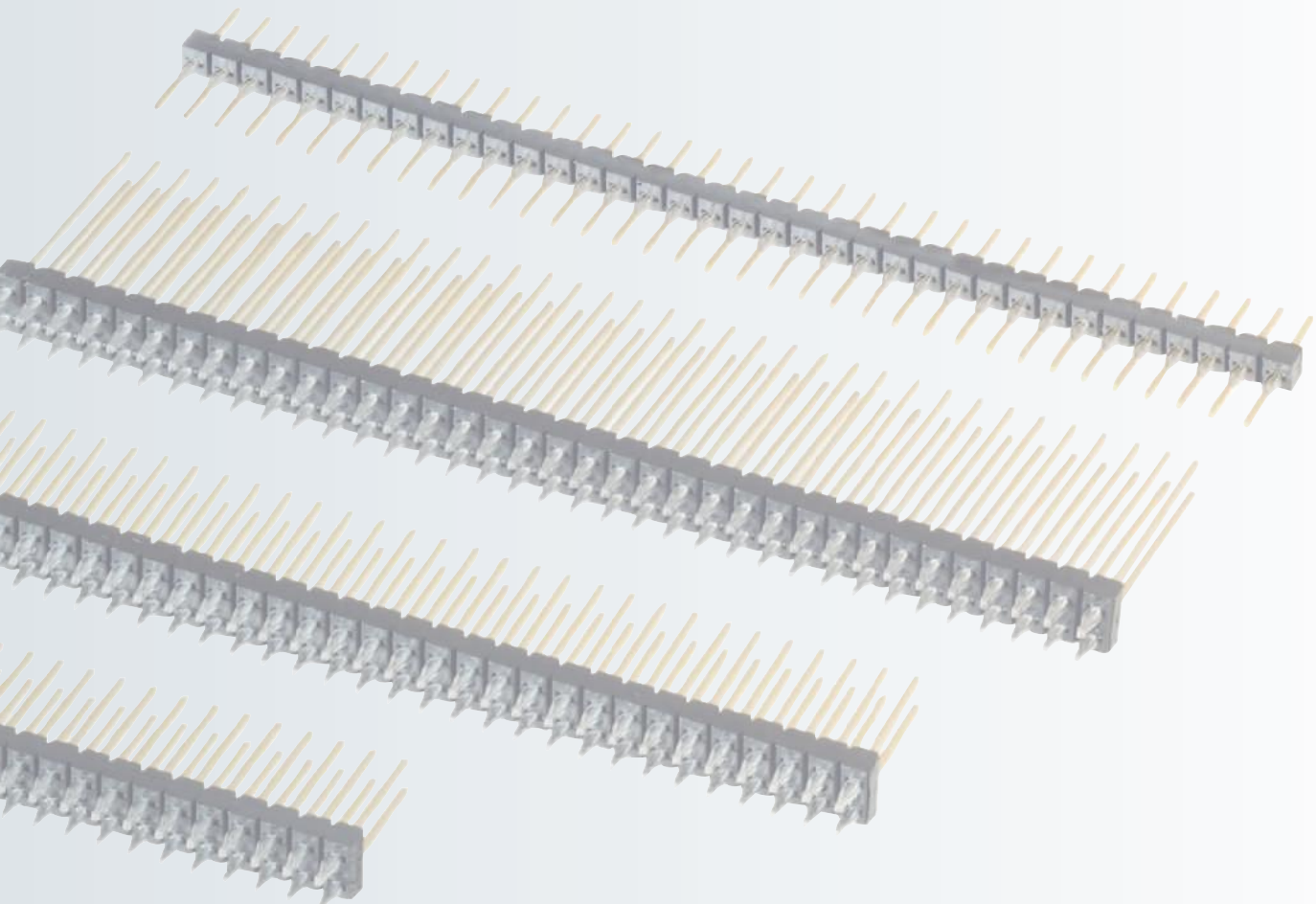
flexilink_{jumper} with 2 contact bridges



On request

- other pin configurations

VarPol Pin Headers and Socket Strips



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PCB Distances	183
Technical Specifications	184
Hole Specifications	185
VarPol Female Connector	186
VarPol Guiding Block	188
VarPol Straight Pin Header	190
VarPol Angled Pin Header	192
Socket Connector	194

VarPol - 2.54 mm Pin Headers and Socket Strips in Press-fit

High Quality, Adaptable and Robust

Pin headers and sockets from ept offer a plethora of possibilities for connecting circuit boards. One or two rows, variable pin counts, different termination lengths, straight or angled – the choice is yours! The product also allows for seamlessly connecting sockets.

In addition, Tcom press®, our tried and proven press-fit zone, allows you to eliminate the soldering process and greatly increase connection reliability.

Key Features:

- a large selection of contact lengths and termination lengths
- a choice of performance levels: 50 and 200 mating cycles
- sockets can be joined end-to-end
- simple and inexpensive processing
- Tcom press® press-fit zone

Applications:

- Board-to-Board distance from 11.45 mm to 35.45 mm
- no soldering process thanks to Press-fit

Termination



Press-fit



Solder

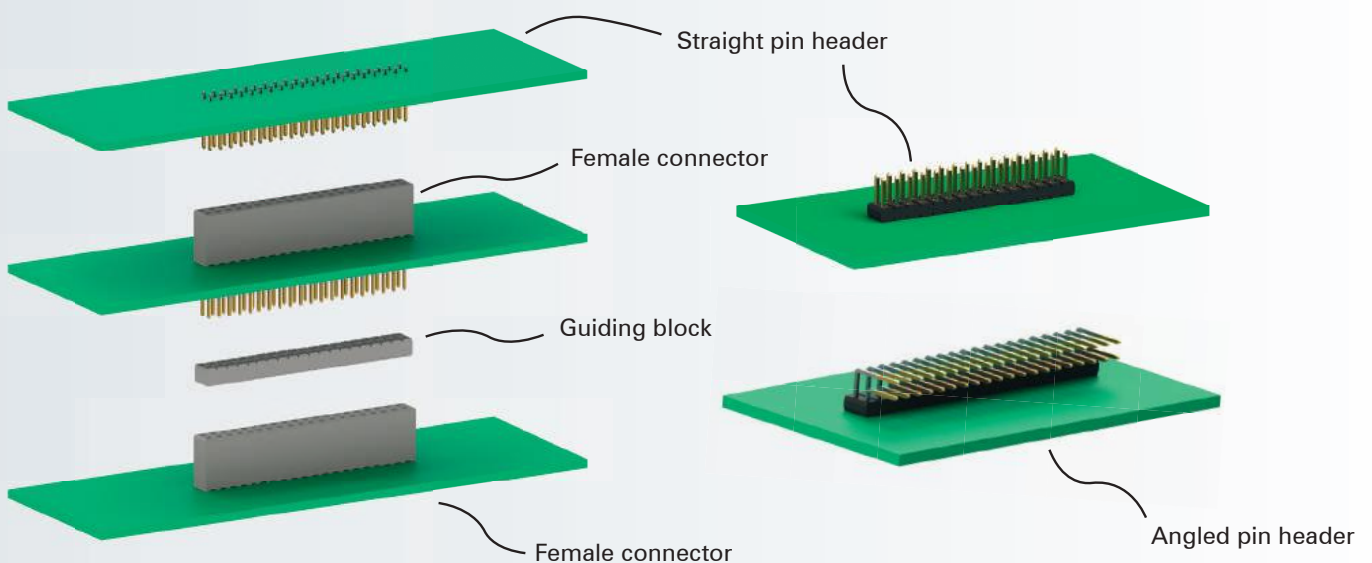
Mating Configuration

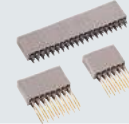

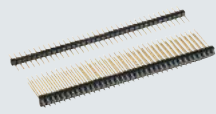
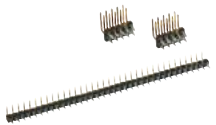



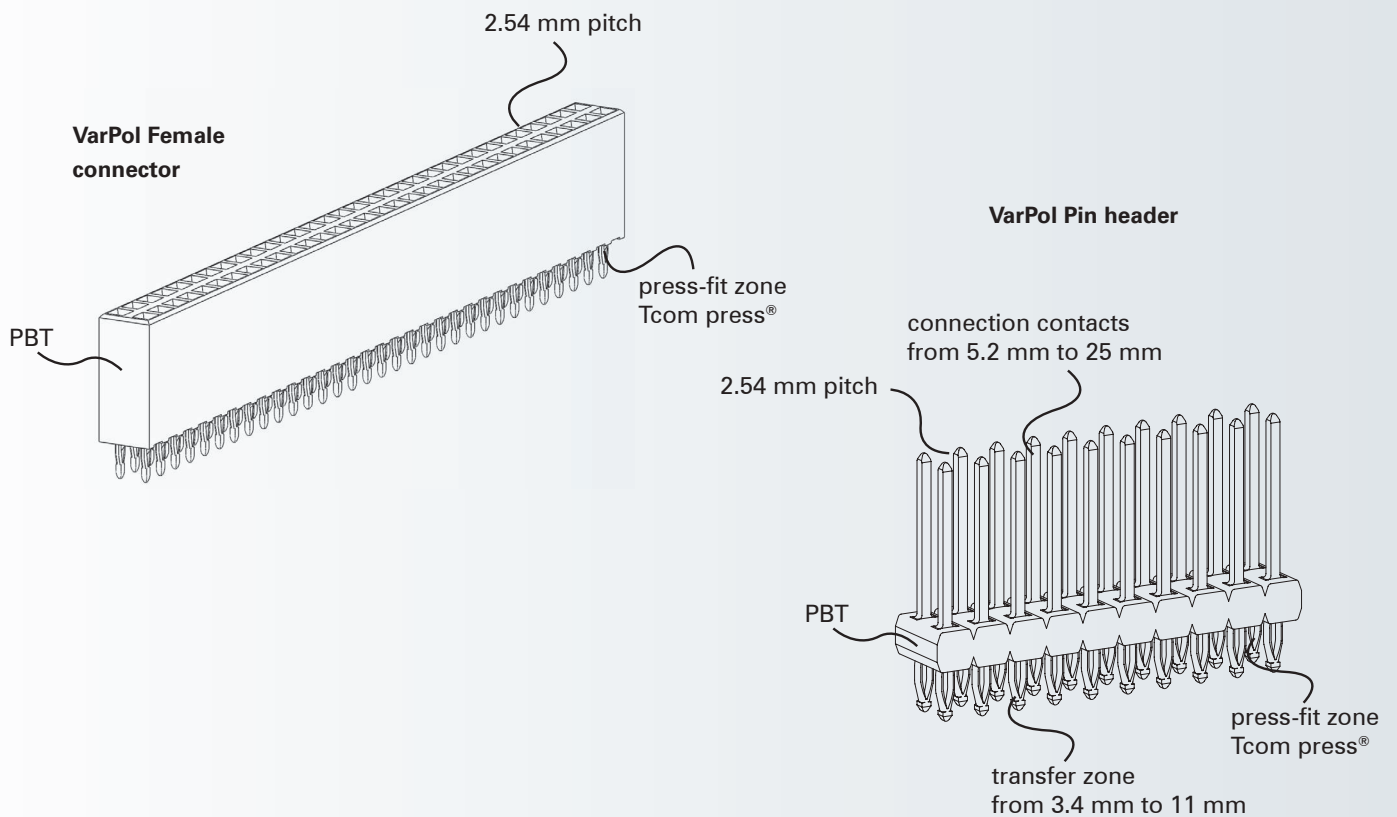
Perpendicular



Parallel



Type	Pitch (mm)	max. number of contacts	Termination	Mating connector	Page reference
	2.54	36 / 108	Press-fit, solder	VarPol Female connector Pin header	S. 186
	2.54	108			S. 188
	2.54	36 / 108	Press-fit	VarPol Female connector	S. 190
	2.54	36 / 108	Press-fit	VarPol Female connector	S. 192
	2.54	32 / 64	Press-fit	VarPol socket connector	S. 194



Stack it with VarPol

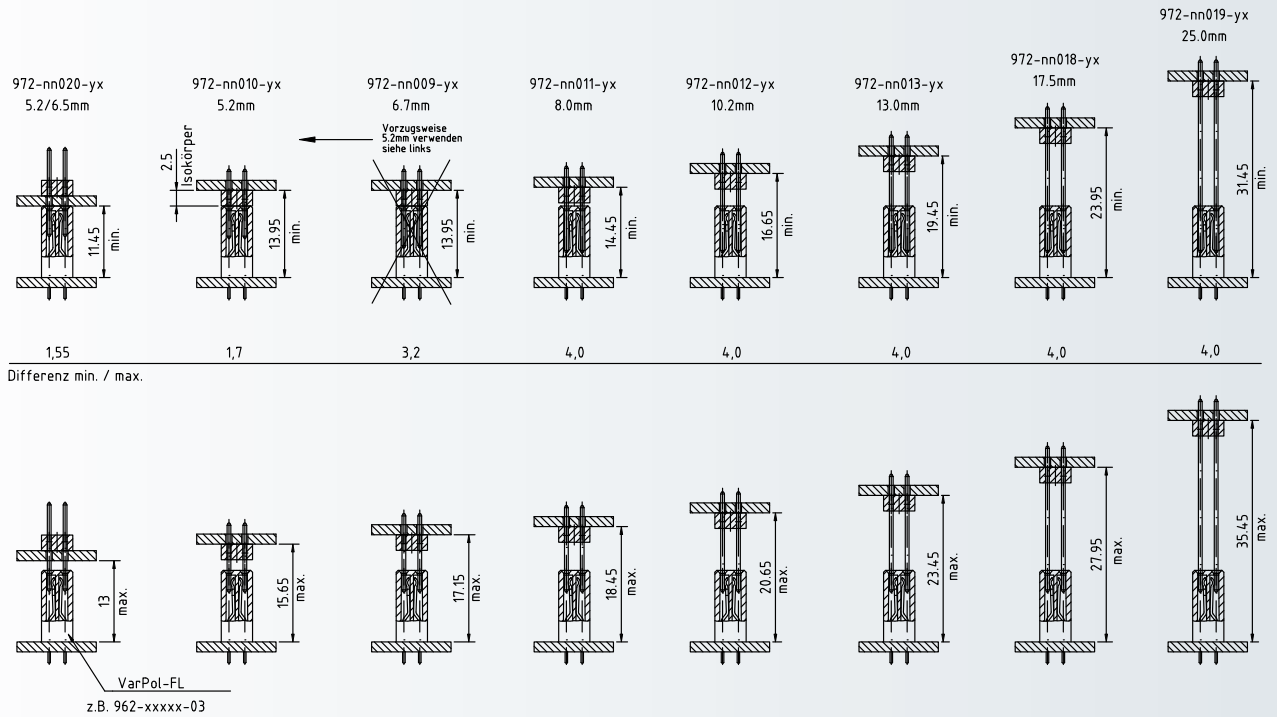
VarPol pin headers and sockets based on the press-fit system make it possible to connect circuit boards with one another in parallel:

- board-to-board distance of 11.45 mm up to 35.45 mm using various termination lengths of the multi-pin connector
- single or double row
- number of contacts is freely selectable (no upper limit, as the connectors can be arranged next to one another without the loss of a pitch)
- interchange zone as an option
- female in soldering or press-fit technology

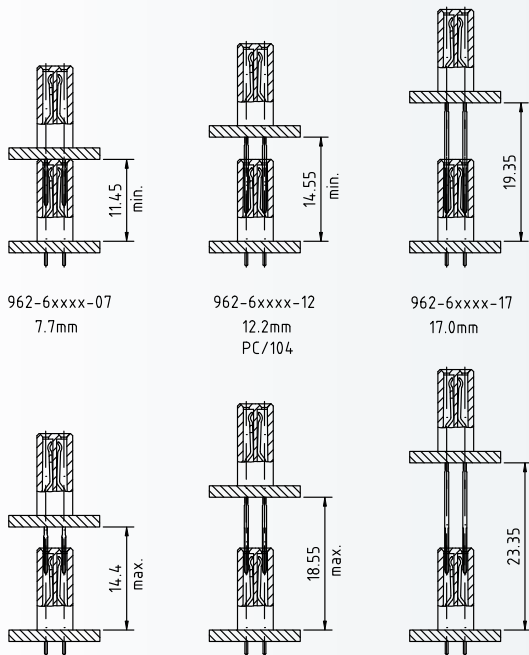
Connecting the connector with the circuit board using press-fit technology ensures a highly robust and resilient connection. High-quality press-fit connections, such as the Tcom press® from ept, offer demonstrably better contact reliability than soldering connections. The cold welding between the contact and the circuit board hole resulting from press-in is highly mechanically stable and of a high electrical quality. It is remarkably easy and reliable to process using the associated processing tools offered by ept.

It is also possible to vertically stack multiple circuit boards, whereby female connectors with a rear mating zone are used. Board-to-board distances of 11.45 mm up to 19.35 mm can be achieved here. Using a guiding system on the underside of the upper circuit board also supports stable contact management and prevents mismatching. Angled pin headers provide the option to implement right-angled connections with the same level of versatility and reliability, in addition to the parallel connection of circuit boards.

System: VarPol Female connector / VarPol Pin header

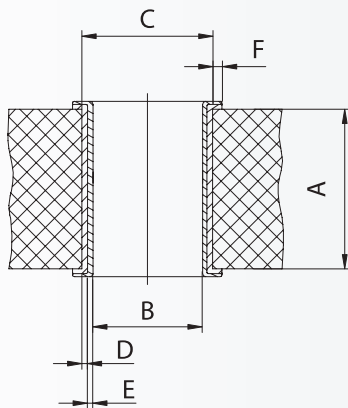


System: VarPol Female connector / VarPol Female connector without guiding block



Technical Specifications

Technical Specifications	VarPol Connectors		
	Testing Standard	Female connectors, Pin headers	Socket connector
Basics			
Number of contacts		2 to 108	2 to 64
Operating temperature range		-55°C to +125°C	
Material			
Insulator material		PBT glass filled	
Contact material		Copper alloy	
Contact surface		Au over NiP over Ni	Sn or Au over Ni
Mechanical			
Pitch		2.54 mm	
Mating force per pin		max. 0.9 N	max. 1.8 N
Separating force per pin		max. 0.6 N	min. 1 N
Durability	IEC 60512-9-1:2010	Perf. level II = 250 mating cycles Perf. level III = 50 mating cycles	-
Electrical			
Operational current	IEC 60512-5-2:2002	max. 1.9 A	max. 1 A
Operating voltage		150 V	100 V
Contact resistance	IEC 60512-2-1:2002	< 20 mΩ	< 10 mΩ
Clearance and creepage		1.2 mm	> 0.6 mm
Insulation resistance	IEC 60512-3-1:2002	> 10 ⁸ MΩ	
Approval			
Flammability		UL (file: E130314)	
Environment		RoHS compliant	



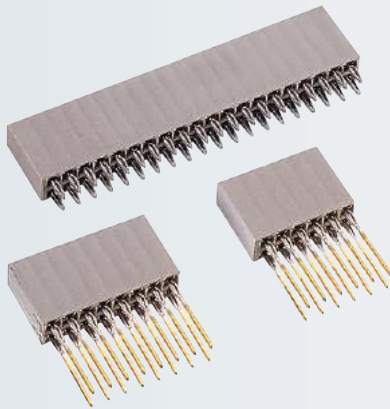
Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

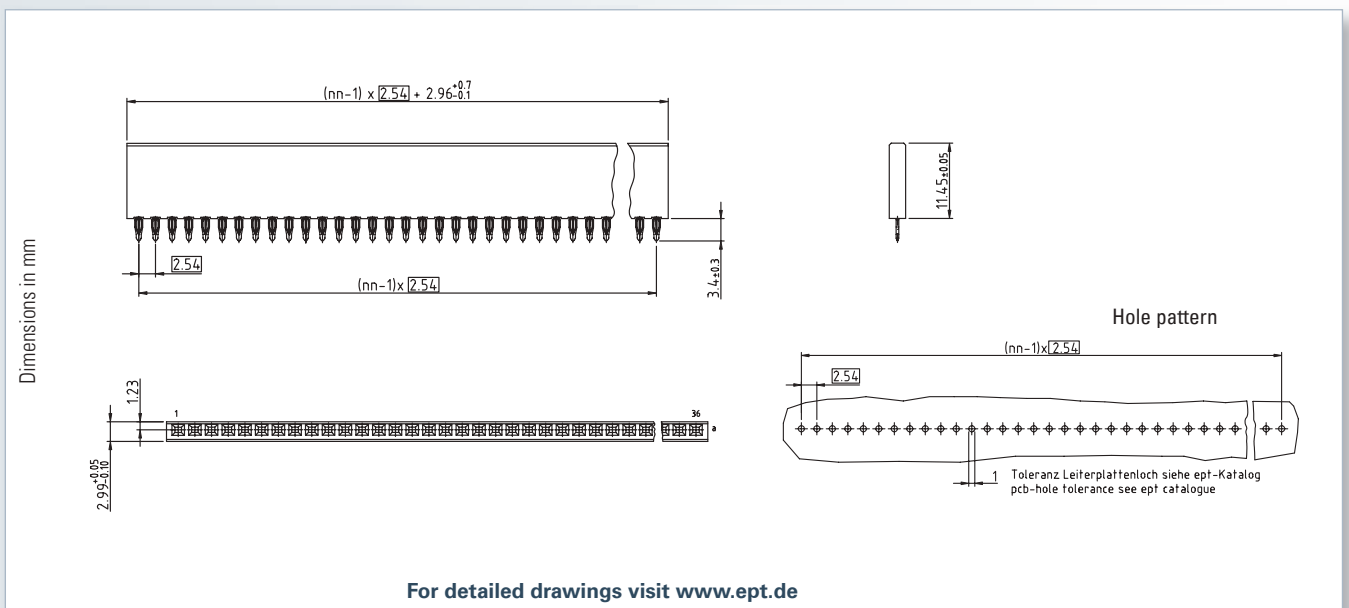
		VarPol
		Ø 1.0 mm
imm. Sn printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm
E	imm. Sn plating	max. 1.5 µm
F	Annular ring	min. 0.1 mm
Ni, Au printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni
F	Annular ring	min 0.1 mm
pure Cu printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm
E	OSP*	e. g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm
F	Annular ring	min. 0.1 mm
HAL Sn printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm
E	HAL Sn	5 – 15 µm
F	Annular ring	min. 0.1 mm

* OSP = Organic Solderability Preservatives



Type: Female connector straight
Termination: Press-fit, solder
Number of contacts: 2 - 108
Pitch: 2.54 mm
Operational current: 1.9 A
Approval: **RoHS COMPLIANT**

Technical Specifications on page 184



Accessories


- Processing tools p. 340
- 2-row guide block 962-17nn2/1 p. 188

Mating connector / Application:

- VarPol Straight pin header (p. 190)
- VarPol Angled pin header (p. 192)



Press-fit 

No. of contacts		Performance level	Termination length L 			
			3.4 mm	8.05 mm	12.2 mm	17 mm
			Part number			
1 - 36	1-row	II	961-60nn6-03	961-60nn6-07	961-60nn6-12	961-60nn6-17
		III	961-60nn2-03	961-60nn2-07	961-60nn2-12	961-60nn2-17
2 - 108	2-row	II	962-60nn6-03	962-60nn6-07	962-60nn6-12	962-60nn6-17
		III	962-60nn2-03	962-60nn2-07	962-60nn2-12	962-60nn2-17

Ordering note


nn=no. of contacts/row
 Example for Female connector:
 2-row, 100 contacts Performance level II, post length 3.4 mm ->
962-60506-03

On request

- contact arrangement
- other contact surface



Solder 

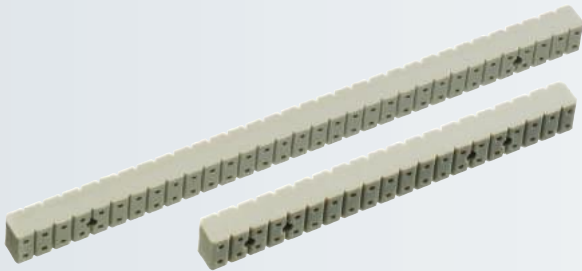
No. of contacts		Performance level	Termination length L 	
			3.4 mm	12.2 mm
			Part number	
1 - 36	1-row	II	961-40nn6-03	961-40nn6-12
		III	961-40nn2-03	961-40nn2-12
2 - 108	2-row	II	962-40nn6-03	962-40nn6-12
		III	962-40nn2-03	962-40nn2-12

Ordering note

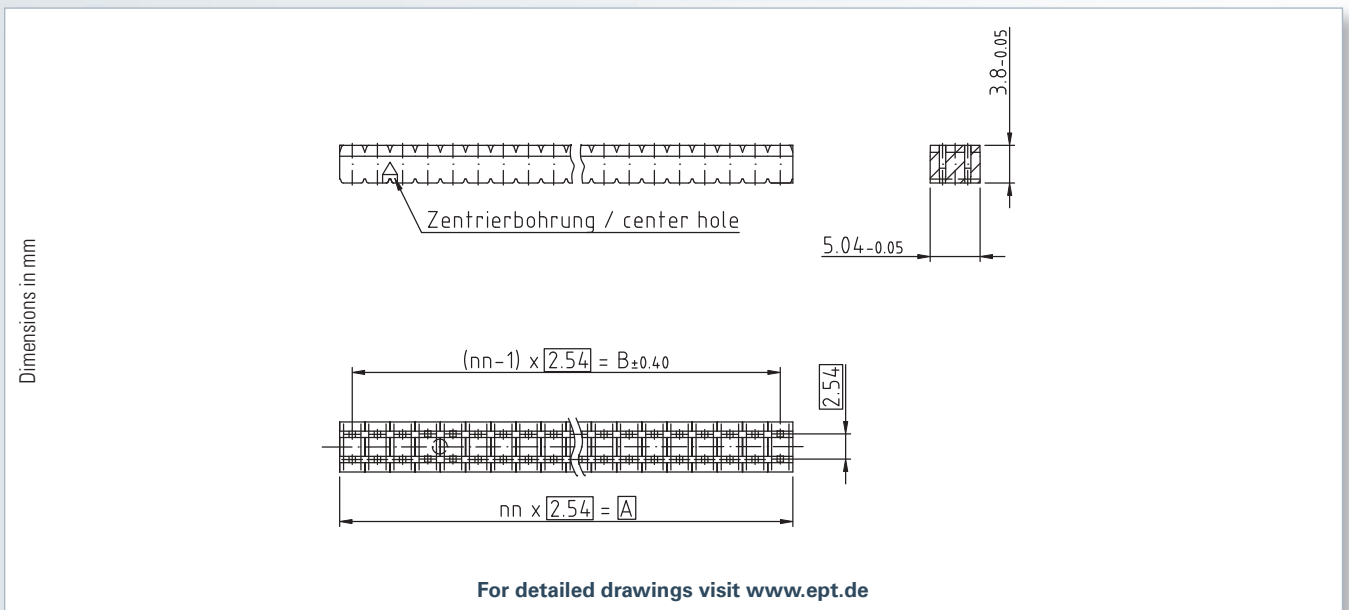
nn=no. of contacts/row
 Example for female connector:
 2-row, 100 contacts Performance level II, post length 3.4 mm ->
962-40506-03

On request

- contact arrangement
- other contact surface



Führungskörper



	VarPol
	Guiding block
No. of contacts	Part number
2 - 108	962-17nn2/1

Ordering note

nn=no. of contacts/row
 Example for Guiding block: 2-row,
 100 contacts -> **962-17502/1**

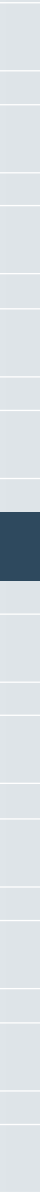
Note

The guiding block supports the solid pin guiding at the bottom side of the PCB and avoids incorrect mating.


Mating connector / Application:



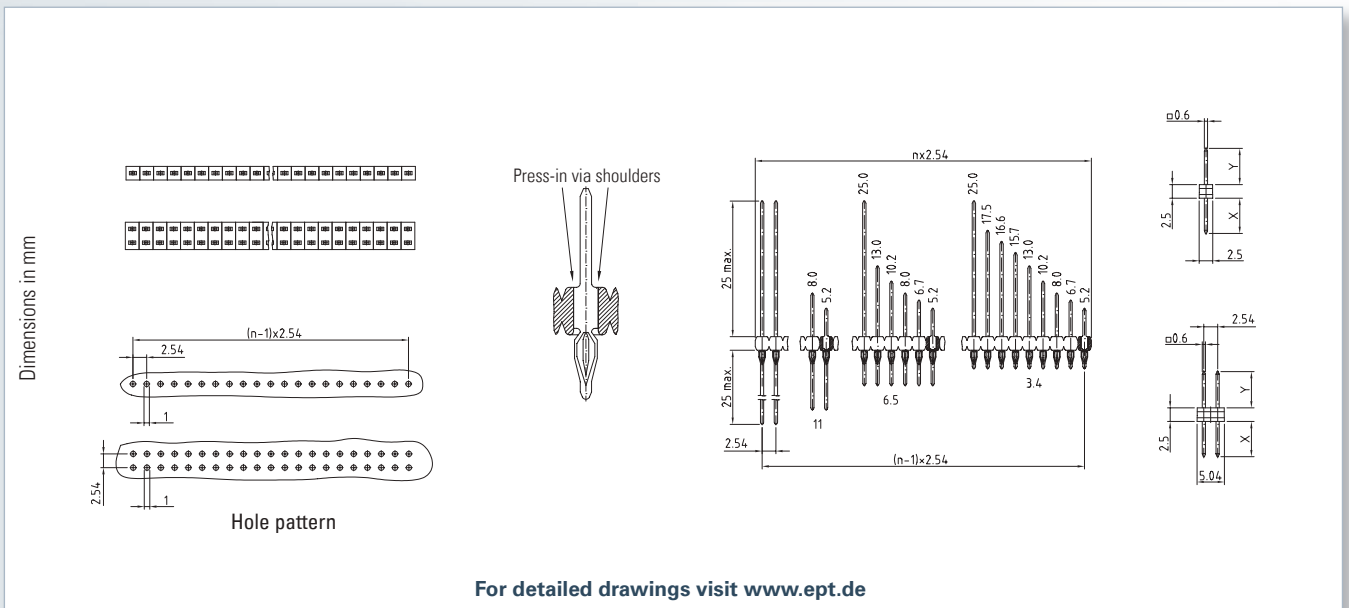
VarPol Female connector (p. 186)





Type: Male connector straight
Termination: Press-fit
Number of contacts: 2 - 108
Pitch: 2.54 mm
Operational current: 1.9 A
Approval: 

Technical Specifications on page 184



Accessories

- Processing tools p. 340

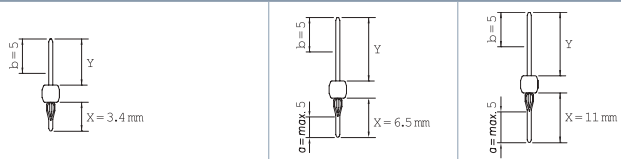
Mating connector / Application:



VarPol Female connector (p. 186)



Press-fit 1-row

No. of contacts	Y	Termination length			
					
		Part number			
		Performance level II	Performance level III	Performance level II	Performance level II
max. 36	5.2	971-nn010-21	971-nn010-31	971-nn020-22	971-nn050-22
	6.7	971-nn009-21	971-nn009-31	971-nn039-22	—
	8.0	971-nn011-21	971-nn011-31	971-nn021-22	971-nn051-22
	10.2	971-nn012-21	971-nn012-31	971-nn022-22	—
	13.0	971-nn013-21	971-nn013-31	971-nn023-22	971-nn053-22
	15.7	971-nn026-21	971-nn026-31	—	—
	16.6	971-nn006-21	971-nn006-31	—	—
	17.5	971-nn018-21	971-nn018-31	—	—
	25.0	971-nn019-21	971-nn019-31	971-nn029-22	—

Ordering note

nn=no. of contacts/row
 Example for pin header: 2-row, 100 contacts Performance level II, length of termination side 3.4 mm, length of mating side 5.2 mm -> **972-50010-21**

Note

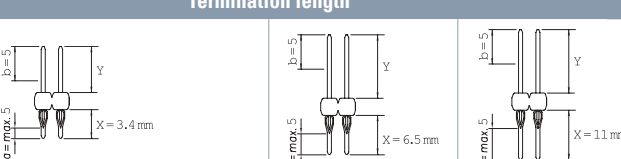
Performance level II = 250 mating cycles
 Performance level III = 50 mating cycles

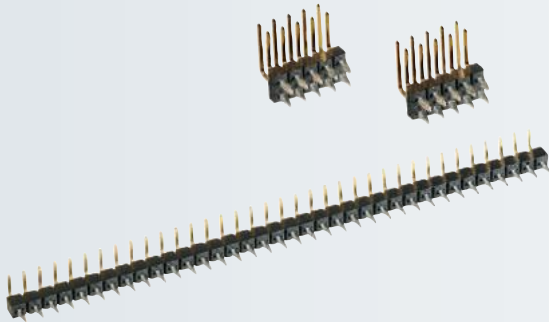
On request

- special contact length
- other contact surface



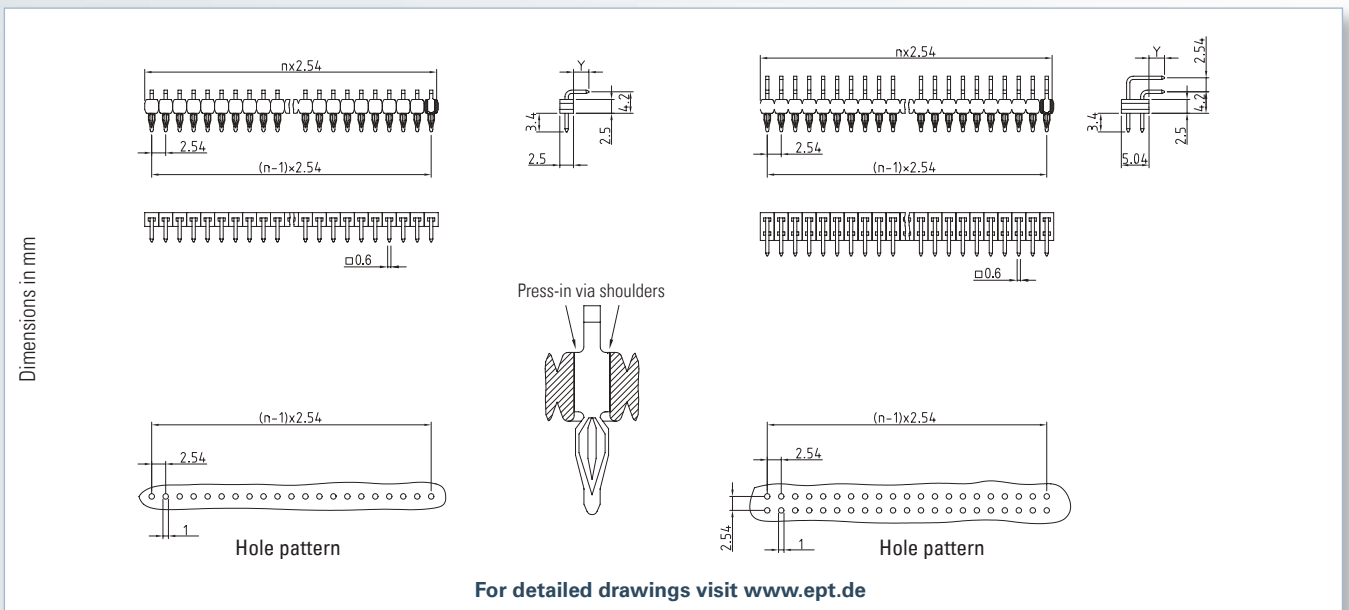
Press-fit 2-row

No. of contacts	Y	Termination length			
					
		Part number			
		Performance level II	Performance level III	Performance level II	Performance level II
max. 108	5.2	972-nn010-21	972-nn010-31	972-nn020-22	972-nn050-22
	6.7	972-nn009-21	972-nn009-31	972-nn039-22	—
	8.0	972-nn011-21	972-nn011-31	972-nn021-22	972-nn051-22
	10.2	972-nn012-21	972-nn012-31	972-nn022-22	—
	13.0	972-nn013-21	972-nn013-31	972-nn023-22	972-nn053-22
	15.7	972-nn026-21	972-nn026-31	—	—
	16.6	972-nn006-21	972-nn006-31	—	—
	17.5	972-nn018-21	972-nn018-31	—	—
	25.0	972-nn019-21	972-nn019-31	972-nn029-22	—



Type: Male connector 90°
Termination: Press-fit
Number of contacts: 2 - 108
Pitch: 2.54 mm
Operational current: 1.9 A
Approval: **RoHS COMPLIANT**

Technical Specifications on page 184



Accessories


- Processing tools p. 340

Mating connector / Application:

VarPol Female connector (p. 186)



Press-fit 1-row

No. of contacts	Y	Termination length		
				
		Part number		
		Performance level II	Performance level III	
max. 36	1-row	2.8	981-nn010-21	981-nn010-31
		5.6	981-nn011-21	981-nn011-31
		7.8	981-nn012-21	981-nn012-31
		10.6	981-nn013-21	981-nn013-31

Ordering note

nn=no. of contacts/row
 Example for pin header: 2-row,
 100 contacts Performance level II,
 length of termination side 3.4 mm,
 length of mating side 5.6 mm ->
982-50011-21

Note


Performance level II
 = 250 mating cycles
 Performance level III
 = 50 mating cycles

On request

- special contact length
- other contact surface





Press-fit 2-row

No. of contacts	Y	Termination length		
				
		Part number		
		Performance level II	Performance level III	
max. 108	2-row	2.8	982-nn010-21	982-nn010-31
		5.6	982-nn011-21	982-nn011-31

VarPol ■ ■ ■

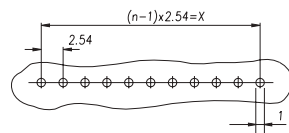
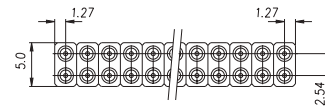
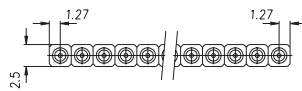
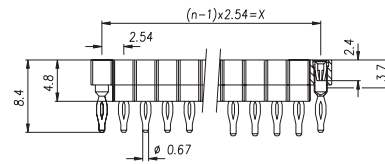
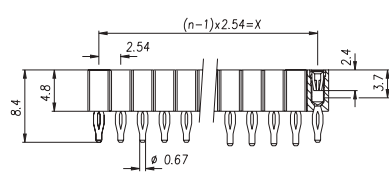
Socket Connector



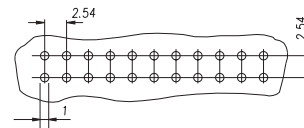
Type: Socket connector straight
Termination: Press-fit
Number of contacts: 2 - 64
Pitch: 2.54 mm
Operational current: 1 A
Approval:  

Technical Specifications on page 184

Dimensions in mm



Hole pattern



Hole pattern

For detailed drawings visit www.ept.de

Couldn't find something suitable or having questions? We will be pleased to help you! Call us: +49 8861 / 25010.



Press-fit

No. of contacts		Surface	Termination length		
			Part number		
max. 32	1-row	5 µm Sn	930-61nn0	–	–
		0.25 µm Au	930-61nn4	930-66nn4	930-66nn5
max. 64	2-row	5 µm Sn	936-61nn0	–	–
		0.25 µm Au	936-61nn4	936-66nn4	936-66nn5

Ordering note

nn=no. of contacts/row
Example for Socket connector:
2-row, 28 contacts, 0.25 µm Au,
15 mm termination length
-> **936-66145**

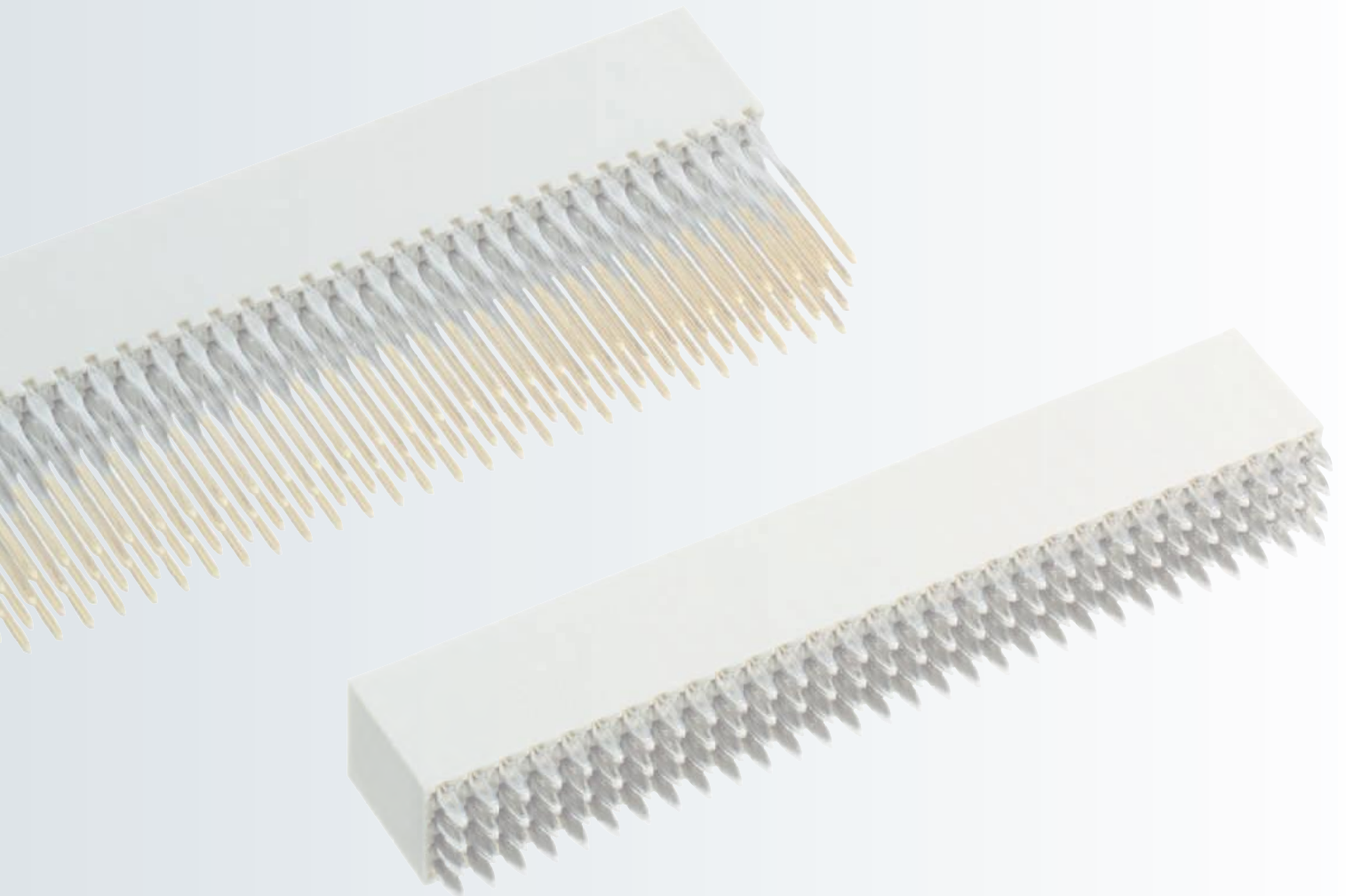
Note

*Rear mating zone Ni, Au

On request

- processing tools

PC/104, PC/104-Plus Easy Stacking with Press-fit



Introduction	198
Overview	199
The Standard	200
Technical Specifications	202
Hole Specifications	203
PC/104	204
PC/104-Plus	206
Accessories: PC/104-Plus	209

PC/104, PC/104-Plus

Highest Quality for Established Form Factor

PC/104 and PC/104-Plus is a standard for PC-compatible modules which are intermateable to set up a complete computing system. The PC/104 and PC/104-Plus ensures complete hardware and software compatibility, is extremely compact (96 mm x 90 mm), and comes with a standardized PC/104 Bus (ISA). Due to this standardization, different PC/104 cards can be combined to implement a defined task.

