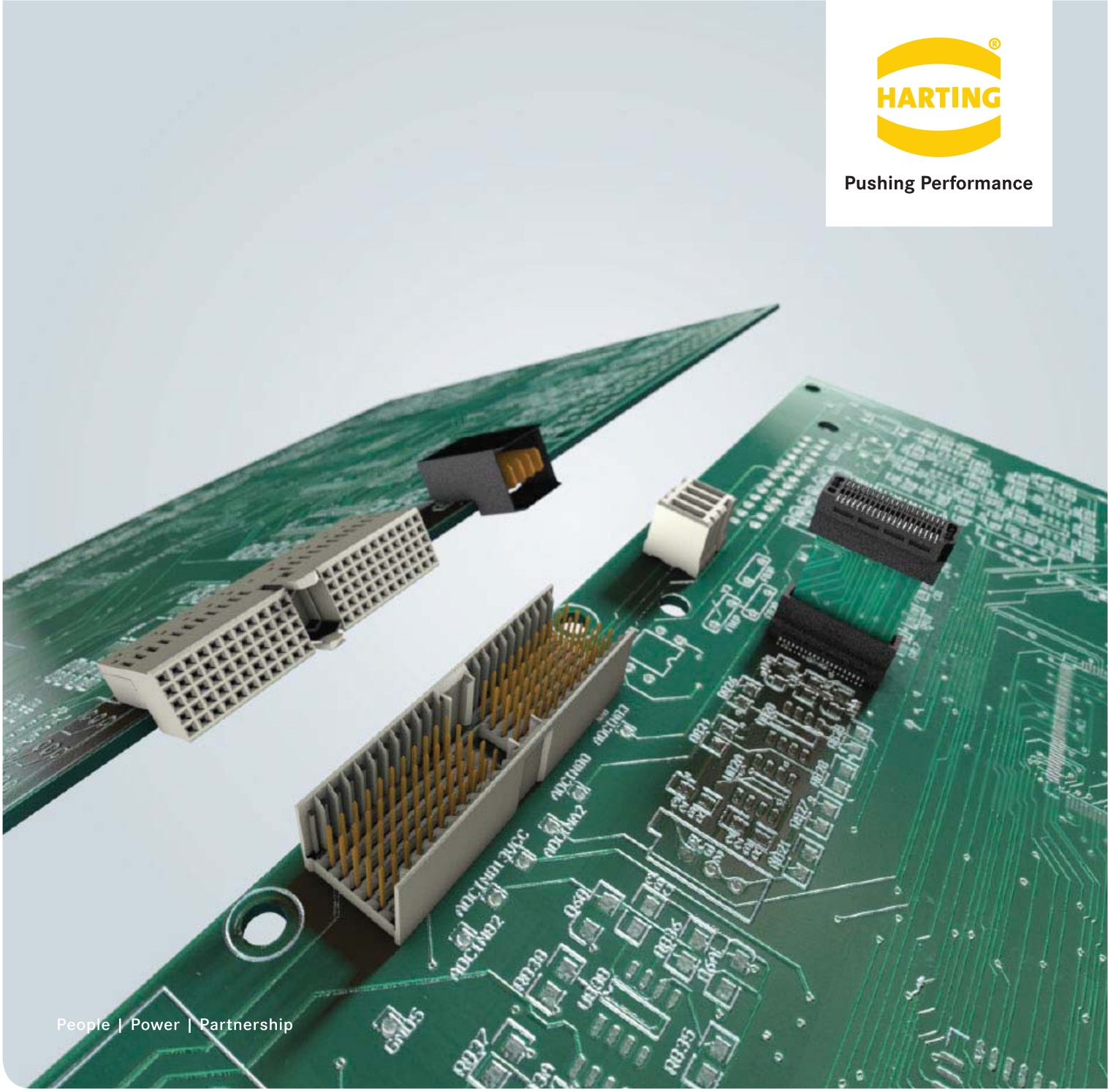
HARTING

Pushing Performance



HARTING

Coaxial and Metric Connectors

Transforming customer wishes into concrete solutions

The HARTING Technology Group is skilled in the fields of electrical, electronic and optical connection, transmission and networking technology, as well as in manufacturing, mechatronics and software creation. The Group uses these skills to develop customized solutions and products such as connectors for energy and data-transmission/data-networking applications, including, for example, mechanical engineering, rail technology, wind energy plants, factory automation and the telecommunications sector. In addition, HARTING also produces electro-magnetic components for the automobile industry and offers solutions in the field of housing technology and shop systems.

The HARTING Group currently comprises 37 subsidiary companies and worldwide distributors employing a total of more than 3,800 staff.

HARTING Subsidiary HARTING Representation

We aspire to top performance.

Connectors ensure functionality. As core elements of electrical and optical termination, connection and infrastructure technologies, they are essential in enabling the modular construction of devices, machines and systems across an extremely wide range of industrial applications. Their reliability is a crucial factor guaranteeing smooth functioning in the manufacturing area, telecommunications, applications in medical technology – in short, connectors are at work in virtually every conceivable application area. Thanks to the ongoing development of our technologies, our customers enjoy investment security and benefit from durable, long-term functionality.

Wherever our customers are, we're there.

Increasing industrialization is creating growing markets that are characterized by widely diverging demands and requirements. What these markets all share in common is the quest for perfection, increasingly efficient processes and reliable technologies. **HARTING** is providing these technologies – in Europe, the Americas and Asia. In order to implement customer requirements in the best possible manner, the **HARTING** professionals at our international subsidiaries engage in up-close, partnership-based interaction with our customers, right from the very early product development phase.

Our on-site staff form the interface to the centrally coordinated development and production departments. In this way, our customers can rely on consistently high, superior product quality – worldwide.

Our claim: Pushing Performance.

HARTING provides more than optimally attuned components. In order to offer our customers the best possible solutions, on request **HARTING** contributes a great deal more and is tightly integrated into the value-creation process.
From ready-assembled cables through to control racks or ready-to-go control desks. Our aim is to generate maximum benefit for our customers – with no compromises!

Quality creates reliability – and warrants trust.

The **HARTING** brand stands for superior quality and reliability – worldwide. The standards we set are the result of consistent, stringent quality management that is subject to regular certifications and audits.
EN ISO 9001, the EU Eco-Audit and ISO 14001:2004 are key elements here. We take a proactive stance towards new requirements, which is why **HARTING** is the first company worldwide to have obtained the new IRIS quality certificate for rail vehicles.

HARTING technology creates added value for customers.

Technologies by **HARTING** are at work worldwide. **HARTING's** presence stands for smoothly functioning systems powered by intelligent connectors, smart infrastructure solutions and sophisticated network systems. Over the course of many years of close, trust-based cooperation with its customers, the **HARTING** Technology Group has become one of the leading specialists globally for connector technology. We offer individual customers specific and innovative solutions that go beyond the basic standard functionalities. These tailored solutions deliver sustained results, ensure investment security and enable customers to achieve significant added value.

Opting for HARTING opens up an innovative, complex world of concepts and ideas.

In order to develop and produce connectivity and network solutions serving an exceptionally wide range of connector applications in a professional and cost-effective manner, **HARTING** not only commands the full array of conventional tools and basic technologies. Above and beyond these capabilities, **HARTING** is constantly harnessing and refining its broad base of knowledge and experience to create new solutions that also ensure continuity. To secure its lead in know-how, HARTING draws on a wealth of sources from its in-house research and applications.

Salient examples of these sources of innovative knowledge include microstructure technologies, 3D design and connection technology, high-temperature and ultrahigh-frequency applications that are finding use in telecommunications and automation networks, in the automotive industry, or in industrial sensor and actuator applications, RFID and wireless technologies, in addition to packaging and housing made of plastics, aluminum and stainless steel.

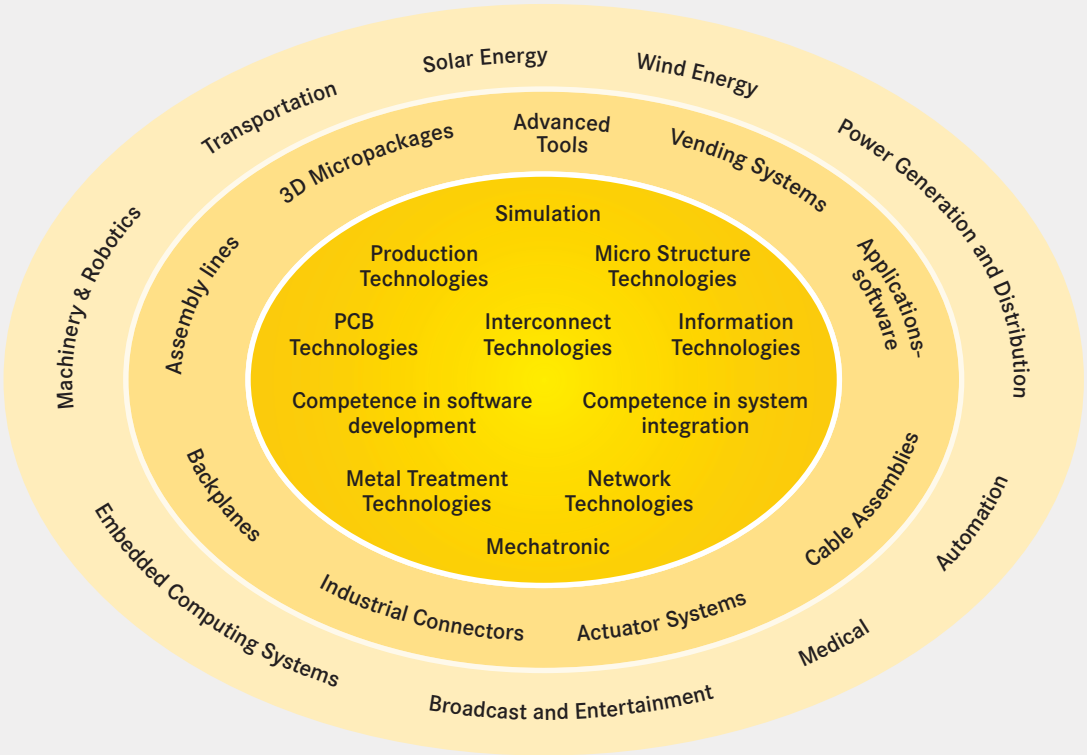
HARTING overcomes technological limitations.

Drawing on the comprehensive resources of the group's technology pool, **HARTING** devises practical solutions for its customers. Whether this involves industrial networks for manufacturing automation, or hybrid interface solutions for wireless telecommunication infrastructures, 3D circuit carriers with microstructures, or cable assemblies for high-temperature applications in the automotive industry – **HARTING** technologies offer not only components, but comprehensive solutions attuned to individual customer requirements and preferences. The range of cost-effective solutions covers ready-to-use cable configurations, completely assembled backplanes and board system carriers, as well as fully wired and tested control panels.

In order to ensure the future-proof design of RF and EMC-compatible interface solutions, the central **HARTING** laboratory (certified to EN 45001) employs simulation tools, as well as experimental, testing and diagnostics facilities all the way to scanning electron microscopes. In addition to product and process suitability considerations, lifecycle and environmental aspects play a key role in the selection of materials and processes.