Based on PC/104, many different boards are offered such as:

- complete single-board computers
- I/O boards for digital or analog I/O
- boards for CAN, Profibus, LON, Ethernet
- PCMCIA boards

Key Features:

- ept's proven press-fit technology Tcom press®
- PC/104-Plus available for 22 mm Board-to-Board distance
- shrouds as accessory available
- individual performance level and contact number possible

Applications:

- PC/104
- PC/104-Plus
- Board-to-Board for PCB distance 15.24 mm and 22 mm

Termination



Press-fit

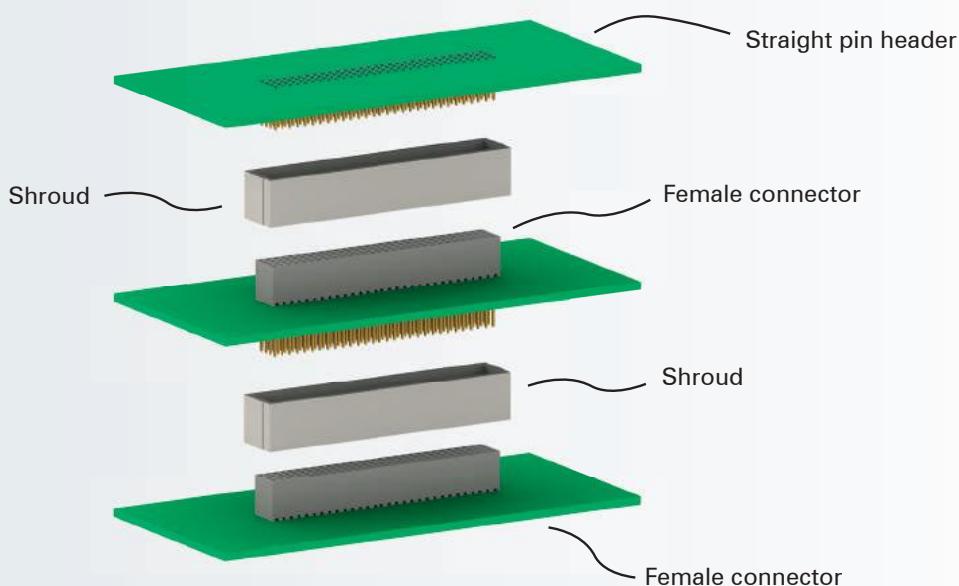


Solder

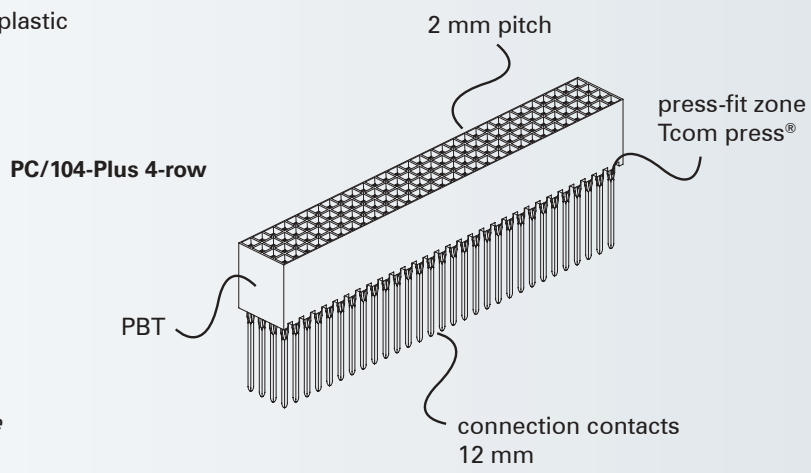
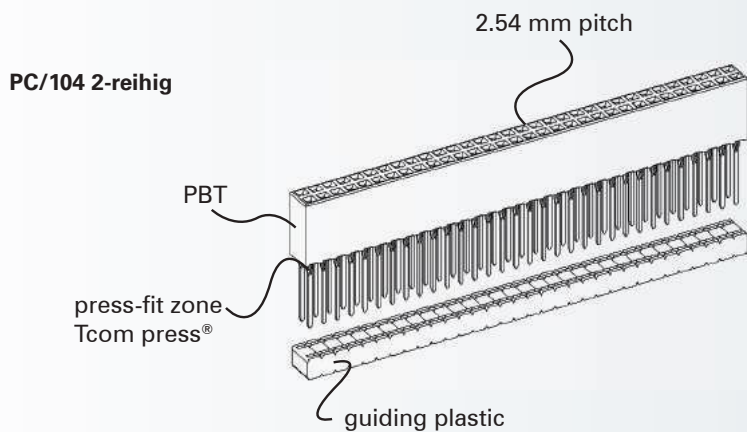
Mating Configuration



Parallel



	Type		Pitch (mm)	Number of contacts	Termination	Mating connector	Page reference
PC/104		PC/104 Female connector	2.54	40 / 64	Press-fit, solder	PC/104 Female connector	p. 204
PC/104-Plus		PC/104-Plus Female connector	2	120	Press-fit, solder	PC/104-Plus Female connector	p. 206
		PC/104-Plus Female connector 22 mm	2	120	Press-fit	PC/104-Plus Female connector	p. 207
		PC/104-Plus Pin header	2	60	Press-fit	PC/104-Plus Female connector	p. 208



available with or without transfer zone

PC/104 and PC/104-Plus

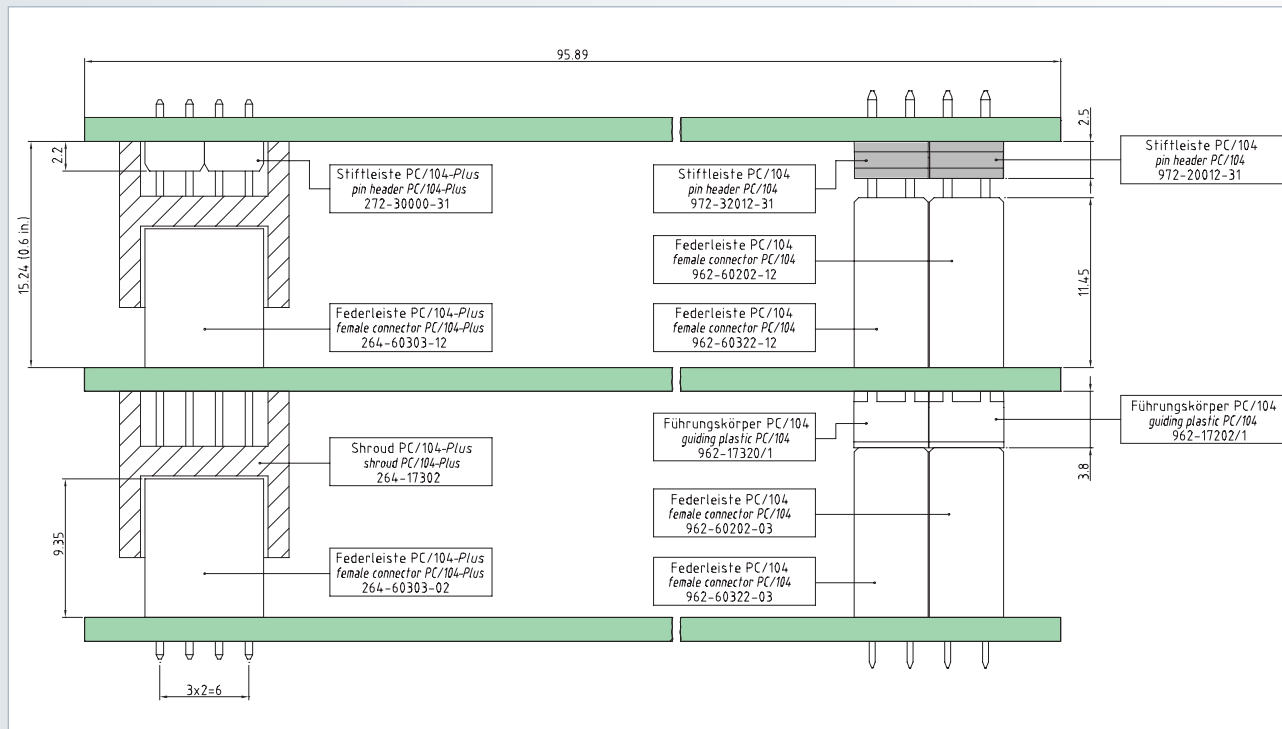
Since more powerful components are available, the PC/104 systems had to be supplemented with a faster bus system. The PC/104 system was supplemented with the PCI bus and thus it was further developed. This supplement is described in the PC/104-Plus specification.

figure). The clearances specified by the PC/104 consortium are ensured by using spacers and shrouds. The additional use of spacing bolts is therefore not required.

PC/104 and PC/104-Plus Connector

While the PC/104 bus comprises two connectors with 40 and 64 pins which can be placed side-by-side and a grid size of 2.54 mm, the PC/104-Plus features 120 pins with a distance of 2.00 mm.

By using connectors with long pins in press-fit technology, several boards can be stacked on top of each other (see



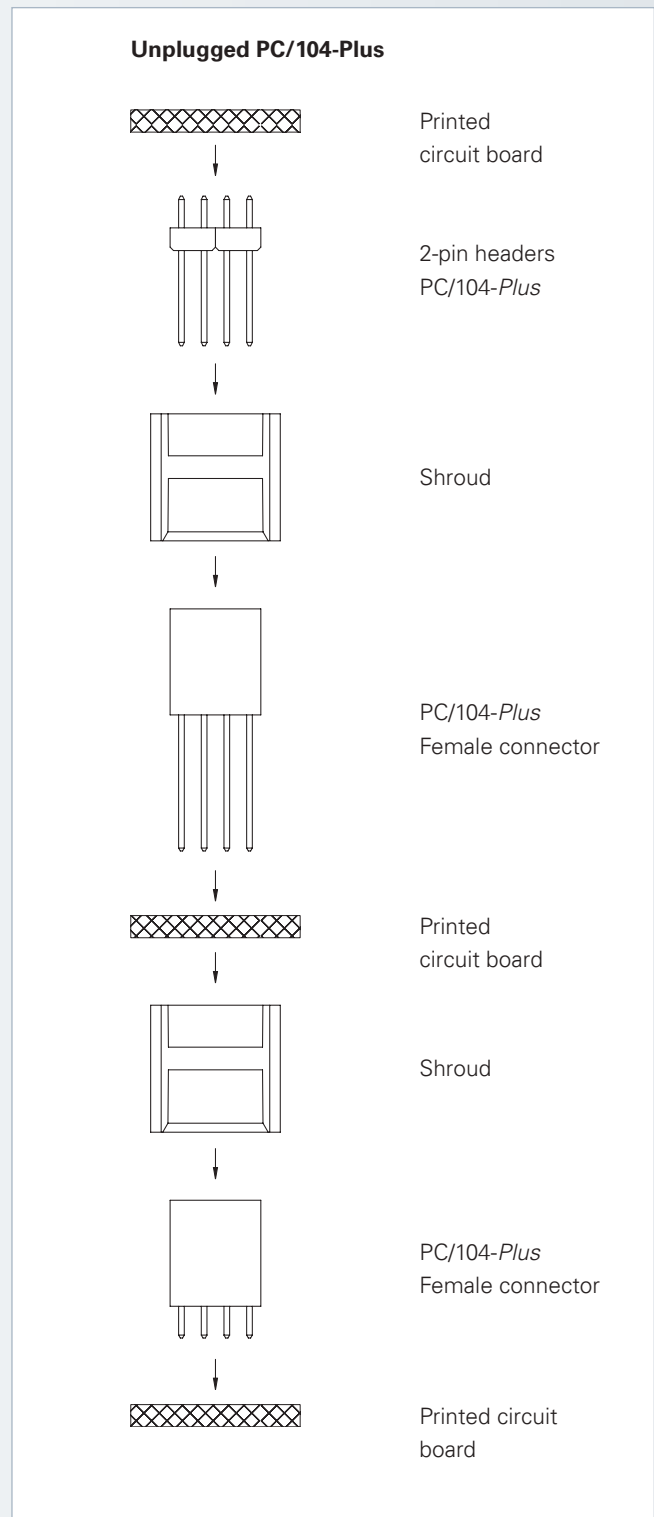
PC/104 and PC/104-Plus press-fit connectors from ept offer various advantages:

- The female connectors are pressed in by means of a simple flat rock press-fit tool
- No additional costs due to complex manual soldering
- No reworking at the rear mating zone (solder bridges, solder splashes)
- Less inspection overhead
- Lower engaging and separating forces; therefore bending of the rear mating zone is prevented
- When female connectors with rear mating zone are pressed in, a guiding block is pushed up from below. This offers the following advantages:
 - No bending of the rear mating zone
 - Serves as spacer so that the clearance of 0.6" is achieved when the modules are plugged in
 - Serves as support tool when pressing in and prevents that the strip lines between the through connections are damaged.

The shroud is reliably fixed on the PCB by additional press in of the shroud housing onto the rear mating zone.

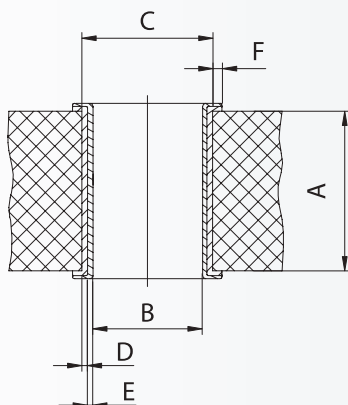
Customer-specific Solutions

Within the scope of PC/104 and PC/104-Plus applications, upon request ept also offers various customer-specific solutions with 2.0 mm and 2.54 mm grid.



Technical Specifications

Technical Specifications	PC/104, PC/104-Plus		
	Testing Standard	PC/104	PC/104-Plus
Basics			
Specification		PC/104	PC/104-Plus
Performance level		2 / 3	
Number of contacts		40 to 120	
Termination		Press-fit, solder	
Operating temperature range		-55°C to +125°C	
Material			
Insulator material		PBT glass filled	
Contact material		Copper alloy	
Contact surface		Au over PdNi or Au over NiP over Ni	
Mechanical			
Pitch		2.54 mm	2.0 mm
Mating force per pin		max. 0.9 N	max. 1.5 N
Separating force per pin		max. 0.6 N	min. 0.3 N
Electrical			
Operational current	IEC 60512-5-2:2002	max. 1.9 A	max. 1.7 A
Operating voltage		150 V	100 V
Contact resistance	IEC 60512-2-1:2002	< 20 mΩ	
Clearance and creepage		1.2 mm	min. 0.5 mm
Insulation resistance	IEC 60512-3-1:2002	> 10 ⁶ M Ω	
Processing			
Packaging		Tray	
Approval			
Flammability		UL (file: E130314)	
Environment		RoHS compliant	



Hole Specifications Press-fit

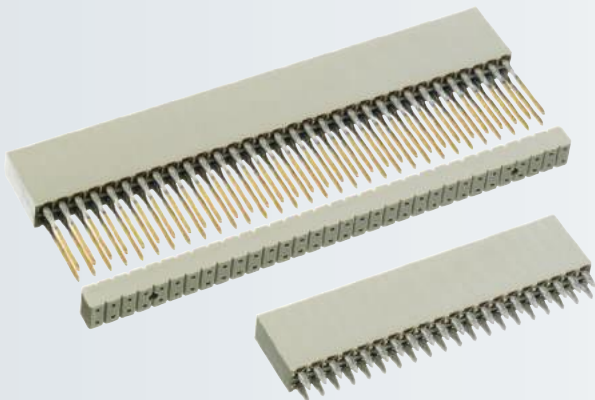
Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

		PC/104-Plus	PC/104
Nominal hole		Ø 0.85 mm	Ø 1.0 mm
imm. Sn printed circuit boards			
A	PCB thickness	min. 1.4 mm	min. 1.4 mm
B	Plated hole	Ø 0.85 + 0.10/- 0.05 mm	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.0 ± 0.025 mm	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	imm. Sn plating	max. 1.5 µm	max. 1.5 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm
Ni, Au printed circuit boards			
A	PCB thickness	min. 1.4 mm	min. 1.4 mm
B	Plated hole	Ø 0.85 + 0.09/- 0.05 mm	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.0 ± 0.025 mm	1.15 ± 0.025 mm
D	Cu plating	min 25 µm	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni
F	Annular ring	min 0.1 mm	min 0.1 mm
pure Cu printed circuit boards			
A	PCB thickness	min. 1.4 mm	min. 1.4 mm
B	Plated hole	Ø 0.85 + 0.10/- 0.05 mm	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.0 ± 0.025 mm	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	OSP*	e. g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm	e. g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm
HAL Sn printed circuit boards			
A	PCB thickness	min. 1.4 mm	min. 1.4 mm
B	Plated hole	Ø 0.85 + 0.10/- 0.05 mm	Ø 1 + 0.09/- 0.06 mm
C	Drill hole	1.0 ± 0.025 mm	1.15 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	HAL Sn	5 – 15 µm	5 – 15 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm

* OSP = Organic Solderability Preservatives

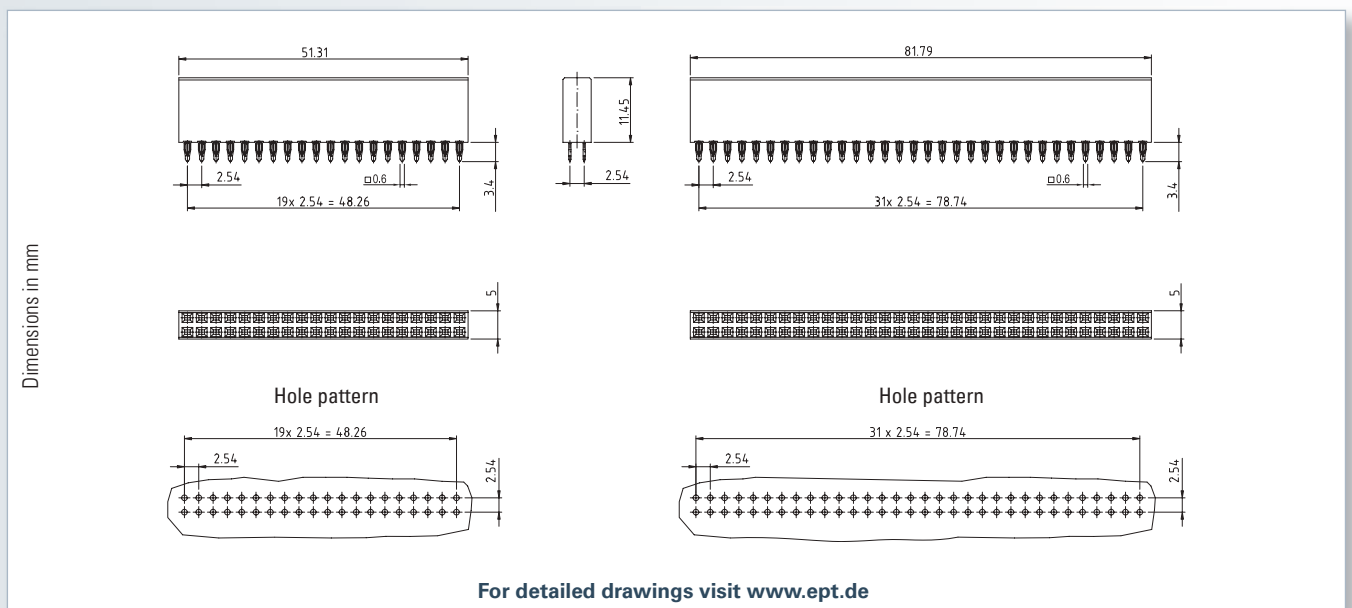
PC/104 Female Connector



Type: Female connector straight
Termination: Press-fit, solder
Number of contacts: 40, 64
Pitch: 2.54 mm
Operational current: 1.9 A
Packaging: Tray
Standard: PC/104



Technical Specifications on page 202



Accessories

- Processing tools p. 340

Note

At a contact length of 12.2 mm a guiding block is scope of delivery.


Mating connector / Application:



VarPol Straight pin header (p. 190)




Press-fit . . .

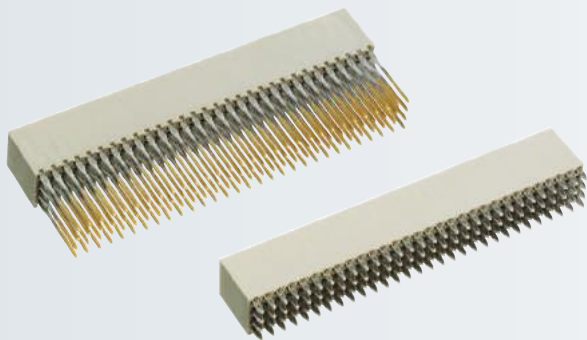
No. of contacts	Performance level	Termination length L 			
		3.4 mm		12.2 mm	
		Part number	PU (Tray)	Part number	PU (Tray)
40	II	962-60206-03	80/1120	962-60206-12	38/532
40	III	962-60202-03		962-60202-12	
64	II	962-60326-03	40/560	962-60326-12	
64	III	962-60322-03		962-60322-12	



Solder . . .

No. of contacts	Performance level	Termination length L 	
		3.4 mm	
		Part number	PU (Tray)
40	II	962-40206-03	80/1120
40	III	962-40202-03	
64	II	962-40326-03	40/560
64	III	962-40322-03	

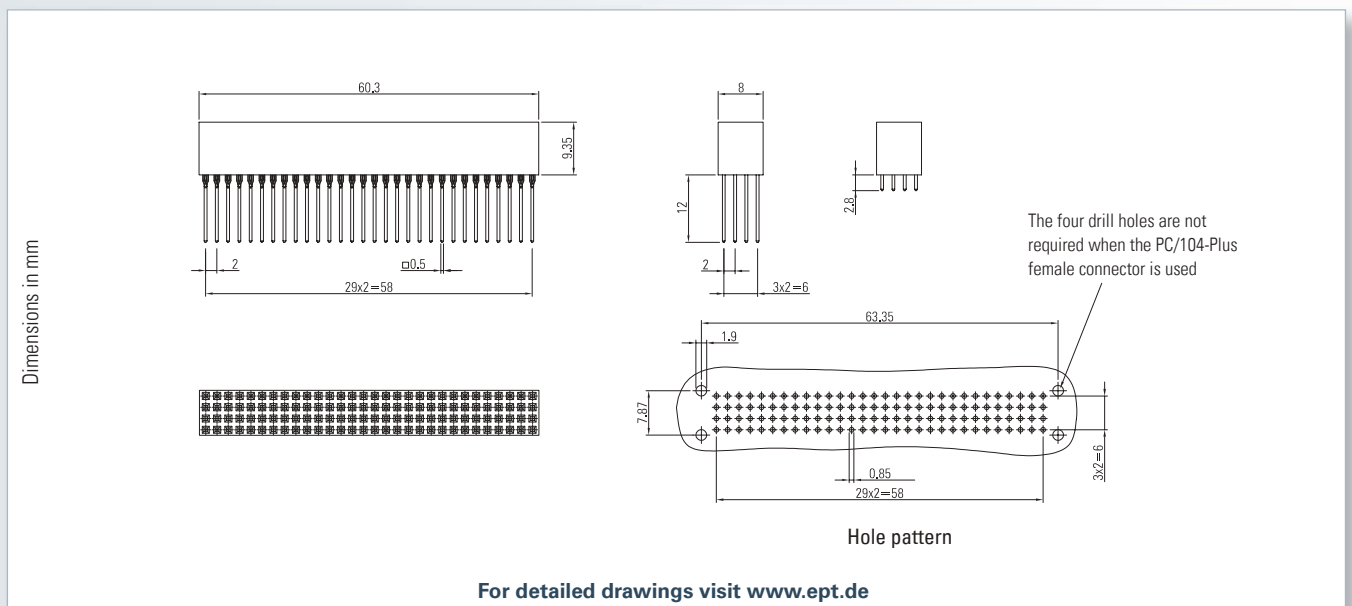
PC/104-Plus Female Connector



Type: Female connector straight
Termination: Press-fit, solder
Number of contacts: 120
Pitch: 2.0 mm
Operational current: 1.7 A
Packaging: Tray
Standard: PC/104-Plus



Technical Specifications on page 202



Press-fit

No. of contacts	Termination length L		PU (Tray)
	2.8 mm	12 mm	
Part number			45/450
120	264-60303-02	264-60303-12	



Solder

No. of contacts	Termination length L	
	2.8 mm	12 mm
Part number		PU (Tray)
120	264-40303-02	45/450

On request

• other no. of contacts

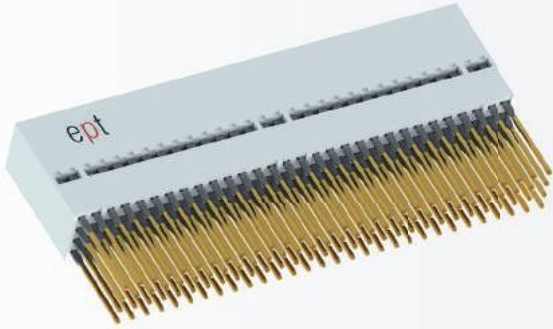
Accessories

- Processing tools p. 340
- Shroud p. 209

Mating connector / Application:



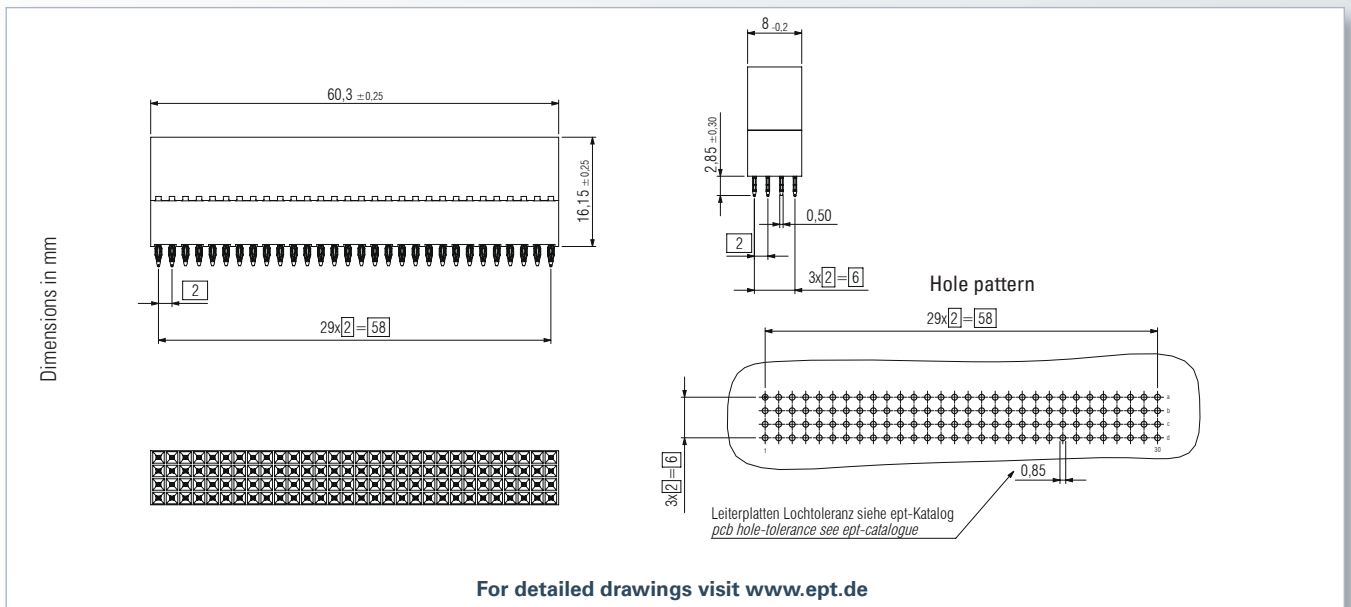
PC/104-Plus Pin header (p. 208)



- Type:** Female connector straight
- Termination:** Press-fit
- Number of contacts:** 120
- Pitch:** 2.0 mm
- Operational current:** 1.7 A
- Packaging:** Tray
- Standard:** PC/104-Plus



Technical Specifications on page 202



Press-fit

No. of contacts	Termination length L		PU (Tray)
Part number			
120	264-61303-02	264-61303-12	45/450

On request

- other no. of contacts

Accessories

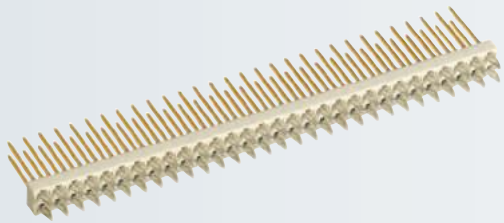
- Processing tools p. 340
- Shroud p. 209

Mating connector / Application:



PC/104-Plus Pin header (p. 208)

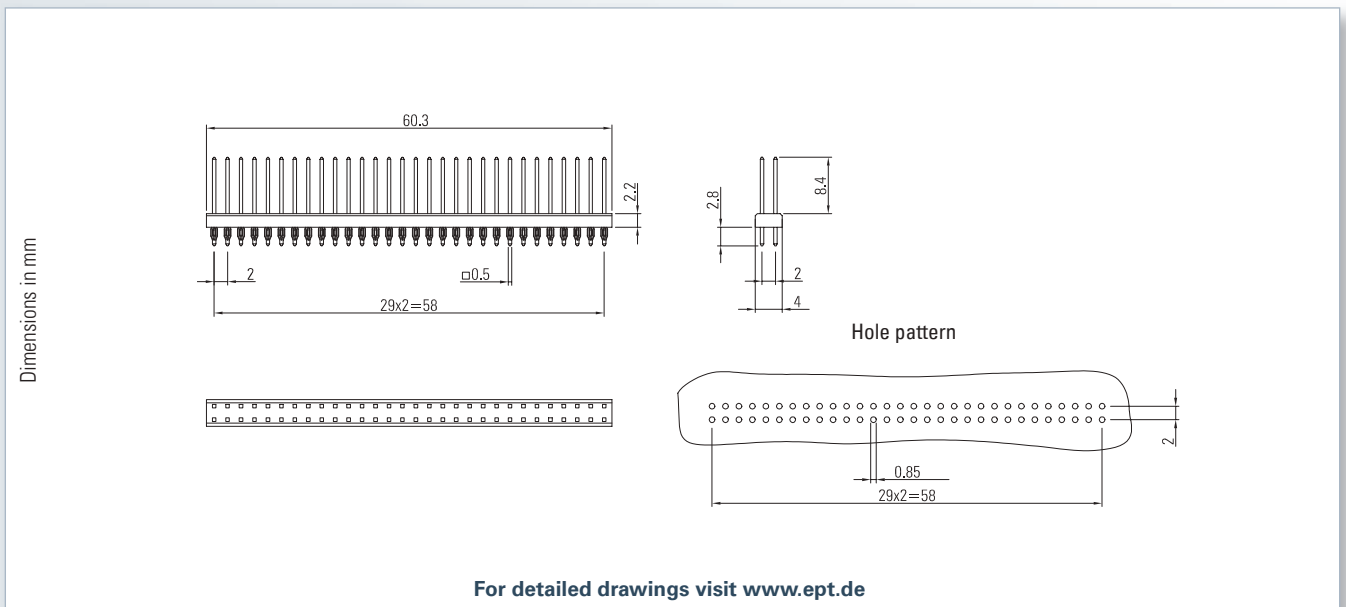
PC/104-Plus Pin Header



Type: Male connector straight
Termination: Press-fit
Number of contacts: 60
Pitch: 2.0 mm
Operational current: 1.7 A
Packaging: Tray
Standard: PC/104-Plus



Technical Specifications on page 202



Press-fit

No. of contacts	Termination length	
	Part number	PU (Tray)
60	272-30000-31	90/900

On request

- other lengths
- other contact numbers

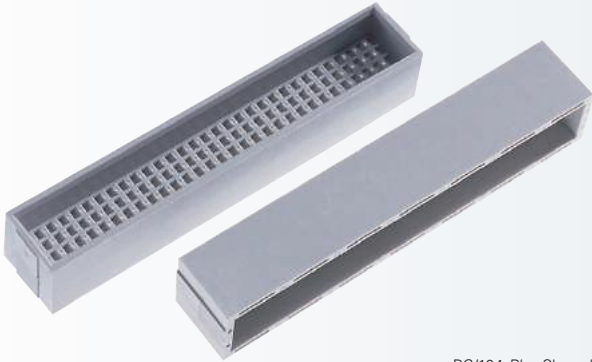
Accessories

- Processing tools p. 342

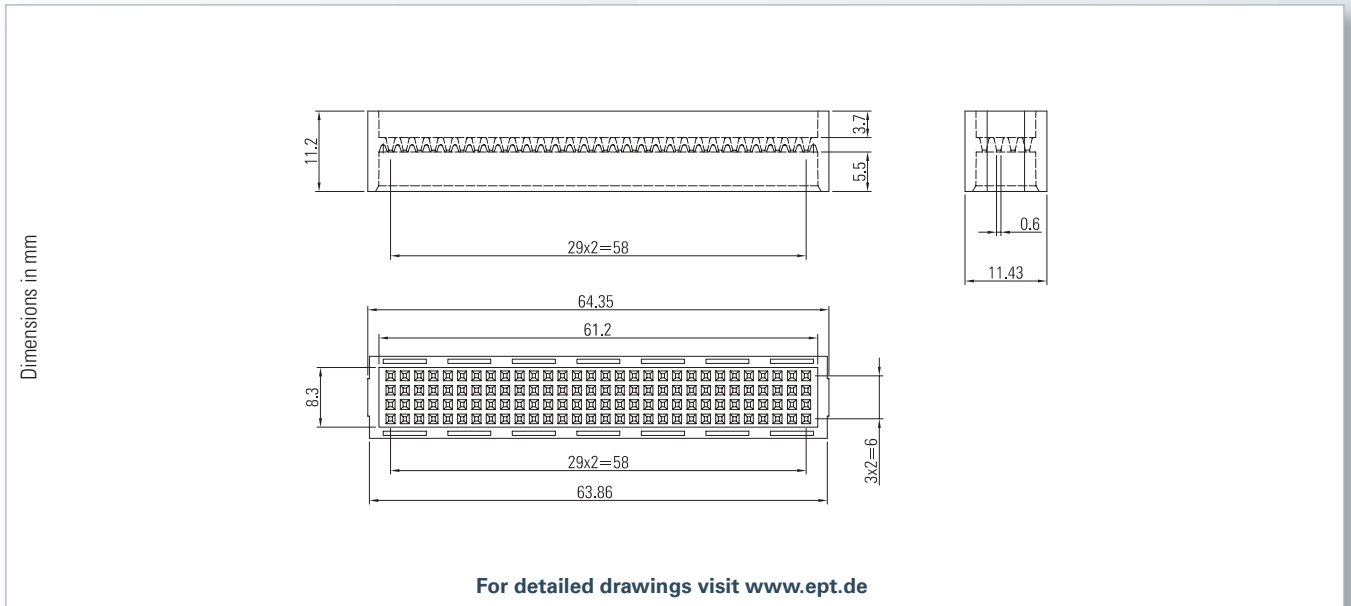
Mating connector / Application:



PC/104-Plus Female connector (p. 206)



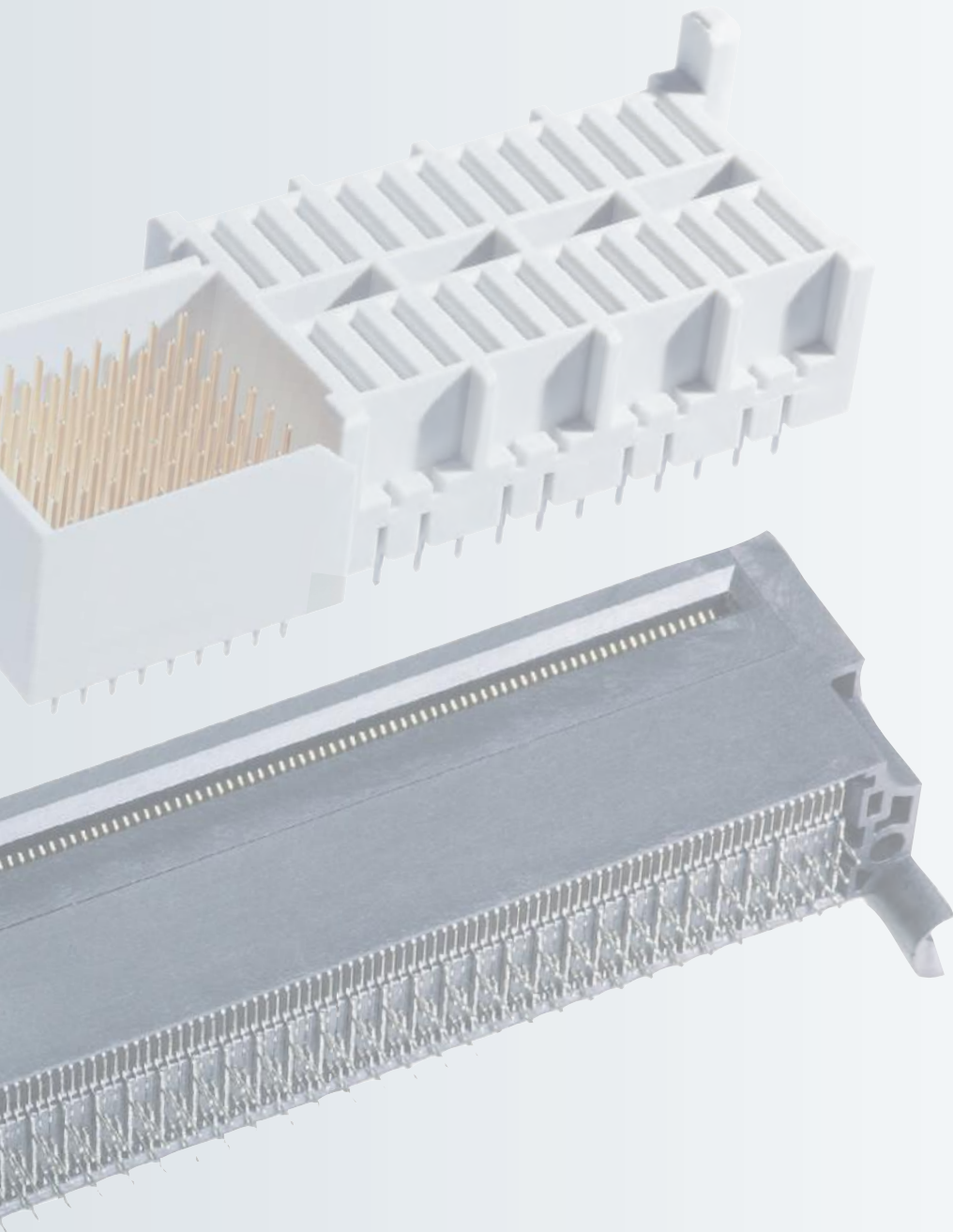
PC/104-Plus Shroud



No. of contacts	PC/104-Plus		PU (Tray)
	Shroud	Spacer	
	Part number		
120	264-17302	264-16302	450

Couldn't find something suitable or having questions? We will be pleased to help you! Call us: +49 8861 / 25010.

TCA Connectors: AdvancedTCA® and MicroTCA®



AdvancedTCA® & MicroTCA® - Introduction	212
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AdvancedTCA®	
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AdvancedTCA® & MicroTCA® - Specifications of PICMG®

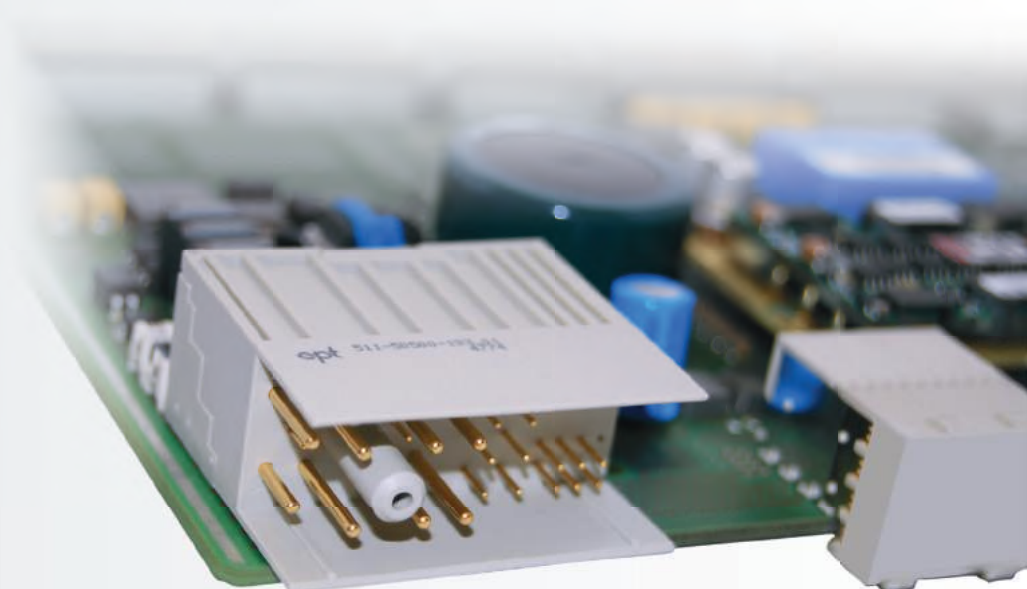
To give consideration to increasing data traffic and new communication services, the PICMG® has developed and adopted the specifications AdvancedTCA® (ATCA) and MicroTCA®.

AdvancedTCA® is mainly aimed at the infrastructure of telecommunications systems requiring maximum availability. With AdvancedTCA® it is possible to set up modular systems with modules from different manufacturers. This technology thus offers the possibility to develop flexible and low-cost systems faster than previously possible with proprietary systems.

AdvancedTCA® is a scalable, powerful architecture with a high degree of functionality, availability and future safety. Many future-oriented applications can be implemented on this platform. Further advantages are scalable data rates of several Tbit/s, support of multi-protocols, new services can be integrated, the convergence of access, core and optical networks as well as the integration of computer center functions. Interfaces for Gigabit Ethernet, Fibre Channel, Infiniband, StarFabric, PCI-Express and RapidIO are evidence of the high flexibility of the AdvancedTCA® architecture. Another

core feature of the systems is their high availability of 99.999 %.

In order to make the described AdvancedTCA® system even more cost-effective, the PICMG® has developed the AdvancedMC® standard (Advanced Mezzanine Card). The AdvancedMC® modules are small cards that are plugged in parallel onto a "Carrier Board" (a carrier board in the form of an AdvancedTCA® subcard) as Mezzanine application. The Carrier Board contains only management functions, the actual application is implemented by means of the AdvancedMC® modules.



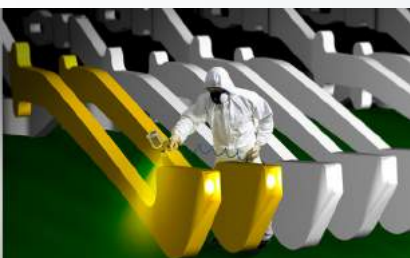
Quality with a Seal - con:card+ for TCA Connectors

con:card+® is a quality seal for MicroTCA® and AdvancedTCA® signal connectors with which the reliability of MicroTCA® and AdvancedTCA® systems can be increased significantly. In order to achieve the goal of 99.999 % availability, all system components must be carefully matched to each other and function reliably. Therefore the selection of suitable connectors is especially important, since the tolerances defined in the specification for AdvancedMC® modules can hardly be observed today. The "GuideSpring" is ideal for compensation. This is only one of five advantages of the **con:card+**® philosophy. All advantages are described

in short below and described in more detail in the **con:card+**® features.

con:card+® ensures the maximum availability of your system.

- GuideSpring for reliable positioning
- An especially smooth contact surface for protecting the gold-plated PCB pads of the AdvancedMC® modules
- Wear-resistant plating of the contacts (palladium/nickel with gold flash) improves the wear resistance by approx. 30 %.
- Special contact material with minimum relaxation, even under high contact spring load
- High-quality press-fit connection as efficient connection technology for series processing



AdvancedTCA® - High-Speed and Power Connectors

For ATCA® applications, ept offers both signal connectors and power connectors that meet PICMG® specifications. Ept connectors meet the highest quality standards and help make AdvancedTCA® systems much more reliable.

Key quality features of the power connectors contain the stamped and thereby easily processable and highly reliable Tcom press® zone. In addition, the dual-beam spring contacts manufactured by ept lead to a reliable, long-term connection between the male and female terminal. Finally, it is possible to offer cost-optimized connectors using alternative interface specifications while simultaneously complying with the same requirements on the PICMG® specifications, particularly in terms of mechanical stability (mating cycles).

Key Features:

- meets PICMG® requirements
- con:card+ seal of quality
- stamped press-fit zone with Tcom press®
- cost-optimized design

Applications:

- AdvancedTCA®
- Backplane-Daughtercards
- Power Applications
- High-speed Board-to-Board

Termination



Press-fit

Mating Configuration



Perpendicular

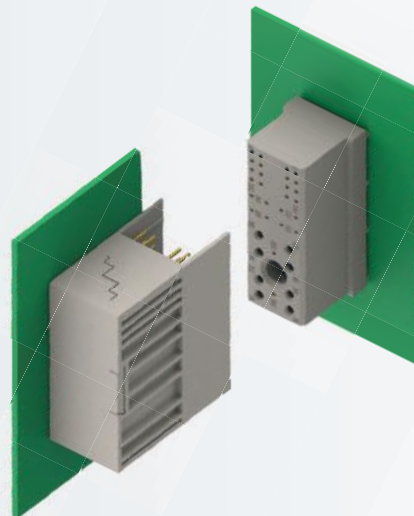
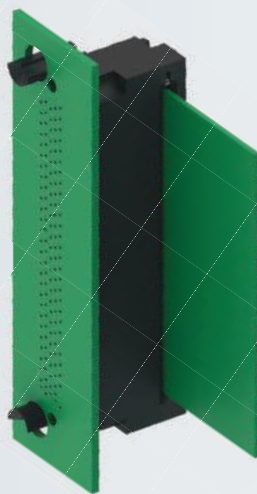
Applications






High-Speed

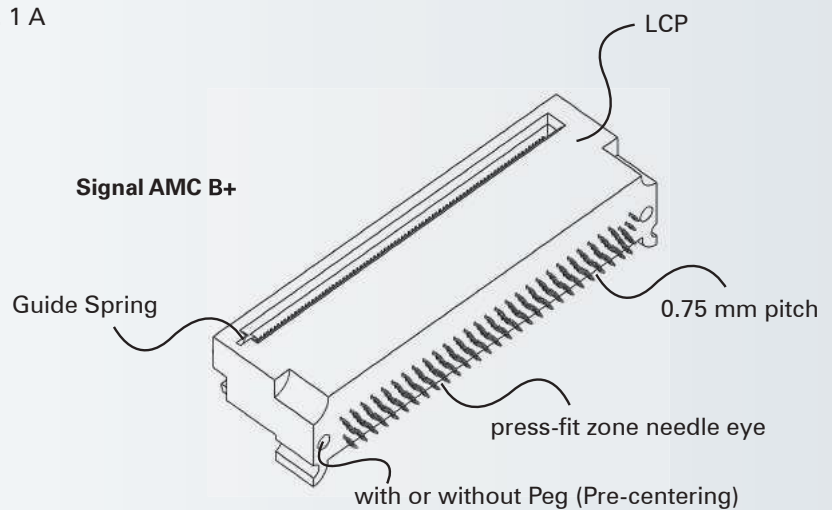
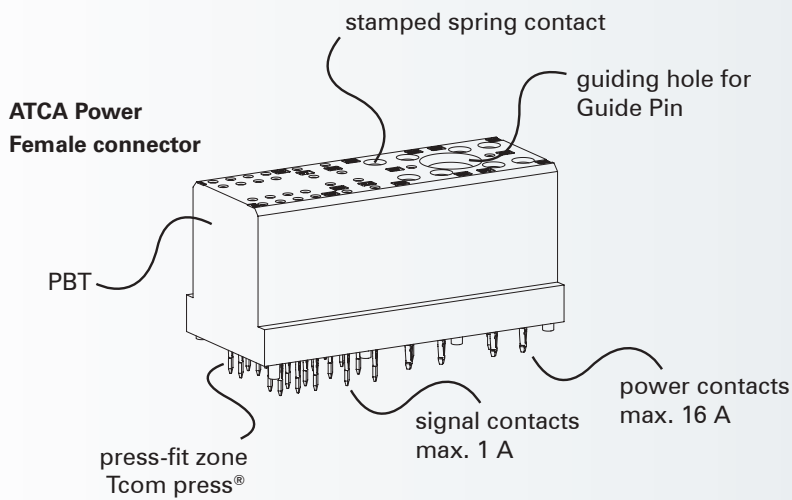


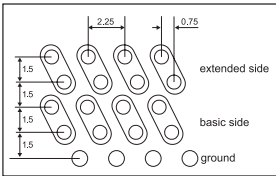
Power



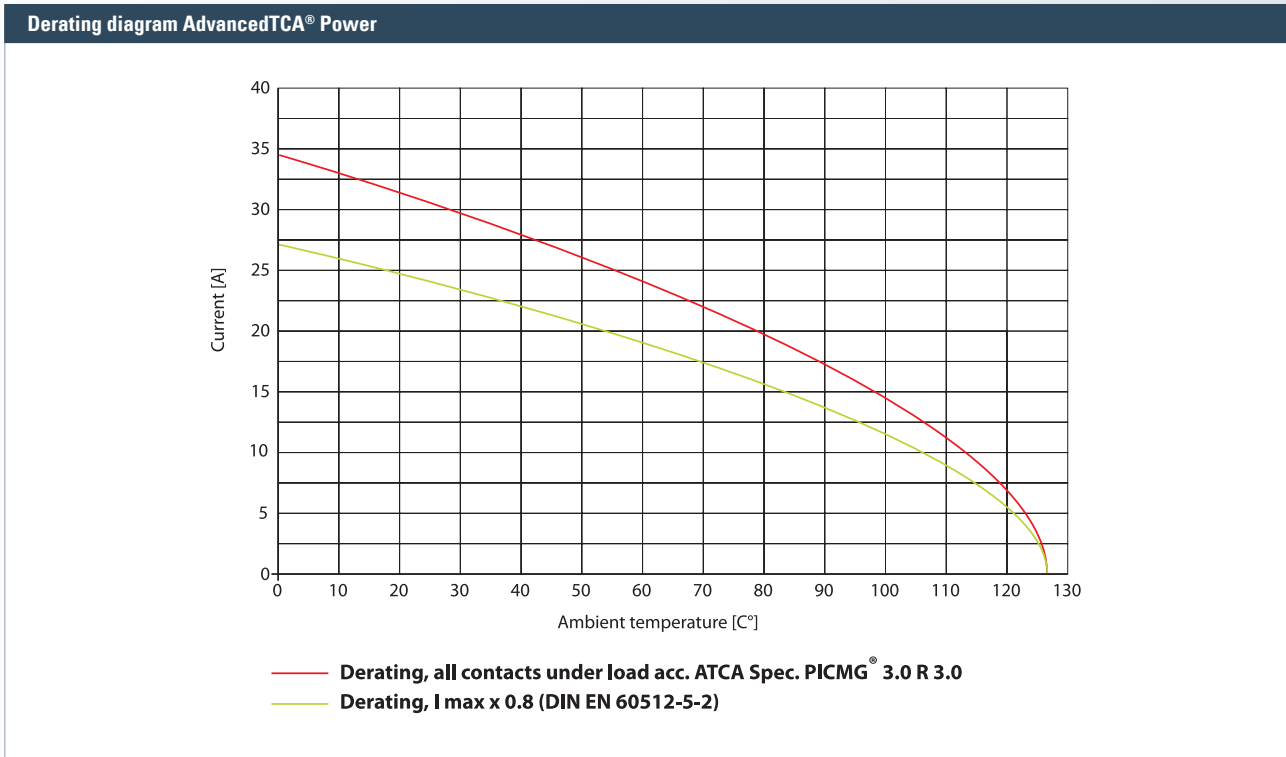
AdvancedTCA®

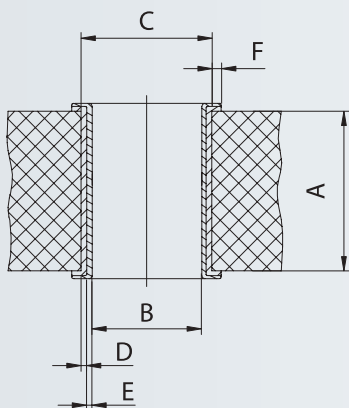
Type	No. of contacts Signal/Power	High Speed or Power	Mating connector	Page reference
	ATCA Signal AMC B+ 170	High Speed 12.5 Gbit/s	-	p. 219
	ATCA Power Male connector 22 / 8 26 / 8	Power 16 A	ATCA Power Female connector	p. 220
	ATCA Power Female connector 22 / 8 26 / 8	Power 16 A	ATCA Power Male connector	p. 221



Technical Specifications	AdvancedTCA®		
	Testing Standard	Signal AMC B+	Power Connectors Female and Male connectors
Basics			
Specification		PICMG® AMC.0	PICMG® 3.0
Number of contacts		170	30 (8 Power, 22 Signal)
Termination		Press-fit	Press-fit
Operating temperature range		-55°C to +105°C	-55°C to +125°C
Material			
Insulator material		LCP	PBT glass filled
Contact material		Copper alloy	Copper alloy
Contact surface		Au over PdNi	Au / Au over NiP
Mechanical			
Pitch		0.75 mm	-
Mating force		max. 100 N	max. 67 N
Separating force		max. 65 N	max. 67 N
Durability	IEC 60512-9-1:2010	200 mating cycles	250 mating cycles
Electrical			
Operational current	IEC 60512-5-2:2002	1.52 A @ 70°C max. 30°C Temperature rise	Power contacts: max. 16 A Signal contacts: max. 1 A
Contact resistance		max. 60 mΩ (ground contacts) max. 90 mΩ (signal, power, general purpose contacts)	Power contacts: <= 2,2 mΩ Signal contacts: <= 8,5 mΩ
Clearance and creepage		min. 0.1 mm	-
Insulation resistance	IEC 60512-3-1:2002	10 ⁸ Ω	>= 10 ¹⁰ Ω
Test voltage	IEC 60512-4-1:2003	80 V r. m. s.	Contact 1 - 16: 1.000 V r.m.s.; Contact 17 - 34: 2.000 V r.m.s.
Impedance (nominal differential)		100Ω+10%	-
Cross talk (NEXT - pair to pair) @ 30 ps risetime		<p>basic to basic < 0.6% basic to extended < 0.9% extended to extended < 0.6% diagonal < 0.3% multiline < 3.0%</p> 	-
Differential signal propagation time		Basic side: 125 ps Extended side: 145 ps	-
Differential signal propagation difference		Between basic and extended side: 20 ps Within basic and extended side: +/- 2 ps	-
Processing			
Packaging		Box	Tray
Approval			
Flammability		UL (file: E130314)	UL (file: E130314)
Environment		RoHS compliant	RoHS compliant

Derating Diagram





Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

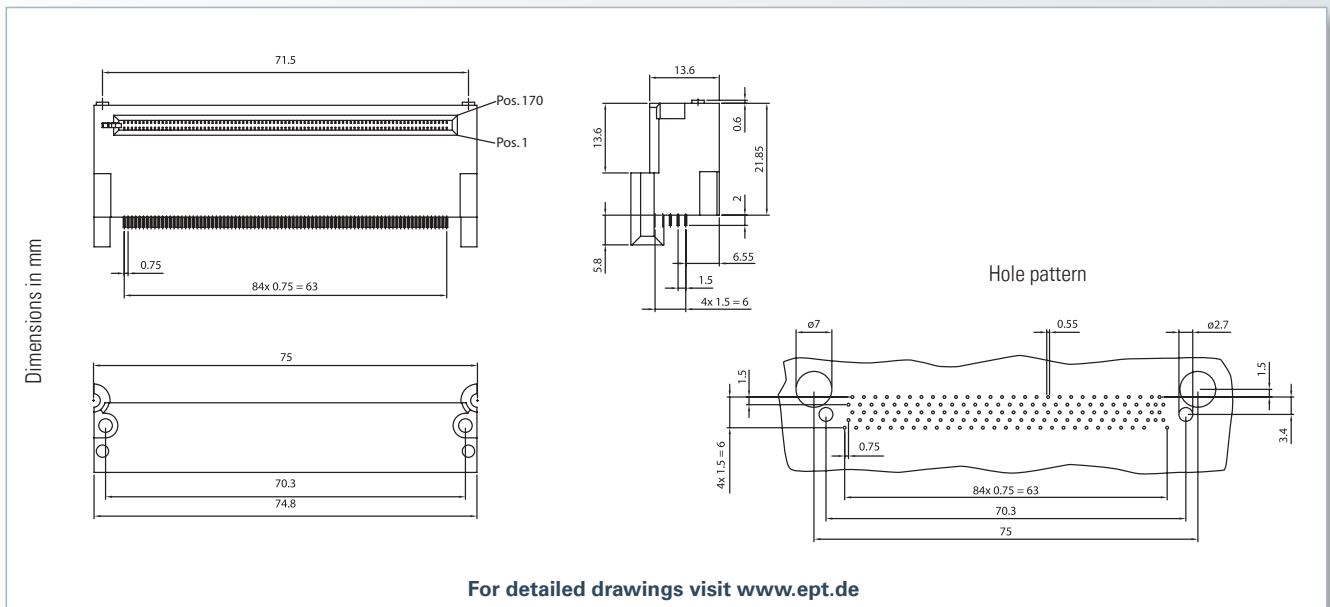
		ATCA Signal		ATCA Power	
		AMC B+	Signal contacts	Power contacts	
Nominal hole		Ø 0.55 mm	Ø 1.0 mm	Ø 1.6 mm	
imm. Sn printed circuit boards					
A	PCB thickness	min. 1.4 mm	min. 1.4 mm (Male connector) min. 2.9 mm (Female connector)	min. 1.4 mm (Male connector) min. 2.9 mm (Female connector)	
B	Plated hole	Ø 0.55 ± 0.05 mm	Ø 1 +0.09/-0.06 mm	Ø 1.6 +0.09/-0.06 mm	
C	Drill hole	Ø 0.64 ± 0.01 mm	Ø 1.15 ± 0.025 mm	Ø 1.75 ± 0.025 mm	
D	Cu plating	min. 25 µm	min. 25 µm	min. 25 µm	
E	imm. Sn plating	max. 1.5 µm	max. 1.5 µm	max. 1.5 µm	
F	Annular ring	min. 0.15 mm	min. 0.15 mm	min. 0.15 mm	
Ni, Au printed circuit boards					
A	PCB thickness	min. 1.4 mm	min. 1.4 mm (Male connector) min. 2.9 mm (Female connector)	min. 1.4 mm (Male connector) min. 2.9 mm (Female connector)	
B	Plated hole	Ø 0.55 ± 0.05 mm	Ø 1 +0.09/-0.06 mm	Ø 1.6 +0.09/-0.06 mm	
C	Drill hole	Ø 0.64 ± 0.01 mm	Ø 1.15 ± 0.025 mm	Ø 1.75 ± 0.025 mm	
D	Cu plating	min. 25 µm	min. 25 µm	min. 25 µm	
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni	
F	Annular ring	min. 0.15 mm	min. 0.15 mm	min. 0.15 mm	



Type: Signal AMC B+
Termination: Press-fit
Number of contacts: 170
Pitch: 0.75 mm
Transfer data rate: 12.5 Gbit/s
Packaging: Box
Standard: PICMG® AMC.0



Technical Specifications on page 216



No. of contacts	without Peg	with Peg	PU (Karton)
	Part number		
170	512-22170-453	512-23170-453	10

Definition

Peg are two guide pins for the exact positioning of the connector on the PCB.

Accessories

- Processing tools p. 344

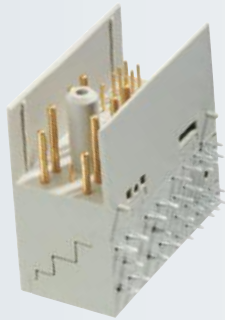
Note

- GuideSpring for positioning of AMC-Card
- con:card+ quality seal: www.concardplus.com

Application:



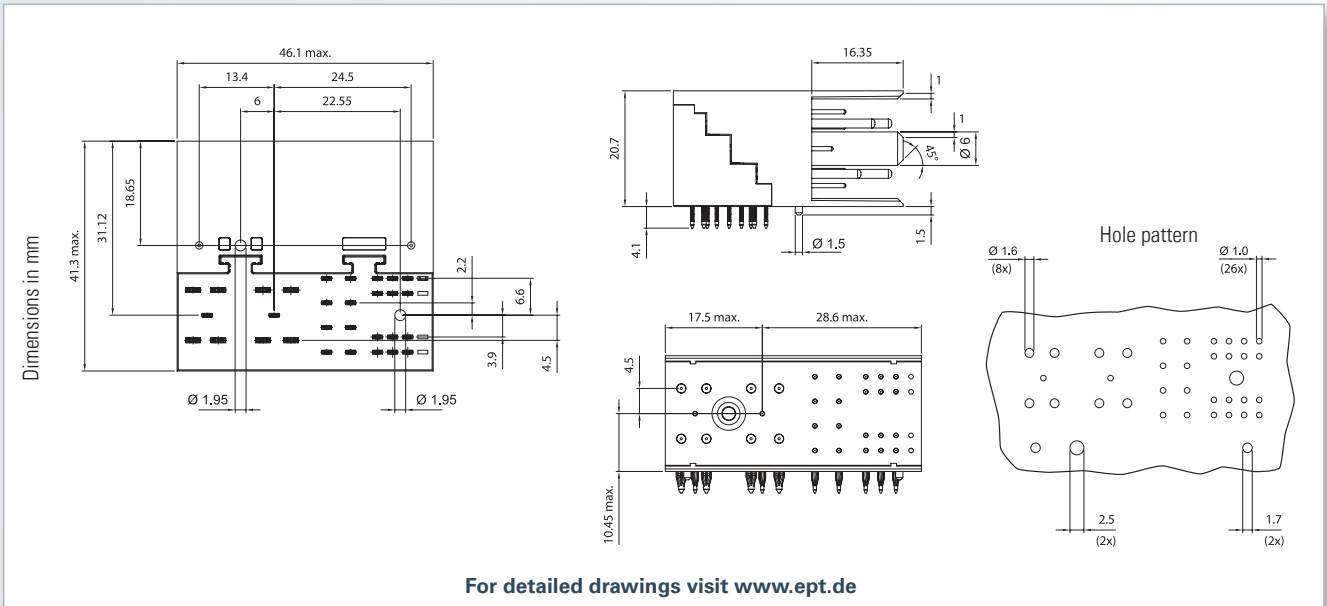
AMC-Card direct connector



Type: Male connector 90°
Termination: Press-fit
Number of contacts: 22 Signal, 8 Power
 26 Signal, 8 Power
Operational current: 16 A
Packaging: Tray
Standard: PICMG® 3.0



Technical Specifications on page 216



No. of contacts	Part number	PU (Tray)
22 Signal / 8 Power	511-50500-193	16/80
26 Signal / 8 Power	511-50501-193	

On request

- other contact numbers
- other contact surface

Accessories

- Processing tools p. 344

Mating connector / Application:

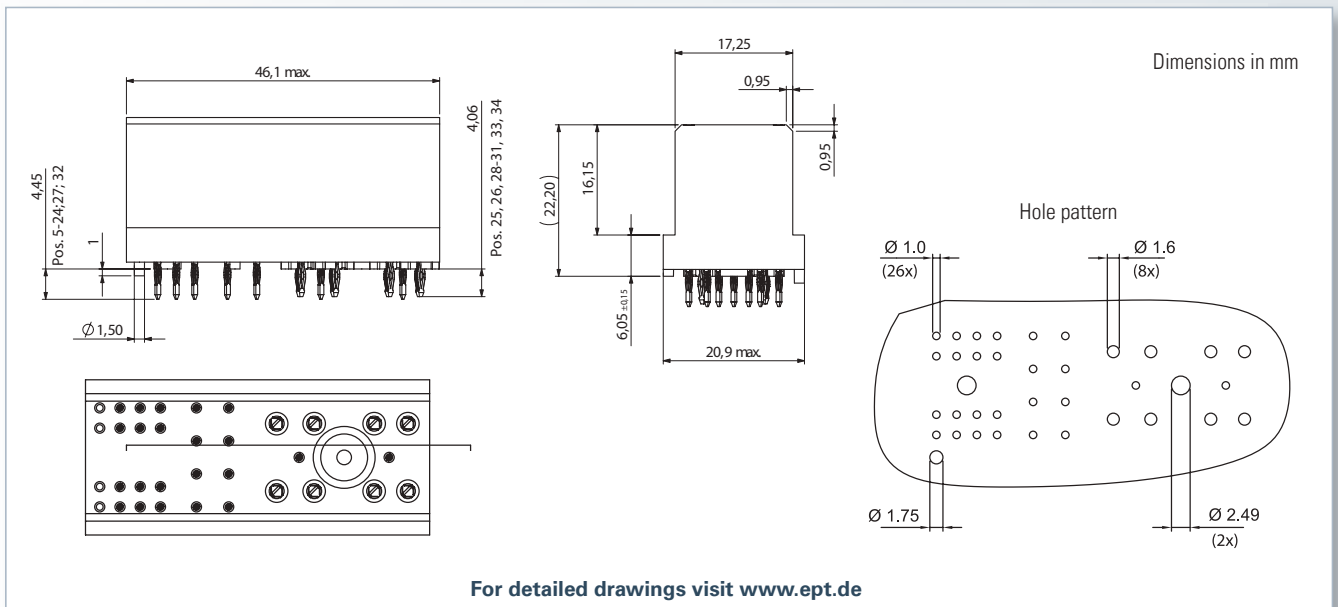
ATCA Power Female connector (p. 221)



Type: Female connector straight
Termination: Press-fit
Number of contacts: 22 Signal, 8 Power
 26 Signal, 8 Power
Operational current: 16 A
Packaging: Tray
Standard: PICMG® 3.0



Technical Specifications on page 216



No. of contacts	Part number	PU (Tray)
22 Signal / 8 Power	512-50500-163	32/160
26 Signal / 8 Power	512-50501-163	

On request

- other contact numbers
- other contact surface

Accessories

- Processing tools p. 344

Mating connector / Application:



ATCA Power Male connector (p. 220)

MicroTCA® - Power Connectors

ept offers power connectors for MicroTCA® applications, that meet PICMG® specifications. ept connectors meet the highest quality standards and help make MicroTCA® systems much more reliable.

Key Features:

- meets PICMG® requirements

Applications:

- MicroTCA®
- Backplane-Daughtercards
- Power-Applications

μTCA®

Termination



Press-fit

Mating Configuration

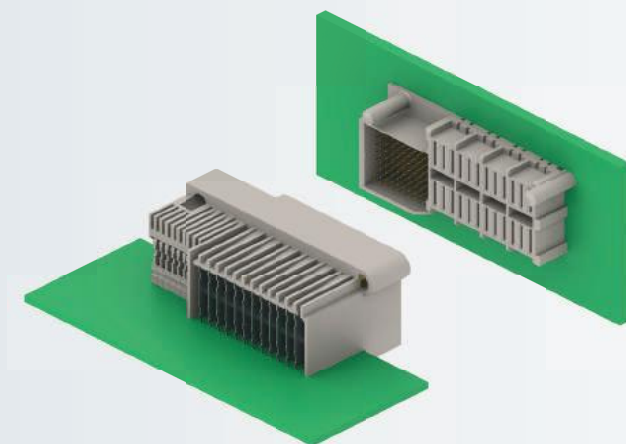


Perpendicular

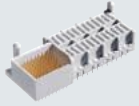

Applications

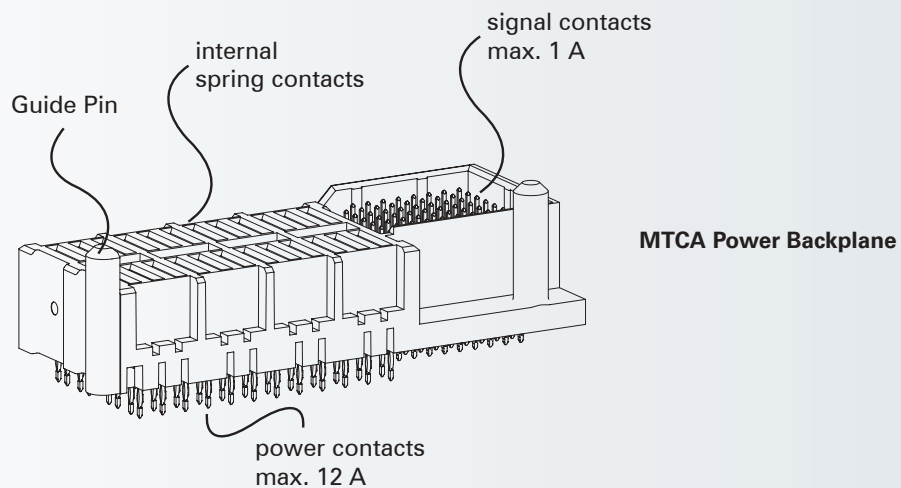


Power



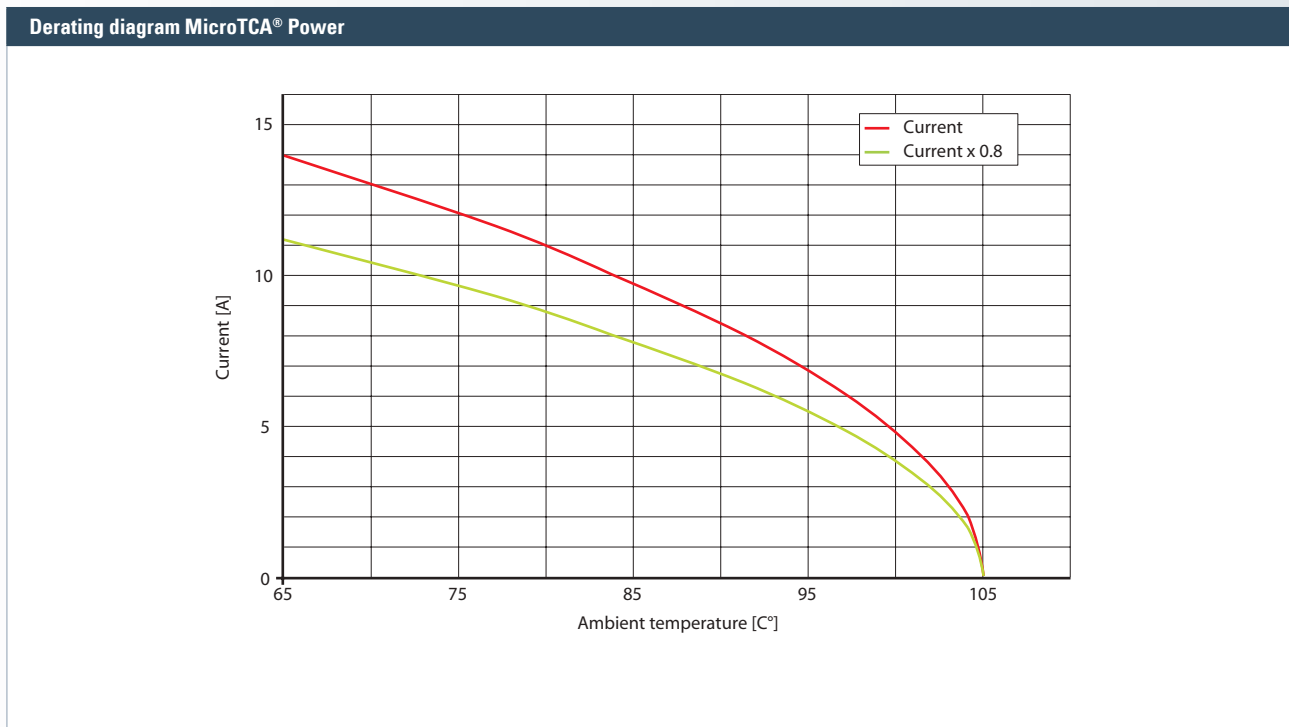
MicroTCA[®]

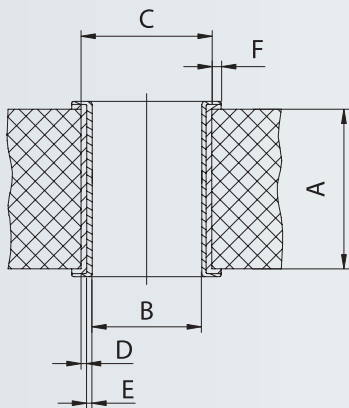
Type	No. of contacts Signal/Power	High Speed or Power	Mating connector	Page reference
 MTCA Power Backplane	72 / 24	Power 12 A	MTCA Power Module Output	p. 227
 MTCA Power Module Output	72 / 24	Power 12 A	MTCA Power Backplane	p. 228



Technical Specifications	Testing Standard	Power Connector Backplane and Power Module Output
Basics		
Specification		PICMG® MTCA.0
Number of contacts		96 (24 Power, 72 Signal)
Termination		Press-fit
Operating temperature range		-55°C to +105°C
Material		
Insulator material		PBT glass filled
Contact material		Copper alloy
Contact surface		Power: Au, Signal: Pd/Ni
Mechanical		
Mating force		max. 50 N
Separating force		max. 50 N
Durability	IEC 60512-9-1:2010	200 mating cycles
Electrical		
Operational current	IEC 60512-5-2:2002	Power contacts: max. 12 A Signal contacts: max. 1 A
Contact resistance		Power contacts: ≤ 5 mΩ Signal contacts: ≤ 25 mΩ
Insulation resistance	IEC 60512-3-1:2002	≥ 10 ⁹ Ω
Test voltage	IEC 60512-4-1:2003	80 V r. m. s.
Processing		
Packaging		Tray
Approval		
Flammability		UL (file: E130314)
Environment		RoHS compliant

Derating Diagram



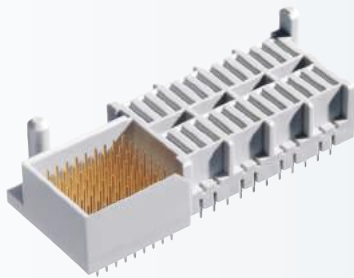


Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

	Nominal hole	MTCA Power Ø 0.6 mm
imm. Sn printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	Ø 0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	Imm. Sn plating	max. 1.5 µm
F	Annular ring	min. 0.15 mm
Ni, Au printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	Ø 0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni
F	Annular ring	min. 0.15 mm

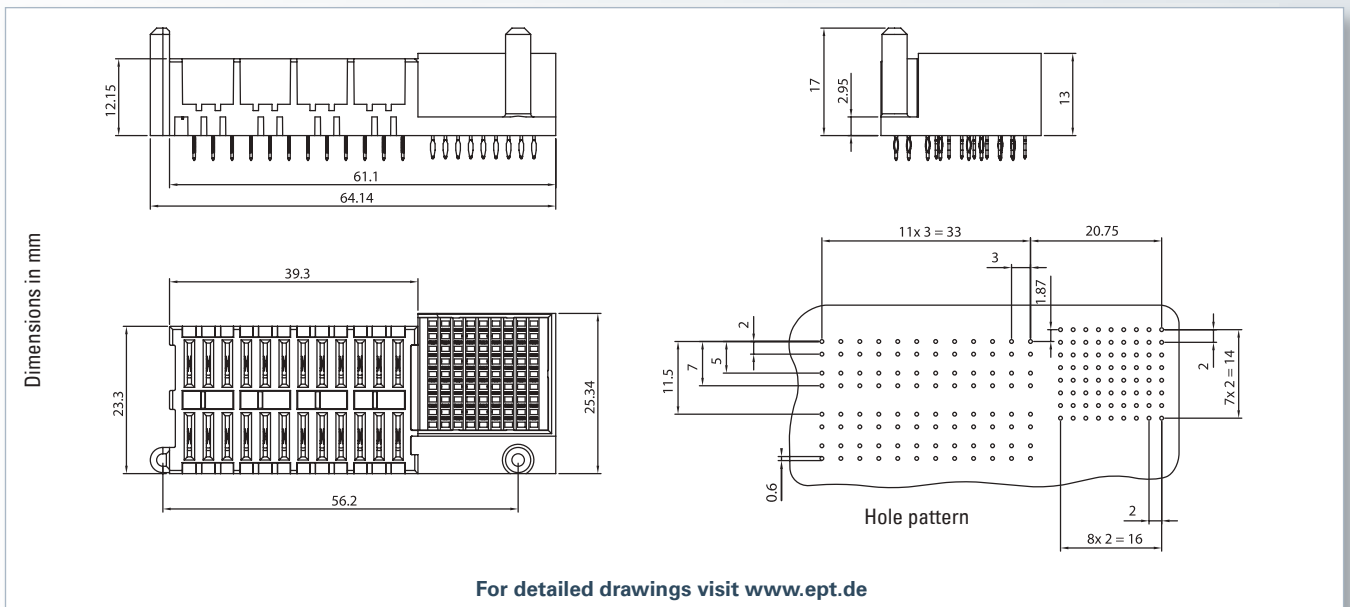


Type: Power Backplane
Termination: Press-fit
Number of contacts: 72 Signal, 24 Power
Operational current: 12 A
Packaging: Tray

Standard: PICMG® MTCA.0



Technical Specifications on page 224



No. of contacts	Part number	PU (Tray)
72 Signal 24 Power	502-50096-183	18/144

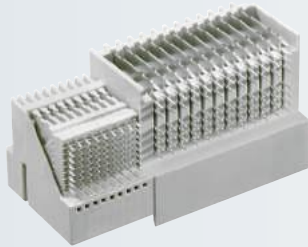
Accessories

- Processing tools p. 346

Mating connector / Application:



MicroTCA Power Module Output

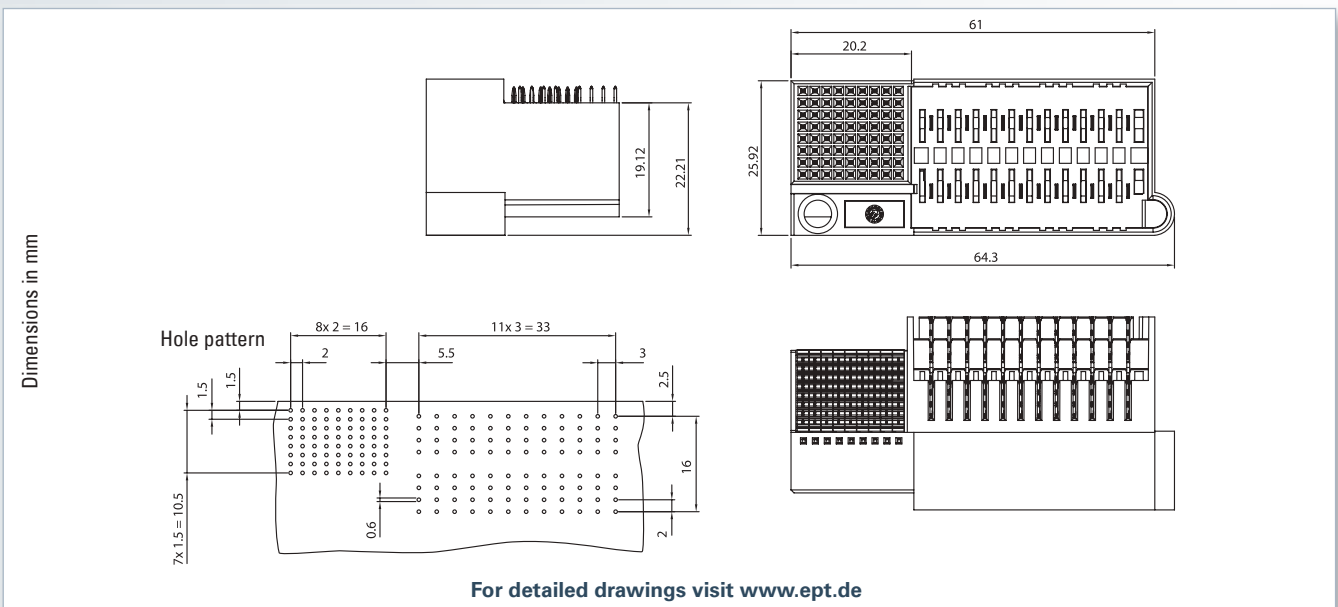


Type: Power Module Output
Termination: Press-fit
Number of contacts: 72 Signal, 24 Power
Operational current: 12 A
Packaging: Tray

Standard: PICMG® MTCA.0



Technical Specifications on page 224



No. of contacts	Part number	PU (Tray)
72 Signal 24 Power	501-50096-183	15/60

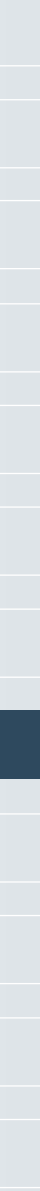
Accessories

- Processing tools p. 346

Mating connector / Application:



MicroTCA Backplane Connector



Hardmetric Connectors: hm2.0 for Backplane-Systems



Introduction	232
Overview	234
The Standard / High-Speed	236
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hm2.0 Type B19	258
hm2.0 Type AB25	262
hm2.0 Type AB22	266
hm2.0 Type AB19	270
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hm2.0 Type D	278
hm2.0 Type E	282
hm2.0 Type DE	286
hm2.0 Type F	290
hm2.0 Type L	294
hm2.0 Type M	296
hm2.0 Type N	300
Accessories: Shroud	302
Accessories: Coding Keys	304
Notes	305

Hardmetric Connectors for Backplane-Systems

High Contact Density

The hm2.0 series of hard metric connectors was developed in accordance with the international IEC 61076-4-101 standard. These shielded connectors have a pitch of 2 mm and are suitable for applications that require high contact density and reliability. Standardization ensures that the connectors are compatible with products from different manufacturers.

hm2.0 connectors are used in CompactPCI, a PICMG standard for high-end systems in 19-inch technology with passive backplanes for high requirements as regards of performance, robustness, and reliability. hm2.0 connectors are also increasingly being used for industrial applications that require a robust connection system with high contact density.