HARTING's knowledge is practical know-how that generates synergy effects.

HARTING commands decades of experience with regard to the applications conditions involved in connections in telecommunications, computer, network and medical technologies, as well as industrial automation technologies, e.g. in the mechanical engineering and plant engineering areas, in addition to the power generation industry and the transportation sector. **HARTING** is highly conversant with the specific application areas in all of these technology fields. In every solution approach, the key focus is on the application. In this context, uncompromising, superior quality is our hallmark. Every new solution found invariably flows back into the **HARTING** technology pool, thereby enriching our resources. And every new solution we go on to create will draw on this wealth of resources in order to optimize each and every individual solution. **HARTING** is synergy in action.



Notes

Directory

HARTING eCatalogue

The **HARTING eCatalogue** is an electronic catalogue with a part configuration and 3D components library.

Here you can choose a connector according to your requirements. Afterwards you are able to send your inquiry directly to a HARTING sales partner.

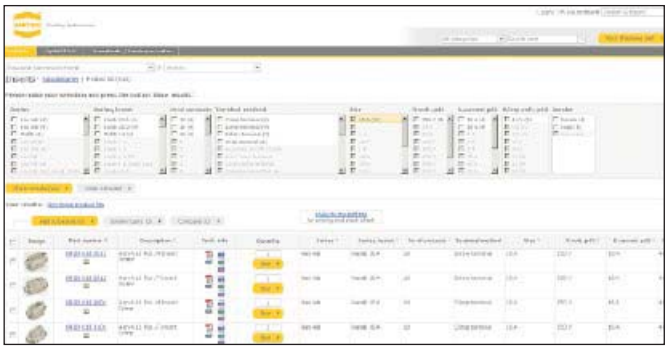
The drawings to every single part are available in PDF-format.

The parts are downloadable in 2D-format (DXF) and 3D-format (IGES, STEP).

The 3D-models can be viewed with a VRML-viewer.

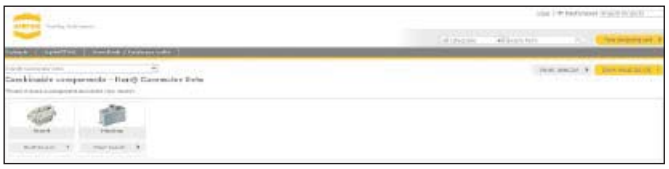
You can find the **HARTING eCatalogue** at **www.HARTING.com**.

Product overview



Product selection

Product configuration



Product combination

Product samples: Fast-track delivery to your desk, free of charge

The new free express sample service in the HARTING eCatalogue allows customers to order samples immediately, easily and completely free of charge. A broad selection from the device connectivity product portfolio is now available. If a product is unavailable, the system offers alternative products with similar features that can be requested at a mouse click.

The free samples are shipped within 24 hours at no cost to you. This service enables tremendous flexibility, especially in the design phase of projects.

General information

It is the customer's responsibility to check whether the components illustrated in this catalogue also comply with different regulations from those stated in special fields of applications.

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

No part of this catalogue may be reproduced in any form (print, photocopy, microfilm or any other process) or processed, duplicated or distributed by means of electronic systems without the prior written consent of HARTING Electronics GmbH, Espelkamp. We are bound by the German version only.

har:bus® HM Standard, 2.00 mm pitch

Any possible contact configuration can be requested with the customer request forms in chapter 20. Alternatively please contact your local HARTING representative.

Design according	:	IEC 61 076 - 4 - 101
Approvals		
Underwriters Laboratories Inc.®	:	c UL us with their respective ratings documented in file E 102079
Number of contacts	:	55 – 220 signal (77 – 308 fully shielded); or customised
Contact spacing	:	2.00 mm
Working current	:	1 A @ 70 °C (80 % derating)
Test voltage $U_{r.m.s.}$	:	AC 750 V min.
Contact resistance	:	20 mΩ max.
Insulation resistance	:	10 GΩ min.
Temperature range	:	– 55 °C … + 125 °C
Durability as per IEC 61076-4-101	:	Performance level 2 = *250 mating cycles* in total. *First 125 mating cycles*, then 4 days gas test using 0.5 ppm SO_2 and 0.1 ppm H_2S (at 25 ± 2 °C and 75 ± 3 % humidity). Measurement of contact resistance. The *remaining 125 mating cycles* are subject to measurement of contact resistance and visual inspection. No abrasion of the contact finish through to the base material. No functional impairment. Performance level 1 = *500 mating cycles* in total. *First 250 mating cycles*, then 10 days gas test using 0.5 ppm SO_2 and 0.1 ppm H_2S (at 25 ± 2 °C and 75 ± 3 % humidity). Measurement of contact resistance. The *remaining 250 mating cycles* are subject to measurement of contact resistance and visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.
Termination technique	:	**compliant press-in**
Mating force	:	0.75 N/pin max.
Withdrawal force	:	0.15 N/pin min.
Materials		
Mouldings	:	Thermoplastic resin, glass-fibre filled, UL 94-V0
Contacts	:	Copper alloy
Contact surface		
Contact zone male	:	Au/PdNi/Ni, contacts are treated with Bellcore recommended lubricant (PPE)
Contact zone female	:	Au/Ni, contacts are treated with Bellore recommended lubricant (PPE)
Press-in zone	:	Ni
Packaging	:	Tube

Due to the high deformation capability and resilience of har:bus® HM press-in contacts, they can be easily and repeatedly removed in case of repairs without impairment to their functioning.

har:bus® HM press-in contacts are extremely versatile and offer a reliable electrical contact, therefore they are especially well suited for applications with these surfaces.

Please contact us for detailed test reports.

Benefits of press-in technology

- Thermal shocks associated with the soldering process and the risk of the board malfunction are avoided.
- No need for the subsequent cleaning of the assembled pcb's
- Unlimited and efficient processing of partially gold-plated pins for rear I/O - manual soldering is no longer necessary!

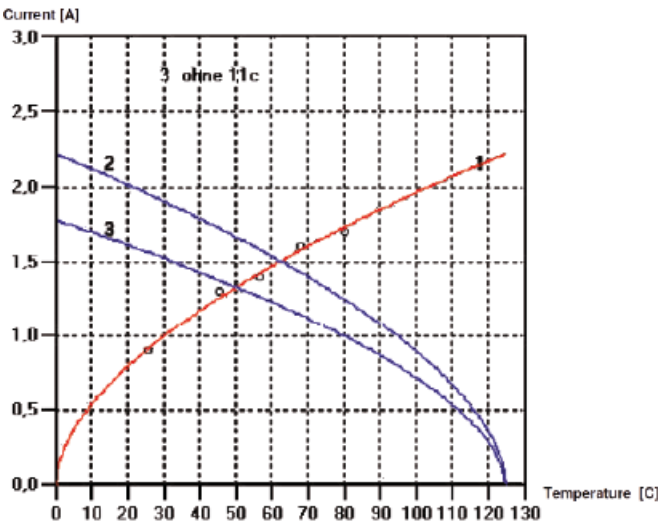
Recommended configuration of plated through holes

The press-in zone of the har:bus® HM connectors is approved to be used with a plated through hole according EN 60352-5 with a diameter of $0.60^{\pm 0.05}$ mm (drilled hole $0.7^{\pm 0.02}$ mm).

Based on our experiences regarding the production process of the PCB manufacturer, we recommend a plated through hole configuration like shown in the below spreadsheet. To achieve the recommended plated through hole diameter, it is important to specify especially the drilled hole diameter of $0.7^{\pm 0.02}$ mm to your PCB supplier.

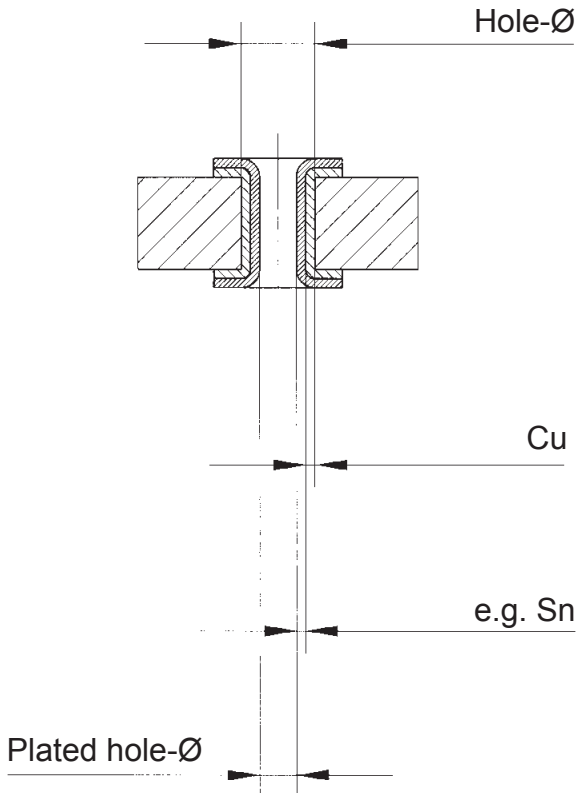
Tin plated PCB (HAL)	Hole-Ø	$0.7^{\pm 0.02}$ mm
	Cu	min. 25 µm
	Sn	max. 15 µm
	Plated hole-Ø	0.60-0.65 mm
Chemical tin plated PCB	Hole-Ø	$0.7^{\pm 0.02}$ mm
	Cu	min. 25 µm
	Sn	min. 0.8 µm
	Plated hole-Ø	0.60-0.65 mm
Au / Ni plated PCB	Hole-Ø	$0.7^{\pm 0.02}$ mm
	Cu	min. 25 µm
	Ni	3-7 µm
	Au	0.05-0.12 µm
	Plated hole-Ø	0.60-0.65 mm
Silver plated PCB	Hole-Ø	$0.7^{\pm 0.02}$ mm
	Cu	min. 25 µm
	Ag	0.1-0.3 µm
	Plated hole-Ø	0.60-0.65 mm
OSP copper plated PCB	Hole-Ø	$0.7^{\pm 0.02}$ mm
	Cu	min. 25 µm
	Plated hole-Ø	0.60-0.65 mm

PCB board thickness: ≥ 1.4 mm



1. Temperature rise
2. Derating
3. Derating at I max * 0.8 according to DIN IEC 512

Derating curve



Recommended configuration of plated through holes, valid for har:bus® HM

HARTING offers 13 contact lengths for har:bus® HM male connectors: the standard mating length of 8.2 mm, pre-leading contacts with 9.7 mm and extra long contacts preferred for shielding with 11.2 mm mating length.