Key Features:

- wide selection of types
- modular connectors with a pitch of 2 mm
- 5 or 8 signal rows
- 12 different pin lengths
- customized assembly layout as an option
- available with or without shielding
- supports a data transfer rate of up to 3.125 Gbit/s
- robust design
- accessories such as shrouds and coding keys

Applications:

- telecommunications
- network systems
- CompactPCI
- medical technology
- industrial PC (IPC)

Termination



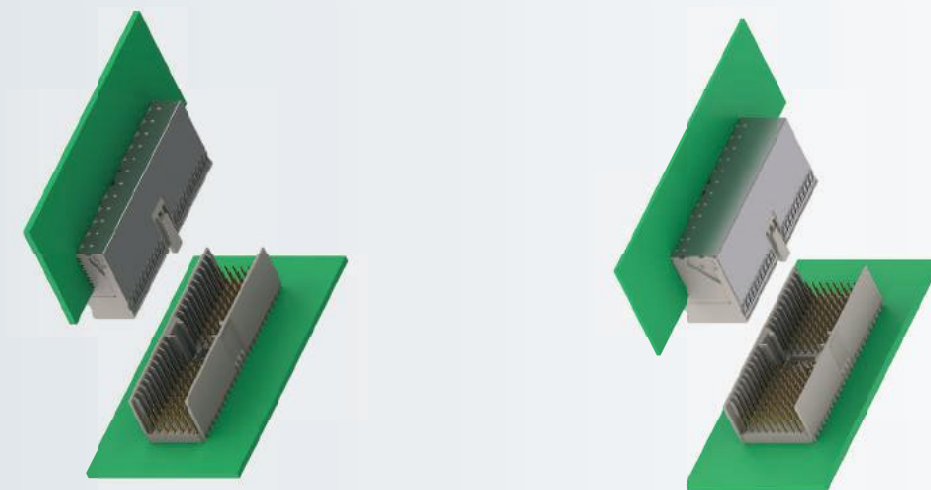
Press-fit

Mating Configuration

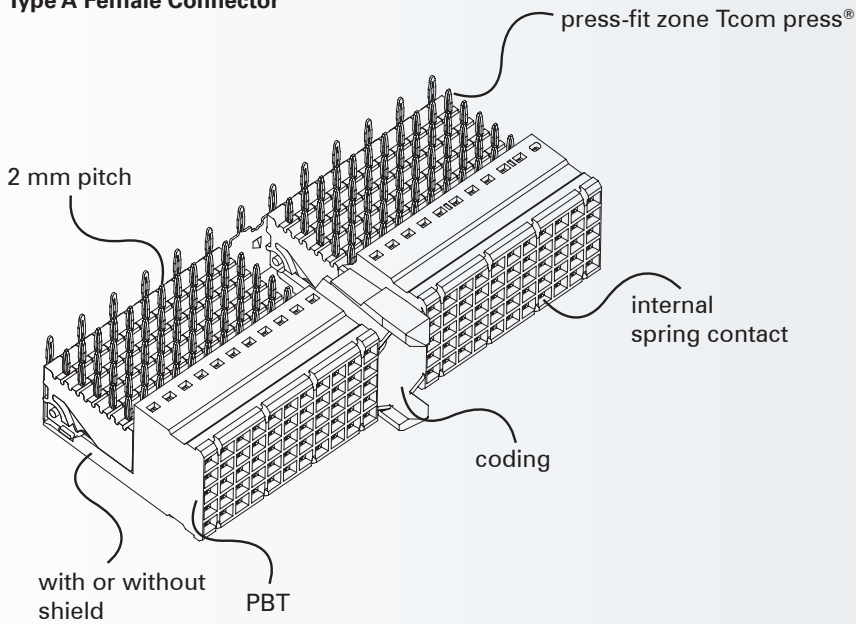


Perpendicular

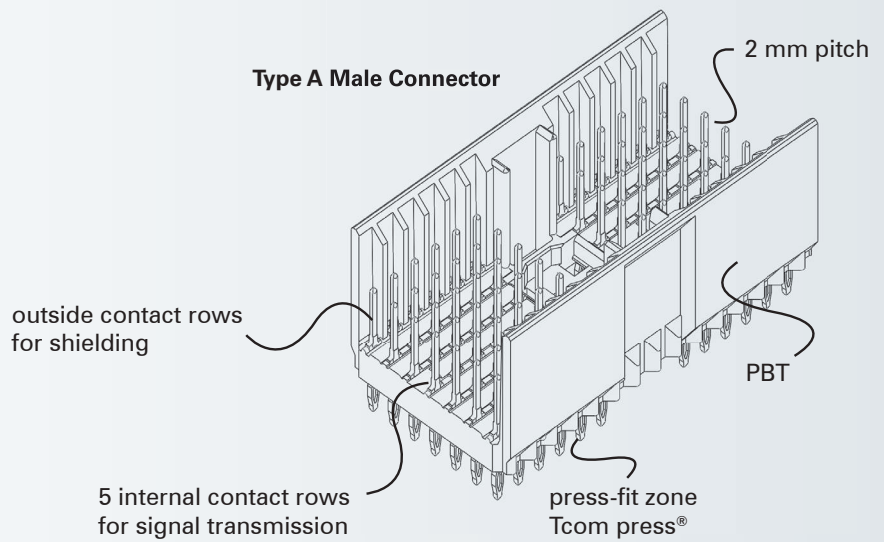
CompactPCI™







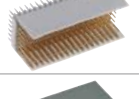
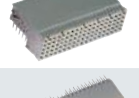
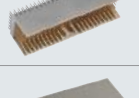
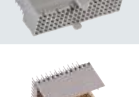
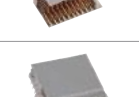


Type A Female Connector



Type A Male Connector



	Type		max. no. of contacts	Backplane or Daughtercard	Mating connector	Page reference
A		A Male connector	154	Backplane 5+2-row	A Female connector	start on p. 246
		A Female connector	110	Daughtercard 5+2-row	A Male connector	
B25		B25 Male connector	175	Backplane 5+2-row	B25 Female connector	start on p. 250
		B25 Female connector	125	Daughtercard 5+2-row	B25 Male connector	
B22		B22 Male connector	154	Backplane 5+2-row	B22 Female connector	start on p. 254
		B22 Female connector	110	Daughtercard 5+2-row	B22 Male connector	
B19		B19 Male connector	133	Backplane 5+2-row	B19 Female connector	start on p. 258
		B19 Female connector	95	Daughtercard 5+2-row	B19 Male connector	
AB25		AB25 Male connector	169	Backplane 5+2-row	AB25 Female connector	start on p. 262
		AB25 Female connector	125	Daughtercard 5+2-row	AB25 Male connector	
AB22		AB22 Male connector	146	Backplane 5+2-row	AB22 Female connector	start on p. 266
		AB22 Female connector	110	Daughtercard 5+2-row	AB22 Male connector	
AB19		AB19 Male connector	127	Backplane 5+2-row	AB19 Female connector	start on p. 270
		AB19 Female connector	95	Daughtercard 5+2-row	AB19 Male connector	
C		C Male connector	77	Backplane 5+2-row	C Female connector	start on p. 274
		C Female connector	55	Daughtercard 5+2-row	C Male connector	

	Type		max. no. of contacts	Backplane or Daughtercard	Mating connector	Page reference
D		D Male connector	220	Backplane 8+2-row	D Female connector	start on p. 278
		D Female connector	176	Daughtercard 8+2-row	D Male connector	
E		E Male connector	250	Backplane 8+2-row	E Female connector	start on p. 282
		E Female connector	200	Daughtercard 8+2-row	E Male connector	
DE		DE Male connector	244	Backplane 8+2-row	DE Female connector	start on p. 286
		DE Female connector	200	Daughtercard 8+2-row	DE Male connector	
F		F Male connector	110	Backplane 8+2-row	F Female connector	start on p. 290
		F Female connector	88	Daughtercard 8+2-row	F Male connector	
L		L Male connector	6	Backplane	L Female connector	start on p. 294
		L Female connector	6	Daughtercard	L Male connector	
M		M Male connector	77+3	Backplane 5+2-row	M Female connector	start on p. 296
		M Female connector	55+3	Daughtercard 5+2-row	M Male connector	
N		N Male connector	3	Backplane	N Female connector	start on p. 300
		N Female connector	3	Daughtercard	N Male connector	
Shroud		A, B, B22, B19, C	-	-	-	start on p. 302
		AB25, AB22, AB19	-	-	-	
Coding		Coding keys	-	-	-	S. 304

The Standard IEC 61076-4-101

The hardmetric connector system ept hm2.0 was developed and manufactured according to the international standard IEC 61076-4-101. Thus the user can rely on a worldwide standard for the connection of printed circuit boards using connectors with a large number of contacts. The printed circuit boards can be exchanged between systems without difficulty. Important parameters such as the fixing, shielding and coding of the printed circuit boards are compatible regardless of the individual application.

ept hm2.0 connectors are designed with a 2 mm metric grid. They can be easily connected in series to form a continuous 2 mm grid. This grid pattern is advantageous when creating a printed circuit board since no space is lost in the individual connector modules.

The modules A, D, L and M are equipped with a multi-function block. This in turn can be equipped with the

coding keys. The molded guides ensure the correct alignment of the male and female connectors to each other and they offer anti-twist protection before contacting.

The coding keys can be inserted or withdrawn using a simple insertion or withdrawal tool.

ept offers three different lengths for the front and four different lengths for the rear side. The different contact lengths are necessary because certain signal or ground contacts need to be the first to be connected/disconnected when adding/removing a module.

The 11.25 mm long contacts are mainly required for the shielding rows z and f.

The ends of the insulator material are chamfered to simplify the connection of additional modules and avoid twisting the connectors. The chamfers ensure the exact positioning on the printed circuit boards and stabilize the modules.



The connectors must be coded in a modern BUS system to avoid mixing up the printed circuit boards.

The possibility of coding has already been defined in the IEC 61076-4-101. "Coding keys" can be manually snapped onto the multi-function block of the connector types A, D, L and M. The different inserts are color-coded and can thus be kept apart.



hm2.0 for High-Speed Applications

High-speed applications can be realized with hm2.0 connectors from ept. It was possible to attain data transfer rates of up to 3.125 Gbps under the framework conditions described below.

- two hm2.0 connector pairs from ept
- two standard FR4 PCBs at a thickness of 1.6 mm and a PCB track length of 115 mm
- one standard FR4 backplane at a thickness of 4.4 mm and a PCB track length of 400 mm
- special attention is paid to connection interruptions, the stub effect, the skin effect, and dielectric losses in the application design

We would be happy to provide you with more details and the corresponding technical literature on high-speed applications using hm2.0 connectors. Get in touch with us.

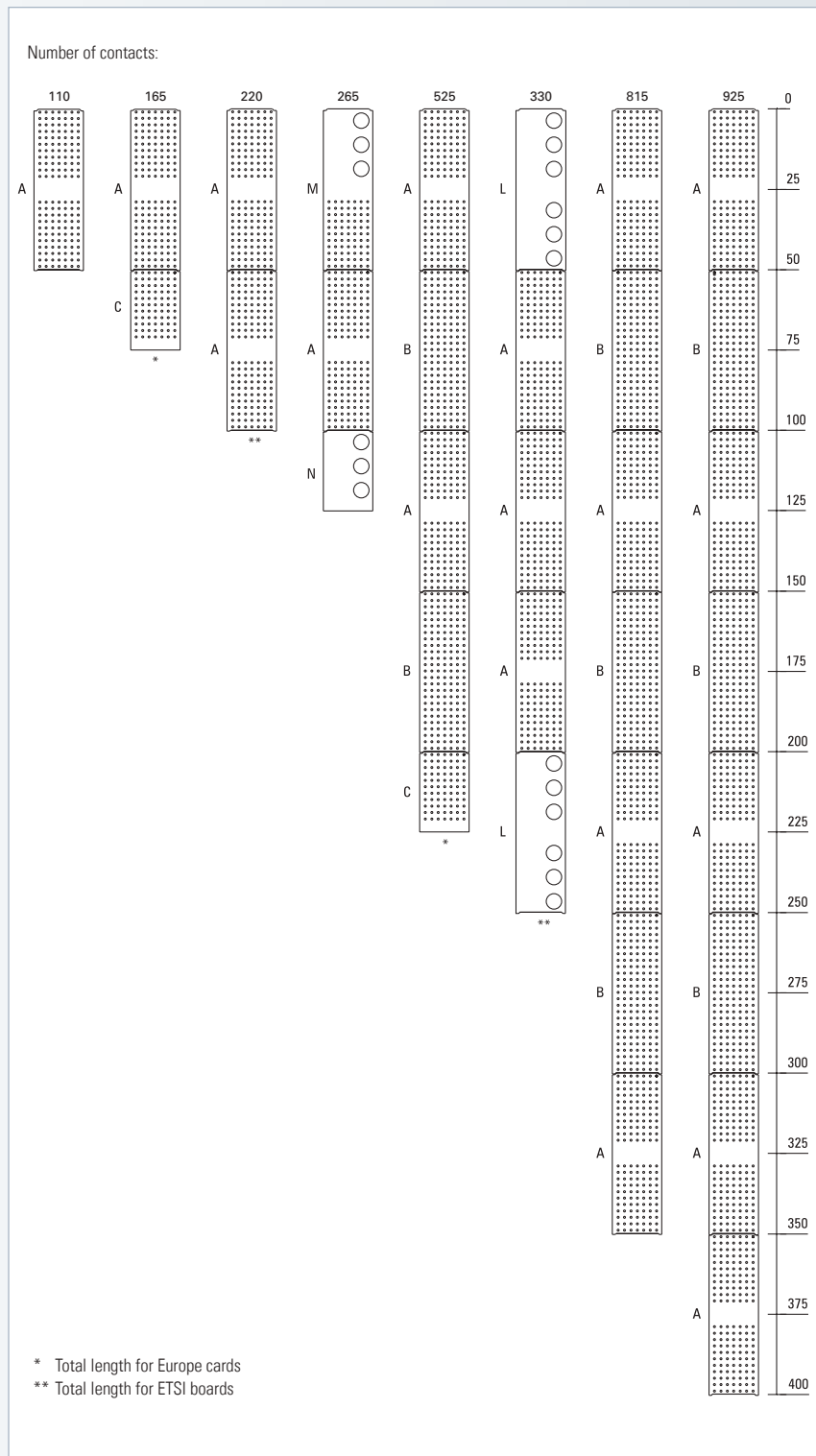
System Modularity

ept hm2.0 modules offer a number of possibilities to optimize large contact densities, especially in combination with coaxial or fiber-optic connections.

Using module type A, connections with a length of 50 mm can be set up in increments of 25 mm to achieve an overall length as required.

The connectors with a multifunction block (types A, M, L) are preferably arranged at the beginning of a connector row. The type B module on the other hand is only arranged between other modules.

Due to their inverse-polarity protection the 25 mm type C and N modules are arranged at the end of a connector row. The coding keys in the multifunction block and the modules type C and N ensure that the modules are plugged in correctly.



Overview CompactPCI Connectors

CompactPCI as the PICMG standard places high requirements on 19-inch high-end systems with passive backplanes as regards robustness, reliability, and performance. CompactPCI platforms are cost optimized, scalable, suitable for harsh environmental conditions, and highly durable. This is why system designers rely on robust, modular, standard-compliant CompactPCI platforms. The PICMG® standards for CompactPCI provide specifications for hard metric connectors. ept's hm2.0 connectors are optimally suited for use in CompactPCI applications.

Female connectors for daughter card	Location	Shielding	Part number	PU (Tray)
Typ A	J1/rJ1/J4/rJ4	top	244-11300-15	35/140
Typ B22	J2/J5	top	244-22300-15	
Typ AB22*	rJ2/rJ5	top	244-62300-15	
Typ B19	J3	top	244-23300-15	42/168
Typ AB19*	rJ3	top	244-63300-15	35/140
Typ A für telephony	J4	divided	244-11305-15	
Typ A für telephony (mirrored)	rJ4	divided	244-11306-15	

* For rear transition card applications the AB connectors are used with AB shroud. All connectors are also available without shield.

Male connectors for backplanes	Position	Contact arrangement*	Part number	PU (Tube)
Type A Hot Swap	P1	CB***BC	243-11322-15	10/240
Type A Hot Swap for Midplane	P1	TP***PT	243-11710-15F	
Type B22	P2	CBBBBBC	243-22320-15	11/264
Type B22 AB compatible	P2/P5	*PPPPP*	243-22361-15F	
Type B22 AB compatible	P2/P5	*NNNNN*	243-22734-15F	
Type B22 AB compatible	P2/P5	*SSSSS*	243-22371-15F	13/312
Type B19	P3	CBBBBBC	243-23320-15	
Type B19 AB compatible	P3	*PPPPP*	243-23361-15F	
Type B19 AB compatible	P3	*NNNNN*	243-23716-15F	
Type B19 AB compatible	P3	*SSSSS*	243-23371-15F	10/240
Type A for telephony	P4	—*****	243-11323-15	
Type A for telephony Midplane	P4	—*****	243-11709-15F	
Type A	P4	TPPPPPT	243-11360-15F	
Type A	P4	TNNNNNT	243-11734-15F	
Type A	P4	TSSSSST	243-11715-15F	11/264
Type B22 for telephony	P5	C*****C	243-22311-15	
Type B22 for telephony, row Z not loaded	P5	—*****C	243-22312-15	
Type B22 for telephony, row Z not loaded	P5	—*****	243-22351-15F	

* Different pin lengths in this row.

All connectors are also available with row Z unloaded/for other contact arrangements, please contact ept.

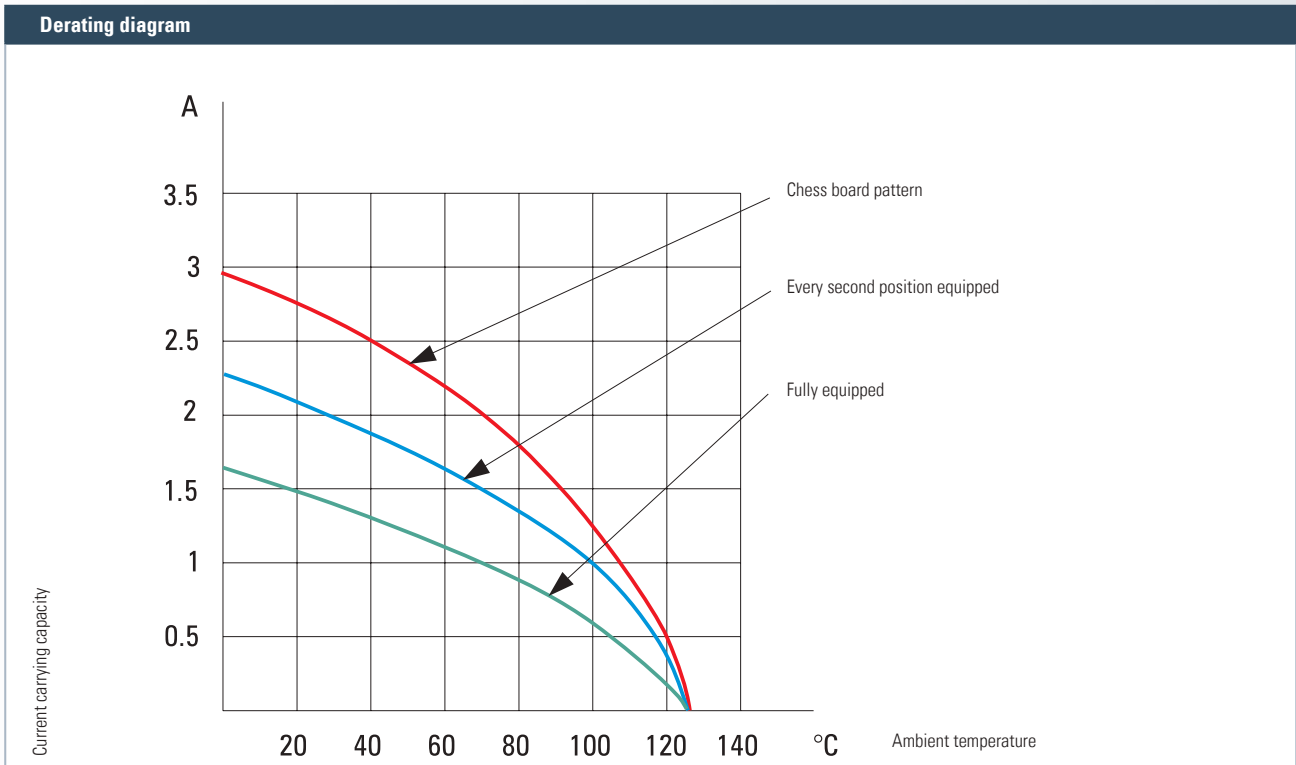
Coding keys	Color	Application	Part number	PU (Bulk)
Male connector backplane	Brilliant blue	5 V – P1	243-8014	1000
Male connector backplane	Cadmium yellow	3.3 V – P1	243-8031	
Male connector backplane	Strawberry red	Telephony – P4	243-8012	
Female connector daughter card	Brilliant blue	5 V – J1	244-8014	
Female connector daughter card	Cadmium yellow	3.3 V – J1	244-8031	
Female connector daughter card	Strawberry red	Telephony – J4	244-8012	

Shroud	Position	Height	Base height	PCB thickness	Part number	PU (Bulk)
Type A	P1/P4	16.75 mm	6.3 mm	< 2.4 mm	243-5525-5/1	750
Type A	P1/P4	15.35 mm	4.9 mm	2.4 – 3.2 mm	243-5525-4/1	
Type A	P1/P4	14.95 mm	4.5 mm	3.2 – 4.0 mm	243-5525-1/1	
Type A	P1/P4	14.15 mm	3.7 mm	4.0 – 4.8 mm	243-5525-2/1	
Type A	P1/P4	13.35 mm	2.9 mm	> 4.8 mm	243-5525-3/1	
Type AB22	P2/P5	16.75 mm	6.3 mm	< 2.4 mm	243-5722-5/1	850
Type AB22	P2/P5	15.35 mm	4.9 mm	2.4 – 3.2 mm	243-5722-4/1	
Type AB22	P2/P5	14.95 mm	4.5 mm	3.2 – 4.0 mm	243-5722-1/1	
Type AB22	P2/P5	14.15 mm	3.7 mm	4.0 – 4.8 mm	243-5722-2/1	
Type AB22	P2/P5	13.35 mm	2.9 mm	> 4.8 mm	243-5722-3/1	
Type AB19	P3	16.75 mm	6.3 mm	< 2.4 mm	243-5719-5/1	1000
Type AB19	P3	15.35 mm	4.9 mm	2.4 – 3.2 mm	243-5719-4/1	
Type AB19	P3	14.95 mm	4.5 mm	3.2 – 4.0 mm	243-5719-1/1	
Type AB19	P3	14.15 mm	3.7 mm	4.0 – 4.8 mm	243-5719-2/1	
Type AB19	P3	13.35 mm	2.9 mm	> 4.8 mm	243-5719-3/1	

The height/bottom thickness of the shroud depends on the thickness of the backplane.

Technical Specifications

Technical Specifications	hm2.0	
	Testing Standard	Connectors according to IEC 61076-4-101
Basics		
Standard		IEC 61076-4-101
Number of contacts		55 to 250
Termination		Press-fit
Operating temperature range		-55°C to +125°C
Material		
Insulator material		PBT glass filled
Contact material		Bronze
Mechanical		
Pitch		2 mm
Mating force per pin		Contact: max. 0.75 N, Shielding: max. 1 N
Separating force per pin		Contact: min. 0.15 N, Shielding: min. 0.15 N
Durability	IEC 60512-9-1:2010	Performance level II = 250 mating cycles
Electrical		
Operational current	IEC 60512-5-2:2002	1.5 A @ +20°C, 1.0 A @ +70°C
Contact resistance	IEC 60512-2-1:2002	max. 20 m Ω
Clearance and creepage		min. 0.6 Female connector, min. 0.8 mm Male connector
Insulation resistance	IEC 60512-3-1:2002	min. 10 ⁴ M Ω
Test voltage	IEC 60512-4-1:2003	750 V r. m. s.
Data transfer rate		up to 3.125 Gbit
Processing		
Packaging		Male connectors: Tube; Female connectors: Tray
Approval		
Flammability		UL (file: E130314)
Environment		RoHS compliant



Test voltage		Fully loaded	every second position	Chessboard
Rows a, c, e Rows b, d	within the row	750 V _{r.m.s}	1500 V _{r.m.s}	–
	between the rows	1500 V _{r.m.s}	1500 V _{r.m.s}	–
Rows a, b, c Rows a, b, c, d Rows a, b, c, d, e	within the rows	750 V _{r.m.s}	1500 V _{r.m.s}	1500 V _{r.m.s}
	between the rows	750 V _{r.m.s}	750 V _{r.m.s}	1200 V _{r.m.s}

Creepages and clearances according to IEC 61076-4-101		Fully loaded		every second position		Chessboard	
		Backplane Male connector	Module Female connector	Backplane Male connector	Module Female connector	Backplane Male connector	Module Female connector
Rows a, c, e Rows b, d	within the row	0.8 mm	0.6 mm	2.5 mm	2.5 mm	–	–
	between the row	2.5 mm	2.5 mm	2.5 mm	2.5 mm	–	–
Rows a, b, c Rows a, b, c, d Rows a, b, c, d, e	within the row	0.8 mm	0.6 mm	2.5 mm	2.5 mm	2.5 mm	2.5 mm
	between the row	0.8 mm	0.6 mm	0.8 mm	0.6 mm	1.2 mm	1.5 mm

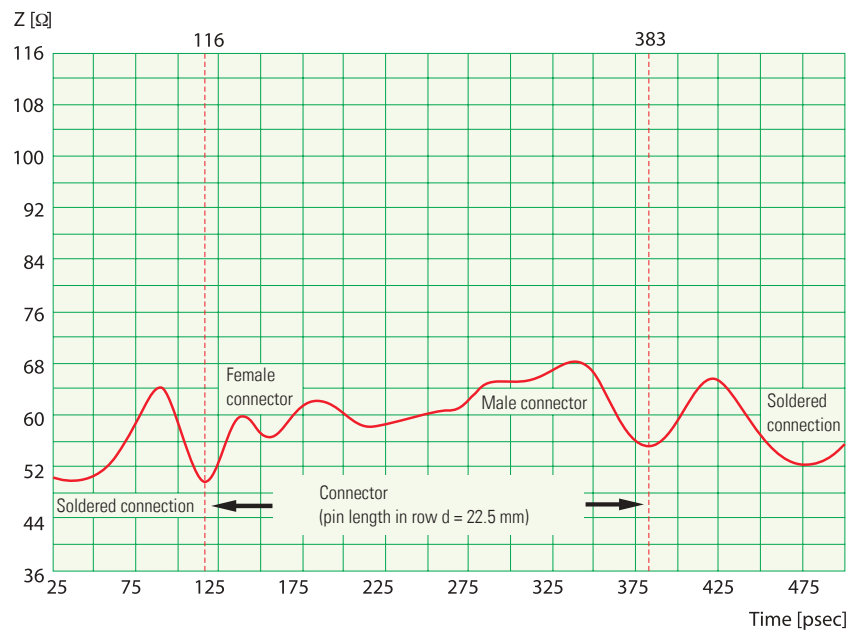
Electrical Characteristics

The connector system ept hm2.0 has been especially developed for high data rates. Below some HF characteristics are described as example.

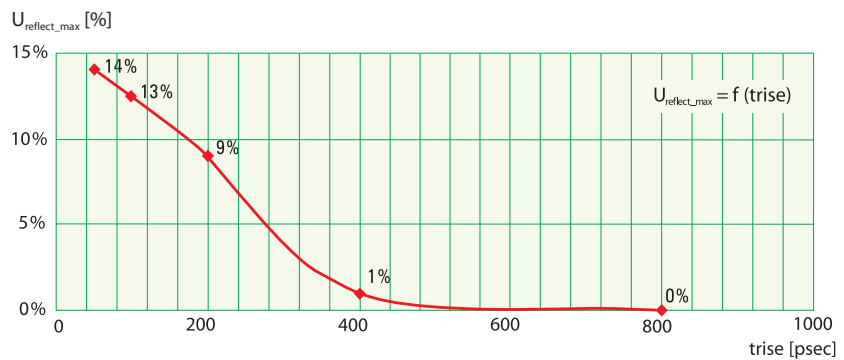
A SPICE model is available for simulation when developing systems. The simulation model was verified by means of TDR measurements.

Impedance gradient along a pin in row d

Impedance measured after eliminating multiple reflection



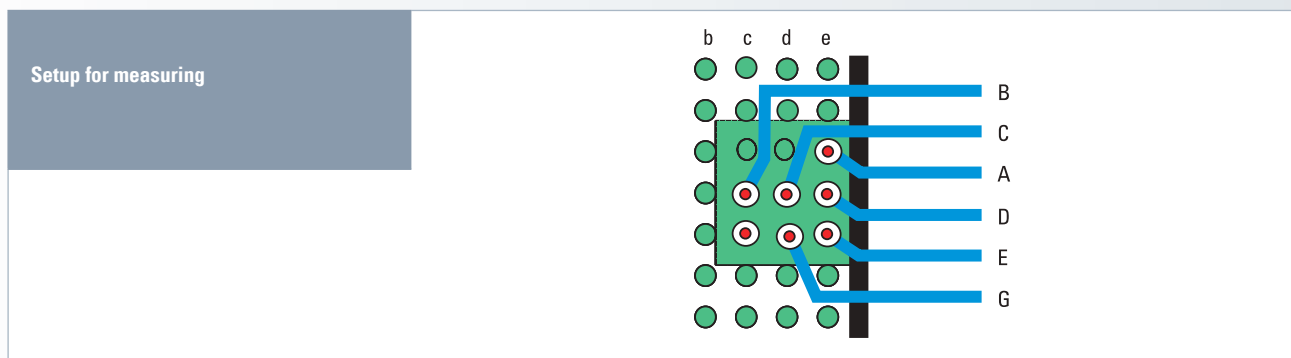
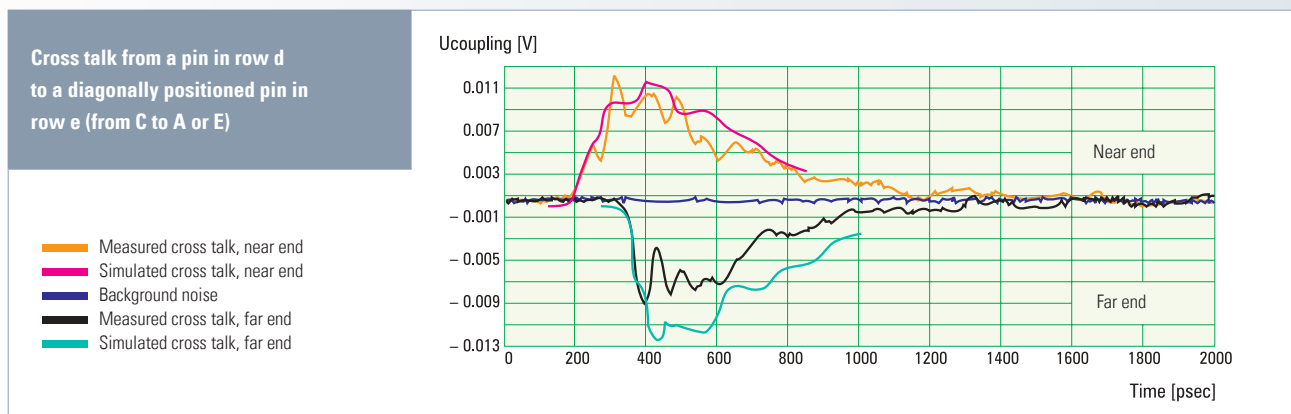
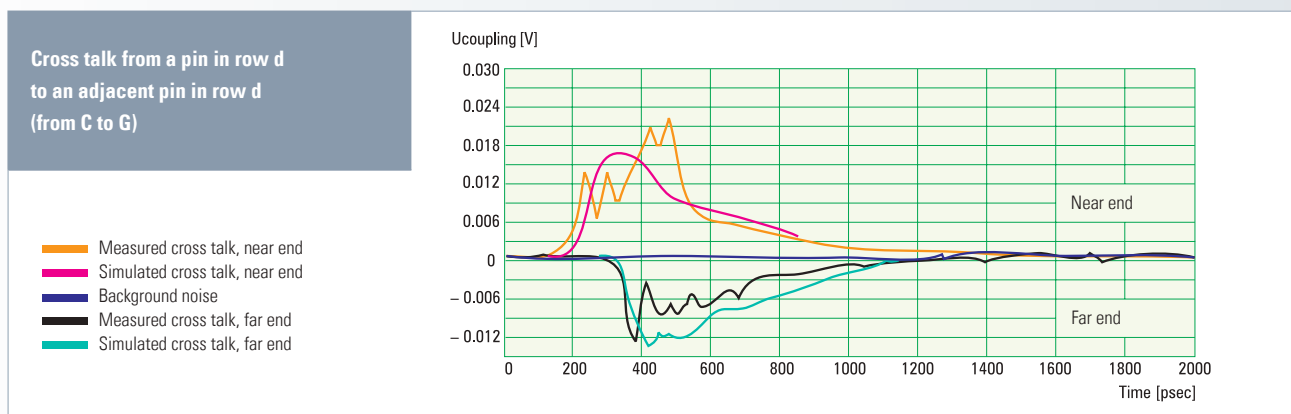
$U_{\text{reflect_max}}$ is the maximum reflection of an ept hm2.0 connector in percent, shown as function of the signal rise time. The connector is the only electrical discontinuity in a selected 50 ohm system.

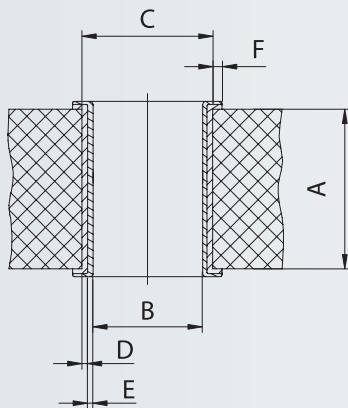


Cross Talk

'Crosstalk' means that independent signal channels are influencing each other in an unwanted manner. This effect is expressed in decibels.

Near end and far end cross talk was measured and simulated for different arrangements. A 200 mV input signal and a signal rise time of 25 psec. were applied.





Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

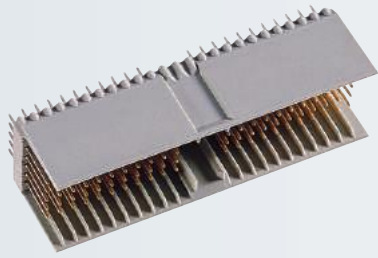
ept offers adapted press-fit zones for various new board surfaces.

	Nominal hole	Ø 0.6 mm
imm. Sn printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	imm. Sn plating	max. 1.5 µm
F	Annular ring	min. 0.1 mm
Ni, Au printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni
F	Annular ring	min. 0.1 mm
pure Cu printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	OSP*	e. g. GLICOAT-SMD (F2) with 0.12 – 0.15 µm
F	Annular ring	min. 0.1 mm
HAL Sn printed circuit boards		
A	PCB thickness	min. 1.4 mm
B	Plated hole	Ø 0.60 ± 0.05 mm
C	Drill hole	0.70 ± 0.02 mm
D	Cu plating	min. 25 µm
E	HAL Sn	5 – 15 µm
F	Annular ring	min. 0.1 mm

* OSP = Organic Solderability Preservatives

Pin Lengths

Dimension drawing	Contact	Connection	Contact length	Use
	A	without rear mating zone	8.25 ± 0.1	Level 1, contact for signal
	B		9.75 ± 0.1	Level 2, contact for signal
	C		11.25 ± 0.1	Level 3, shielding
	K	with rear mating zone 13 mm	8.25 ± 0.1	Level 1, contact for signal
	L		9.75 ± 0.1	Level 2, contact for signal
	M		11.25 ± 0.1	Level 3, shielding
	N	with rear mating zone 14.5 mm	8.25 ± 0.1	Level 1, contact for signal
	P		9.75 ± 0.1	Level 2, contact for signal
	Q		11.25 ± 0.1	Level 3, shielding
	R	with rear mating zone 16 mm	8.25 ± 0.1	Level 1, contact for signal
	S		9.75 ± 0.1	Level 2, contact for signal
	T		11.25 ± 0.1	Level 3, shielding



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 100, 110, 154

Pitch: 2 mm

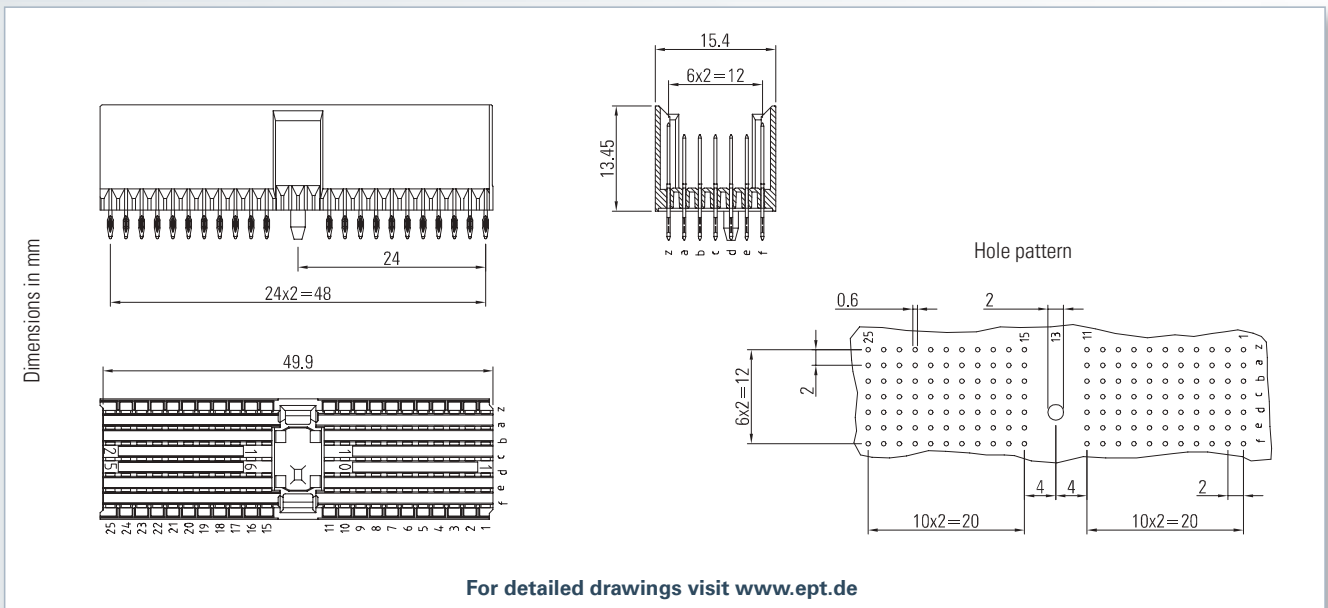
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 348
- Coding p. 304
- Shroud p. 302

Note

- Pin lengths see p. 245
- CompactPCI P1/P4

Mating connector / Application:



Type A Female connector (p. 248)



Press-fit - Performance level II

No. of contacts	Contact arrangement	PCB thickness >2.2 mm	
		Part number	PU (Tube)
110		243-11010-15	
154		243-11310-15	
154		243-11322-15 cPCI Hot-Swap (P1)	10/240
100		243-11323-15 cPCI Telephony Spec (P4)	
154		243-11360-15F	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm
(Part number 243-11xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 90, 110

Pitch: 2 mm

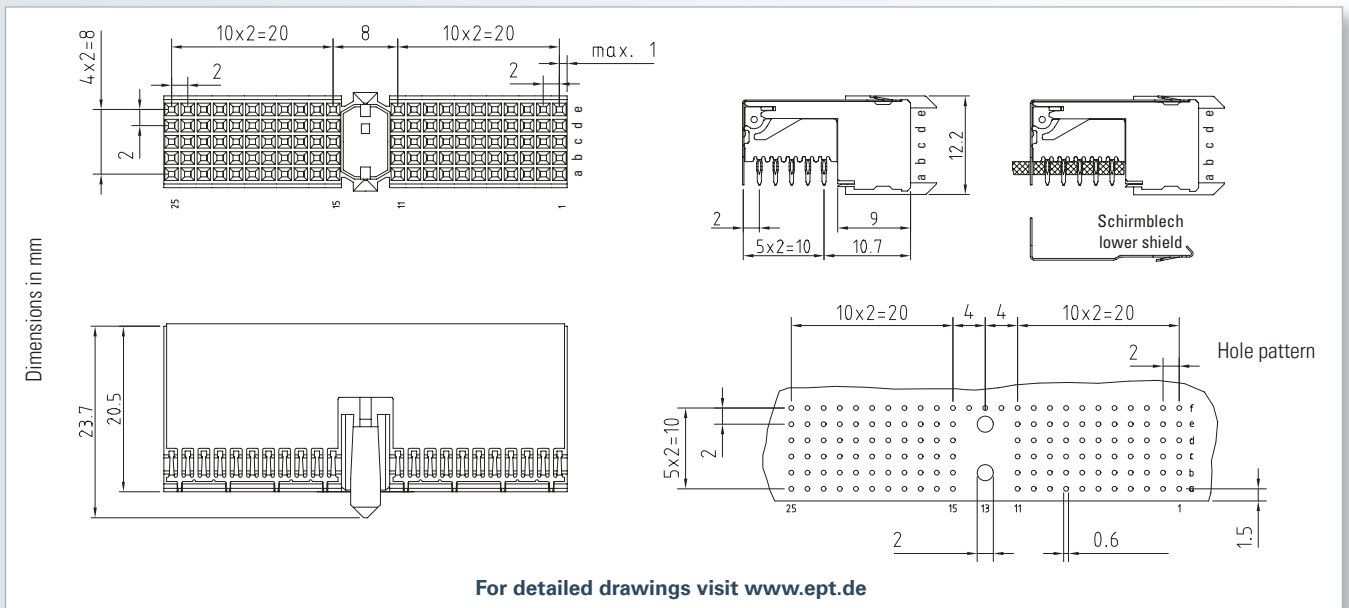
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352
- Coding p. 304

Note

- CompactPCI J1/J4

Mating connector / Application:



Type A Male connector (p. 246)

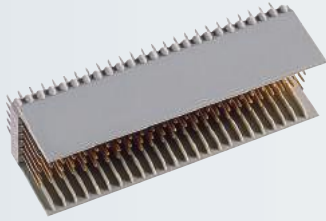


Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
110	without shielding	244-11000-15	35/140
110	with shielding (cPCI J1/J4)	244-11300-15	
90	with shielding (cPCI Telephony Spec)	244-11305-15	
–	Lower shield	244-11600-1	24/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 125, 175

Pitch: 2 mm

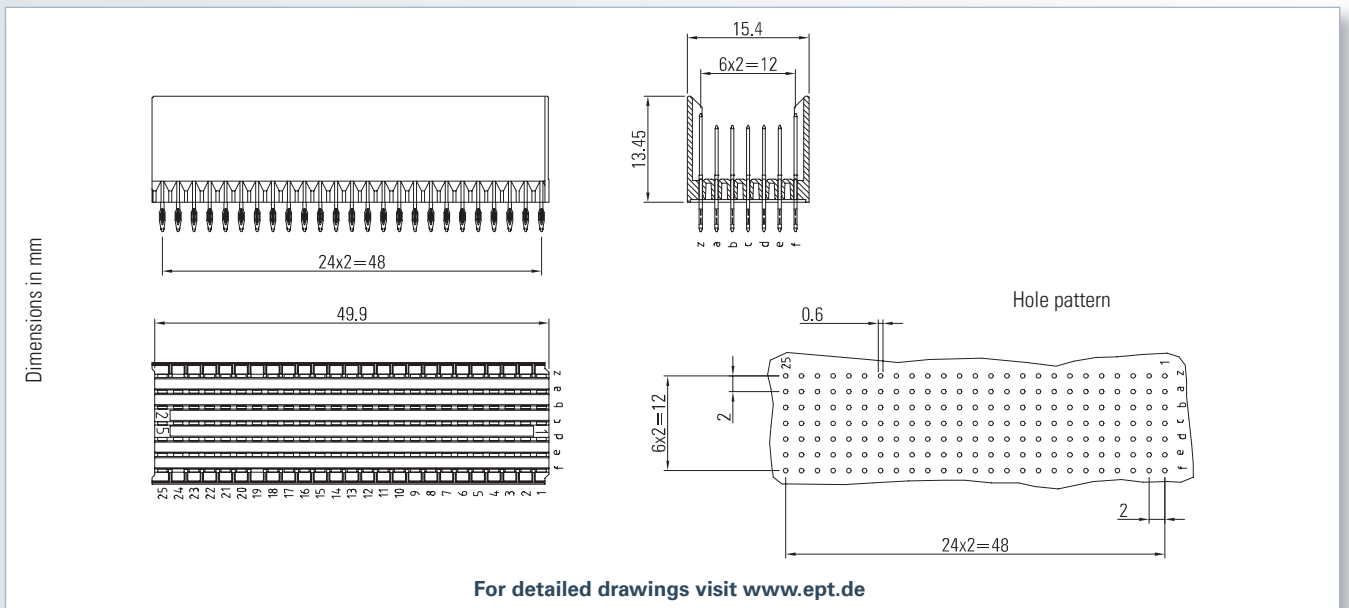
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 350
- Shroud p. 302

Note

- Pin length p. 245

Mating connector / Application:



Type B25 Female connector (p. 252)



Einpresstechnik - Gütestufe II

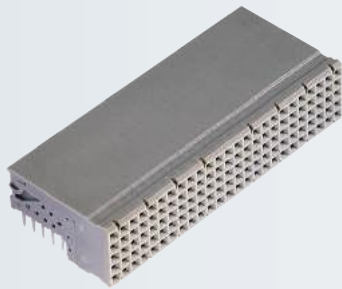
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
125	<p>Diagram showing a 5x25 grid of 'A' contacts. Columns are numbered 1-25 from right to left. Rows are labeled a-f from top to bottom.</p>	243-21010-15	10/240
125	<p>Diagram showing a 5x25 grid of 'B' contacts. Columns are numbered 1-25 from right to left. Rows are labeled a-f from top to bottom.</p>	243-21020-15	
175	<p>Diagram showing a 5x25 grid. The first 20 columns (1-20 from right) are 'A' contacts, and the last 5 columns (21-25 from right) are 'C' contacts. Columns are numbered 1-25 from right to left. Rows are labeled a-f from top to bottom.</p>	243-21310-15	
175	<p>Diagram showing a 5x25 grid. The first 20 columns (1-20 from right) are 'B' contacts, and the last 5 columns (21-25 from right) are 'C' contacts. Columns are numbered 1-25 from right to left. Rows are labeled a-f from top to bottom.</p>	243-21320-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 243-21xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 125