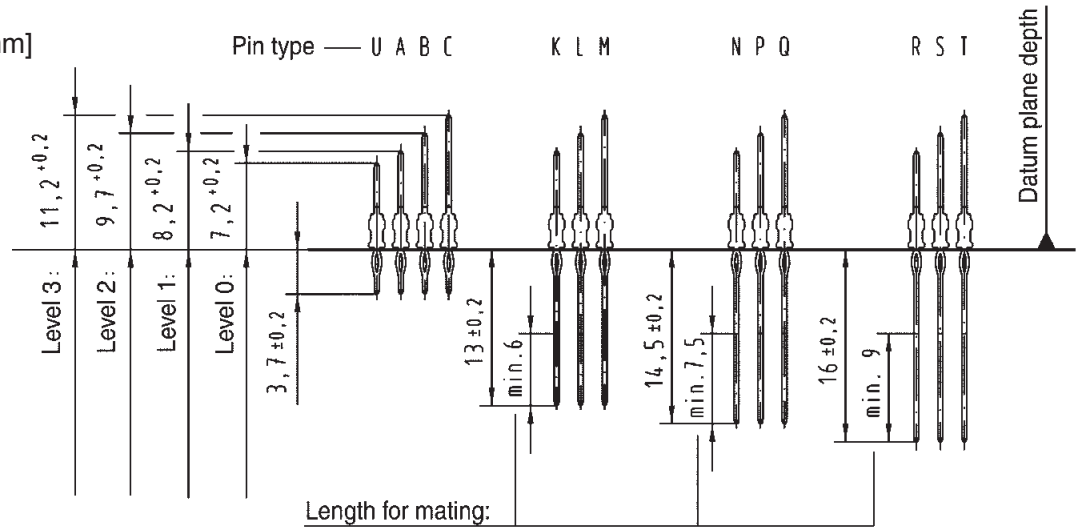
On the termination side the standard length is 3.7 mm. With the three termination lengths of 13.0, 14.5 and 16.0 mm even for rear I/O applications different mating levels are possible, depending on the pcb thickness and shroud height.

For the standard termination length, an extra short contact for special applications with a mating length of 7.2 mm is available.

The different contact lengths are designated with letters to identify them in the configurations. For special loadings please use the customer request form at the end of this catalogue.

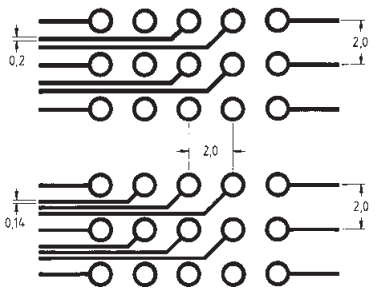
All contacts are offered with press-in termination ‘eye of the needle’. In accordance with the application they can be delivered in performance level 1 or 2.

Contact dimensions [mm]



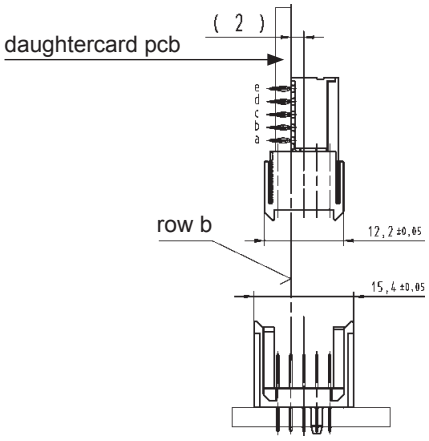
Circuit density

When using the specified diameter of the finished through hole according to IEC 61076-4-101 (0.6 ± 0.05 mm) with an appropriate annular ring, the remaining distance between the rings is about 1 mm. Under the condition that the width of the track and the space between should be equal, two tracks of 0.2 mm width or three tracks of 0.14 mm width can be placed between two rings. Typical designs are shown in the drawing on the right side.

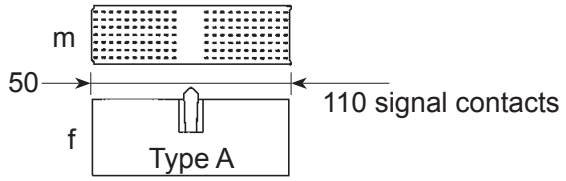


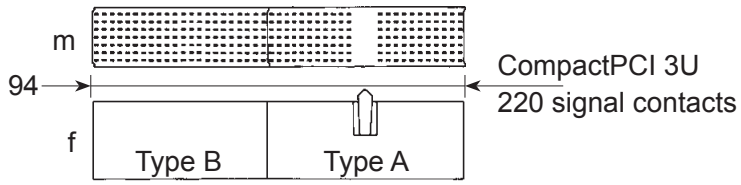
Alignment of male and female connector

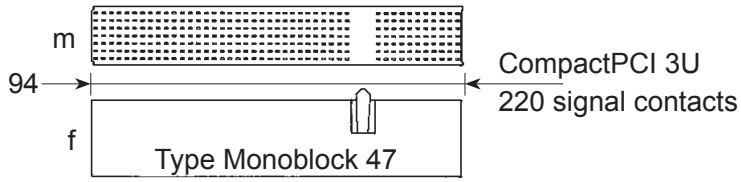
For the alignment of male and female connector, a common reference plane is defined. This reference plane is the top side of the daughtercard pcb and the contact rows "b" of the female and the male connector (see drawing).

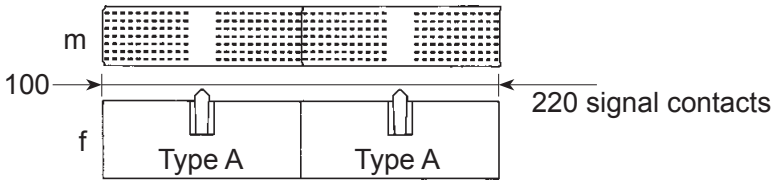


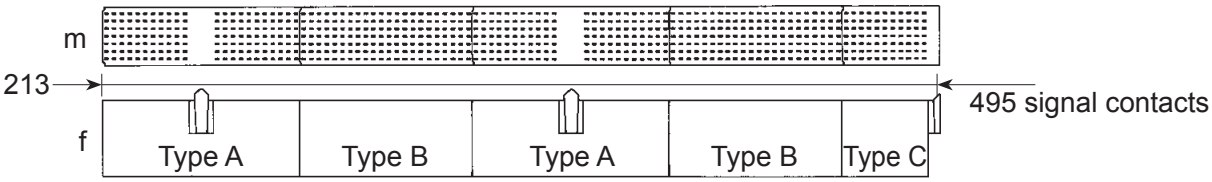
Typical configurations on pcb

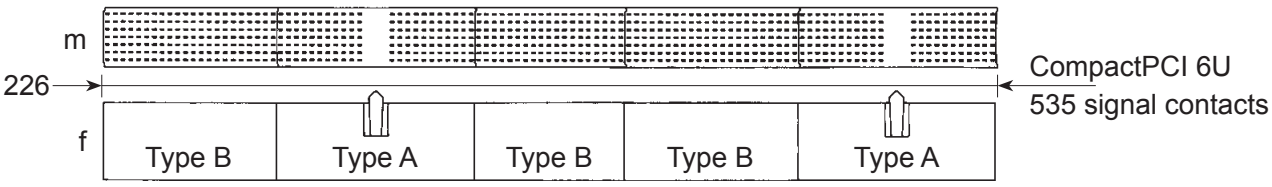


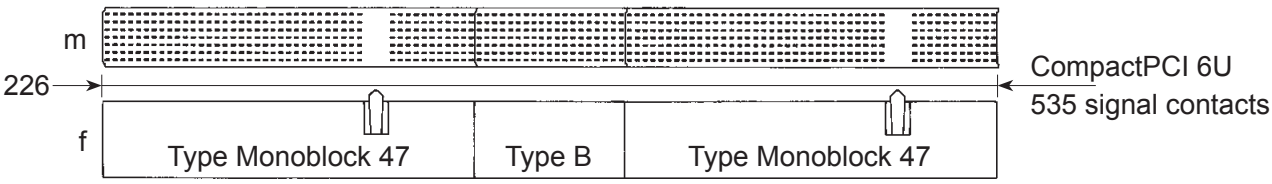












All HARTING har:bus® HM connectors can be assembled end to end in any configuration.

General rules:

- Type B connectors should always be used in combination with an A type and/or C type connectors that are fitted with alignment features.
- Type C connectors must be assembled at the end of a connector stack, to achieve polarisation and avoid mismating.
- To ensure the correct slot position of connector stacks coding can be added with type A connectors.
- Starting with an A type module (50 mm) any module can be added within the above recommendation (see typical examples shown in the diagram).

m = male connector

f = female connector

Dimensions [mm]

Improved guiding with AB-modules:

In accordance with the equipment practice each front side arrangement of har:bus® HM connectors shall have at least one A-module per slot to ensure that the connector can accommodate ± 2 mm alignment tolerances in rack systems.

On some rear I/O arrangements the A-module's alignment capability cannot be utilised, because only B-modules are used for feed through. Consequently AB-modules were introduced to ensure guiding capabilities where formerly only B-modules were used. Those AB-modules represent a combination of A- and B-modules and are specified in **CompactPCI by PICMG 2.0 Rev. 3.0** for certain rear I/O applications.

The AB-modules have guiding pegs similar (but not mating compatible to prevent mismating) to those of the A-module providing the same proven mating tolerances of ± 2 mm. The AB-modules have no coding center but are fully equiped with contacts in order to maintain the full density as per the B-modules.

The **AB-female** connector mates either with an **AB-shroud** or with **AB-male** connectors. The centered pin positions of the shielding rows of male connectors are simply equipped with short spill contacts (if standard connector and shroud are used). This prevents that the guiding peg of the female AB-module stubbing on the feed through contacts of the front side's fixed connector. These fixed connector loadings are called **AB-friendly**.

The AB-male connector will not be equiped with shielded contacts in the centre where the guiding peg will engage.

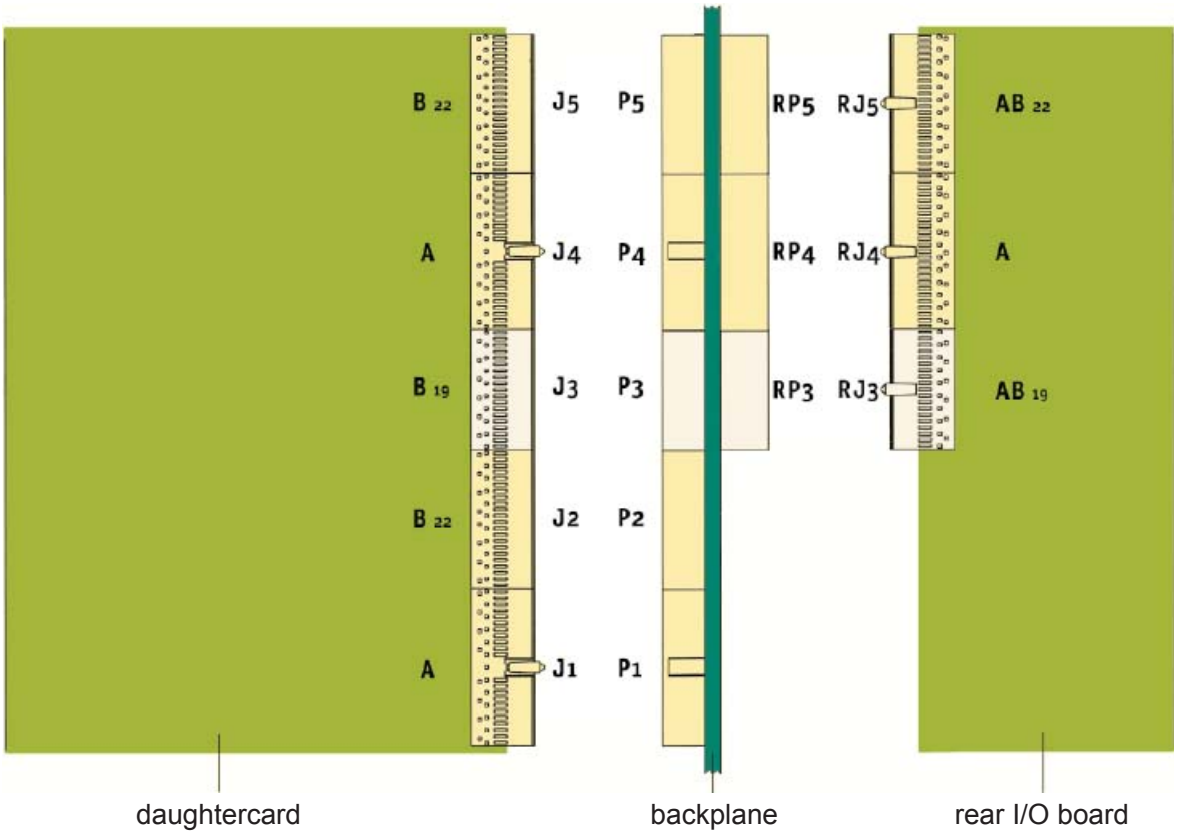
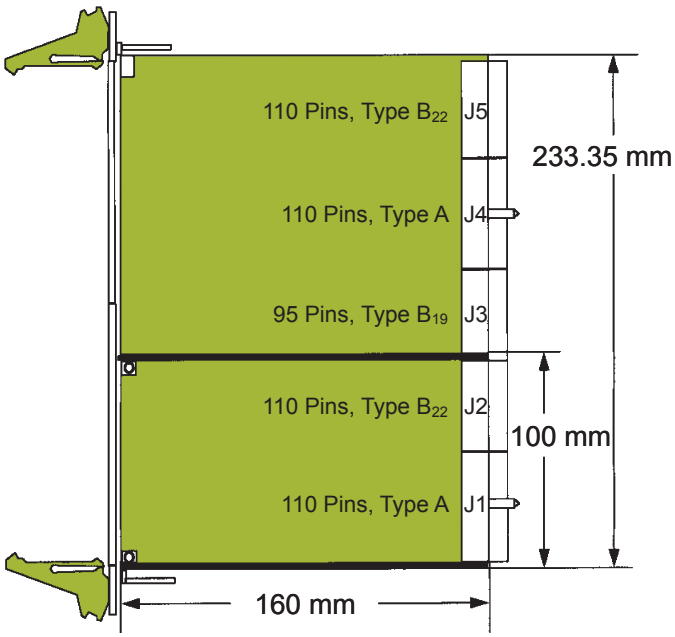


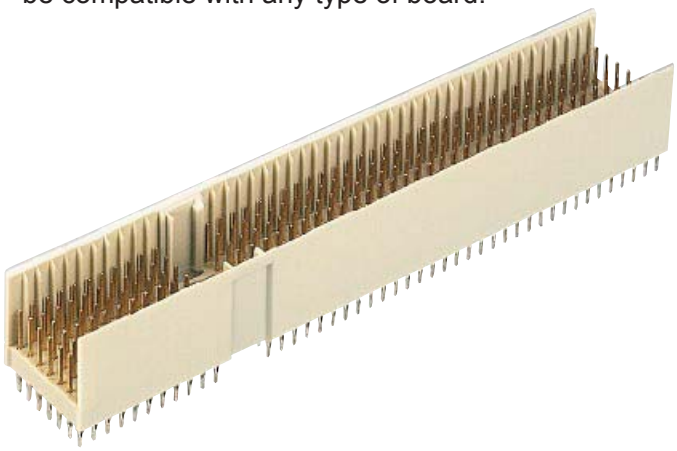
Fig. 3: CompactPCI 6U configuration

CompactPCI® as a standard is maintained and enhanced by the PCI Industrial Computer Manufacturers Group (PICMG®). It defines a combination of the electrical and logical specifications of the PCI standard and the mechanical specifications of the IEEE 1101 and IEC 60297 series of standards. The board connector has been developed from the IEC 61076-4-101 series of 2.0 mm connectors. The mounting location and dimensions for the 2.0 mm connectors are specified in IEEE 1101.11. Some additional mechanical definitions for 2.0 mm connectors in the Eurocard format are being specified in the VITA 30 draft.

Other international standards are listed in the *CompactPCI*® standard for environmental and related specifications. This gives *CompactPCI*® a solid foundation of international standards and practices for mechanical robustness.



The board format is either a 3U or a 6U Eurocard as defined in IEC 60297. There are two or five connectors specified for 3U or 6U boards respectively. Connectors are numbered from J1/P1 through J5/P5 (bottom to top) on the board or backplane. Slave or peripheral boards need J1/P1 as a minimum, master or system boards need both J1/P1 and J2/P2 as a minimum. Backplanes should always have the full complement of connectors to be compatible with any type of board.



As opposed to the CPCI standard (pins numbered from bottom to top), the contact numbers on the connector are numbered from top to bottom (according to the IEC standard).

The front panel of CPCI cards may be equipped with additional keying pegs to code individual board types. There is also an extended pin length to remove any electro static charge before contacts on the rear connnectors mate. This pin also functions as a mechanical guide to position the board as straight as possible for insertion. This prevents pin bending and lowers the insertion force. Some applications could require up to 500 pins to be pushed into sockets simultaneously.

Connectors for high availability applications (hot swap) come with 3 different lengths of pins for a staged sequence of mate or break of contact.

Connector J1/P1 carries the signals for a 32 bit PCI bus (see table of contact assignments for J1/P1). Connector J2/P2 on a system card has the additional signals for a 64 bit PCI bus and some user-defined I/O (see table of contact assignments for J2/P2). On slave cards all of J2/P2 might be user-defined I/O except the top row which carries the signals for geographical addressing. J3/P3 should be reserved for other system bus definitions. J4/P4 and J5/P5 are used for I/O or secondary buses, e.g. H.110 in telecom applications or for bridges into other buses like VMEbus. This is used to accommodate two bus platforms in one card cage on one backplane.

Contact assignment on *CompactPCI*® system position (J1/P1)

	a	b	c	d	e	
25	+5 V	REQ64#	ENUM#	+3,3 V	+5 V	25
24	AD[1]	+5 V	V(I/O)	AD[0]	ACK64#	24
23	+3,3 V	AD[4]	AD[3]	+5 V	AD[2]	23
22	AD[7]	GND	+3,3 V	AD[6]	AD[5]	22
21	+3,3 V	AD[9]	AD[8]	M66EN	C/BE[0]#	21
20	AD[12]	GND	V(I/O)	AD[11]	AD[10]	20
19	+3,3 V	AD[15]	AD[14]	GND	AD[13]	19
18	SERR#	GND	+3,3 V	PAR	C/BE[1]#	18
17	+3,3 V	SDONE	SBO#	GND	PERR#	17
16	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	16
15	+3,3 V	FRAME#	IRDY#	GND	TRDY#	15
14						14
13			Key Area			13
12						12
11	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	11
10	AD[21]	GND	+3,3 V	AD[20]	AD[19]	10
9	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	9
8	AD[26]	GND	V(I/O)	AD[25]	AD[24]	8
7	AD[30]	AD[29]	AD[28]	GND	AD[27]	7
6	REQ#	GND	+3,3 V	CLK	AD[31]	6
5	Bus Reserved	Bus Reserved	RST#	GND	GNT#	5
4	Bus Reserved	GND	V(I/O)	INTP	INTS	4
3	INTA#	INTB#	INTC#	+5 V	INTD#	3
2	TCK	+5 V	TMS	TDO	TDI	2
1	+5 V	-12 V	TRST#	+12 V	+5 V	1
	a	b	c	d	e	

Contact assignment on *CompactPCI*® system position (J2/P2)

	a	b	c	d	e	
22	GA4	GA3	GA2	GA1	GA0	22
21	CLK6	GND	Reserved	Reserved	Reserved	21
20	CLK5	GND	Reserved	GND	Reserved	20
19	GND	GND	Reserved	Reserved	Reserved	19
18	Bus Reserved	Bus Reserved	Bus Reserved	GND	Bus Reserved	18
17	Bus Reserved	GND	PRST#	REQ6#	GNT6#	17
16	Bus Reserved	Bus Reserved	DEG#	GND	Bus Reserved	16
15	Bus Reserved	GND	FAL#	REQ5#	GNT5#	15
14	AD[35]	AD[34]	AD[33]	GND	AD[32]	14
13	AD[38]	GND	V(I/O)	AD[37]	AD[36]	13
12	AD[42]	AD[41]	AD[40]	GND	AD[39]	12
11	AD[45]	GND	V(I/O)	AD[44]	AD[43]	11
10	AD[49]	AD[48]	AD[47]	GND	AD[46]	10
9	AD[52]	GND	V(I/O)	AD[51]	AD[50]	9
8	AD[56]	AD[55]	AD[54]	GND	AD[53]	8
7	AD[59]	GND	V(I/O)	AD[58]	AD[57]	7
6	AD[63]	AD[62]	AD[61]	GND	AD[60]	6
5	C/BE[5]#	GND	V(I/O)	C/BE[4]#	PAR64	5
4	V(I/O)	Bus Reserved	C/BE[7]#	GND	C/BE[6]#	4
3	CLK4	GND	GNT3#	REQ4#	GNT4#	3
2	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	2
1	CLK1	GND	REQ1#	GNT1#	REQ2#	1
	a	b	c	d	e	

In mechanical terms J1/P1 is a 25x5 matrix of contacts. Three rows of 5 contacts (rows 12 - 14) are not used for electrical contacts. Instead, plastic keys of different orientation and configuration are used to key board locations as to system or peripheral slot, voltage options, etc.

J2/P2 is a shortened connector with only 22 rows of contacts instead of 25 rows for a standard size. HARTING now offers monolithic versions with J1/P1 and J2/P2 combined in one single connector.

This combination together with some space left on the card to fit into guide rails makes maximum use of the 100 mm rear edge of the 3U Eurocard.

On a 6U card this connector setup is repeated on J4/P4 and J5/P5.

The J3/P3 connector is a shortened version of the 2.0 mm connector with 19 rows of 5 signal contacts.

The size results from the height of a 6U board (233 mm) which is more than double the height of a 3U board.