Pitch: 2 mm

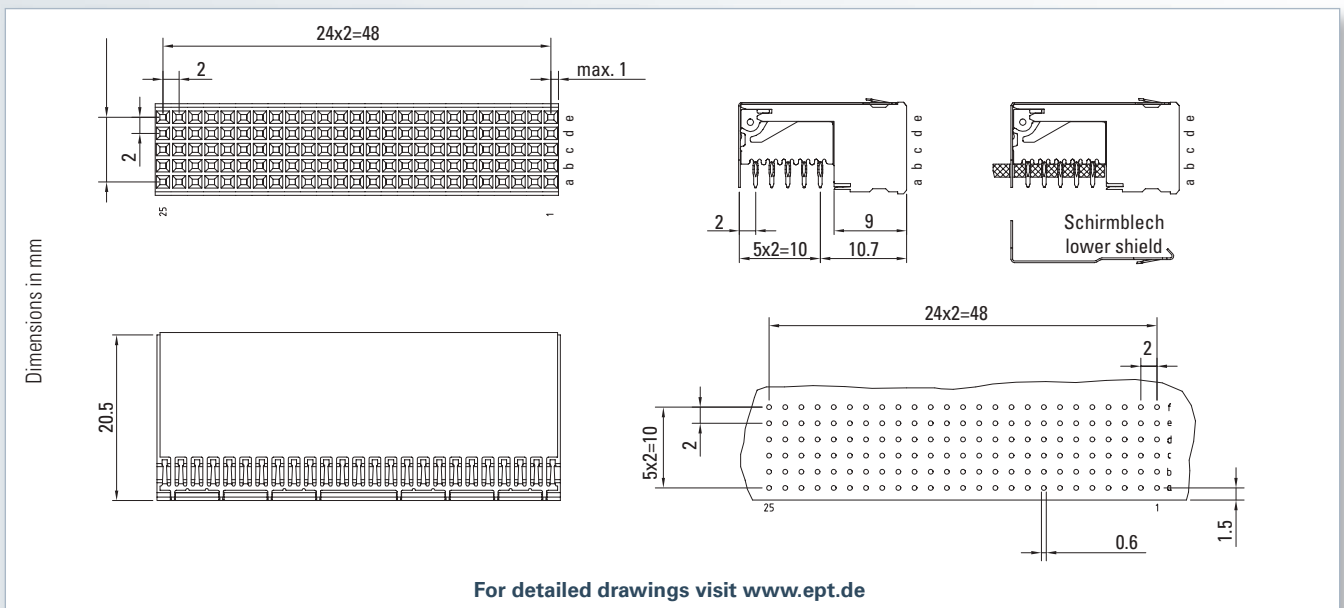
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:



Type B25 Male connector (p. 250)

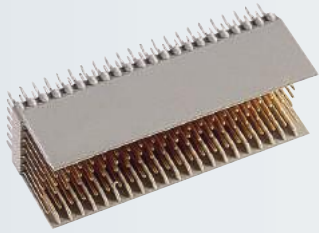


Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
125	without shielding	244-21000-15	35/140
125	with shielding	244-21300-15	
–	Lower shield	244-21600-1	24/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 132, 154

Pitch: 2 mm

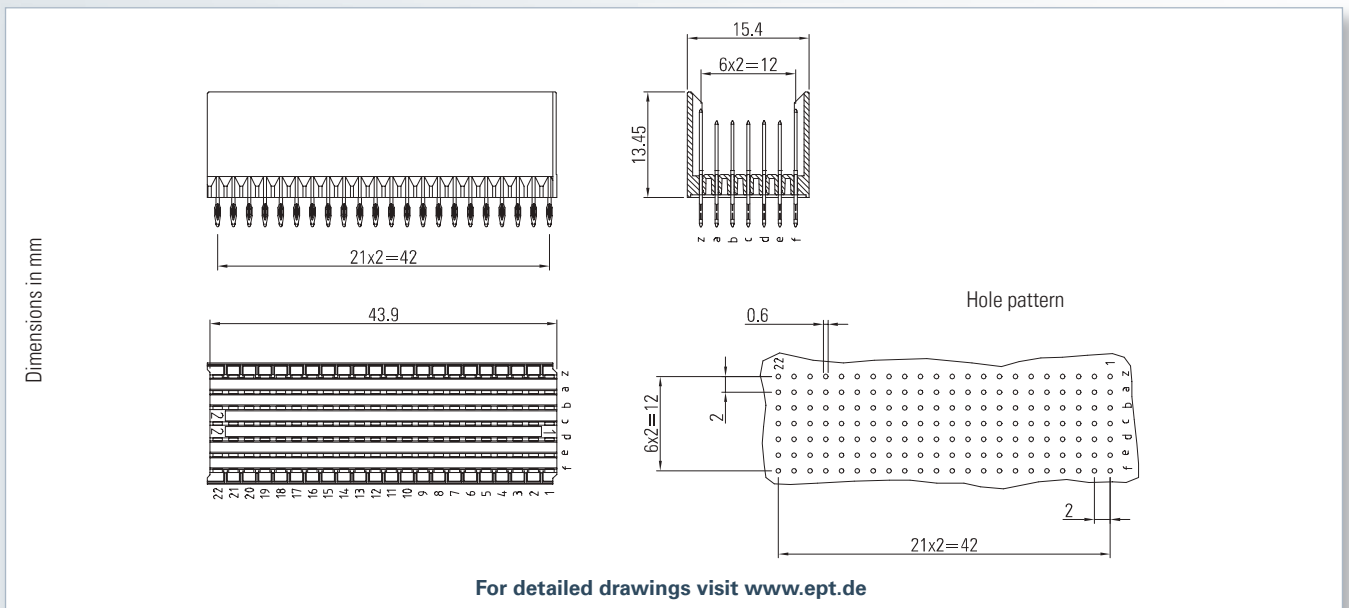
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 350
- Shroud p. 302

Note

- Pin lengths p. 245
- CompactPCI P2/P5

Mating connector / Application:

Type B22 Female connector (p. 256)



Press-fit - Performance level II

No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
154		243-22310-15	11/264
154		243-22311-15 cPCI Telephony Spec (P5)	
154		243-22320-15 cPCI (P2/P5)	
154		243-22360-15F cPCI (P2/P5)	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm
(Part number 243-22xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 110

Pitch: 2 mm

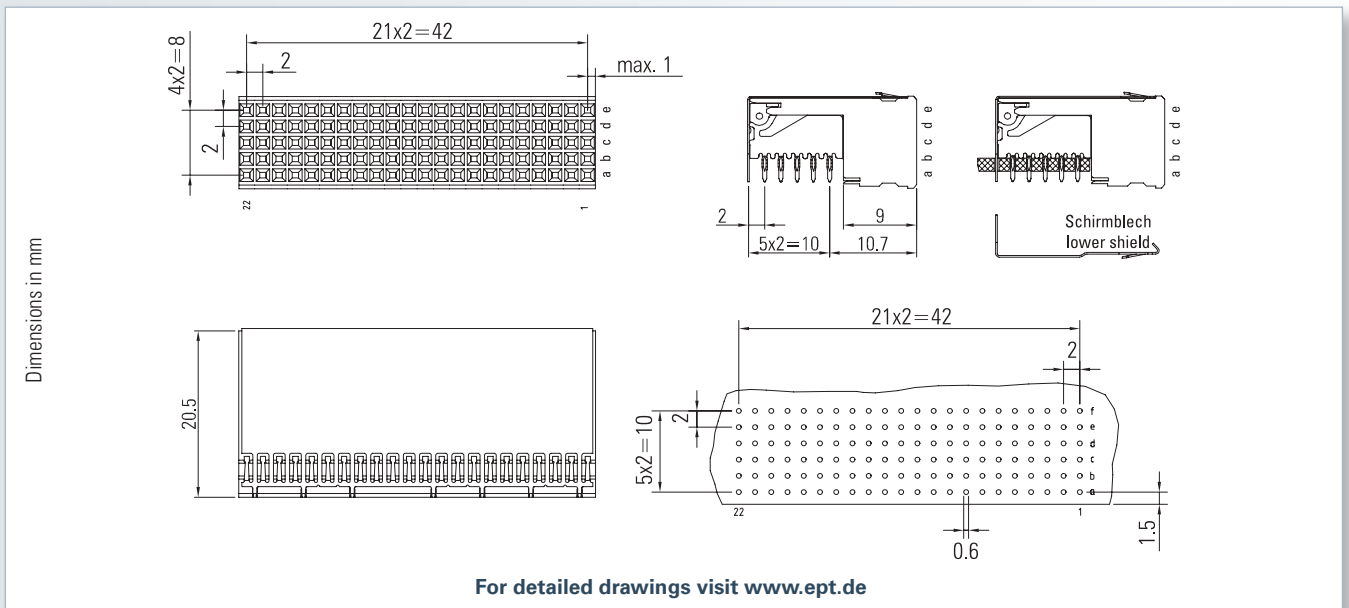
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Note

- CompactPCI J2/J5

Mating connector / Application:



Type B22 Male connector (p. 254)



Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
110	without shielding	244-22000-15	35/140
110	with shielding	244-22300-15	
–	Lower shield	244-22600-1	24/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 95, 133

Pitch: 2 mm

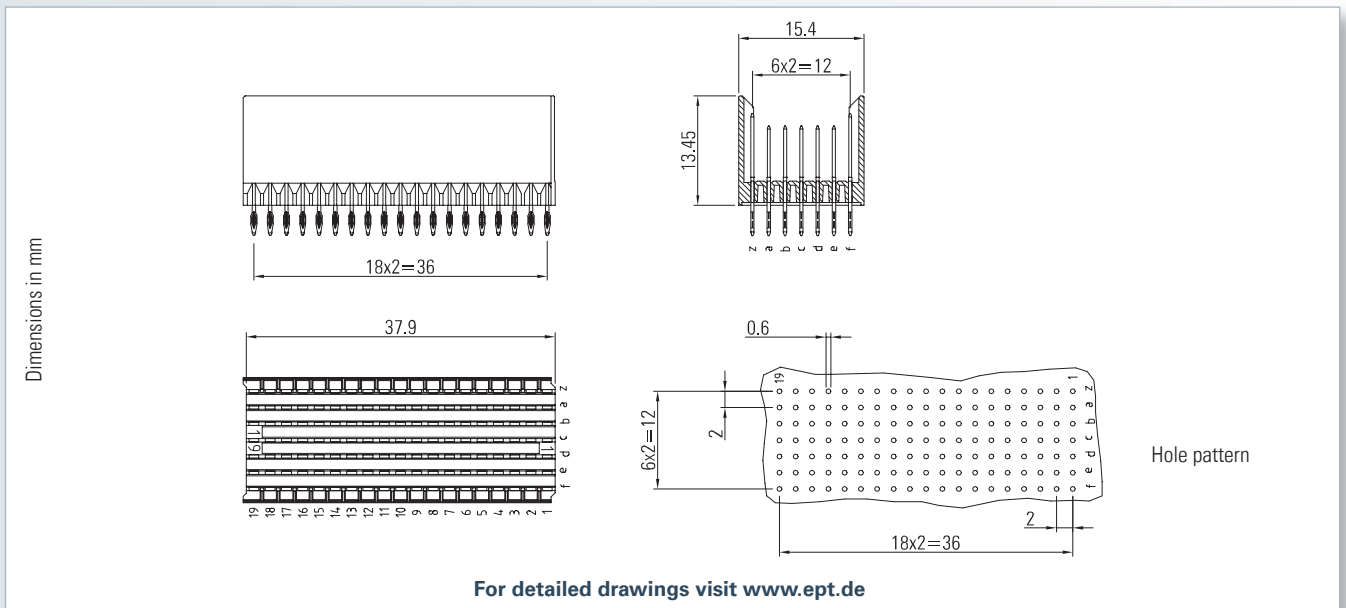
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352
- Shroud p. 302

Note

- Pin lengths p. 245
- VME J0 and cPCI P3

Mating connector / Application:



Type B19 Female connector (p. 260)



Press-fit - Performance level II

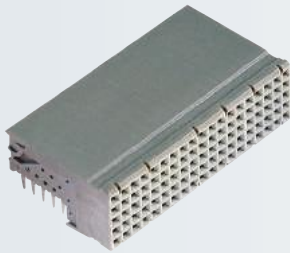
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
133		243-23310-15	13/312
133		243-23320-15	
133		243-23360-15F	
133		243-23700-15F	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 243-23xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 95

Pitch: 2 mm

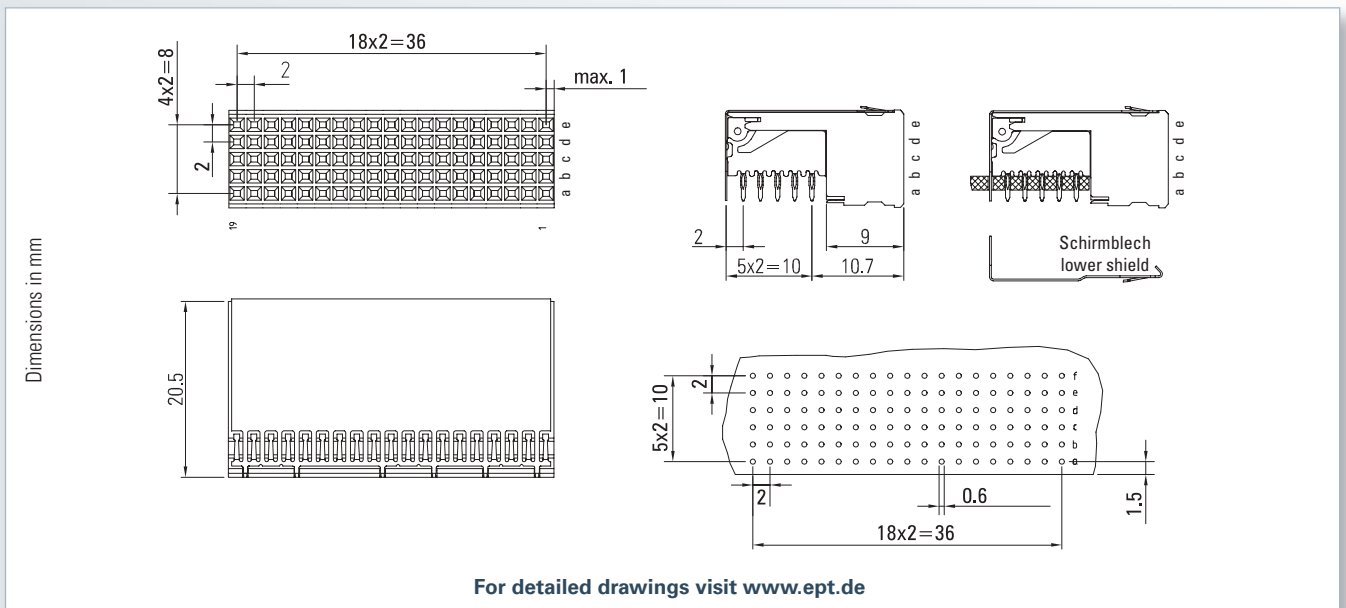
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Note

- VME P0 and cPCI J3

Mating connector / Application:



Type B19 Male connector (p. 258)

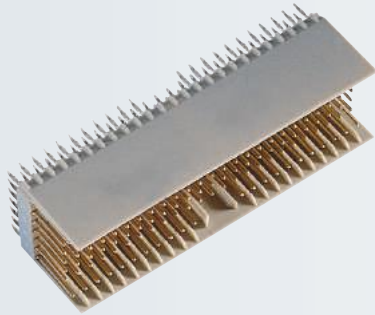


Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
95	without shielding	244-23000-15	42/168
95	with shielding	244-23300-15	
–	lower shield	244-23600-1	24/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 125, 169

Pitch: 2 mm

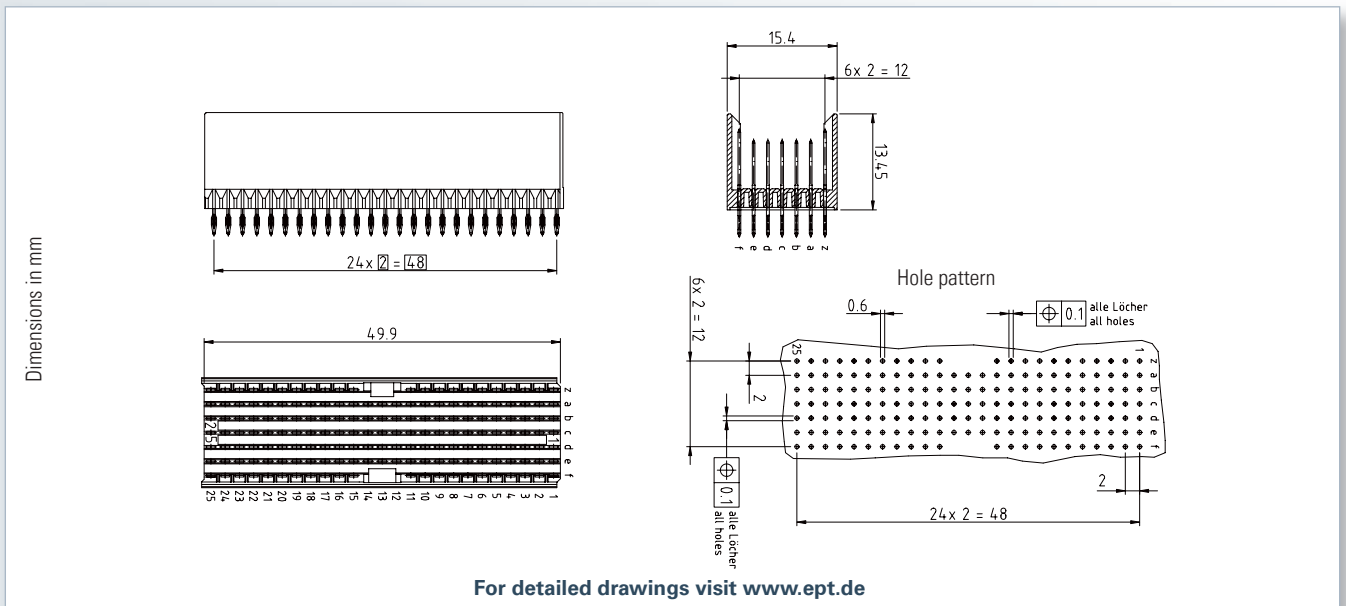
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 348
- Shroud p. 302

Note

- Pin lengths p. 245

Mating connector / Application:



Type AB25 Female connector (p. 264)



Press-fit - Performance level II

No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
125		243-61010-15	10/240
169		243-61310-15	
169		243-61320-15	
169		243-61360-15F	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 243-61xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 125

Pitch: 2 mm

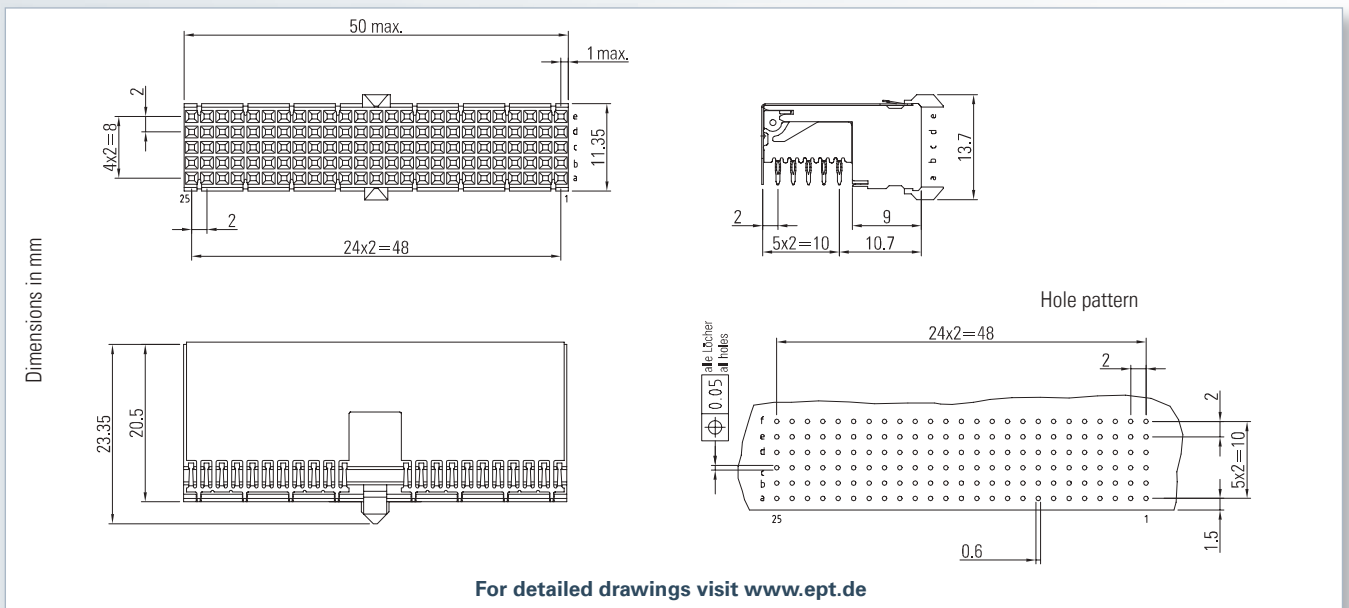
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:



Type AB25 Male connector (p. 262)

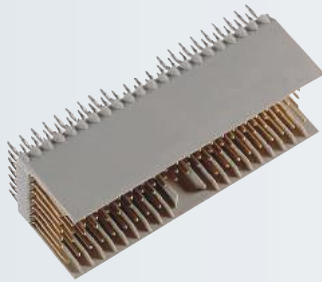


Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
125	without shielding	244-61000-15	35/140
125	with shielding	244-61300-15	
–	lower shield	244-11600-1	24/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 110, 146

Pitch: 2 mm

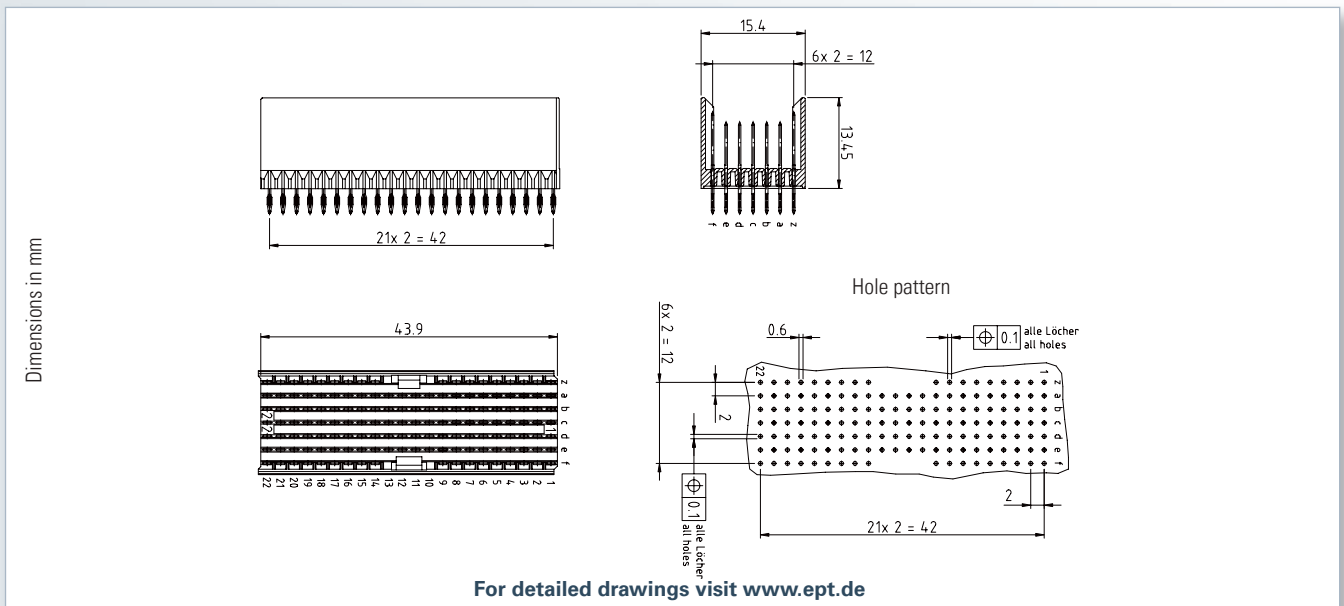
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 348
- Shroud p. 302

Note

- Pin lengths p. 245

Mating connector / Application:



Type AB22 Female connector (p. 268)



Press-fit - Performance level II

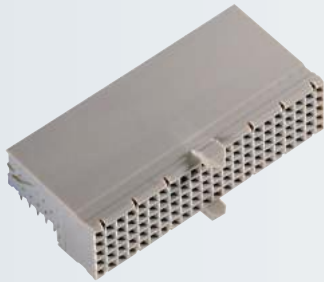
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
110		243-62010-15	11/264
146		243-62310-15	
146		243-62320-15	
146		243-62360-15F	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 243-62xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 110

Pitch: 2 mm

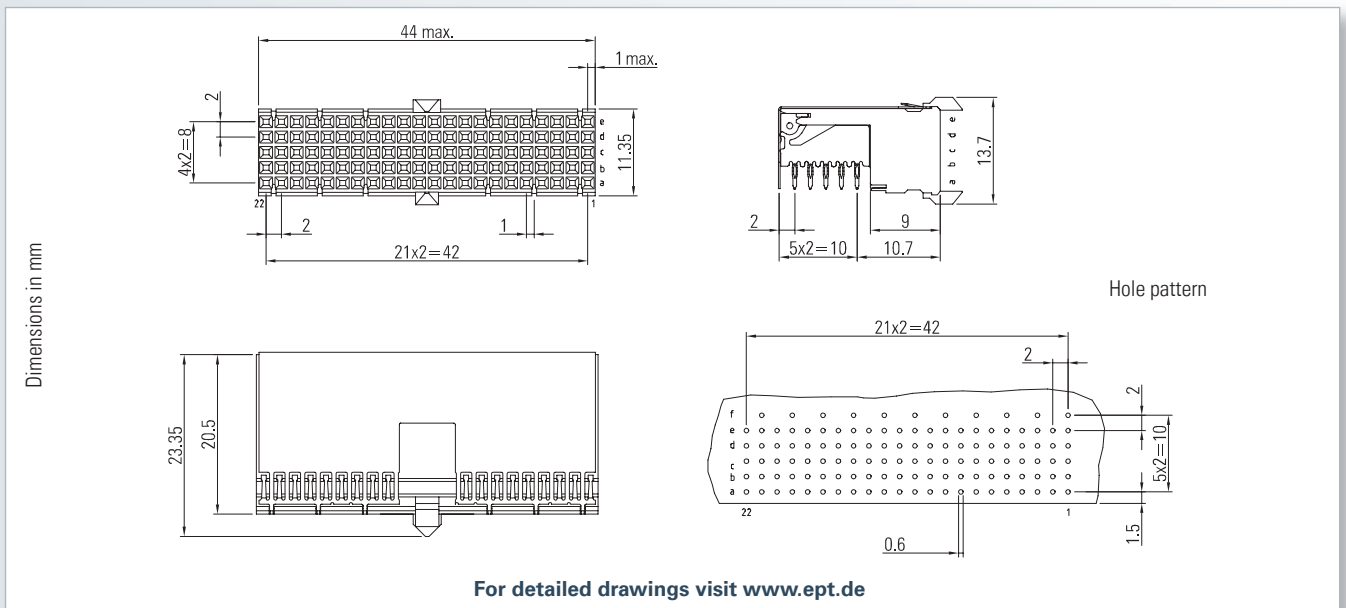
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Note

- CompactPCI RJ5

Mating connector / Application:



Type AB22 Male connector (p. 266)

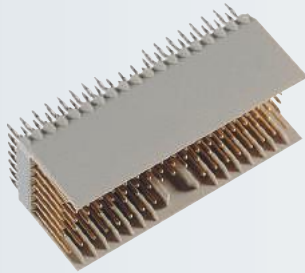


Press-fit - Performance level II

No. of contacts	Description	Part number	PU (Tray)
110	without shielding	244-62000-15	35/140
110	with shielding	244-62300-15	

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 95, 127

Pitch: 2 mm

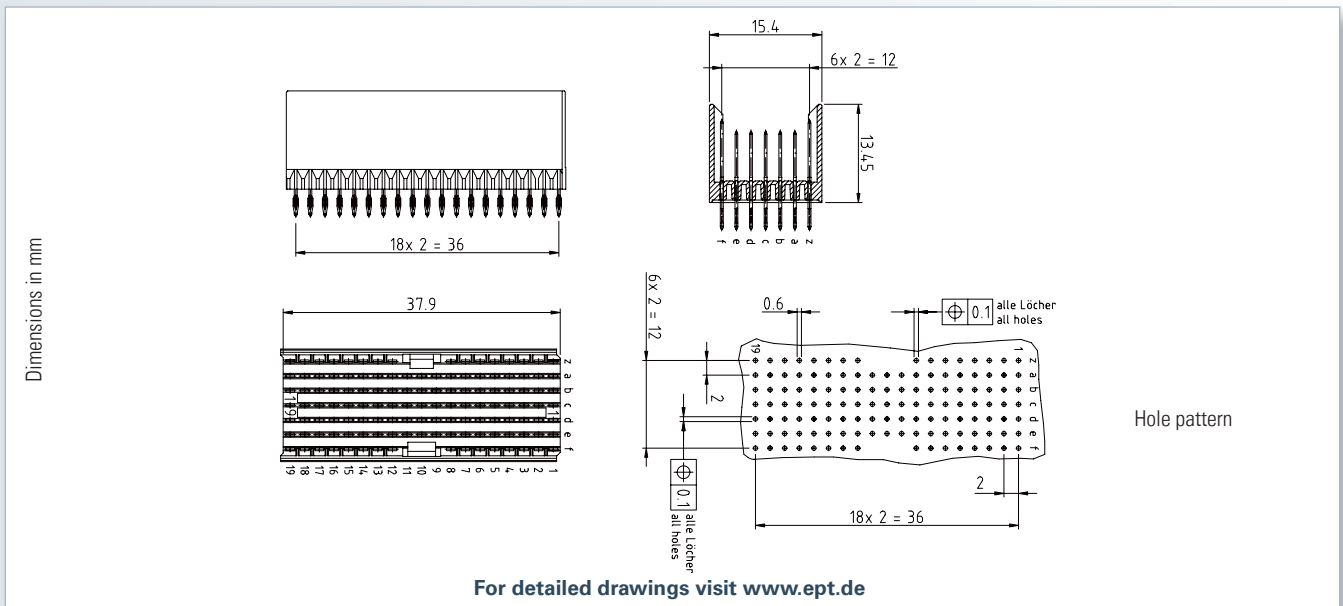
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 348
- Shroud p. 302

Note

- Pin lengths p. 245

Mating connector / Application:



Type AB19 Female connector (p. 272)



Press-fit - Performance level II

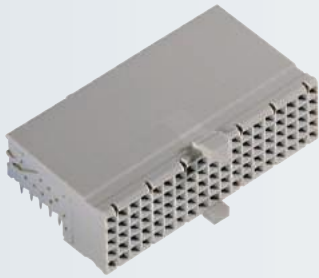
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
95		243-63010-15	13/312
127		243-63310-15	
127		243-63320-15	
127		243-63360-15F	

On request

- other contact surface
- also in THTR

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 243-63xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 95

Pitch: 2 mm

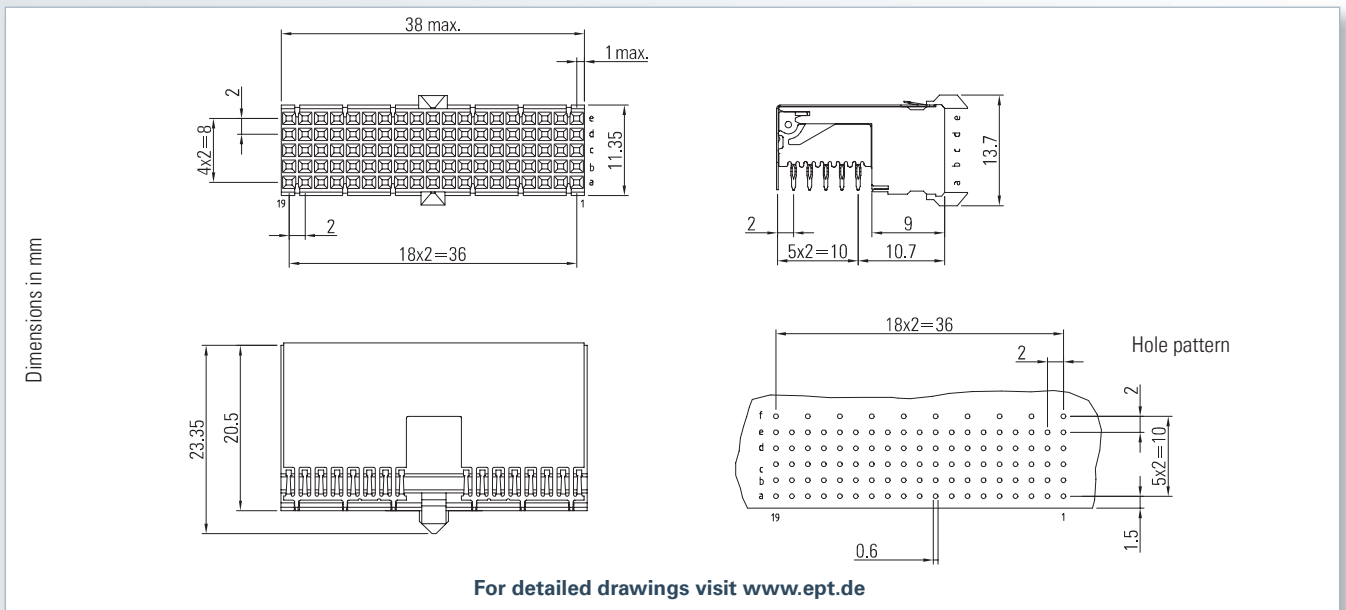
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Note

- CompactPCI RJ3

Mating connector / Application:



Type AB19 Male connector (p. 270)



Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
95	without shielding	244-63000-15	35/140
95	with shielding	244-63300-15	

On request

- other contact surface
- also in THTR



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 55, 77

Pitch: 2 mm

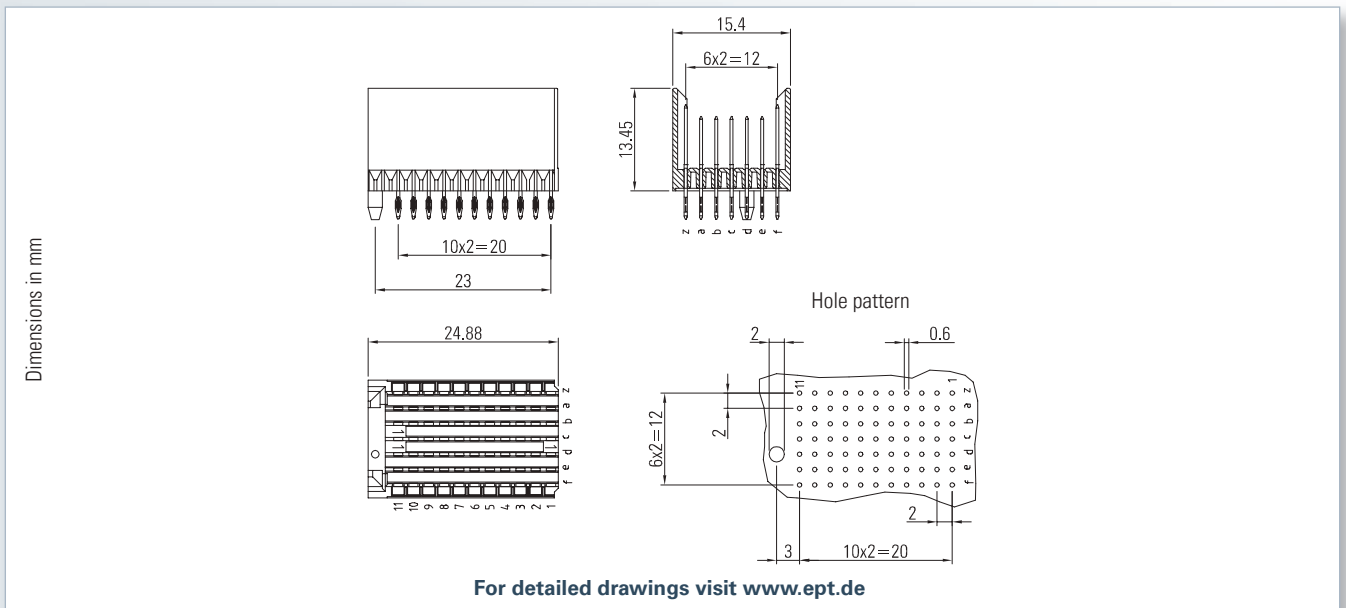
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352
- Shroud p. 302

Note

- Pin lengths p. 245

Mating connector / Application:



Type C Female connector (p. 276)



Press-fit - Performance level II

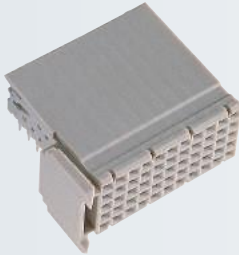
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
55		243-31010-15	20/480
55		243-31020-15	
77		243-31310-15	
77		243-31320-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm
(Part number 243-31xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 55

Pitch: 2 mm

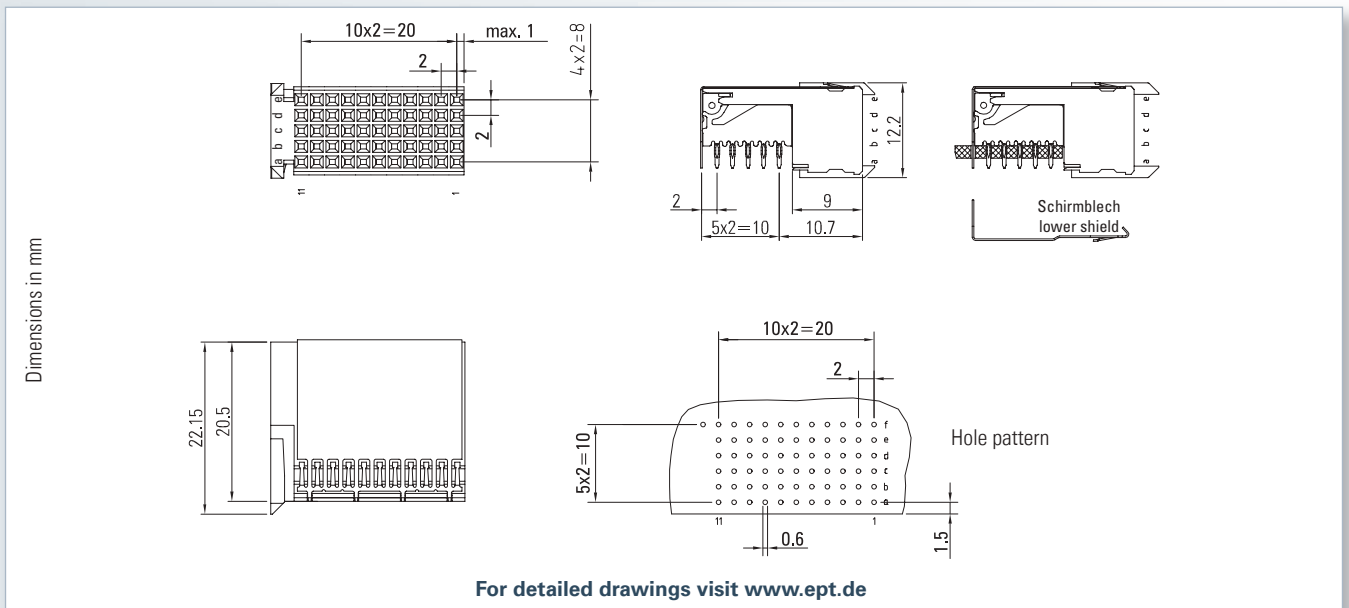
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:

Type C Male connector (p. 274)

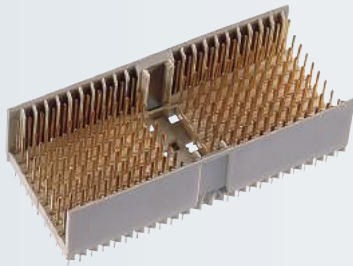


Press-fit - Performance level II

No. of contacts	Description	Part number	PU (Tray)
55	without shielding	244-31000-15	70/280
55	with shielding	244-31300-15	
–	lower shield	244-31600-1	48/600

On request

- other contact surface
- also in THTR



Type: Male connector straight with 8 rows

Termination: Press-fit

Number of contacts: 176, 220

Pitch: 2 mm

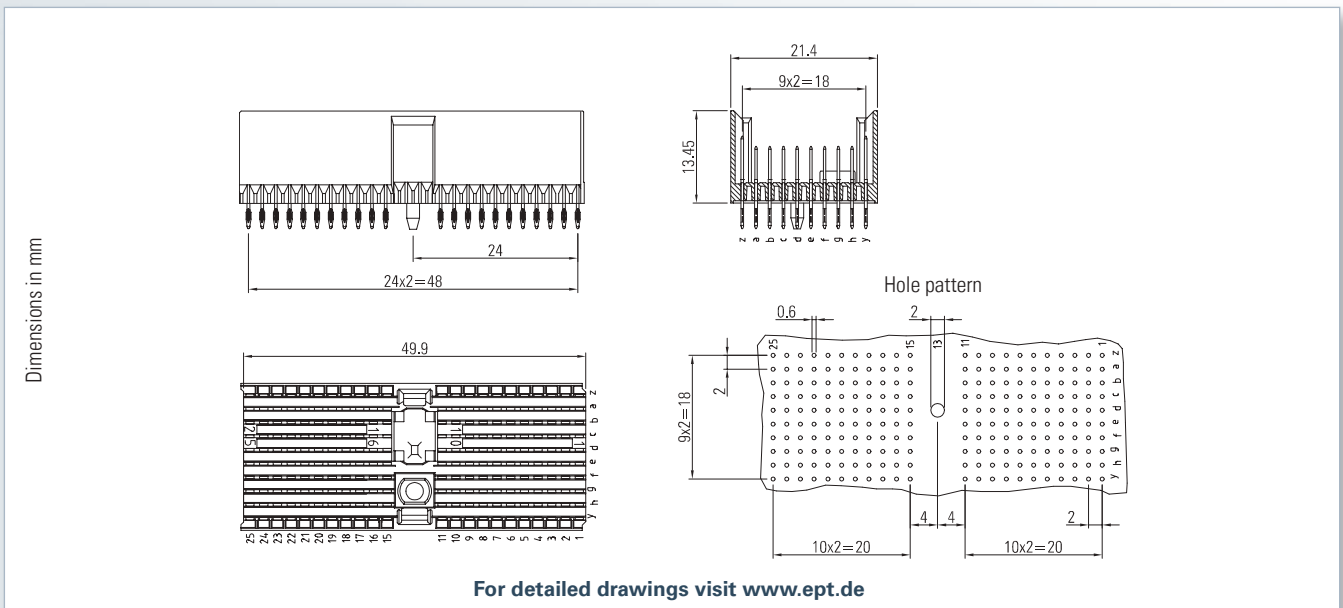
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352
- Coding p. 304

Note

- Pin lengths p. 245

Mating connector / Application:



Type D Female connector (p. 280)



Press-fit - Performance level II

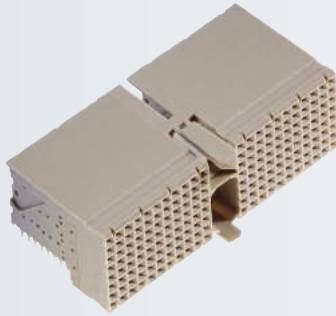
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
176		245-11010-15	10/160
220		245-11310-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 245-11xxx-05)