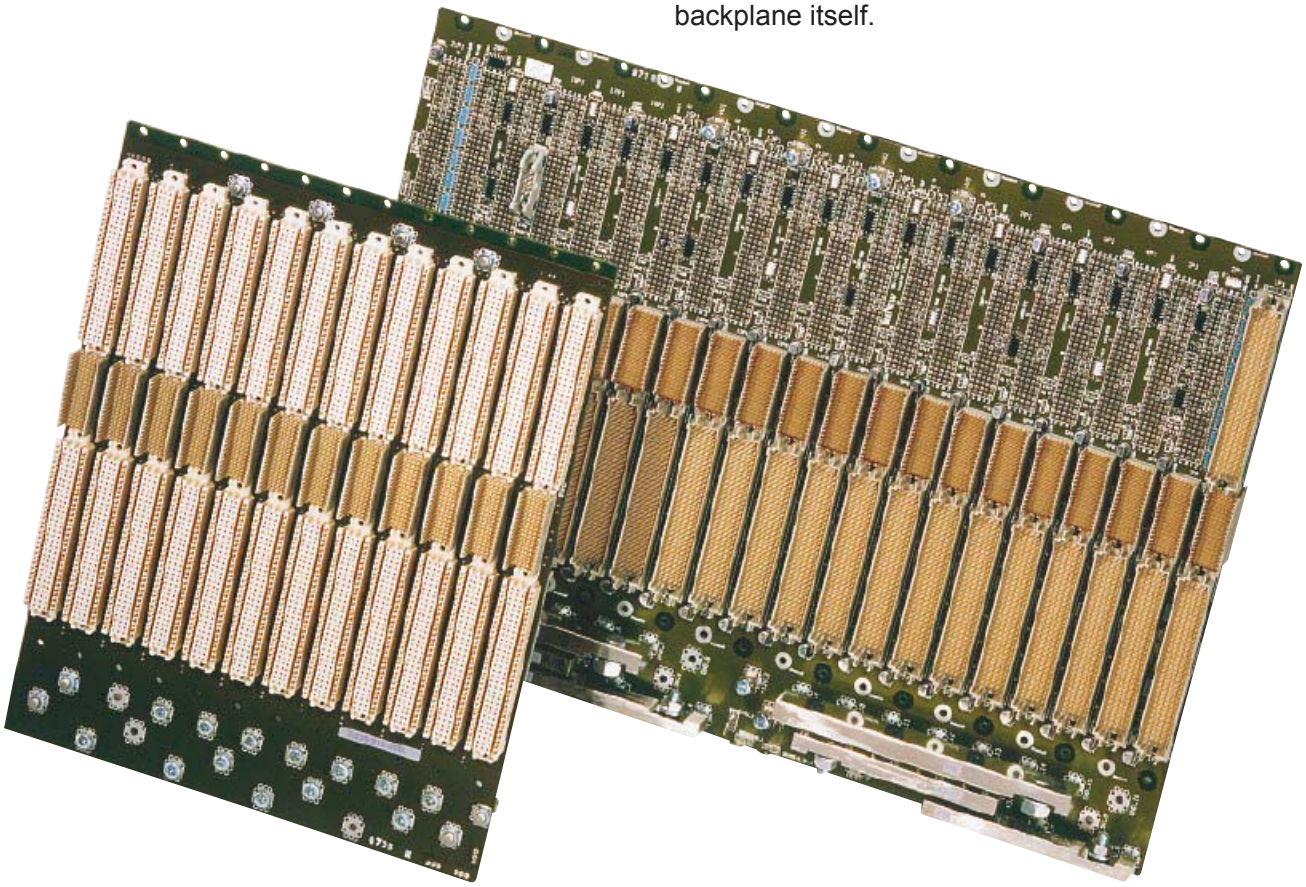
All connectors used for *CompactPCI*® are based on a 7 column pitch. The inner 5 columns are used for logic signals and power. The outer columns on either side are reserved for shielding or ground.

PICMG®

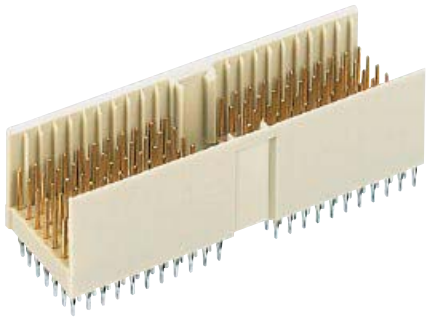
Executive Member

The VMEbus has evolved over a period of more than 25 years to become the leading bus architecture in open industrial applications. The specification is an ANSI norm, the original specification has been extended to become a draft standard VME64x ANSI/VITA 1.1-1997. This draft standard includes the specification for the 5-row DIN compatible connector (IEC 61076-4-113) and for a centre connector J0/P0 on 6U VME cards, which is identical to J3/P3 in *CompactPCI*® systems.

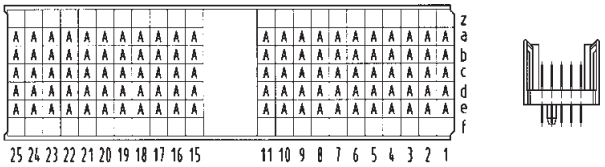
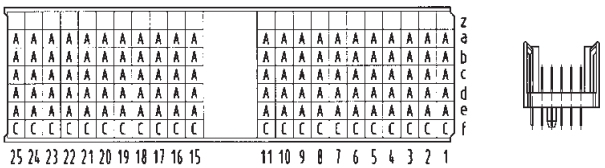
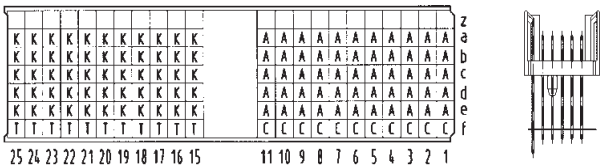
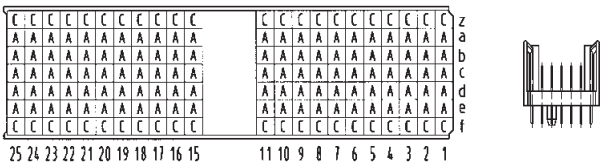
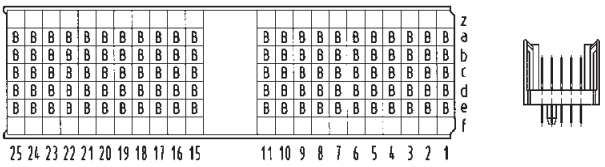
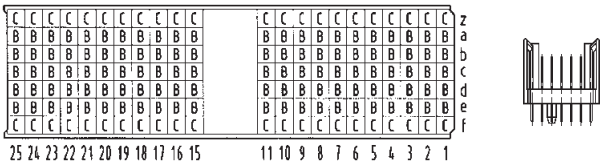
In VMEbus systems it is possible to use custom connectors in the J0/P0 area (e.g. coax connectors). To prevent problems with non-mating backplanes it is strongly recommended to use front panel keying. The IEEE 1101 documents J0/P0 can also be used with rear transition modules for pluggable I/O cabling. As mentioned above, the contacts on this connector may be bussed. One example is the ATM CellBus, which is in the process of being standardised. The bus on J0/P0 connectors might actually be a plug-on mezzanine backplane rather than conducting traces integrated into the backplane itself.



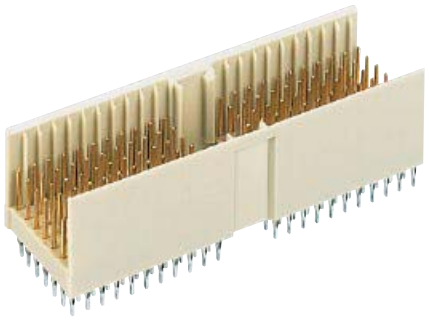
The 2.0 mm J0/P0 connector in VME64x systems is used for additional I/O, for new high speed sub busses or I/O for mezzanine modules, e.g. IPmodules on VMEbus boards. The connector is placed on the Eurocard to work in combination with the non-metric original VMEbus connectors DIN 41612 type C or the newer 5-row connector har-bus® 64. The mounting location and dimensions for the J0/P0 VMEbus connector (IEC 61076-4-101) is specified in IEEE 1101.11. The VMEbus 2.0 mm connector uses 5 columns of signal contacts and optional two additional outer columns on either side for shielding. All 95 signal contacts are user defined.



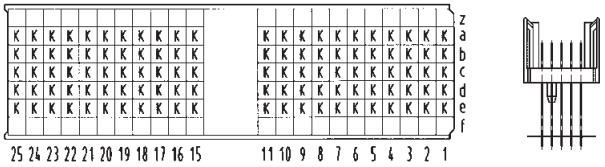
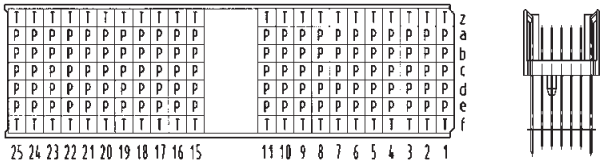
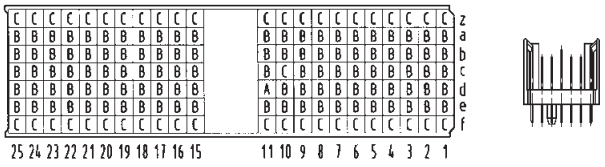
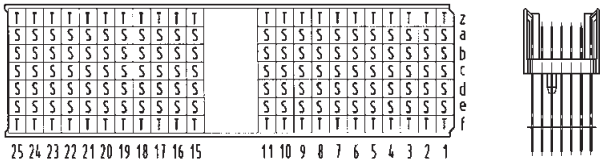
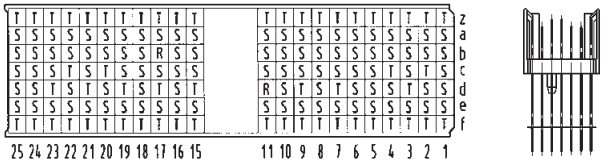
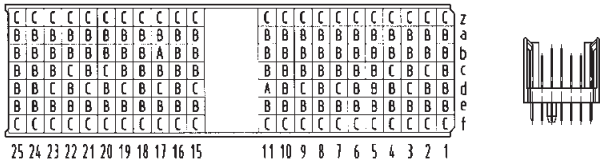
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type A	110	8.2	3.7	17 01 110 1201 **17 01 110 2201**	
Type A	132	8.2/ 11.2	3.7	17 01 132 1203 **17 01 132 2203**	
Type A	132	8.2/ 11.2	3.7/ 13.0/ 16.0	17 01 132 1007 **17 01 132 2007**	
Type A	154	8.2/ 11.2	3.7	17 01 154 1201 **17 01 154 2201**	
Type A	110	9.7	3.7	17 01 110 1204 **17 01 110 2204**	
Type A	154	9.7/ 11.2	3.7	17 01 154 1205 **17 01 154 2205**	

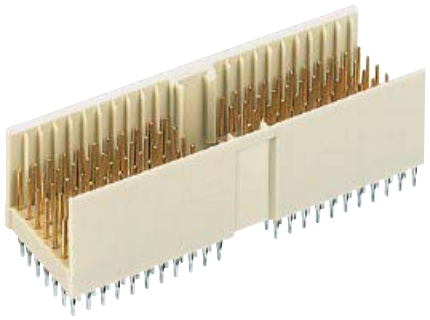
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.14



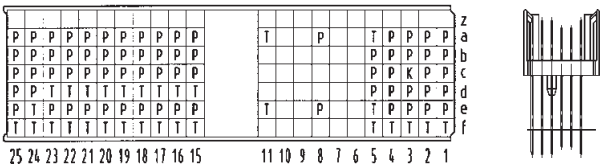
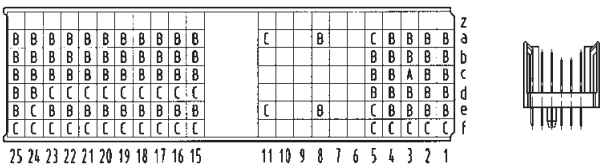
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type A	110	8.2	13.0	17 01 110 1402 **17 01 110 2402**	
Type A	154	9.7/ 11.2	14.5/ 16.0	17 01 154 1001 **17 01 154 2001**	
Type A CompactPCI Position P1	154	8.2/ 9.7/ 11.2	3.7	17 01 154 1203 **17 01 154 2203**	
Type A CompactPCI Position P4	154	9.7/ 11.2	16.0	17 01 154 1604 **17 01 154 2604**	
Type A CompactPCI Position P4	154	8.2/ 9.7/ 11.2	16.0	17 01 154 1603 **17 01 154 2603**	
Type A CompactPCI hot swap Position P1	154	8.2/ 9.7/ 11.2	3.7	17 01 154 1204 **17 01 154 2204**	

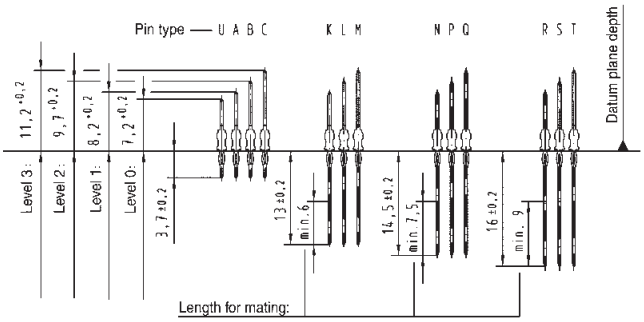
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.14



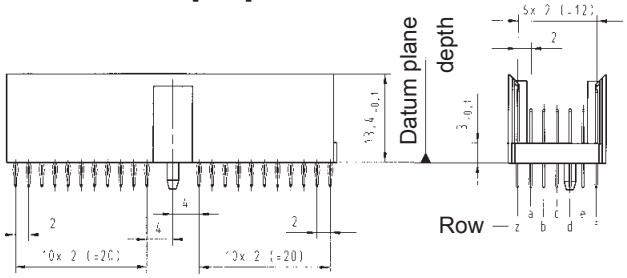
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type A CompactPCI computer telephony Position P4	100	8.2/ 9.7/ 11.2	13.0/ 14.5/ 16.0	17 01 100 1001 **17 01 100 2001**	
Type A CompactPCI computer telephony Position P4	100	8.2/ 9.7/ 11.2	3.7	17 01 100 1201 **17 01 100 2201**	

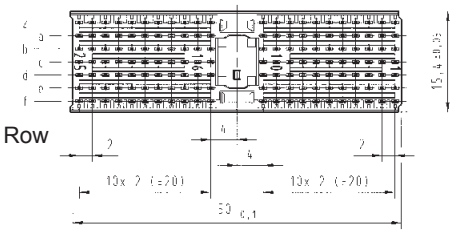
Contact dimensions [mm]



Connector dimensions [mm]



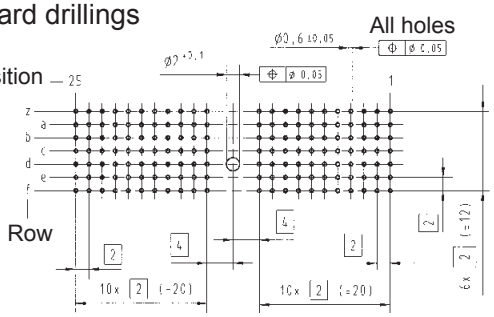
Position — 25



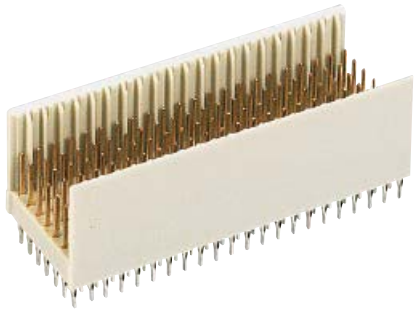
Board drillings

All holes

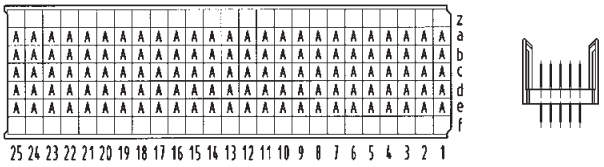
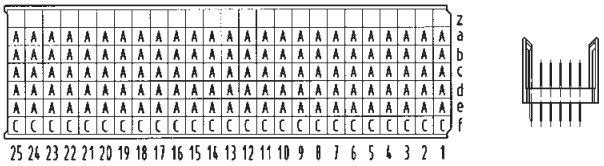
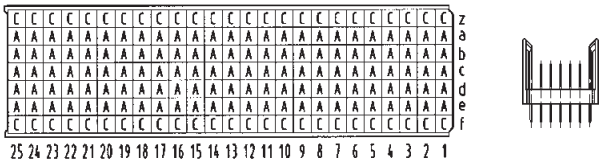
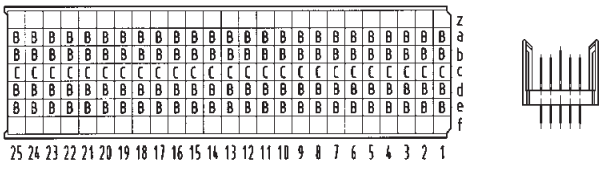
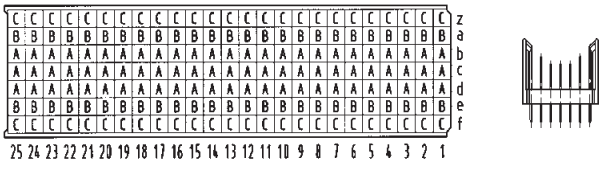
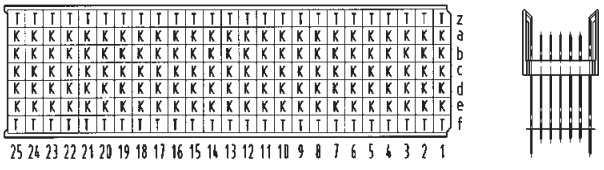
Position — 25



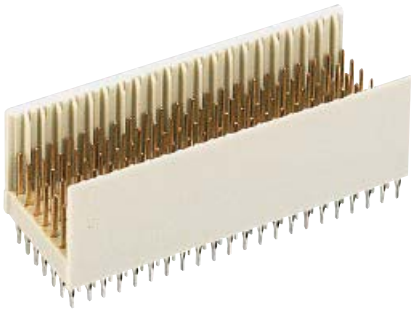
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



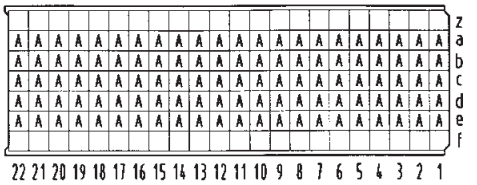
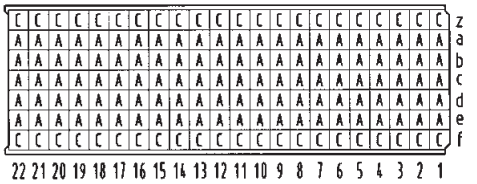
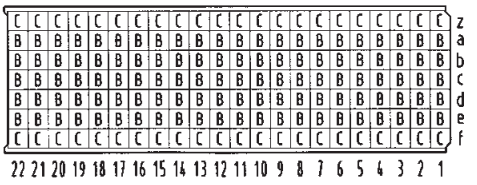
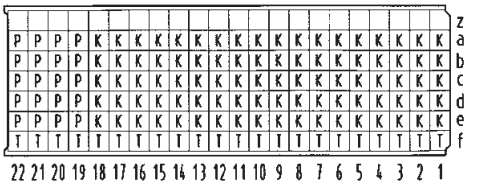
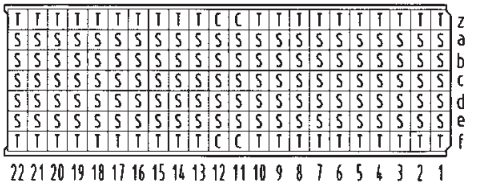
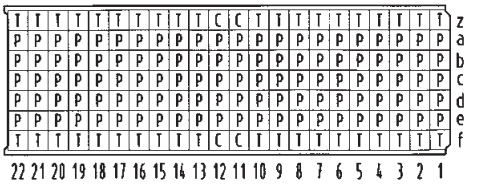
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type B_{25}	125	8.2	3.7	17 02 125 1201 **17 02 125 2201**	
Type B_{25}	150	8.2/ 11.2	3.7	17 02 150 1201 **17 02 150 2201**	
Type B_{25}	175	8.2/ 11.2	3.7	17 02 175 1201 **17 02 175 2201**	
Type B_{25}	125	9.7/ 11.2	3.7	17 02 125 1205 **17 02 125 2205**	
Type B_{25}	175	8.2/ 9.7/ 11.2	3.7	17 02 175 1202 **17 02 175 2202**	
Type B_{25}	175	8.2/ 11.2	13.0/ 16.0	17 02 175 1006 **17 02 175 2006**	

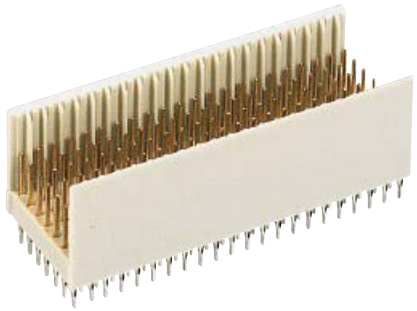
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.18