Type: Female connector 90° with 8 rows

Termination: Press-fit

Number of contacts: 176

Pitch: 2 mm

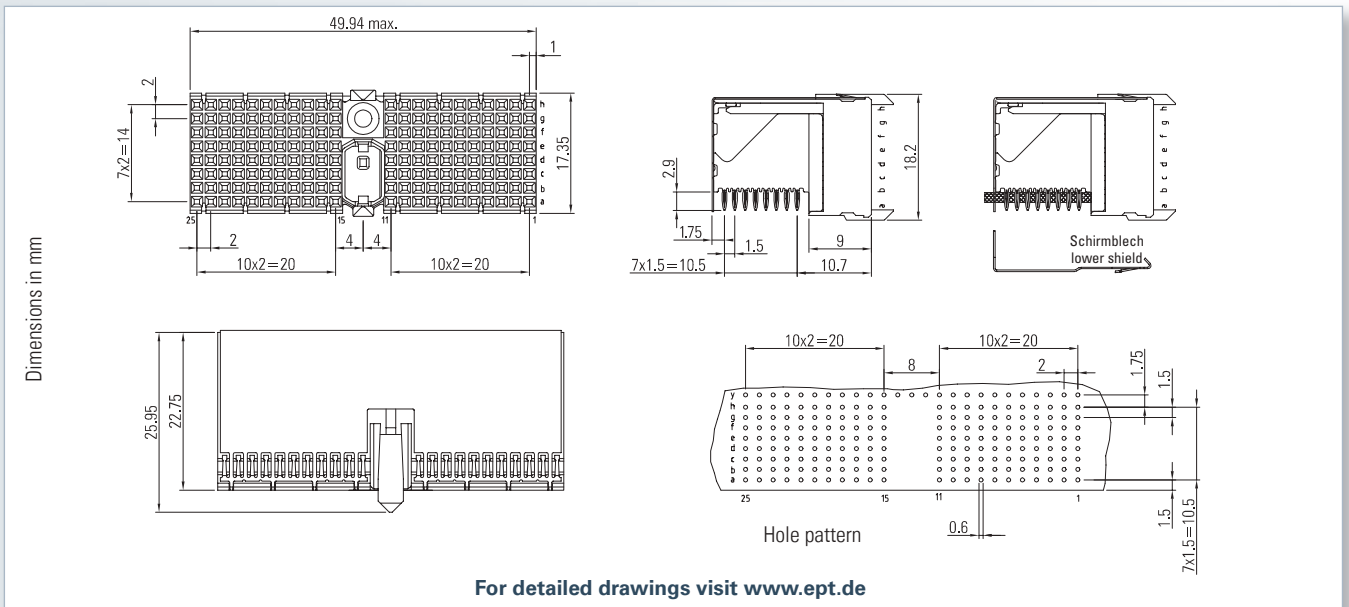
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352
- Coding p. 304

Mating connector / Application:



Type D Male connector (p. 278)



Press-fit - Performance level II

No. of contacts	Description	Part number	PU (Tray)
176	without shielding	246-11000-15	30/90
176	with shielding	246-11300-15	
–	lower shield	246-11600-1	24/600

On request
 • other contact surface



Type: Male connector straight with 8 rows

Termination: Press-fit

Number of contacts: 200, 250

Pitch: 2 mm

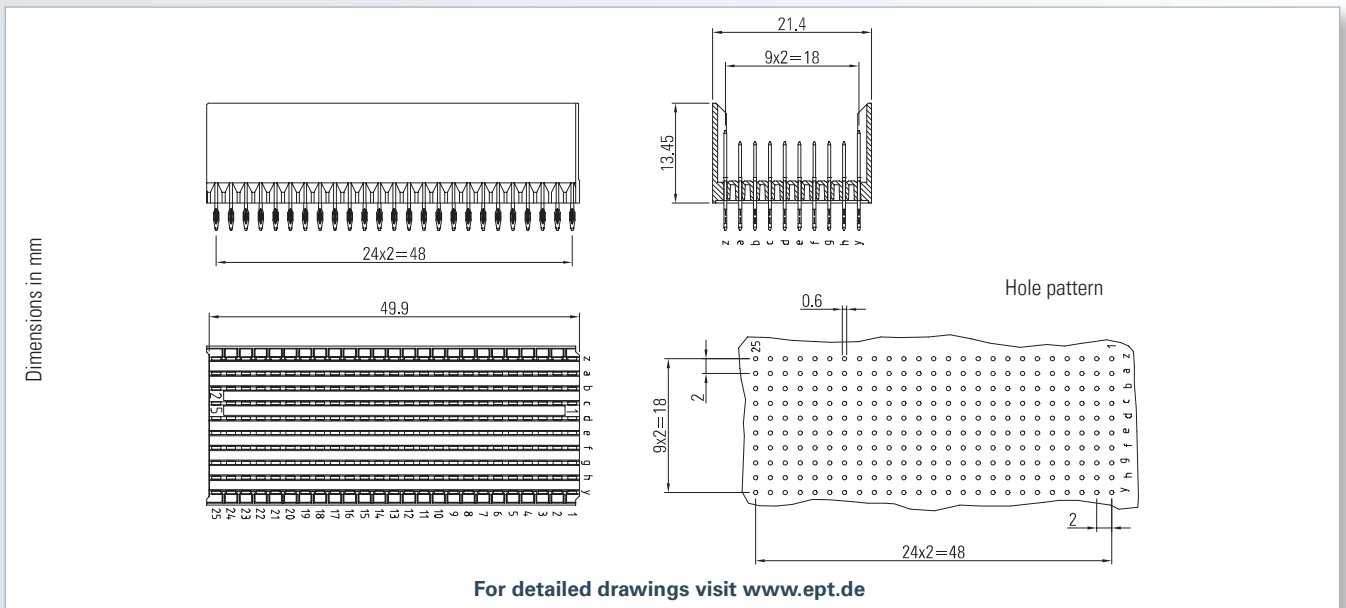
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 350

Note

- Pin lengths p. 245

Mating connector / Application:



Type E Female connector (p. 284)



Press-fit - Performance level II

No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
200		245-21010-15	10/160
250		245-21310-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 245-21xxx-05)



Type: Female connector 90° with 8 rows

Termination: Press-fit

Number of contacts: 200

Pitch: 2 mm

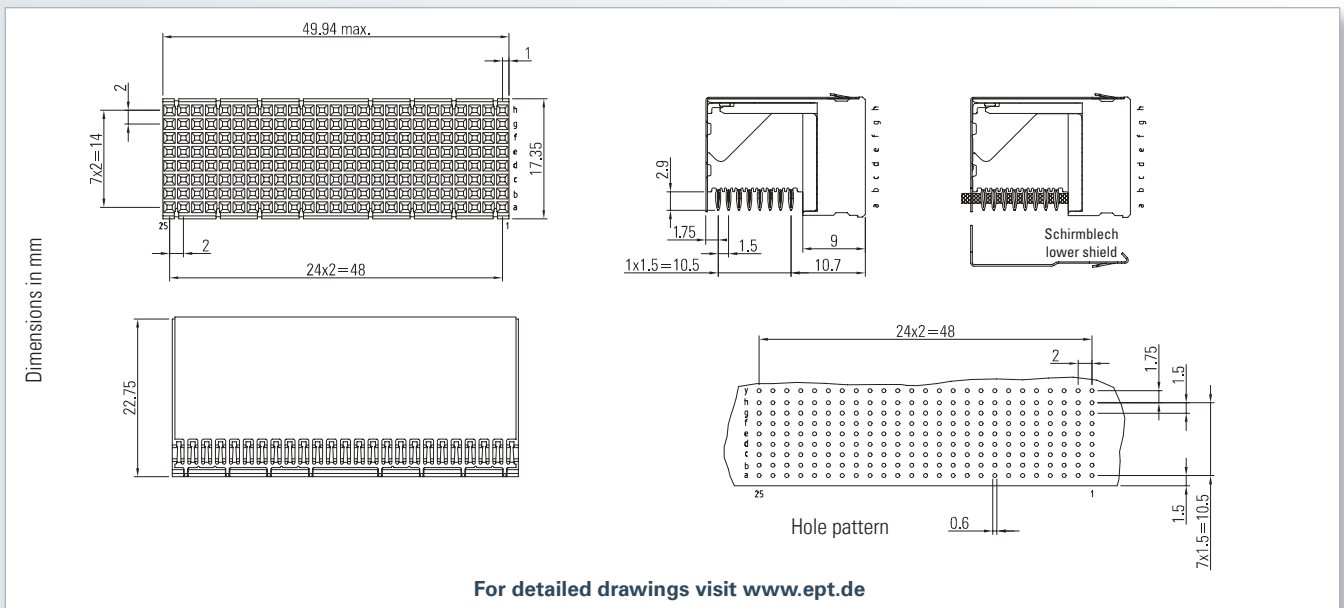
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:



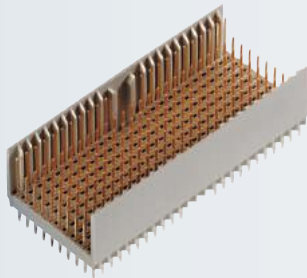
Type E Male connector (p. 282)



Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
200	without shielding	246-21000-15	30/90
200	with shielding	246-21300-15	
–	lower shield	246-21600-1	24/600

On request
 • other contact surface



Type: Male connector straight with 8 rows

Termination: Press-fit

Number of contacts: 200, 244

Pitch: 2 mm

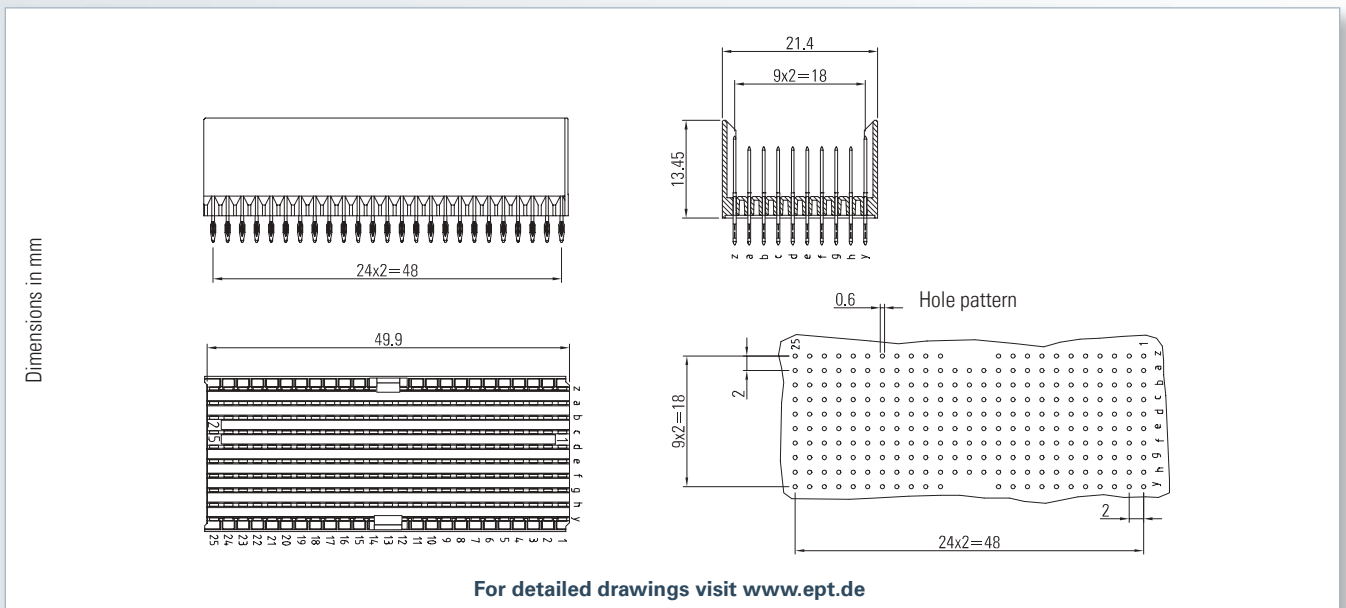
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 348

Note

- Pin lengths p. 245

Mating connector / Application:



Type DE Female connector (p. 288)



Press-fit - Performance level II

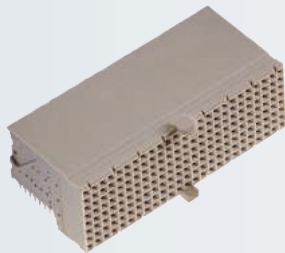
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
200		245-61010-15	10/160
244		245-61310-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 245-61xxx-05)



Type: Female connector 90° with 8 rows

Termination: Press-fit

Number of contacts: 200

Pitch: 2 mm

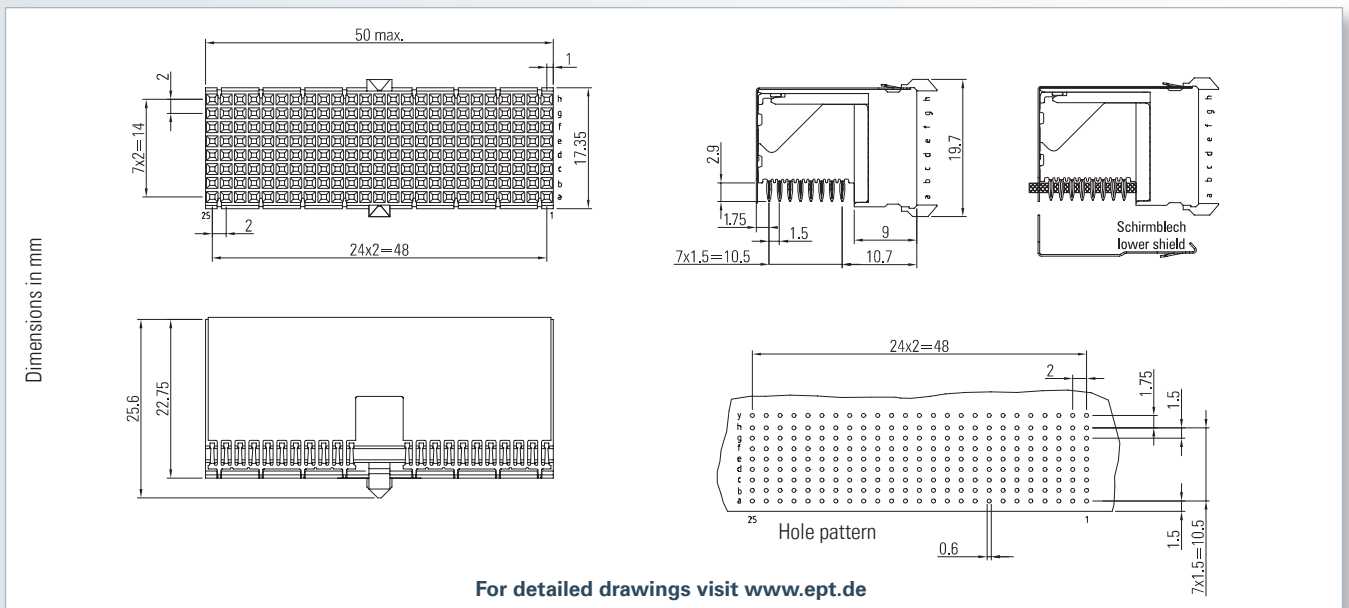
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:



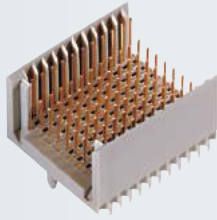
Type DE Male connector (p. 286)



Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
200	without shielding	246-61000-15	30/90
200	with shielding	246-61300-15	
–	lower shield	246-11600-1	24/600

On request
 • other contact surface



Type: Male connector straight with 8 rows

Termination: Press-fit

Number of contacts: 88, 110

Pitch: 2 mm

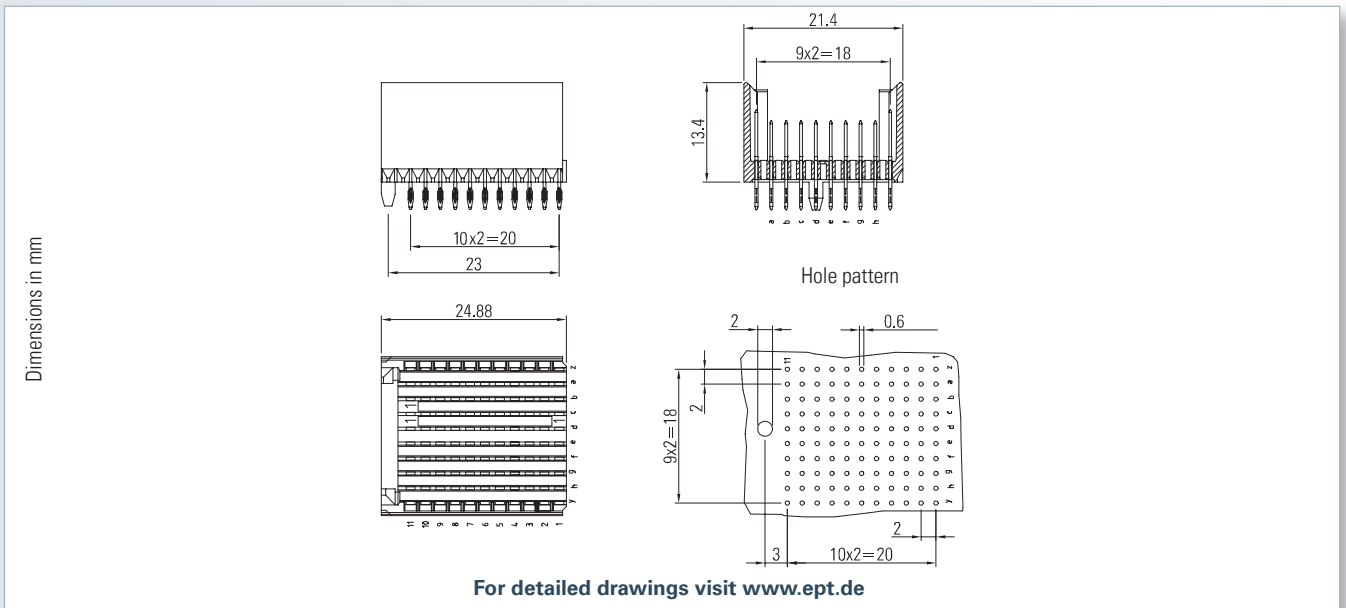
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 350

Note

- Pin lengths p. 245

Mating connector / Application:



Type F Female connector (p. 292)



Press-fit - Performance level II

No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
88		245-31010-15	20/320
110		245-31310-15	

On request

- contact arrangement
- other contact surface

Ordering note

- PCB thickness 1.4 - 2.2 mm (Part number 245-31xxx-05)

hm2.0



Type F Female Connector



Type: Female connector 90° with 8 rows

Termination: Press-fit

Number of contacts: 88

Pitch: 2 mm

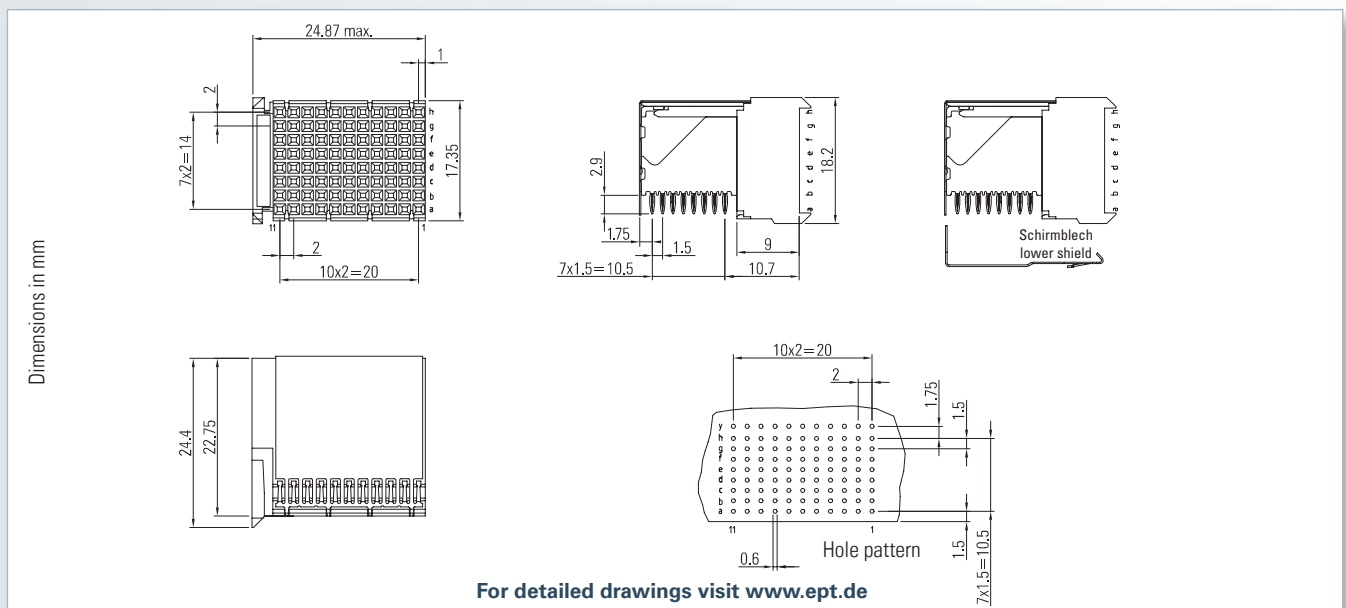
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Processing tools p. 352

Mating connector / Application:



Type F Male connector (p. 290)



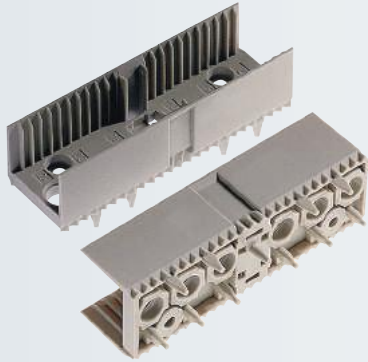
Press-fit - Performance level II

No. of contacts	Description	Part number	PU (Tray)
88	without shielding	246-31000-15	60/180
88	with shielding	246-31300-15	
–	lower shield	246-31600-1	24/600

On request
 • other contact surface



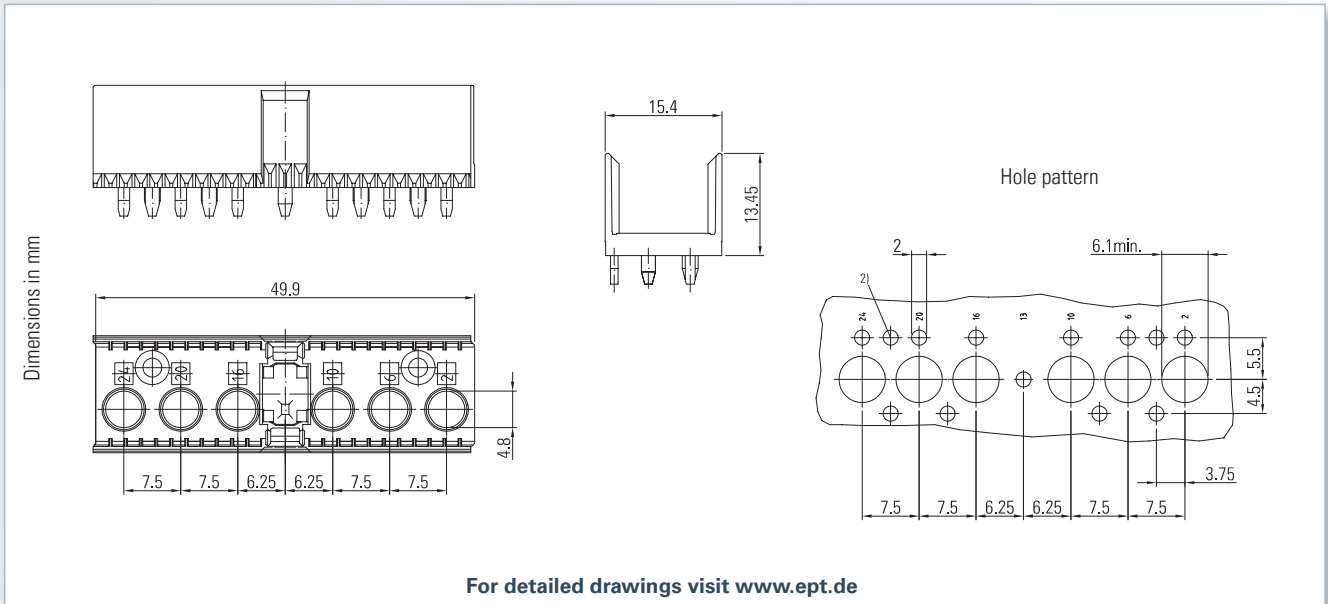
Type L Male Connector



Type: Male connector straight
Termination: Press-fit
Number of contacts: 6
Pitch: 2 mm
Packaging: Bulk
Standard: IEC 61076-4-101



Technical Specifications on page 240



No. of contacts	Description	Part number	PU (Bulk)
6		243-51000	750

Mating connector / Application:



Type L Female connector (p. 295)

Type L Female Connector



Type: Female connector 90°

Termination: Press-fit

Number of contacts: 6

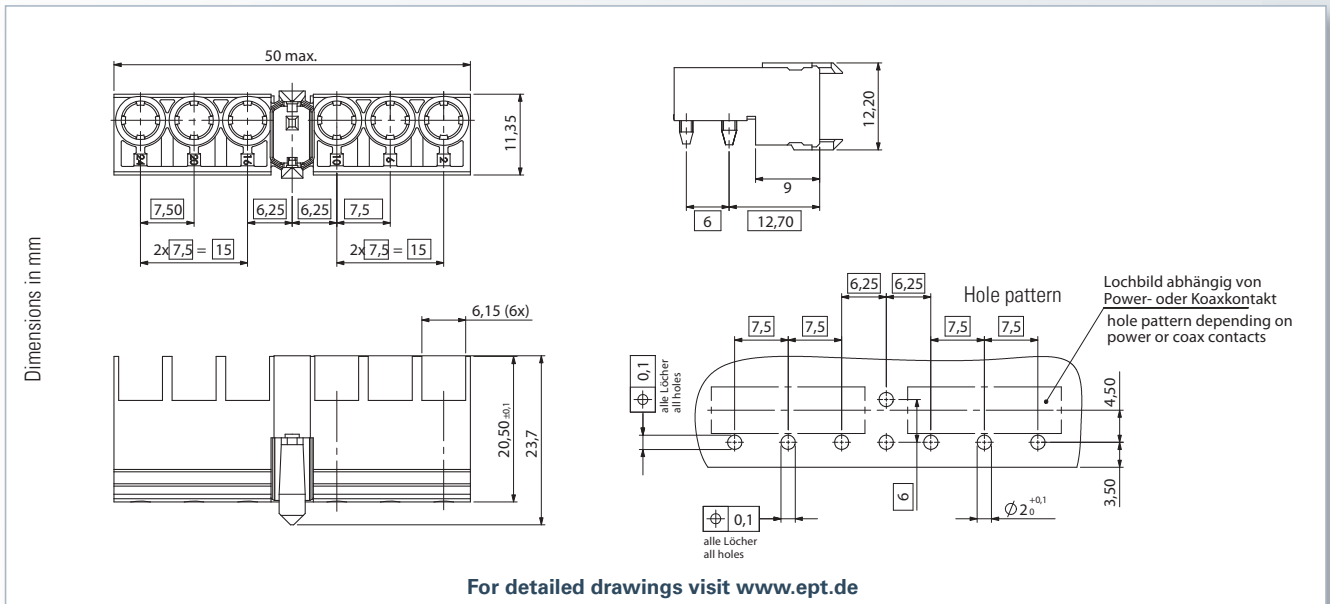
Pitch: 2 mm

Packaging: Bulk

Standard: IEC 61076-4-101



Technical Specifications on page 240

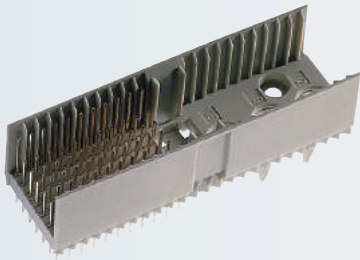


No. of contacts	Description	Part number	PU (Bulk)
6	without shielding	244-51000	140

Mating connector / Application:



Type L Male connector (p. 294)



Type: Male connector straight with 5 rows

Termination: Press-fit

Number of contacts: 55, 77

Pitch: 2 mm

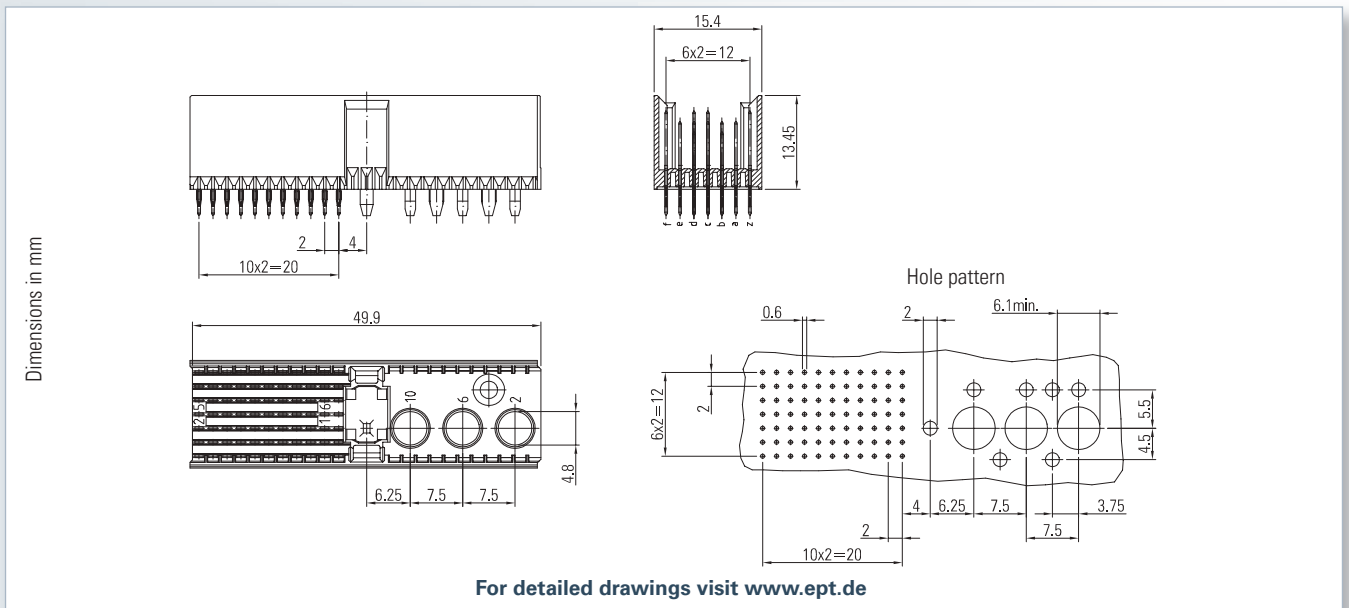
Operational current: 1.5 A

Packaging: Tube

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Coding p. 304

Note

- Pin length p. 245

Mating connector / Application:



Type M Female connector (p. 298)



Press-fit - Performance level II

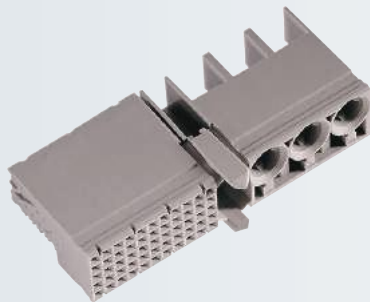
No. of contacts	Contact arrangement	PCB thickness > 2.2 mm	
		Part number	PU (Tube)
55+3		243-41010-15	10/240
77+3		243-41310-15	

On request

- contact arrangement
- other contact surface
- processing tools

Ordering note

- PCB thickness 1.4 - 2.2 mm
(Part number 243-41xxx-05)



Type: Female connector 90° with 5 rows

Termination: Press-fit

Number of contacts: 55

Pitch: 2 mm

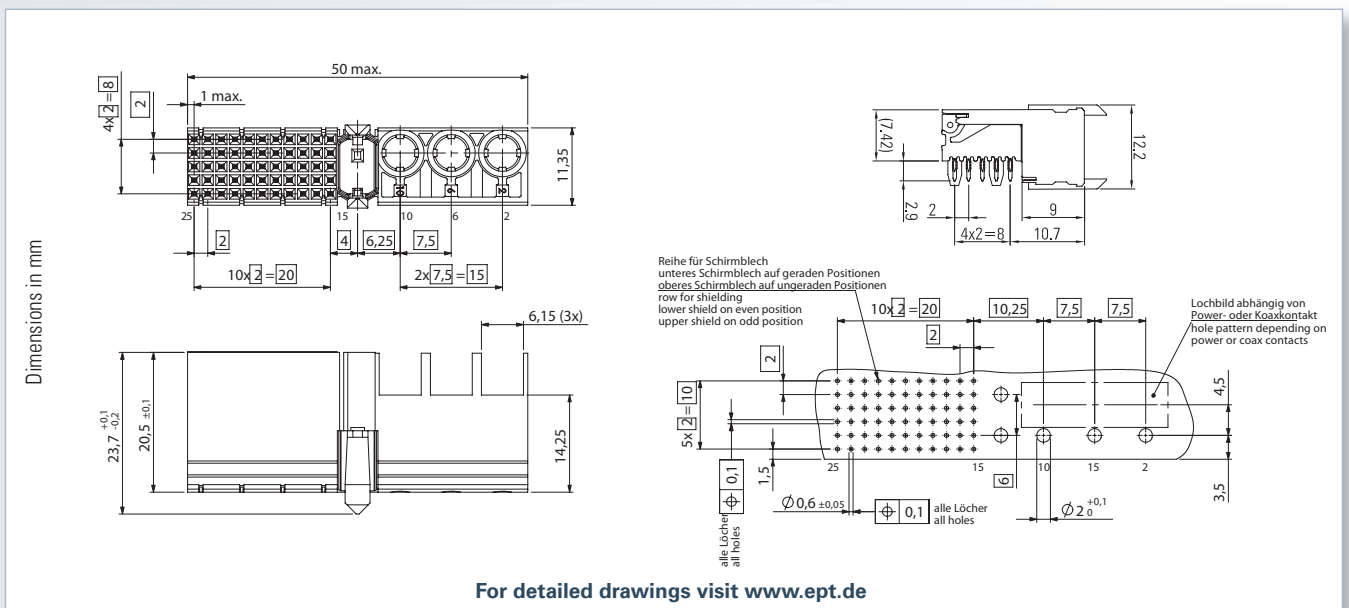
Operational current: 1.5 A

Packaging: Tray

Standard: IEC 61076-4-101



Technical Specifications on page 240



Accessories

- Coding p. 304

Mating connector / Application:



Type M Male connector (p. 296)



Press-fit - Performance level II •••

No. of contacts	Description	Part number	PU (Tray)
55+3	without shielding	244-41000-15	35/140
55+3	with shielding	244-41300-15	
–	lower shield	244-31600-1	48/1200

On request

- other contact surface
- processing tools



Type: Male connector straight

Termination: Press-fit

Number of contacts: 3

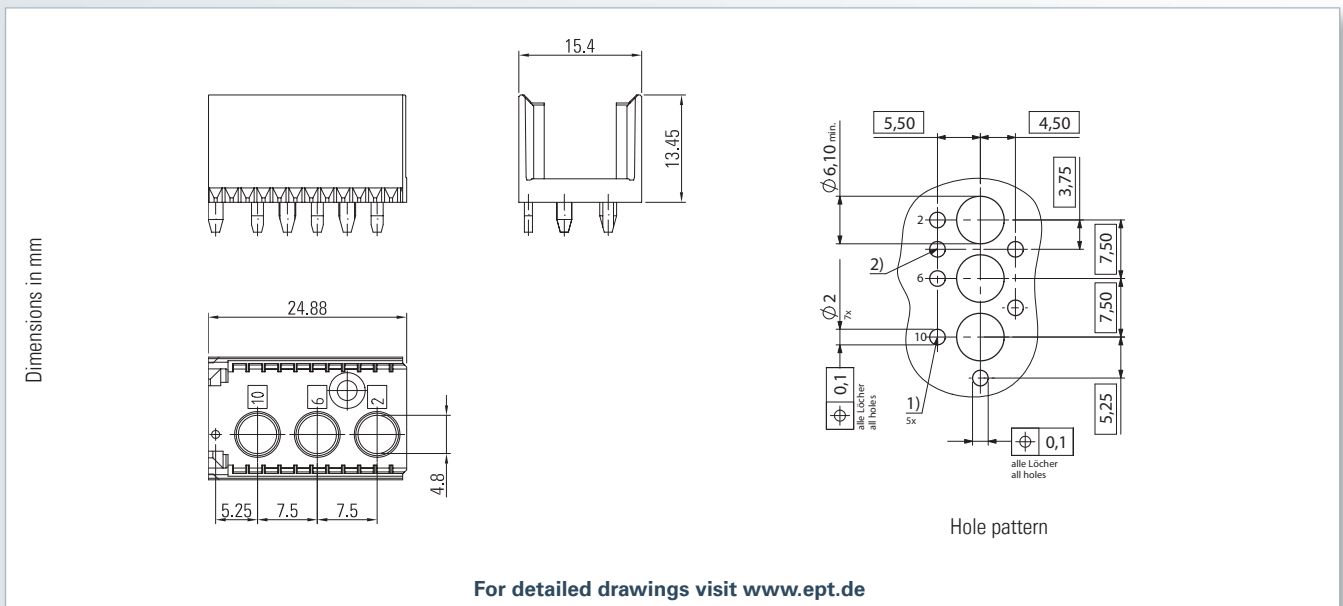
Pitch: 2 mm

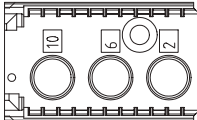
Packaging: Bulk

Standard: IEC 61076-4-101



Technical Specifications on page 240



No. of contacts	Contact arrangement	Part number	PU (Bulk)
3	without shielding 	243-52000	1800

Mating connector / Application:



Type N Female connector (p. 301)

Type N Female Connector



Type: Female connector 90°

Termination: Press-fit

Number of contacts: 3

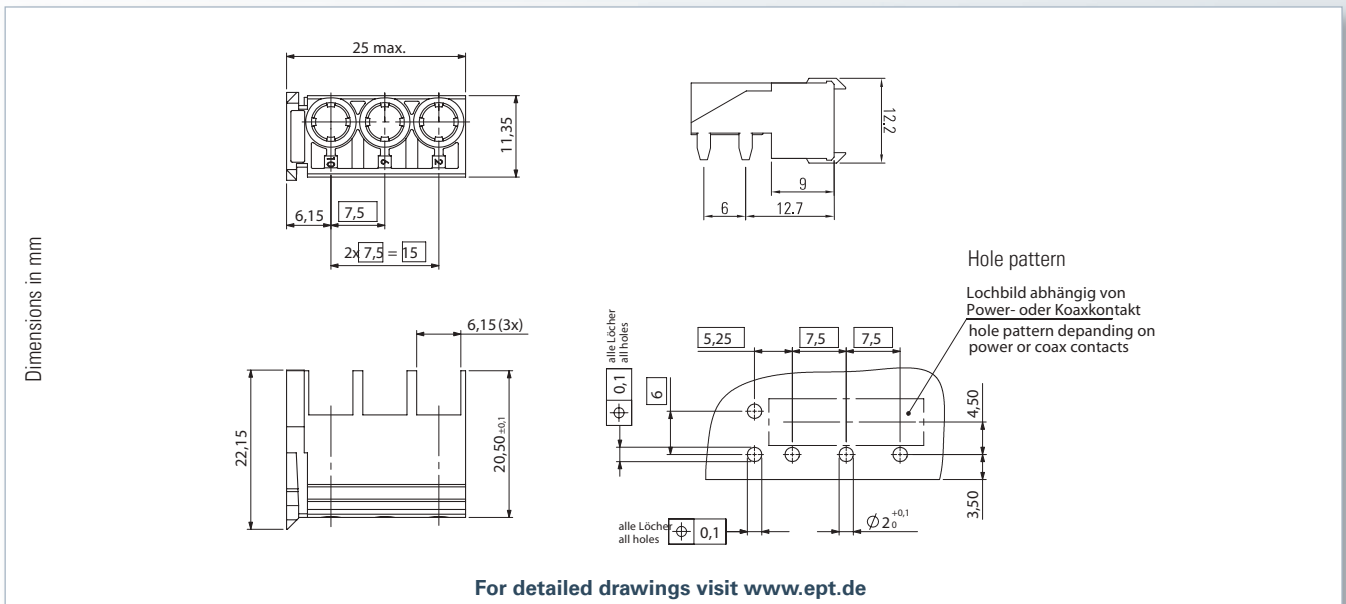
Pitch: 2 mm

Packaging: Bulk

Standard: IEC 61076-4-101



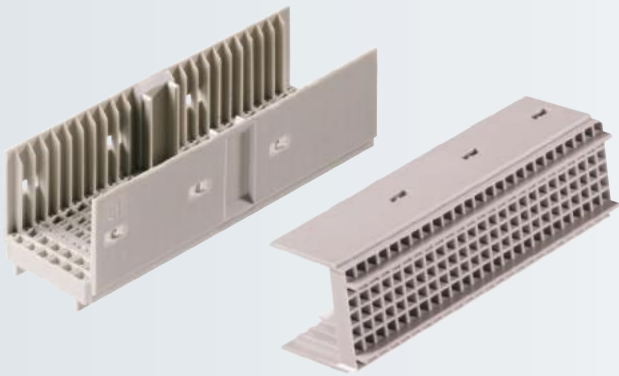
Technical Specifications on page 240



No. of contacts	Description	Part number	PU (Bulk)
3	ohne Abschirmung	244-52000	280

Mating connector / Application:

Type N Male connector (p. 300)



Type: Shroud

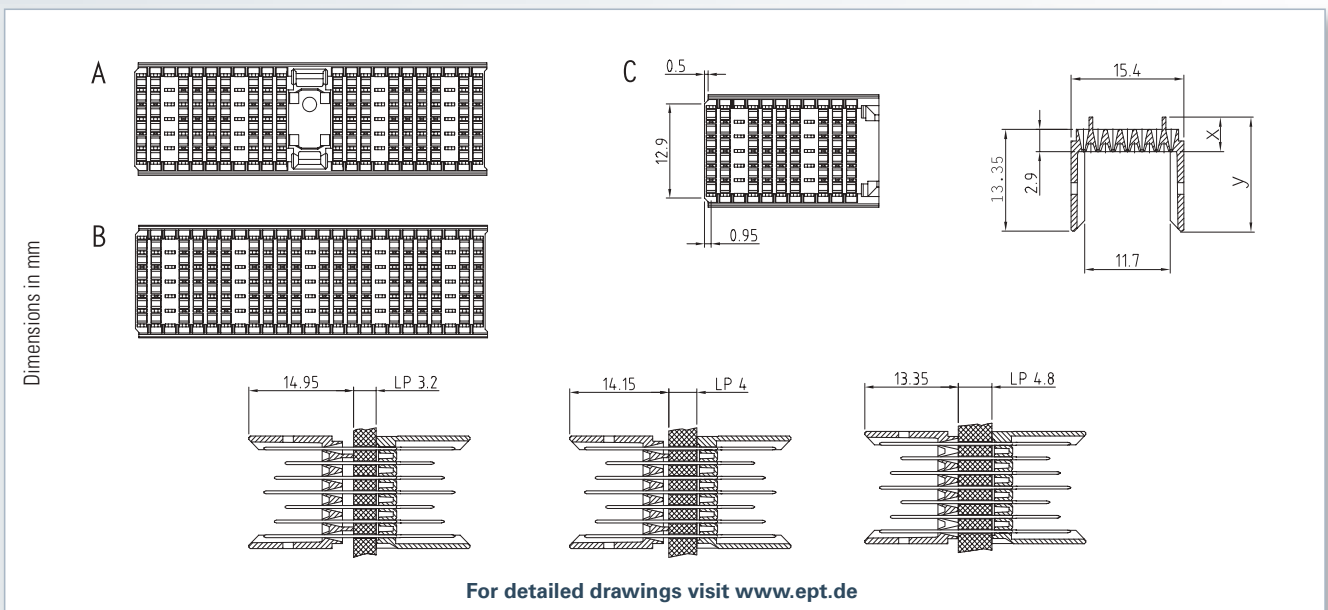
Pitch: 2 mm

Packaging: Bulk

Standard: IEC 61076-4-101



Technical Specifications on page 240



PCB thickness	X	Y	Part number		PU (Bulk)	Part number B22	PU (Bulk)	Part number B19	PU (Bulk)	Part number C	PU (Bulk)
			A	B							
< 2.4 mm	6.3 mm	16.75 mm	243-5525-5/1	243-5625-5/1	750	243-5622-5/1	850	243-5619-5/1	1000	243-5511-5/1	1800
2.4 – 3.2 mm	4.9 mm	15.35 mm	243-5525-4/1	243-5625-4/1		243-5622-4/1		243-5619-4/1		243-5511-4/1	
3.2 – 4.0 mm	4.5 mm	14.95 mm	243-5525-1/1	243-5625-1/1		243-5622-1/1		243-5619-1/1		243-5511-1/1	
4.0 – 4.8 mm	3.7 mm	14.15 mm	243-5525-2/1	243-5625-2/1		243-5622-2/1		243-5619-2/1		243-5511-2/1	
> 4.8 mm	2.9 mm	13.35 mm	243-5525-3/1	243-5625-3/1		243-5622-3/1		243-5619-3/1		243-5511-3/1	