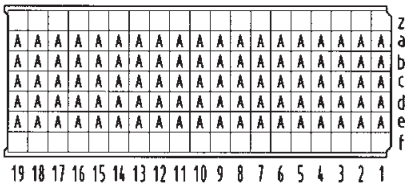
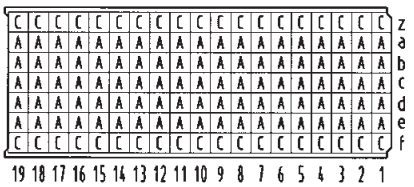
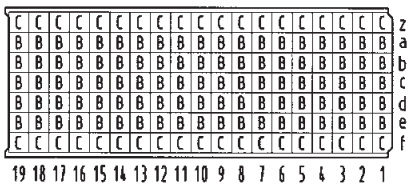
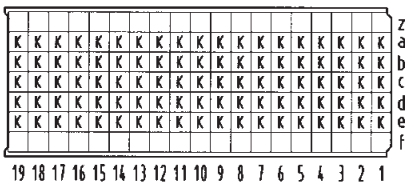
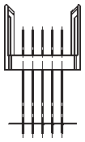
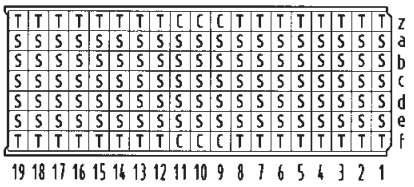
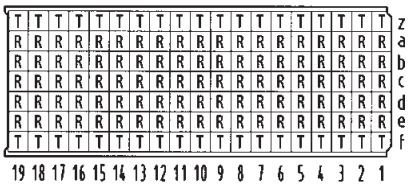
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type B_{22}	110	8.2	3.7	17 04 110 1201 **17 04 110 2201**	 
Type B_{22}	154	8.2/ 11.2	3.7	17 04 154 1201 **17 04 154 2201**	 
Type B_{22} CompactPCI Position P2	154	9.7/ 11.2	3.7	17 04 154 1203 **17 04 154 2203**	 
Type B_{22} CompactPCI computer telephony	132	8.2/ 9.7/ 11.2	13.0/ 14.5/ 16.0	17 04 132 1001 **17 04 132 2001**	 
Type B_{22} CompactPCI AB friendly	154	9.7/ 11.2	3.7/ 16.0	17 04 154 1010 **17 04 154 2010**	 
Type B_{22} CompactPCI AB friendly	154	9.7/ 11.2	3.7/ 14.5/ 16.0	17 04 154 1002 **17 04 154 2002**	 

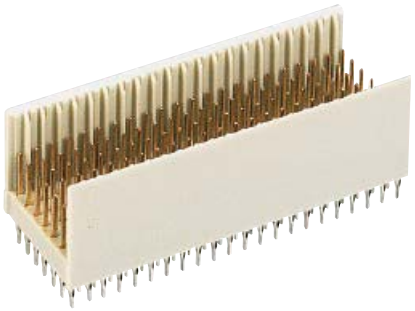
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.18



Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration	
Type B_{19} VME Position J0	95	8.2	3.7	17 05 095 1201 **17 05 095 2201**		
Type B_{19} VME Position J0	133	8.2/ 11.2	3.7	17 05 133 1201 **17 05 133 2201**		
Type B_{19} VME Position J0	133	9.7/ 11.2	3.7	17 05 133 1203 **17 05 133 2203**		
Type B_{19} VME Position J0	95	8.2	13.0	17 05 095 1401 **17 05 095 2401**		
Type B_{19} CompactPCI AB friendly Position P3	133	9.7/ 11.2	3.7/ 16.0	17 05 133 1005 **17 05 133 2005**		
Type B_{19} Compact PCI Position P3 VME Position J0	133	8.2/ 11.2	16.0	17 05 133 1602 **17 05 133 2602**		

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.18

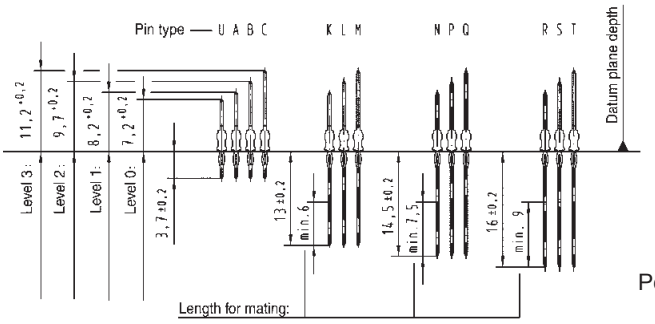


Male connectors, straight

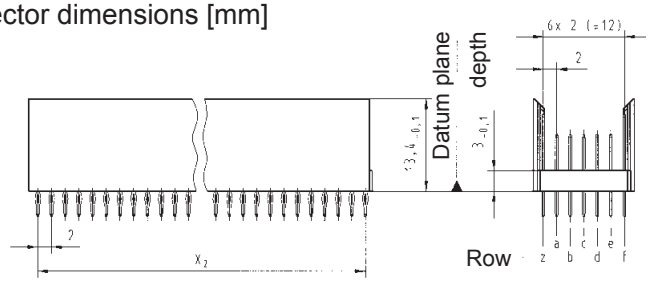
Drawing

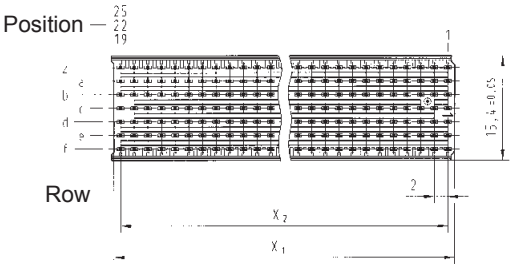
Dimensions in mm

Contact dimensions [mm]

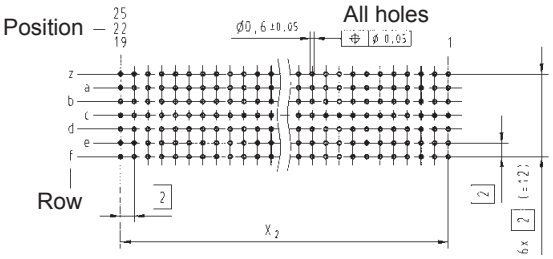


Connector dimensions [mm]

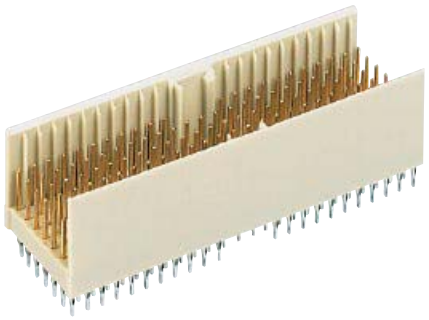




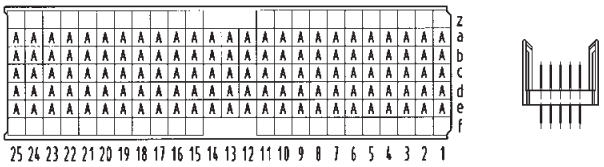
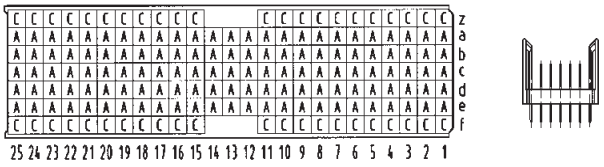
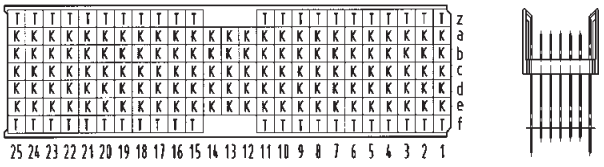
Board drillings



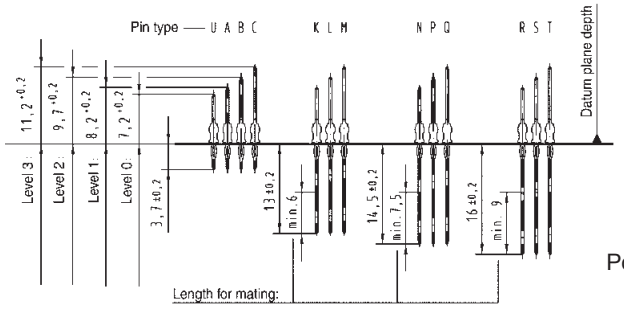
Contact positions	x_1	x_2
19	37.9	18 x 2 (= 36)
22	43.9	21 x 2 (= 42)
25	49.9	24 x 2 (= 48)



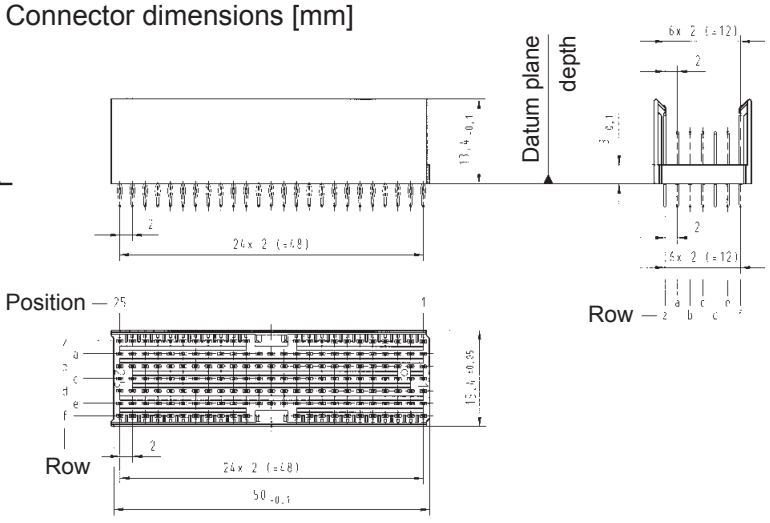
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type AB25	125	8.2	3.7	17 15 125 1201 **17 15 125 2201**	
Type AB25	169	8.2/ 11.2	3.7	17 15 169 1201 **17 15 169 2201**	
Type AB25	169	8.2/ 11.2	13.0/ 16.0	17 15 169 1003 **17 15 169 2003**	

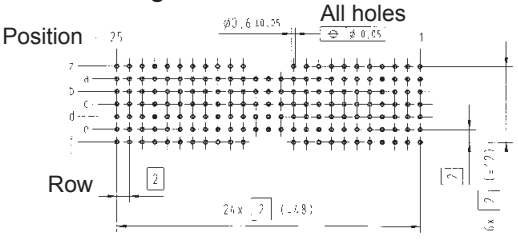
Contact dimensions [mm]



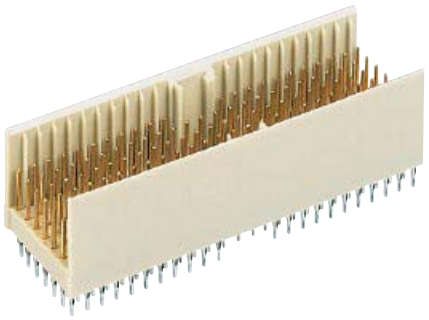
Connector dimensions [mm]



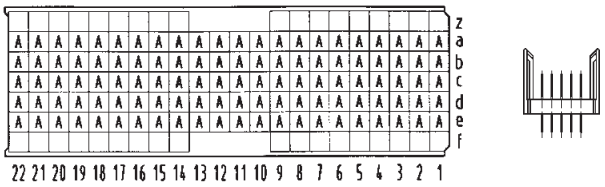
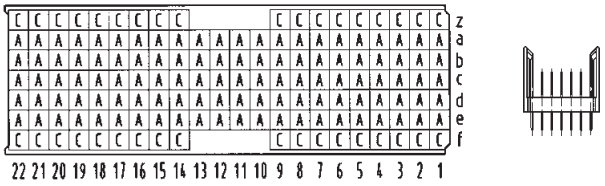
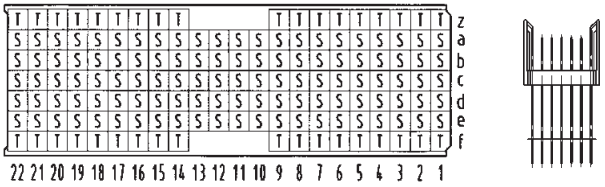
Board drillings