On request

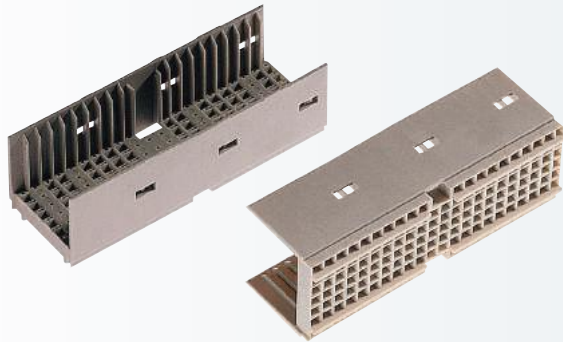
- different designs and special types

Accessories

- Processing tools p. 355

Application:

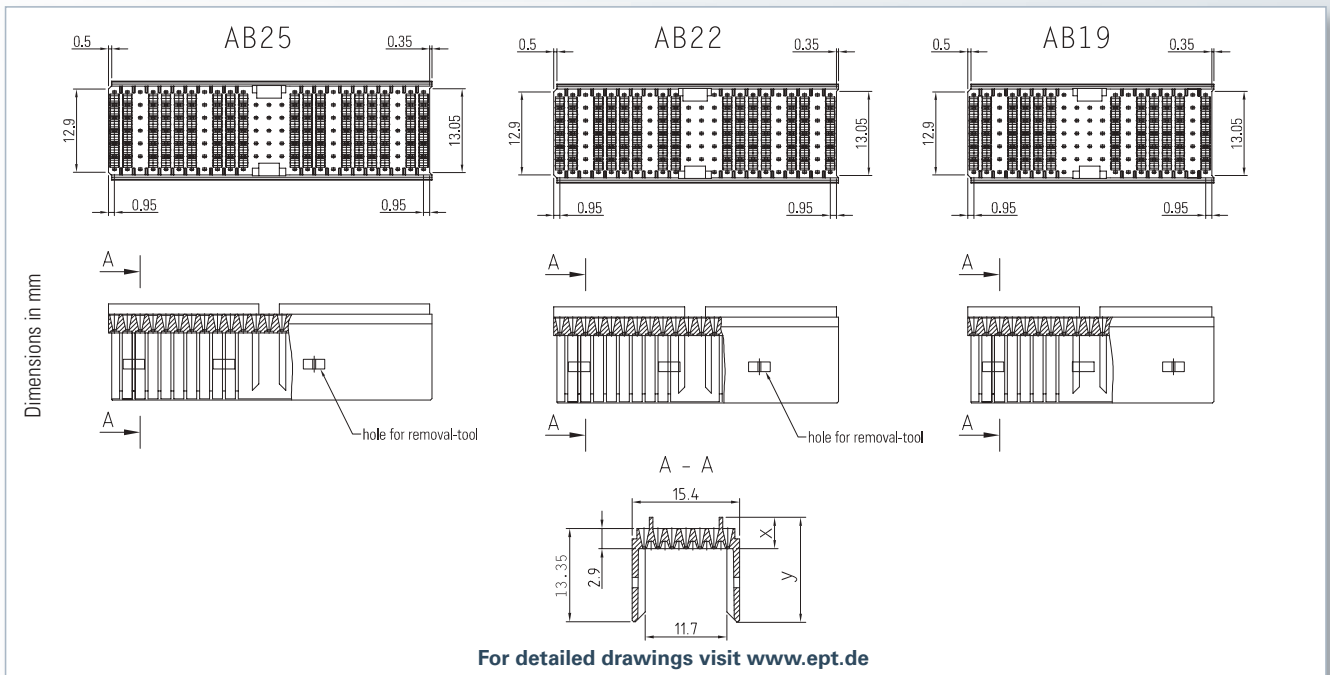
compatible with all male connectors with transfer zone



Type: Shroud
Pitch: 2 mm
Packaging: Bulk
Standard: IEC 61076-4-101



Technical Specifications on page 240



PCB thickness	X	Y	Part number		PU (Bulk)	Part number		PU (Bulk)	Part number		PU (Bulk)
			AB25			AB22 (cPCI RP 5)			AB19 (cPCI RP 3)		
< 2.4 mm	6.3 mm	16.75 mm	243-5725-5/1		750	243-5722-5/1		850	243-5719-5/1	1000	
2.4 – 3.2 mm	4.9 mm	15.35 mm	243-5725-4/1			243-5722-4/1			243-5719-4/1		
3.2 – 4.0 mm	4.5 mm	14.95 mm	243-5725-1/1			243-5722-1/1			243-5719-1/1		
4.0 – 4.8 mm	3.7 mm	14.15 mm	243-5725-2/1			243-5722-2/1			243-5719-2/1		
> 4.8 mm	2.9 mm	13.35 mm	243-5725-3/1			243-5722-3/1			243-5719-3/1		

On request

- different designs and special types

Accessories

- Processing tools p. 355

Application

compatible with all male connectors with transfer zone

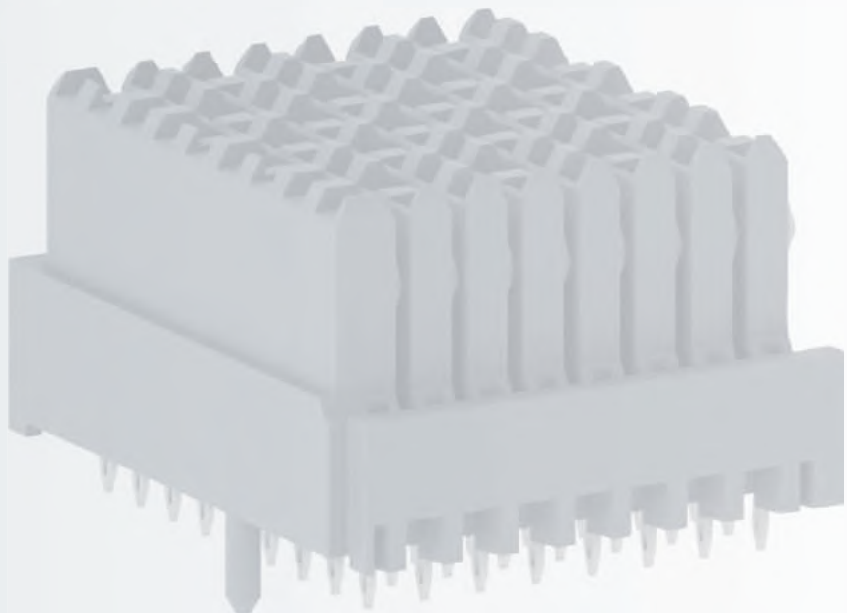
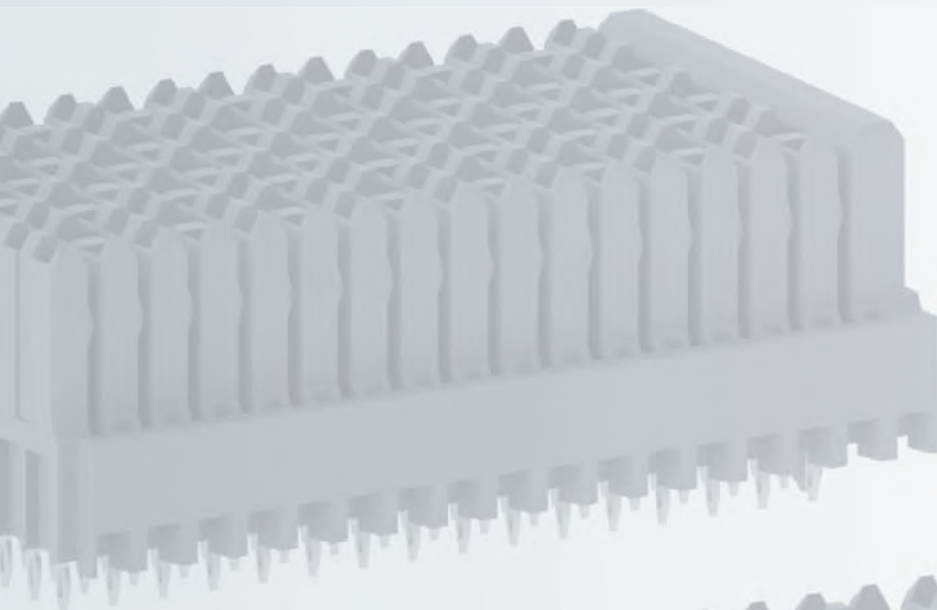
Coding keys

Male connector				PU (Bulk)	Female connector				PU (Bulk)
Coding key	Code No.	Color	Part number		Coding key	Code No.	Color	Part number	
	1236	Nut brown RAL 8011	243-8011	1000		4578	Nut brown RAL 8011	244-8011	1000
	1248	Strawberry red RAL 3018 Telephony Spec	243-8012			3567	Strawberry red RAL 3018 Telephony Spec	244-8012	
	1356	Blue lilac RAL 4005	243-8013			2478	Blue lilac RAL 4005	244-8013	
	1567	Brilliant blue RAL 5007 5.0 V cPCI	243-8014			2348	Brilliant blue RAL 5007 5.0 V cPCI	244-8014	
	2578	Reseda green RAL 6011	243-8021			1346	Reseda green RAL 6011	244-8021	
	3456	Rape yellow RAL 1021 3.3 V cPCI	243-8031			1278	Rape yellow RAL 1021 3.3 V cPCI	244-8031	
	3467	Slate gray RAL 7015	243-8032			1258	Slate gray RAL 7015	244-8032	
	3478	Steel blue RAL 5011	243-8033			1256	Steel blue RAL 5011	244-8033	
	3568	Pastel orange RAL 2003	243-8034			1247	Pastel orange RAL 2003	244-8034	
	4678	Ocher yellow RAL 1024	243-8041			1235	Ocher yellow RAL 1024	244-8041	



Velox

High-Speed Connector for VPX



Introduction	308
Technical Specifications	310
Hole Specifications	311
Velox High-Speed Backplane-Connector	312
Accessories: Guidings	314

Velox – High-Speed for VPX

Modular Backplane-Connector System

ept's Velox is a modular connector system for high-speed backplane applications. The connectors are used specifically for high requirements in demanding environments.

Velox is designed to meet the harsh requirements of VITA 46 systems. The product series is available in four different types with the flexibility for customized pin assembly allowing designers to create a flexible backplane design.

The 1.27 µm (50 micro inch) heavy gold plating ensure a high-speed signal transmission during the entire lifetime of a system.

Key Features:

- 10 Gbit/s
- rugged design
- tested in accordance to VITA46
- durability: 200 mating cycles
- „Heavy Gold“ plating
- pinless interface
- modular connector system
- custom loaded designs

Applications:

- military
- aerospace
- ruggedized systems
- telecom / datacom



Termination



Press-fit

Mating Configuration



Perpendicular

Application

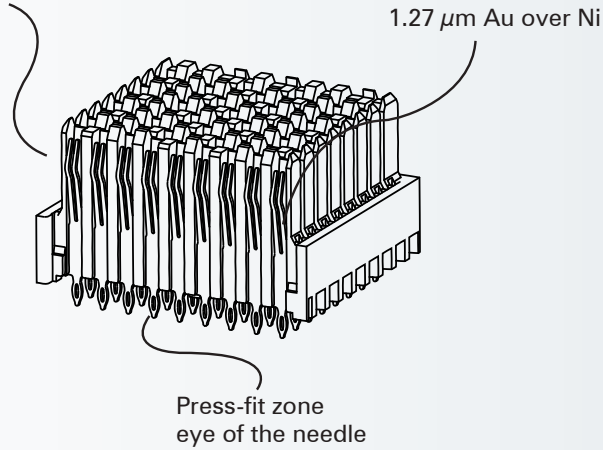


High-Speed

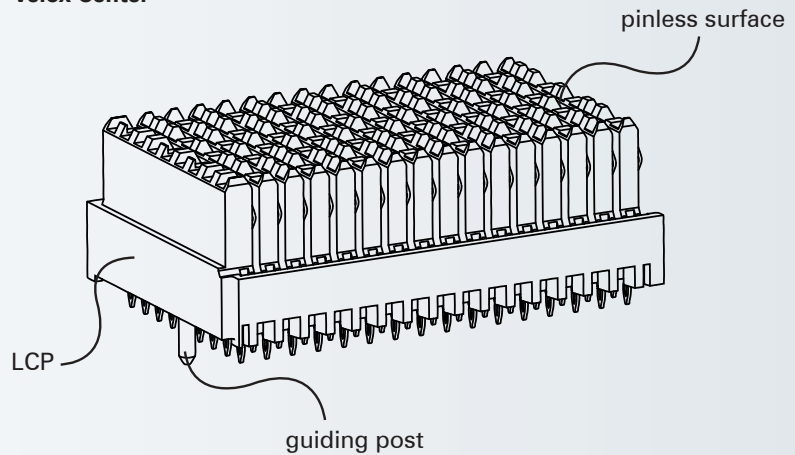


Velox 8-left

double beam contact



Velox Center



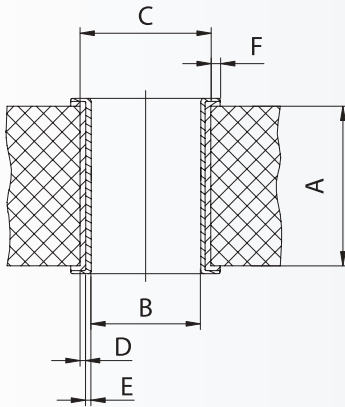
VITA46 - Specification

The Vita46 specification, also known as VPX, describes a new high-speed connector system. It transfers Gigabit Ethernet, PCI Express, Serial RapidIO, and InfiniBand, among others. The well-known 6U and 3U European PCB form factors from VMEbus are supported in order to ensure maximum compatibility. This also makes hybrid systems a possibility. The VITA 46 standard was developed by VITA mainly for computer systems that need to be able to withstand high stresses, for example military applications.

The four different types of Velox can be combined in a modular way. You get even more flexibility by combining the fully loaded Velox connectors with individually loaded versions.

Technical Specifications

Technical Specifications	Velox	
	Testing Standard	High-speed Backplane-Connector for VPX
Basics		
Specification		VITA 46
Number of contacts		72 / 144 / custom loaded
Termination		Press-fit
Operating temperature range		-55°C to +105°C
Material		
Insulator material		LCP
Contact material		Phosphor Bronze
Contact surface		1.27 µm Au in contact area over Ni, Sn or SnPb on press-fit zone
Mechanical		
Pitch		1.8 mm
Mating force per pin		max. 0.75 N
Separating force per pin		min. 0.15 N
Durability	IEC 60512-9-1:2010	200 mating cycles
Electrical		
Operational current	IEC 60512-5-2:2002	max. 1.0 A (< 30°C)
Operating voltage		50 V AC peak or DC
Contact resistance	IEC 60512-2-1:2002	max. 80 mΩ (according to IEC 512-5)
Insulation resistance	IEC 60512-3-1:2002	min. 1000 MΩ (according to IEC 512-5)
Test voltage	IEC 60512-4-1:2003	500 V (AC/DC)
Data transfer rate		10 Gbit/s
Processing		
Packaging		Tray
Approval		
Flammability		UL (file: E130314)
Environment	RoHS compliant (except with SnPb-surface on press-fit zone)	



Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for many PCB surfaces.

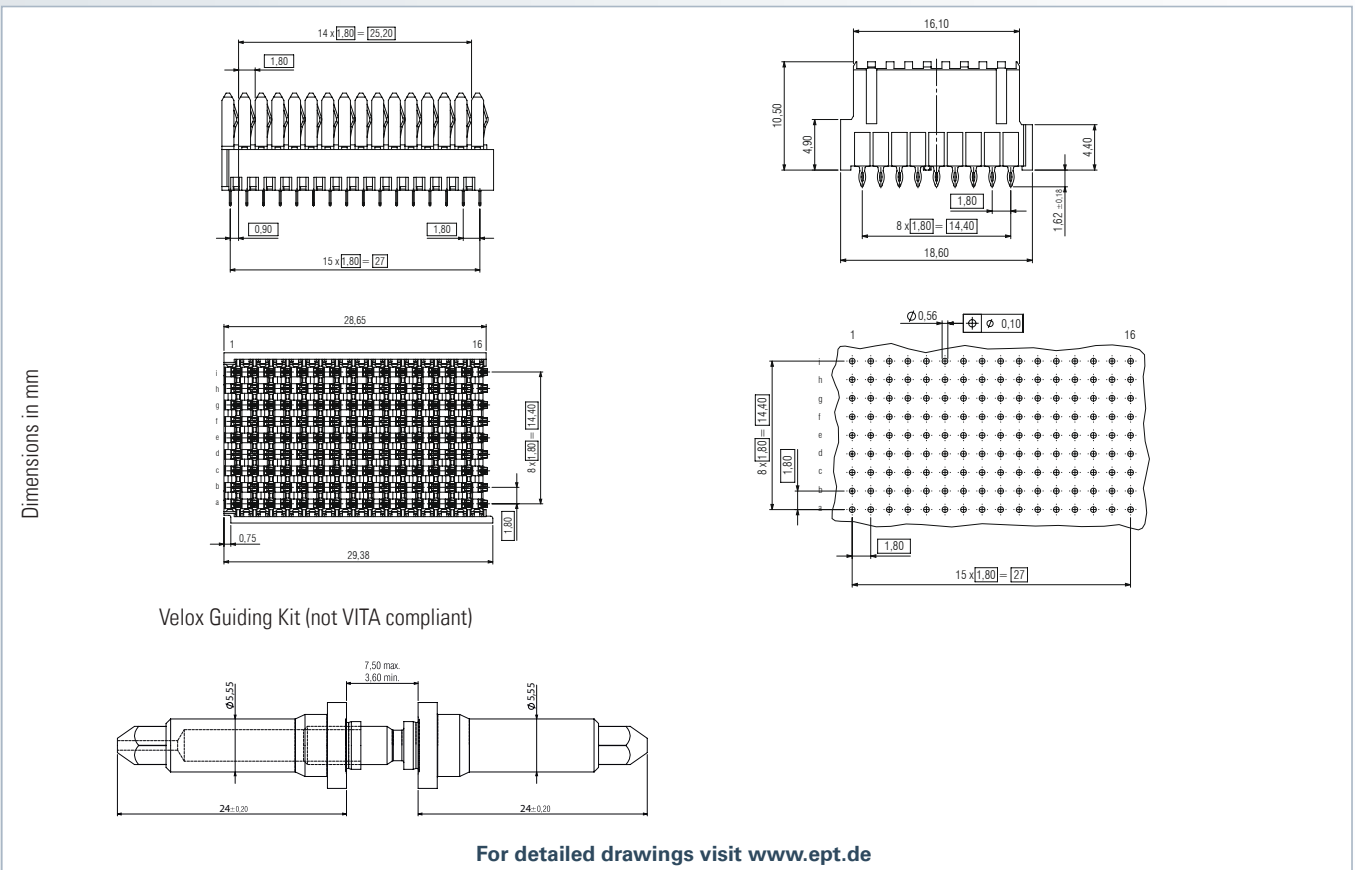
		Hole Specifications	
		Nominal Hole Ø 0.56 mm	
		imm. Sn printed circuit boards	Ni, Au printed circuit boards
A	PCB thickness	min 1.4 mm	min 1.4 mm
B	Plated hole	Ø 0.56 ± 0.05 mm	0.56 ± 0.05 mm
C	Drill hole	Ø 0.65 ± 0.02 mm	Ø 0.65 ± 0.02 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	Plating	max. 1.5 µm imm. Sn	0.05 - 0.2 µm Au; over 2.5 - 5 µm Ni
F	Annular ring	min. 0.1 mm	min. 0.1 mm



Type: Female connector straight
Termination: Press-fit
Number of contacts: 71, 72, 80, 135, 144
Pitch: 1.8 mm
Data transfer rate: 10 Gbit/s
Packaging: Tray
Standard: VITA 46



Technical Specifications on page 310



Accessories

- Velox Guidings p. 314
- Processing tools p. 356

Note

Please take detailed information from the customer drawing at www.ept.de



Press-fit

		Velox High-speed Backplane-Connector						
		8-left		center	16-right		16-left	
Surface		Part number	PU (Tray)	Part number		PU (Tray)		
fully loaded (Number of contacts)	Sn (RoHS compliant)	308-52200-42 <i>(72 contacts)</i>	28/280	308-50100-42 <i>(144 contacts)</i>	308-51100-42 <i>(144 contacts)</i>	308-52100-42 <i>(144 contacts)</i>	20/200	
	SnPb	308-52200-41 <i>(72 contacts)</i>		308-50100-41 <i>(144 contacts)</i>	308-51100-41 <i>(144 contacts)</i>	308-52100-41 <i>(144 contacts)</i>		
custom loaded (Number of contacts)	Sn (RoHS compliant)	on request		308-50101-42 <i>(135 contacts)</i>	on request	on request		on request
				308-50102-42 <i>(71 contacts)</i>				
				308-50103-42 <i>(80 contacts)</i>				
	SnPb	on request		308-50101-41 <i>(135 contacts)</i>	on request	on request		on request
308-50102-41 <i>(71 contacts)</i>								
308-50103-41 <i>(80 contacts)</i>								

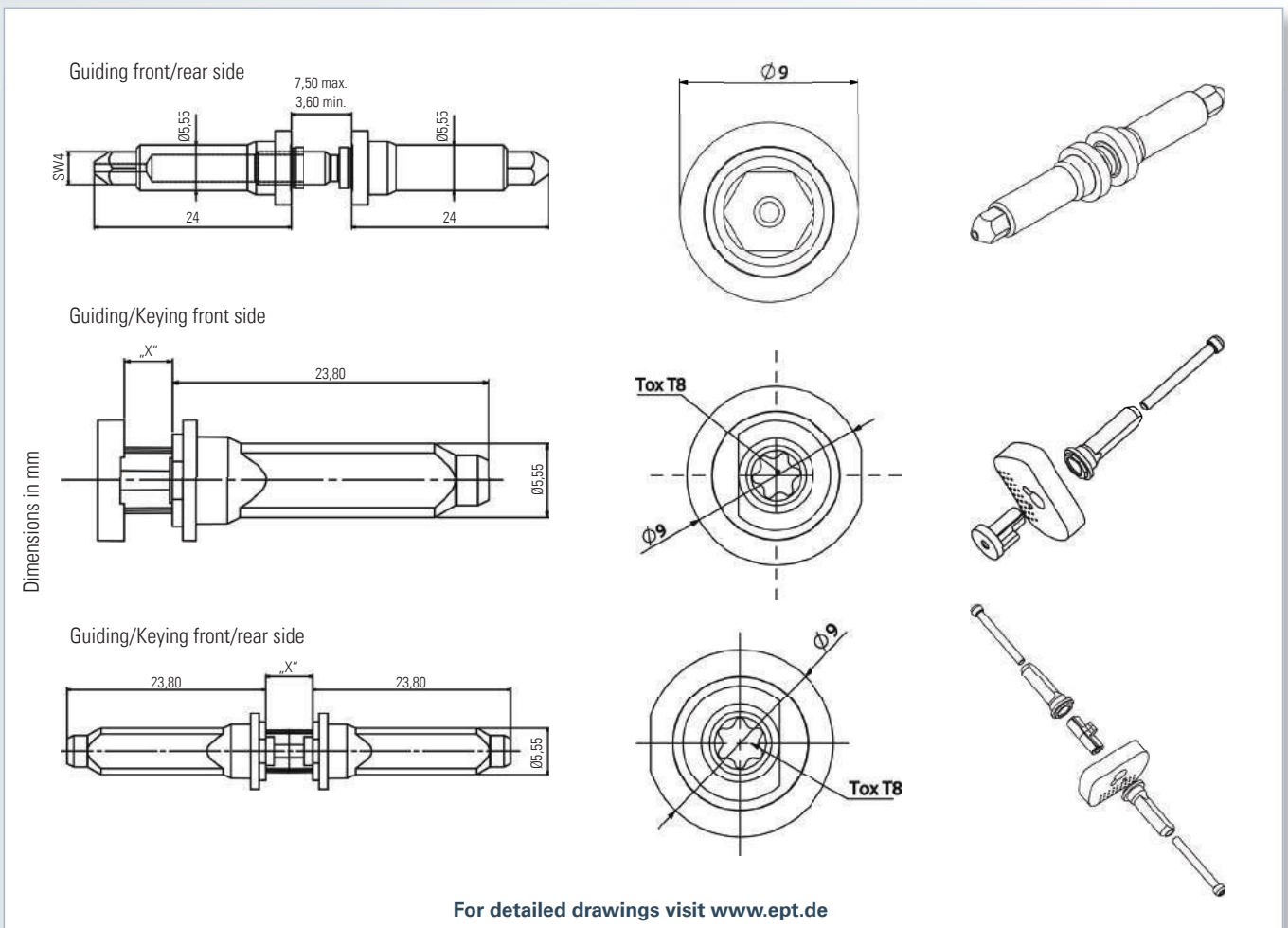
On request

- different custom loaded versions



Key Features:

- for alignment of the daughtercard connector with the backplane connector
- zinc or copper alloy, silver plated
- compatible with available systems in the market
- meets the requirements of VITA46
- available for use with front side and rear I/O
- for PCB thickness 3.6 - 7.5 mm

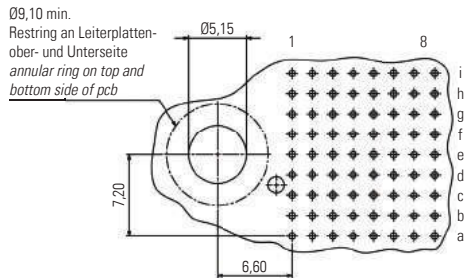


Note

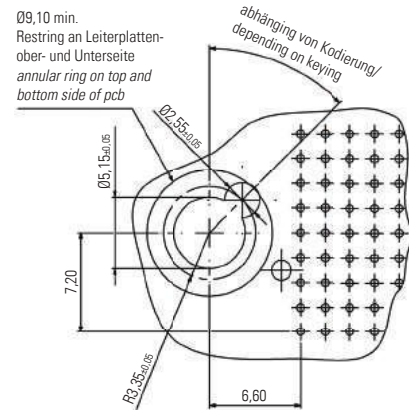
Please take detailed information from the customer drawing at www.ept.de

Hole pattern

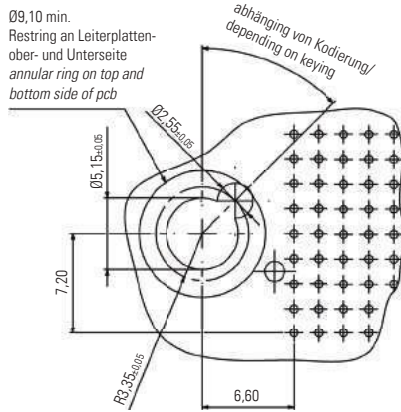
Guiding front/rear side



Guiding/Keying front side



Guiding/Keying front/rear side



Maße in mm

	Velox Guidings			PU (Bulk)
	Guiding front/rear side	Guiding/Keying front side	Guiding/Keying front/rear side	
PCB thickness	Part number			
3.6 - 5.5 mm		308-62113	308-62213	
3.6 - 7.5 mm	308-61013	-	-	10
5.5 - 7.5 mm		308-62123	308-62223	

Power Terminals



Introduction	318
Overview	319
Technical Specifications	320
Hole Specifications	321
Power Terminal Pitch 5.08 x 7.62 mm	322
Power Terminal Pitch 5.08 x 10.16 mm	324
Accessories	326
Notes	327

Power Terminals - Power Supply on the PCB

Power Supply Connections based on Press-Fit Technology

ept power terminals are specially designed to provide power supply connections to circuit boards. The cable is connected using a cable lug that is screwed in place or via a tab terminal (Faston).

Key Features:

- easy connection of power cables
- individual variants such as angled or offset connectors are possible
- easy processing via press-in
- accessories: M4 or M5 screws

Applications:

- power supply through screw connection or faston contact

Termination



Press-fit

Mating Configuration





Cable-to-Board

Application

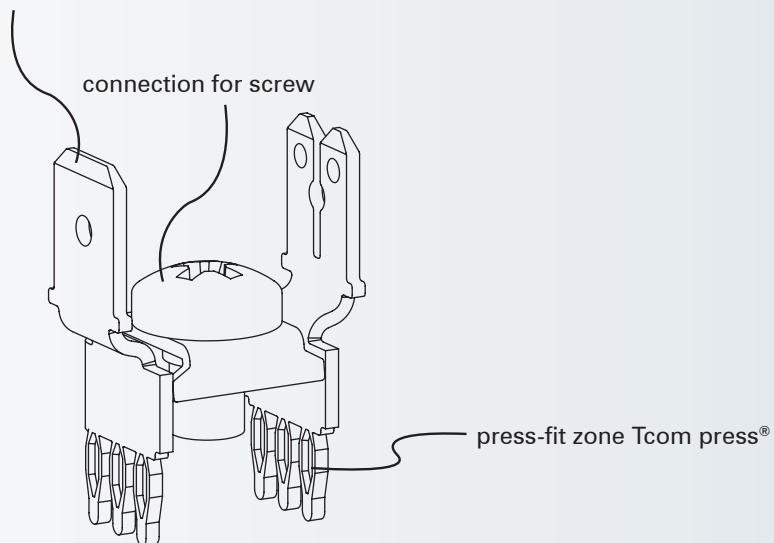


Power



Type	Number of pins	Termination	Page reference
 5.08 x 7.62	4	Press-fit M4 / M5	p. 322
 5.08 x 10.16	4 / 6 / 8 / 9	Press-fit M4	p. 324

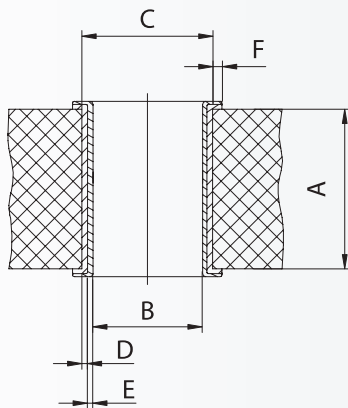
connection for faston contact



Technical Specifications

Technical Specifications	Power Terminals		
	Testing Standard	Pitch 5.08 x 7.62 mm	Pitch 5.08 x 10.16 mm
Basics			
Termination		Press-fit	
Operating temperature		-55°C to +125°C	
Material			
Contact material		Copper alloy	
Contact surface		2-8 µm Sn	
Mechanical			
Insertion force		Type 150 N/Pin	
Retention force		min. 60 N/Pin	
Electrical			
Operational current*	IEC 60512-5-2:2002	20°C: 45 A 70°C: 30 A 100°C: 25 A	
Processing			
Thread		M4 / M5	M4
Max. tightening or torque		1.3 Nm	
Packaging		Bulk	
Approval			
Environment		RoHS compliant	

*The operational current is determined by the printed circuit board, the cable diameter and the cable lug used.



Hole Specifications Press-fit

Plated through-hole according to IEC 60352-5

ept offers adapted press-fit zones for various new board surfaces.

		Pitch 5.08 x 10.16 mm	Pitch 5.08 x 7.62 mm
Nominal hole		Ø 1.45 mm	Ø 1.6 mm
imm. Sn printed circuit boards			
A	PCB thickness	min. 2.9 mm	min. 2.9 mm
B	Plated hole	Ø 1.45 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.6 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	imm. Sn plating	max. 1.5 µm	max. 1.5 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm
Ni, Au printed circuit boards			
A	PCB thickness	min. 2.9 mm	min. 2.9 mm
B	Plated hole	Ø 1.45 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.6 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	Ni, Au plating	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni	0.05 – 0.2 µm Au over 2.5 – 5 µm Ni
F	Annular ring	min. 0.1 mm	min. 0.1 mm
HAL Sn printed circuit boards			
A	PCB thickness	min. 2.9 mm	min. 2.9 mm
B	Plated hole	Ø 1.45 + 0.09/- 0.06 mm	Ø 1.6 + 0.09/- 0.06 mm
C	Drill hole	1.6 ± 0.025 mm	1.75 ± 0.025 mm
D	Cu plating	min. 25 µm	min. 25 µm
E	HAL Sn	5 – 15 µm	5 – 15 µm
F	Annular ring	min. 0.1 mm	min. 0.1 mm

Power Terminals

5.08 x 7.62 mm




Type: Power Terminal

Termination: Press-fit

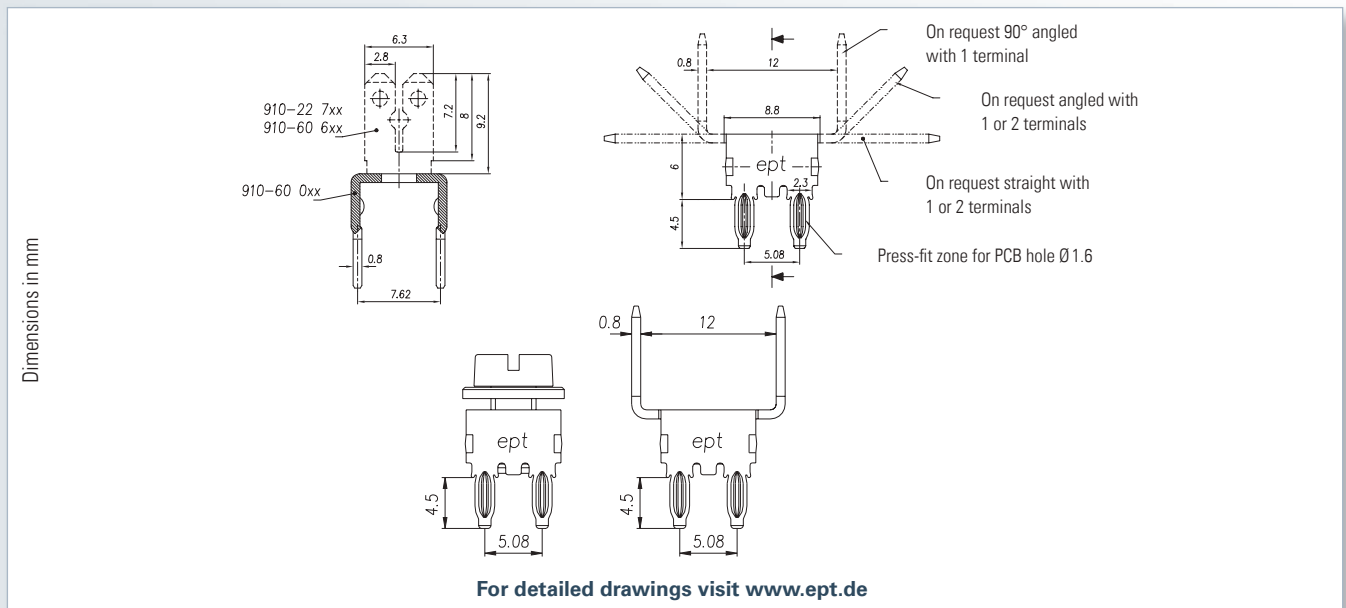
Pitch: 5.08 x 7.62 mm

Operational current: 20° 45 A, 70° 30 A, 100° 25 A

Packaging: Bulk

Approval: 

Technical Specifications on page 320



Accessories

- Screws DIN 84 p. 326
- Philips screw p. 326
- Washer p. 326
- Processing tools p. 358
- Lock nut p. 326





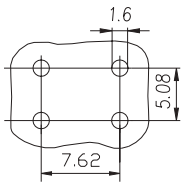
Application:



Power supply through screwed connection or faston contact



Press-fit - Thread M4





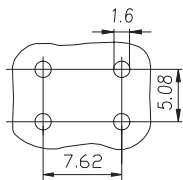
Pins	Contact arrangement				
		Part number			
4		910-60045	910-22015	910-60645/1	910-22715/1

On request

- with 1 or 2 terminals angled
- with 1 or 2 terminals straight
- with 1 terminal 90°



Press-fit - Thread M5

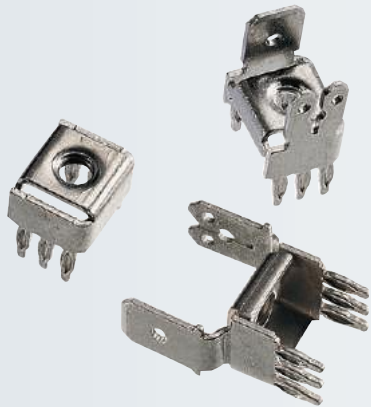
Pins	Contact arrangement				
		Part number			
4		910-60050	910-22020	910-60650/1	910-22720/1

On request

- Philips screw
- with 1 or 2 terminals angled
- with 1 or 2 terminals straight
- with 1 terminal 90°

Power Terminals

5.08 x 10.16 mm



Type: Power Terminal

Termination: Press-fit

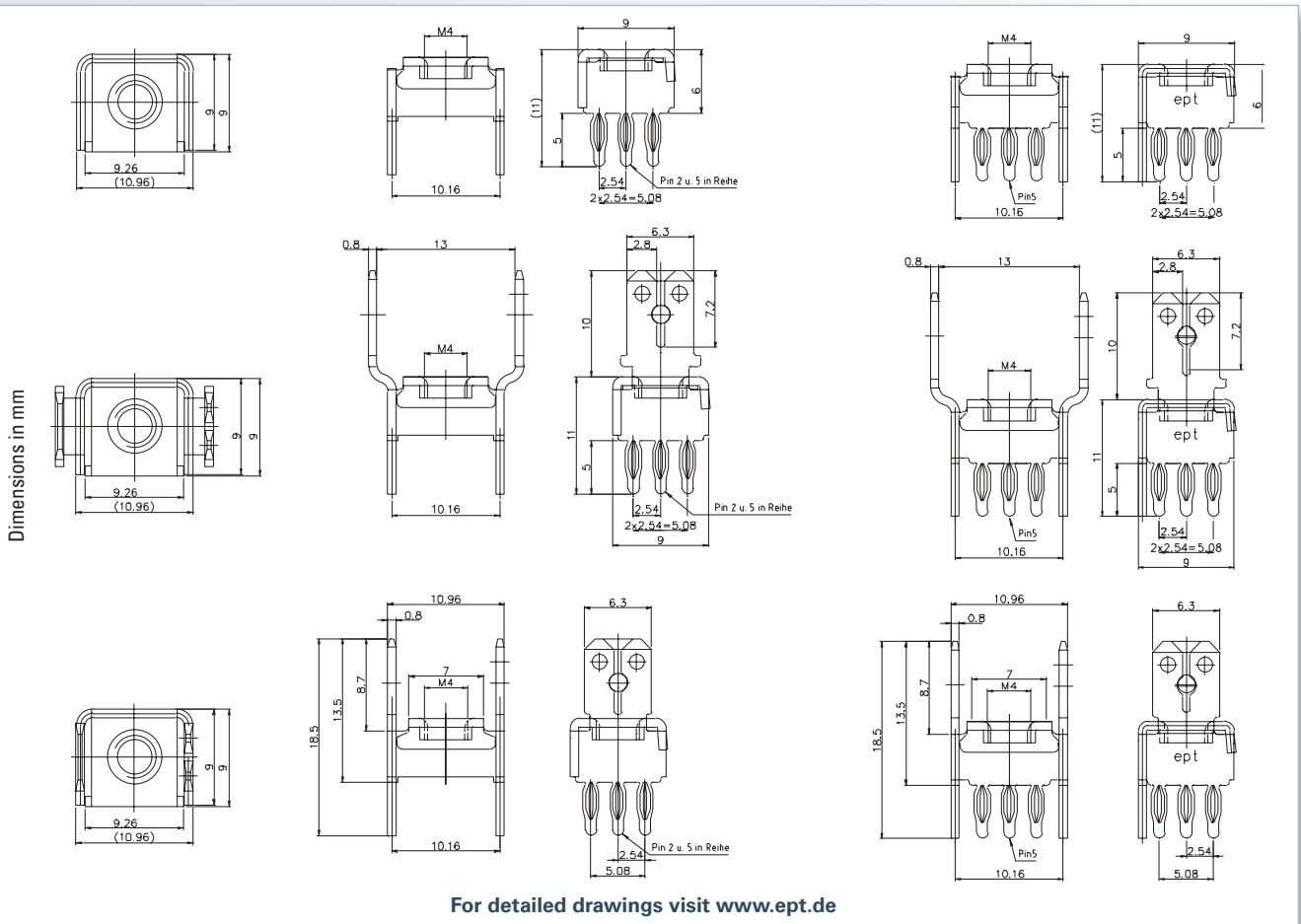
Pitch: 5.08 x 10.16 mm

Operational current: 20° 45 A, 70° 30 A, 100° 25 A

Packaging: Bulk

Approval: RoHS COMPLIANT

Technical Specifications on page 320



Accessories

- Processing tools p. 358
- Washers p. 326
- Screws DIN 84 p. 326
- Philips screw p. 326

Application:







Power supply through screwed connection or faston contact



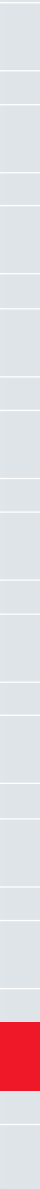
Press-fit - Thread M4

Pins	Contact arrangement	Part number		
4		911-32004	911-32244	911-32044
6		911-32006	911-32246	911-32046
8		911-33008	911-33248	911-33048
9		911-33009	911-33249	911-33049

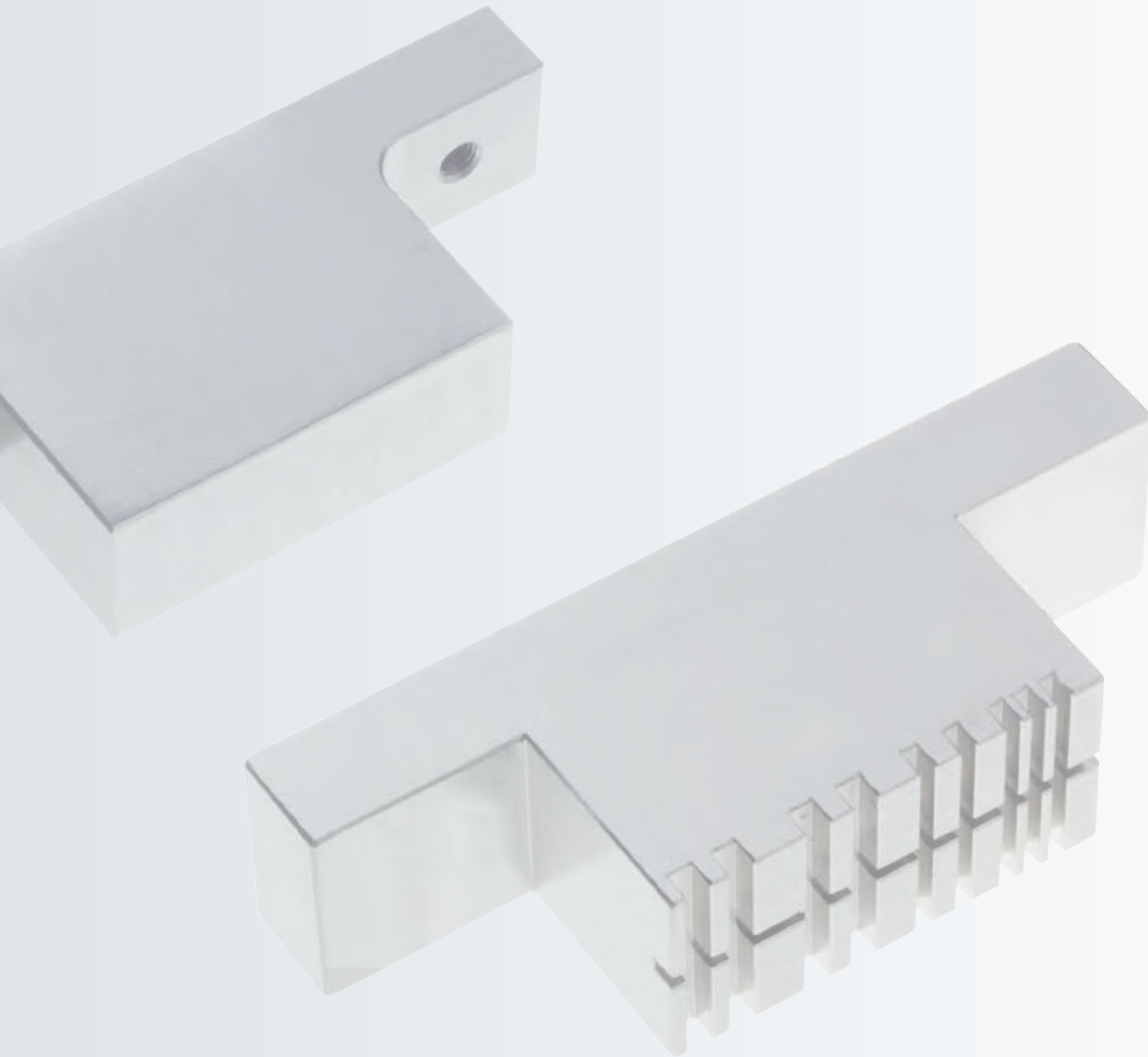
Thread	Side view	Part number	
		M4	M5
Socket cap screw DIN 84		910-20145	910-20150
Philips screw		910-20146	–
Washer		910-20320	910-20330
Lock nut		910-20015	910-20020

On request

- Philips screw in M5



Assembly Tools & Machines



Introduction	330
Assembly tools for:	
DIN 41612 Products	332
VarPol, PC/104, PC/104-Plus Products	340
TCA Products	344
hm2.0 Products	348
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The perfect Supplement

In order to ensure that we offer perfect solutions from one source, we also supply suitable assembly machines for press-fit connectors. You can choose various highly efficient solutions – from manual production all the way to complete automated processes.

ept assembly machines

By supplementing the ept connectors with suitable ept assembly machines and the associated ept tools, you will receive an all-in-one system solution from one source. The advantages are obvious: the design of the connectors, press-fit zone, assembly tools and the process and machine are perfectly matched to each other. This results in a considerable reduction of the process costs and thus the reduction of the "Total Cost of Ownership" (TCO). Practical experience has shown that a fast amortization of the investment – within a few months – is possible. Another important advantage is the increased quality and thus increased reliability of the electrical connections.

From manual to serial production – We offer the right assembly machine for any application

For the production of small and pilot series, manual workstations with manual lift with or without pneumatic support (HKP 16 or HKP 20) are the preferred choice.

For more sophisticated applications, the manual workstation HKP 35 can be used. This assembly machine offers many expansion options depending on your requirements, e.g. a free-moving XY bench or the monitoring of the press-fit force by a PC controlled programmable electronic force-displacement monitoring.

A database for recorded data permits simple documentation of the press-fit processes. Furthermore, the HKP 35 can be expanded to create a complete workstation where the required connectors and printed circuit boards as well as the press-fit tools are stored and readily provided.

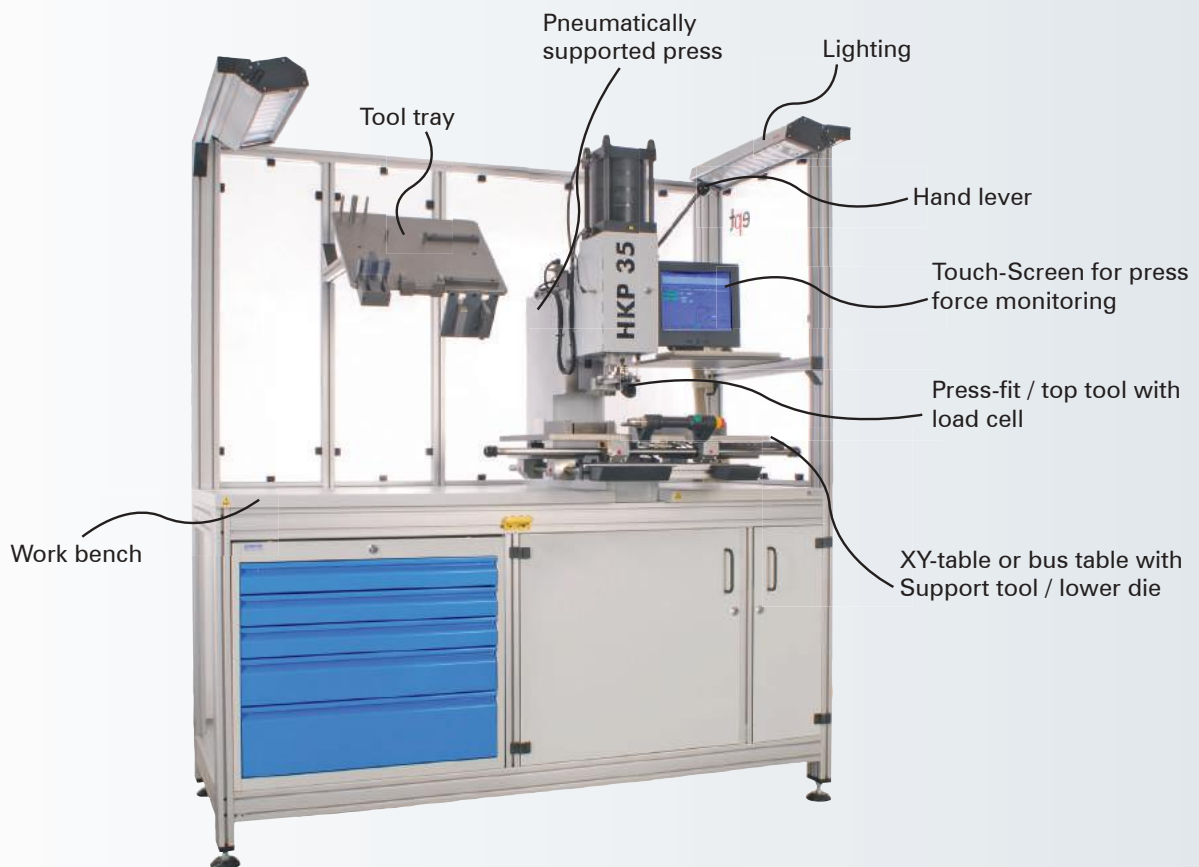
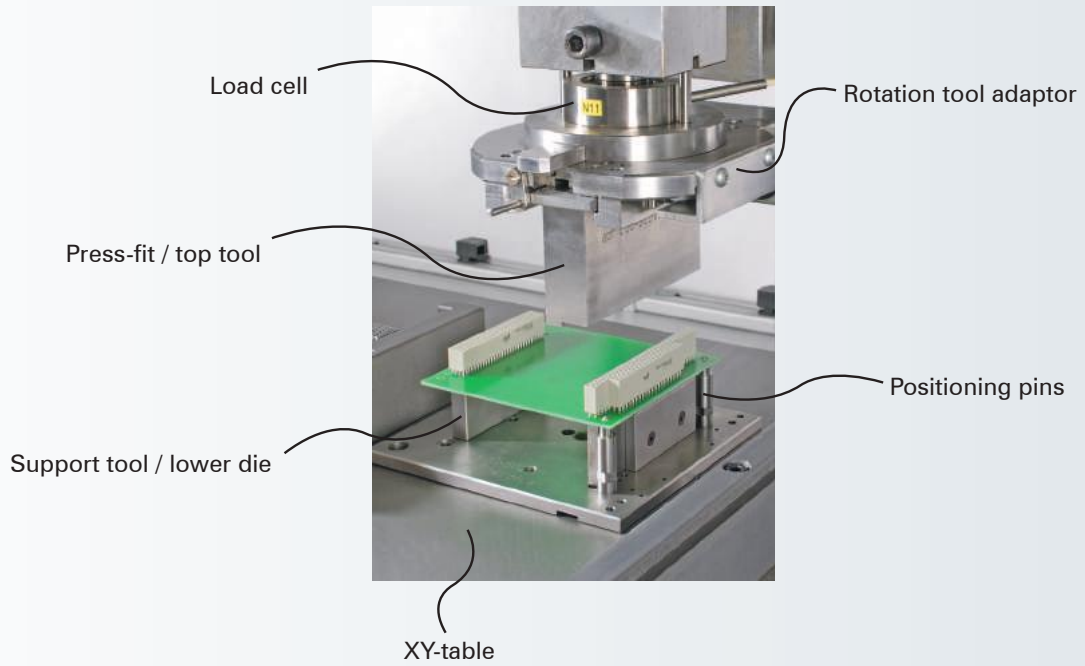
For large serial production, fully automatic machines have already been proven in the market. This modular system permits fully automatic press-fit process of pre-loaded printed circuit boards, the upper and lower die can be vertically traversed along the Z axis, the XY bench can program controlled traversed along both horizontal axes. The customer's benefits are obvious:

- bidirectional printed circuit board transport is possible, thus „inline-capable“
- fully automatic production, including loading and unloading of printed circuit boards, automatic tool change, monitoring of the press-fit force
- high production capacity of up to 1000 press-fit connectors per hour
- quick conversion to new product series by means of simple program and tool change
- connectors can be pressed in on both sides of the board
- modular configuration and retrofitting are possible
- remote maintenance is possible

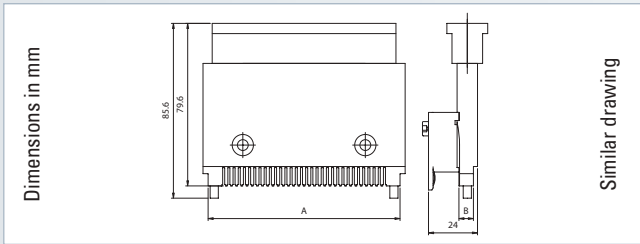
Let us know the demand of your machine

Together, we analyze your requirements and configure the ideal assembly machine for you. You will benefit from the experience of our specialists gained in many realized projects.

As one of the few connector manufacturers we can offer you the whole range of services from one source, we have the comprehensive expertise, the right tools and selected partners. By combining connectors, the assembly machine and tools we can offer optimum technical, schedule-based, and economical results for you.

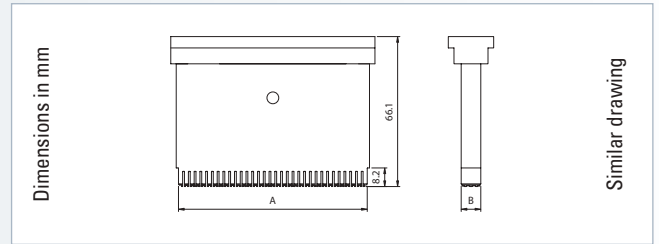


Similar image



DIN Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
B	94	5.5	884-150
B/2	53.4	5.5	884-151
B/3	38	5.5	884-152
C	94	8.5	884-250
C/2	53.4	8.5	884-251
C/3	38	8.5	884-252

Similar image



DIN Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
R	83	8.6	884-525
R/2	42.5	8.6	884-526
R/3	27.3	8.6	884-527

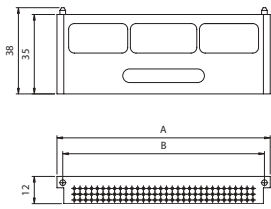
On request

- customer-specific adaptation

Similar image



Dimensions in mm



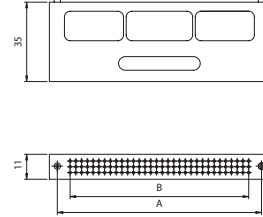
Similar drawing

DIN Male connector support tool			
Type	Dimension A	Dimension B	Part number
B	96	89	890-302
B/2	55	48	890-303
B/3	40	33	890-304
C	96	89	890-305
C/2	55	48	890-306
C/3	40	33	890-307

Similar image



Dimensions in mm



Similar drawing

DIN Male connector support tool			
Type	Dimension A	Dimension B	Part number
R	90	78.74	890-317
R/2	50	38.10	890-348
R/3	34.76	22.86	890-336

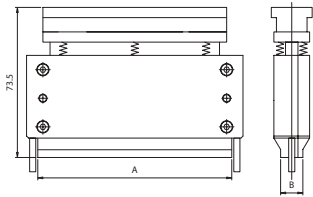
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

DIN Female connector press-fit tool			
Type	Dimension A	Dimension B	Part number
B*	95	11	884-100
B/2*	54	11	884-101
B/3*	39	11	884-102
C**	95	13.5	884-200
C/2**	54	13.5	884-201
C/3**	39	13.5	884-202
D	95	13.5	884-303
E	95	18.6	884-353
F low profile	95	17.5	884-406
G low profile	95	22.6	884-451
VME switching connector	95	–	884-200
Switching connector across rows	95	–	888-214

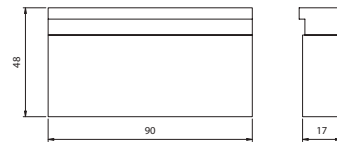
Note

- * only for connector 102-x
- ** only for connector 104-x

Similar image



Dimensions in mm



Similar drawing

DIN Female connector press-fit tool	
Type	Part number
B*	886-900-W1
C**	886-900-W1
C/2**	886-900-W1
C/3**	886-900-W1
VME 64x	886-900-W1

Note

- * only for connector 302-x
- ** only for connector 304-x

On request

- customer-specific adaptation

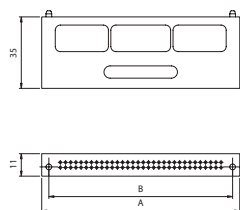
Similar image



Similar image

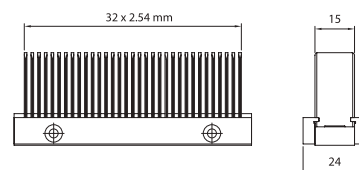


Dimensions in mm



Similar drawing

Dimensions in mm



Similar drawing

DIN Female connector support tool

Type	Dimension A	Dimension B	Part number
B	97	90	890-333
B/2	57	49.36	890-334
B/3	40	34	890-335
C and switching connector	97	90	890-317
C/2	57	49.36	890-331
C/3	41	34	890-332

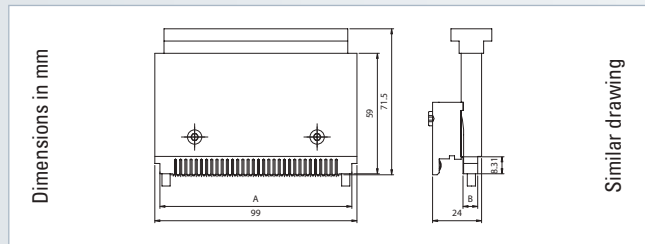
DIN Female connector support tool

Type	Part number
D	890-100-W1
E	890-100-W1
F low profile	890-100-W1
G low profile	890-100-W1
VME 64x	890-100-W1

On request

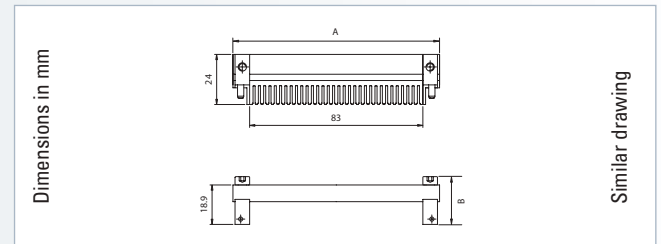
- customer-specific adaptation

Similar image



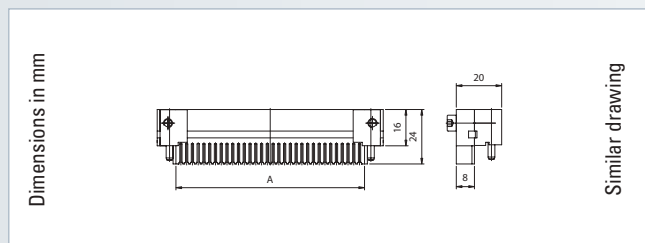
DIN Female press-fit tool			
Type	Dimension A	Dimension B	Part number
R	94	7.2	884-500
R/2	55	7.2	884-501
R/3	—	7.2	890-504

Similar image



DIN Male connector insert block for flat rock			
Type	Dimension A	Dimension B	Part number
C	99	13.6	884-260
C/2	59	13.6	884-261
C/3	41	13.6	884-262

Similar image

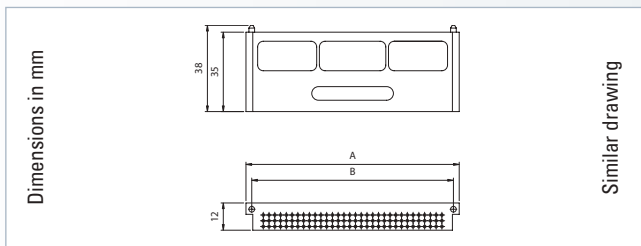


DIN Female connector insert block for flat rock			
Type	Dimension A	Dimension B	Part number
R	83.13	8	884-503
R/2	42.49	8	884-502
R/3	27.40	8	884-504

On request

- customer-specific adaptation

Similar image



DIN Female connector support tool			
Type	Dimension A	Dimension B	Part number
R	96	89	890-305
R/2	55	48	890-306
R/3	40	33	890-307

On request

- customer-specific adaptation

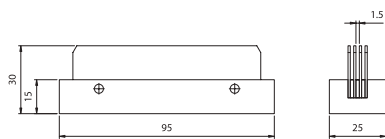
Assembly Tools

DIN 41612 Products Accessories

Similar image



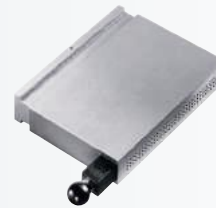
Dimensions in mm



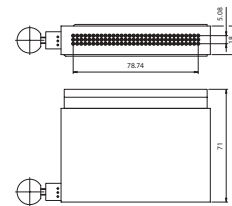
Similar drawing

DIN disassembly support tool	
Type	Part number
B/C female connector	892-300
R male connector	892-304
D female connector	892-301
F low profile female connector	892-302
E female connector	892-303

Similar image



Dimensions in mm



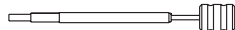
Similar drawing

DIN extruding tool single contacts male and female connector	
Type	Part number
Short contacts	892-210
B/C female connector, R male connector	892-200
F low profile female connector	892-202

Similar image



Dimensions in mm



Similar drawing

DIN extruding tool single contacts male connector	
Type	Part number
0.6 x 0.6	892-203

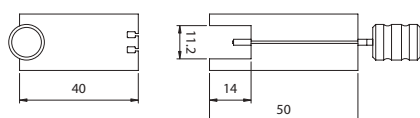
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

DIN insertion tool single contacts female connector

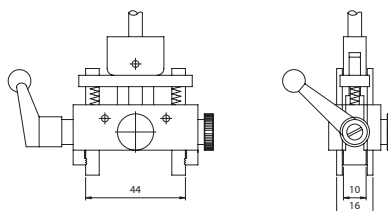
Type	Part number
B*	892-400
C**	892-401
R	892-405
D	892-402
E	892-403
F low profile	892-404

*only for connector 102-x
 **only for connector 104-x

Similar image



Dimensions in mm



Similar drawing

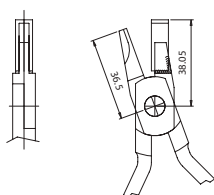
DIN female connector ejector tool

Type	Part number
1/1	892-100
1/2	892-103
1/3	892-104

Similar image



Dimensions in mm



Similar drawing

DIN keying pliers

Type	Part number
B and C	894-301

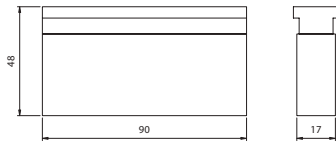
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

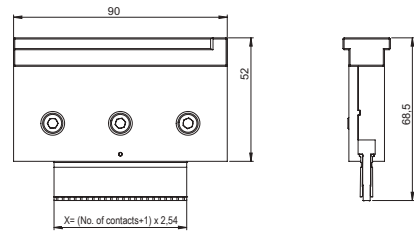
PC/104, PC/104-Plus, VarPol Female connector press-fit tool

Type	Part number
PC 104	886-900-W1
PC 104-Plus	886-900-W3
PC/104-Plus in 22 mm	886-900-W5
VarPol 1-, 2-row	886-900

Similar image



Dimensions in mm



Similar drawing

VarPol pin header press-fit tool

Type	Part number
Straight, 1-row	886-461-xx
Straight, 2-row	886-462-xx
Angled, 1-row	886-471-xx
Angled, 2-row	886-472-xx

On request

- flat rock insert
2-row: 886-466-xx
3-row: 886-467-xx

Note

- xx=no. of contacts of connector per row

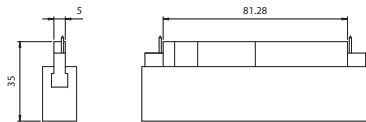
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

VarPol Female connector and VarPol pin header support tool

Type	Part number
1-row	890-330-xx
2-row	890-323-xx

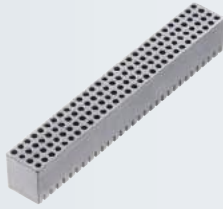
Note

- xx=no. of contacts of connector per row

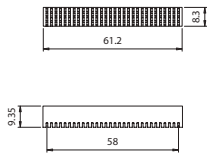
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

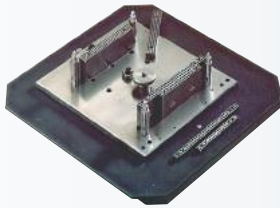
PC/104-Plus straight pin header press-fit tool

Type	Part number
2 mm pitch	886-903-W1

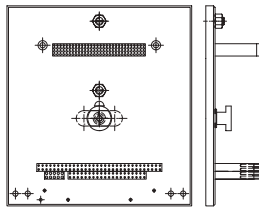
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

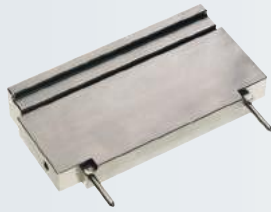
PC/104, PC/104-Plus Female connector support tool

Type	Part number
PC/104	890-602-W1
PC/104-Plus	

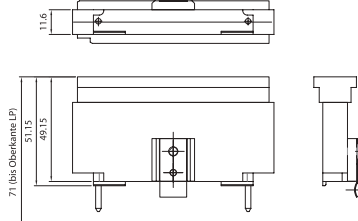
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

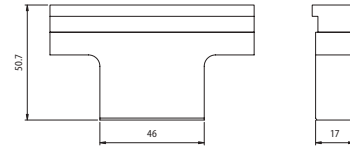
AdvancedTCA® Signal B+ press-fit tool

Type	Part number
AMC B+	886-115-W21

Similar image



Dimensions in mm



Similar drawing

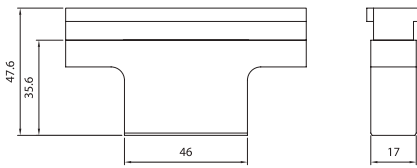
AdvancedTCA® Power Male connector press-fit tool

Type	Part number
Male connector	884-050-W1

Similar image



Dimensions in mm



Similar drawing

AdvancedTCA® Power Female connector press-fit tool

Type	Part number
Female connector	884-051-W1

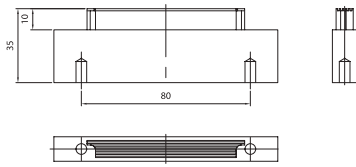
On request

- customer-specific adaptation

Similar image



Dimensions in mm

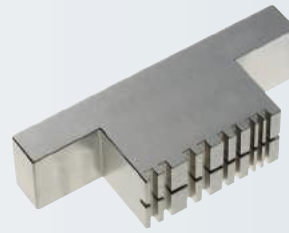


Similar drawing

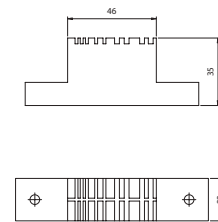
AdvancedTCA® Signal B+ support tool

Type	Part number
AMC B+ with/without Peg	890-115-W21

Similar image



Dimensions in mm



Similar drawing

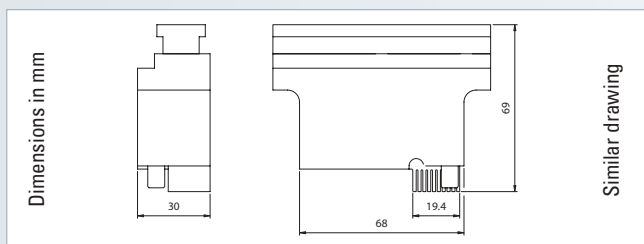
AdvancedTCA® Power Male/Female connector support tool

Type	Part number
Male connector	890-050-W1
Female connector	890-051-W1

On request

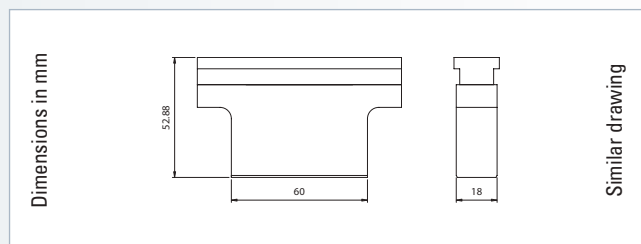
- customer-specific adaptation

Similar image



MicroTCA® Power press-fit tool	
Type	Part number
Backplane Connector	884-044-W1

Similar image

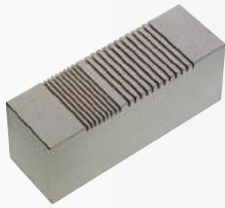


MicroTCA® Power press-fit tool	
Type	Part number
Power Module Output	884-045-W1

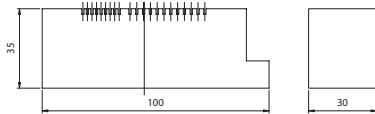
On request

- customer-specific adaptation

Similar image



Dimensions in mm



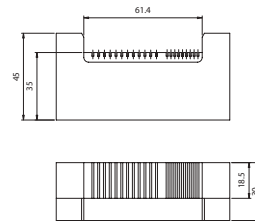
Similar drawing

MicroTCA® Power support tool	
Type	Part number
Backplane Connector	890-044-W1

Similar image



Dimensions in mm



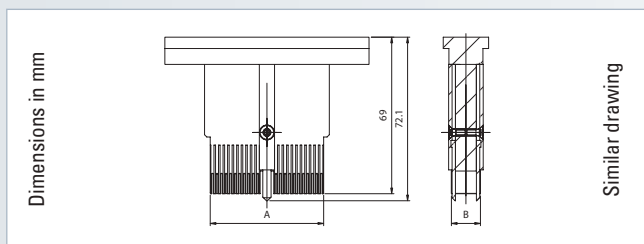
Similar drawing

MicroTCA® Power support tool	
Type	Part number
Power Module Output	890-045-W1

On request

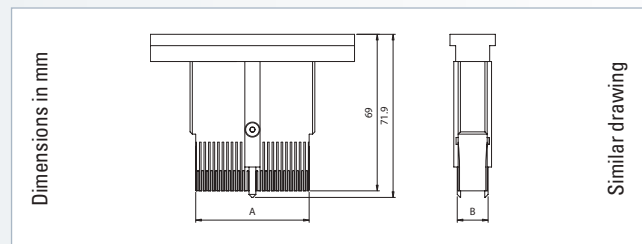
- customer-specific adaptation

Similar image



hm2.0 Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
A	50	13.6	884-700-W25
D	50	19.6	884-710-W25

Similar image



hm2.0 Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
AB25	50	13.6	884-708-W25
AB22	44	13.6	884-708-W22
AB19	38	13.6	884-708-W19
DE	50	19.6	884-712-W25

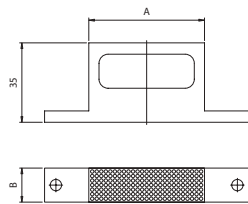
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

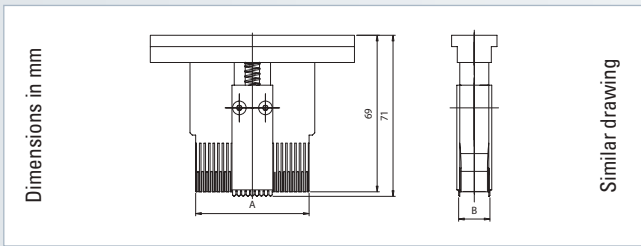
hm2.0 Male connector support tool

Type	Dimension A	Dimension B	Part number
A	51	15	890-700-W25
D	51	21	890-710-W25
AB25	51	15	890-701-W25
AB22	45	15	890-701-W22
AB19	39	15	890-701-W19
DE	51	21	890-711-W25

On request

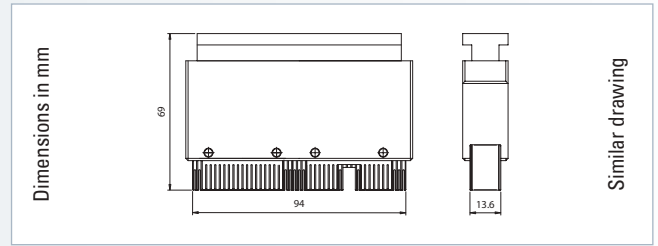
- customer-specific adaptation

Similar image



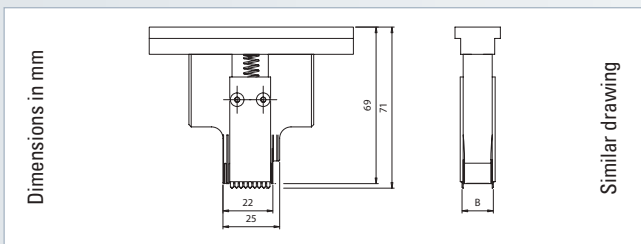
hm2.0 Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
B25	50	13.6	884-701-W25
B22	44	13.6	884-701-W22
B19	38	13.6	884-701-W19
E	50	19.6	884-711-W25

Similar image



hm2.0 accessory male connector press-fit tool	
Type	Part number
A + B22 (cPCI)	884-703-W47

Similar image



hm2.0 Male connector press-fit tool		
Type	Dimension B	Part number
C	13.6	884-702-W11
F	19.6	884-713-W11

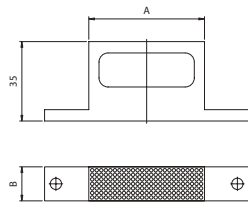
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

hm2.0 Male connector support tool

Type	Dimension A	Dimension B	Part number
B25	51	15	890-701-W25
B22	45	15	890-701-W22
B19	39	15	890-701-W19
E	51	21	890-711-W25
C	23	15	890-702-W11
F	23	21	890-713-W11
A + B22 (cPCI)	95	15	890-703-W47

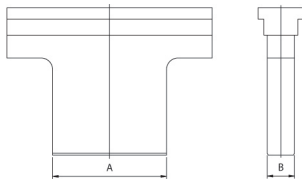
On request

- customer-specific adaptation

Similar image



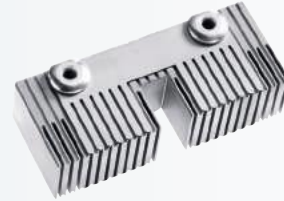
Dimensions in mm



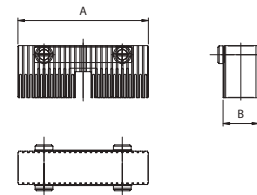
Similar drawing

hm2.0 Female connector flat rock press-fit tool			
Type	Dimension A	Dimension B	Part number
A	50	12	884-720-W25
B25	50	12	884-720-W25
B22	44	12	884-720-W22
B19	38	12	884-720-W19
AB25	50	12	884-720-W25
AB22	44	12	884-720-W22
AB19	38	12	884-720-W19
C	25	12	884-720-W11
D	50	16	884-730-W25
E	50	16	884-730-W25
DE	50	16	884-730-W25
F	25	16	884-730-W11
A + B22 (cPCI)	94	12	884-720-W47

Similar image



Dimensions in mm



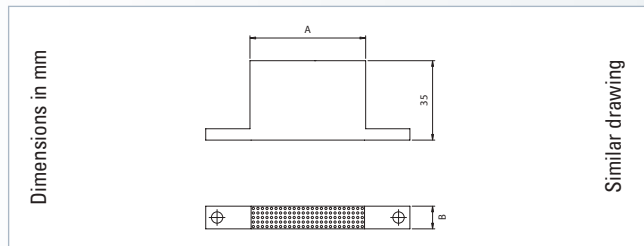
Similar drawing

hm2.0 Male connector press-fit tool			
Type	Dimension A	Dimension B	Part number
A	50	13.6	884-700-W125
B	50	13.6	884-701-W125
B22	44	13.6	884-701-W122
B19	38	13.6	884-701-W119
AB25	50	13.6	884-708-W125
AB22	44	13.6	884-708-W122
AB19	38	13.6	884-708-W119
C	25	13.6	884-702-W111
D	50	19.6	884-710-W125
E	50	19.6	884-711-W125
DE	50	19.6	884-712-W125
F	25	19.6	884-713-W111

On request

- customer-specific adaptation

Similar image

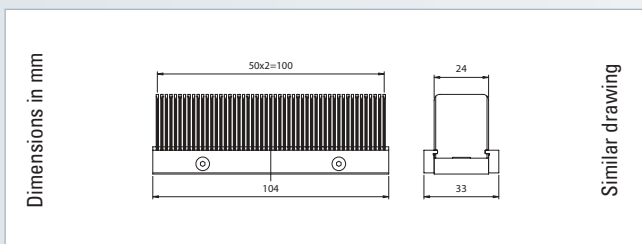


hm2.0 Female connector support tool			
Type	Dimension A	Dimension B	Part number
A	50	10	890-720-W25
B25	50	10	890-720-W25
B22	44	10	890-720-W22
B19	38	10	890-720-W19
AB25	50	10	890-720-W25
AB22	44	10	890-720-W22
AB19	38	10	890-720-W19
C	25	10	890-720-W11
D	50	13	890-710-W25/1
E	50	13	890-711-W25/1
DE	50	13	890-731-W25
F	25	13	890-713-W11/1
A + B22 (cPCI)	94	10	890-720-W47

On request

- customer-specific adaptation

Similar image



hm2.0 support tool

Type	Part number
modular	890-705-W50

On request

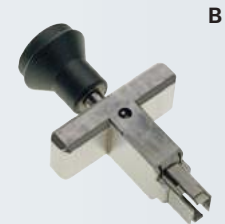
- customer-specific adaptation

Similar image



Removal tool/shroud

Similar image



Insertion tool for male connector coding

Similar image

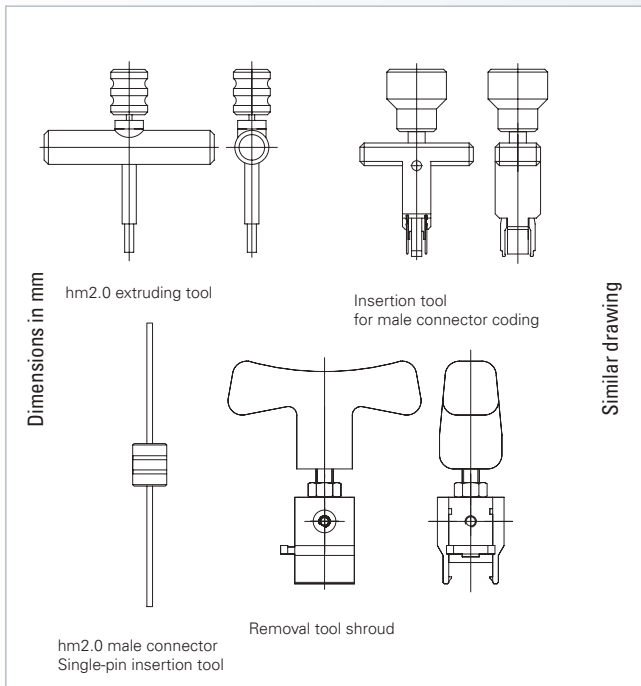


hm2.0 extruding tool

Similar image



hm2.0 male connector single-pin/insertion tool



hm2.0 repair kit	
Contents of the kit	Part number
A, B, C, D	892-705-W1
C, D	892-705-W2

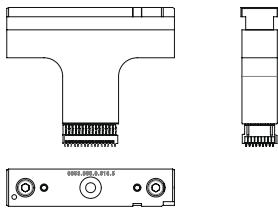
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Similar image



Dimensions in mm



Similar drawing

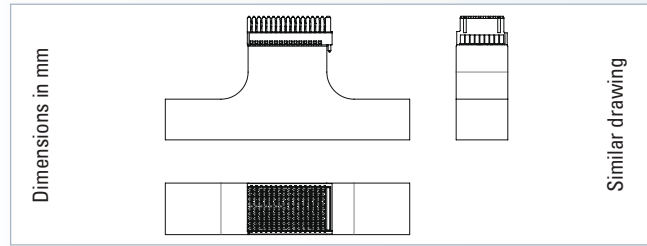
Velox press-fit tool

Number of contacts	Part number
16	884-055-W1
8	884-057-W1

On request

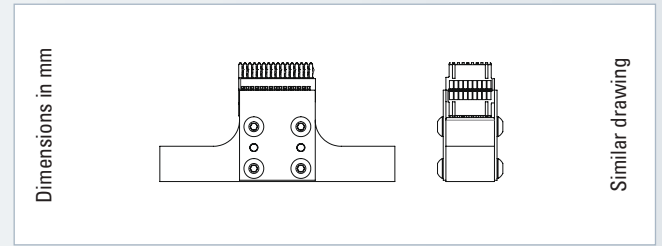
- customer-specific adaptation

Similar image



Velox support tool	
Number of contacts	Part number
16	890-056-W1
8	890-058-W1

Similar image



Velox support tool on pressed connector at the front side	
Number of contacts	Part number
16	890-055-W1
8	890-057-W1

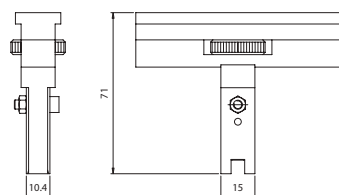
On request

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Similar image



Dimensions in mm



Similar drawing

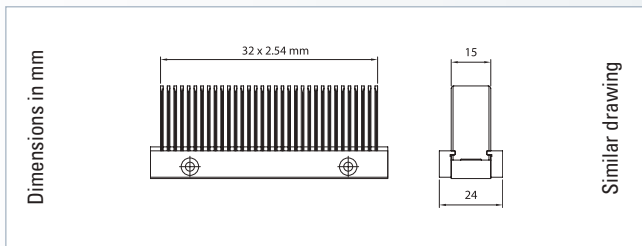
Power Terminal press-fit tool

Type	Part number
Pitch 5.08 x 7.62	
Part number 910-2xxxx	886-601
Part number 910-6xxxx	886-601
Pitch 5.08 x 10.16	
Part number 911-320xx	886-601-1
Part number 911-330xx	886-601-1
Part number 911-322xx	886-604
Part number 911-332xx	886-604

On request

- customer-specific adaptation

Similar image



Universal support tool pitch 2.54 mm	
Type	Part number
modular	890-100-W1

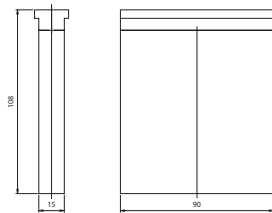
On request

- customer-specific adaptation

Similar image



Dimensions in mm



Similar drawing

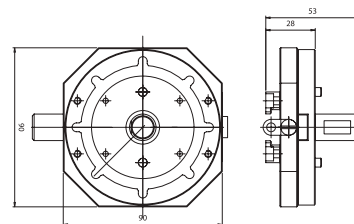
Alignment tool

Type	Part number
Alignment tool	892-903

Similar image



Dimensions in mm



Similar drawing

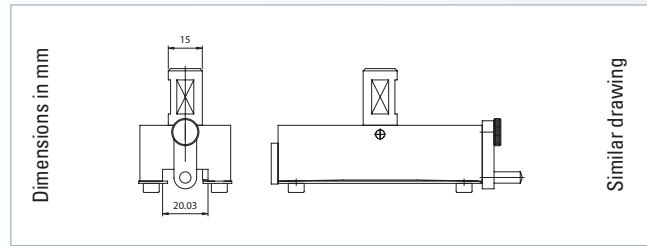
Rotary tool holder

Type	Part number
Rotary tool holder	882-204-W1

On request

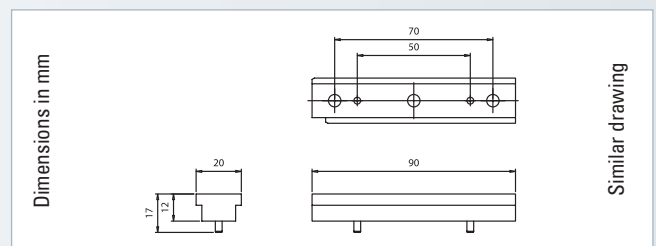
- customer-specific adaptation

Similar image



Quick release tool holder	
Type	Part number
Quick release tool holder	882-201

Similar image



Tool adapter	
Type	Part number
T-unit	882-300

On request

- customer-specific adaptation

Overview

Machine type	Insertion force	PCB size	Insertion force monitoring	Suitable for				
		Max. (mm)		Modules	Backplanes	Pilot and small series	Repair	Large series
 <p>HKP 16</p>	16 kN	400 x 300		X	X	X	X	
 <p>HKP 20</p>	20 kN	500 x 300		X	X	X	X	
 <p>HKP 35</p>	35 kN	500 x 300	X	X	X	X	X	X



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