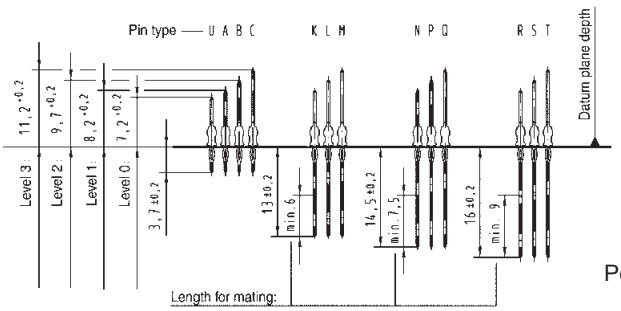
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



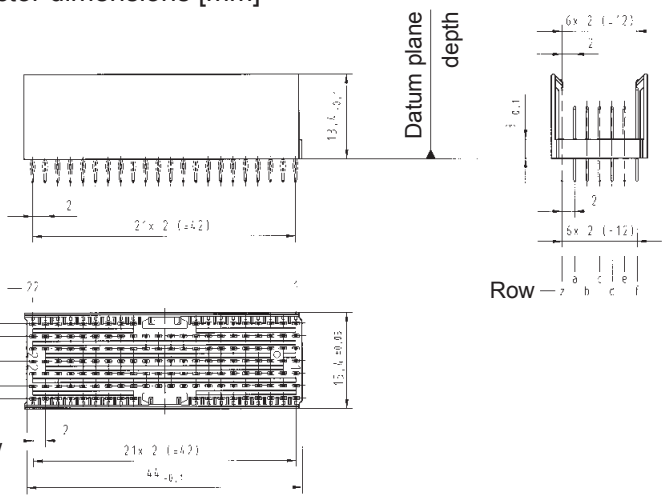
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type AB22	110	8.2	3.7	17 14 110 1201 **17 14 110 2201**	
Type AB22	146	8.2/ 11.2	3.7	17 14 146 1201 **17 14 146 2201**	
Type AB22	146	9.7/ 11.2	16.0	17 14 146 1601 **17 14 146 2601**	

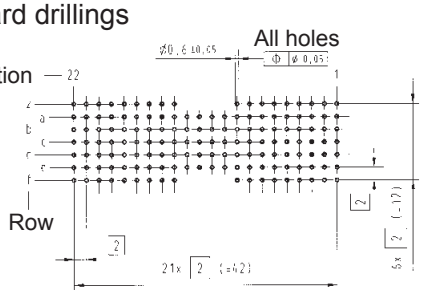
Contact dimensions [mm]



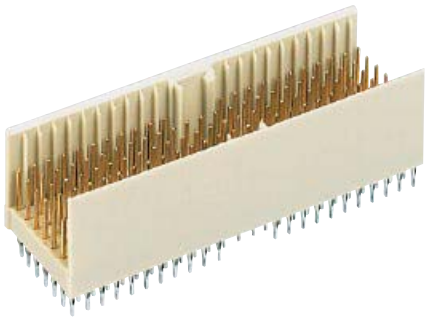
Connector dimensions [mm]



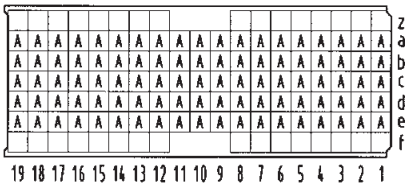
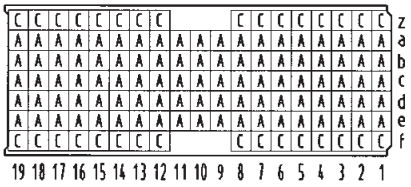
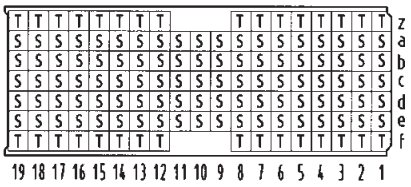
Board drillings



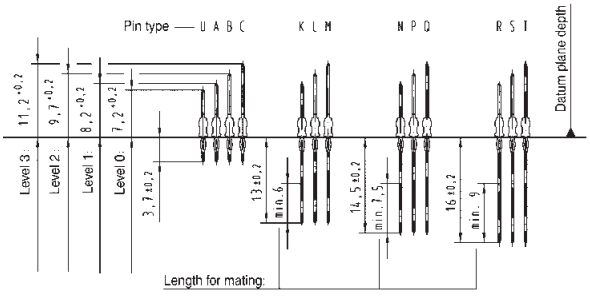
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



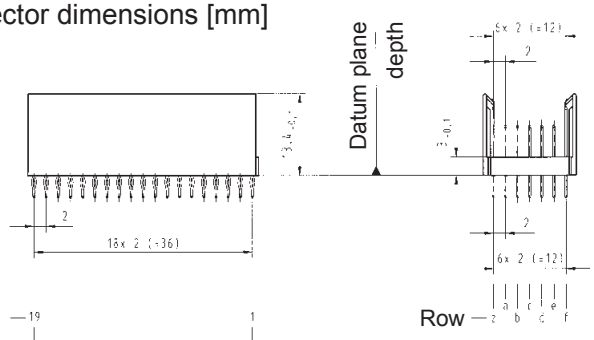
Male connectors, straight

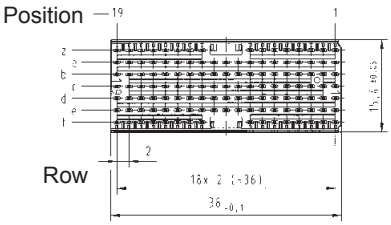
Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type AB19	95	8.2	3.7	17 13 095 1201 **17 13 095 2201**	 
Type AB19	127	8.2/ 11.2	3.7	17 13 127 1201 **17 13 127 2201**	 
Type AB19	127	9.7/ 11.2	16.0	17 13 127 1601 **17 13 127 2601**	 

Contact dimensions [mm]

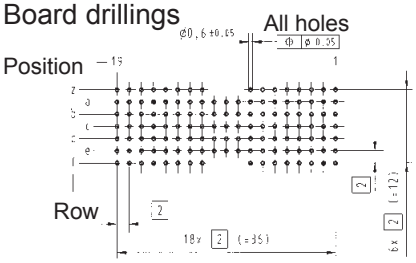


Connector dimensions [mm]



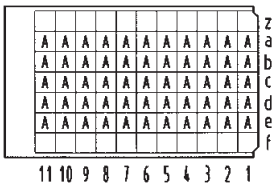
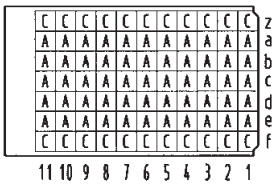
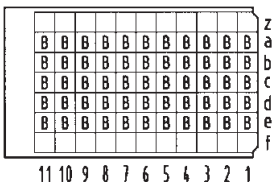
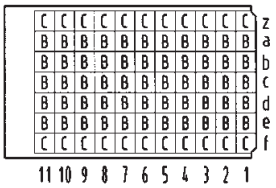
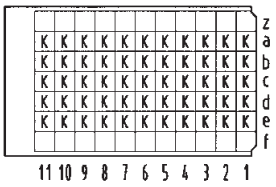
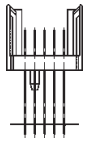
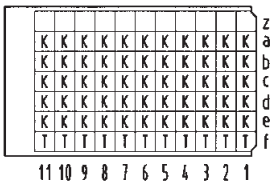
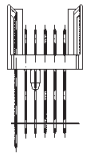


Board drillings



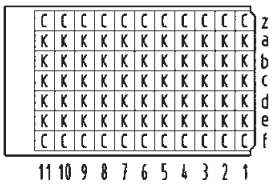
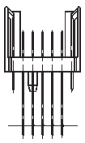
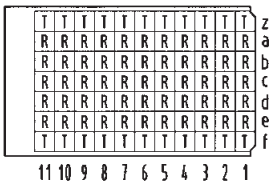
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

Male connectors, straight

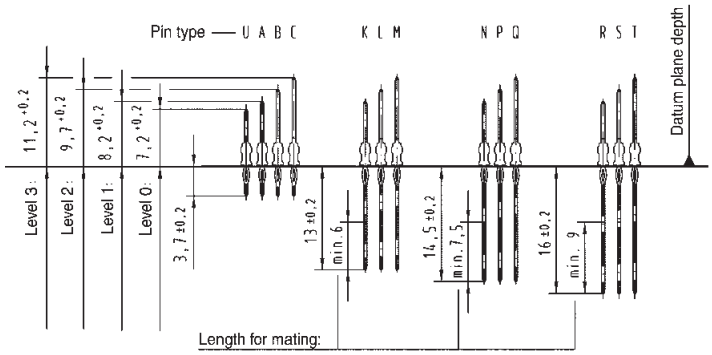
Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration	
Type C	55	8.2	3.7	17 03 055 1201 **17 03 055 2201**		
Type C	77	8.2/ 11.2	3.7	17 03 077 1201 **17 03 077 2201**		
Type C	55	9.7	3.7	17 03 055 1202 **17 03 055 2202**		
Type C	77	9.7/ 11.2	3.7	17 03 077 1202 **17 03 077 2202**		
Type C	55	8.2	13.0	17 03 055 1401 **17 03 055 2401**		
Type C	66	8.2/ 11.2	13.0/ 16.0	17 03 066 1001 **17 03 066 2001**		

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.23

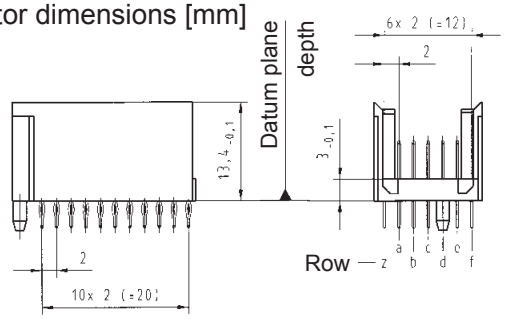
Male connectors, straight

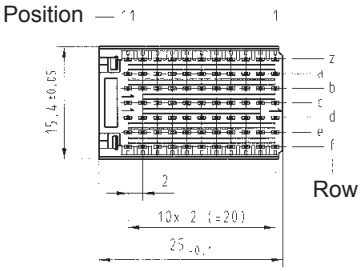
Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type C	77	8.2/ 11.2	3.7/ 13.0	17 03 077 1001 **17 03 077 2001**	 
Type C	77	8.2/ 11.2	16.0	17 03 077 1601 **17 03 077 2601**	 

Contact dimensions [mm]

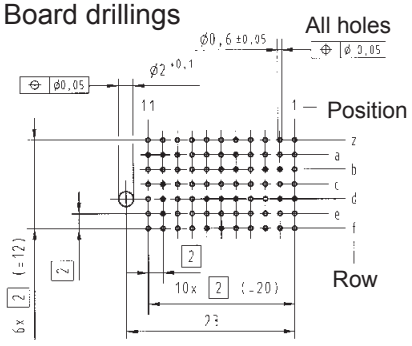


Connector dimensions [mm]

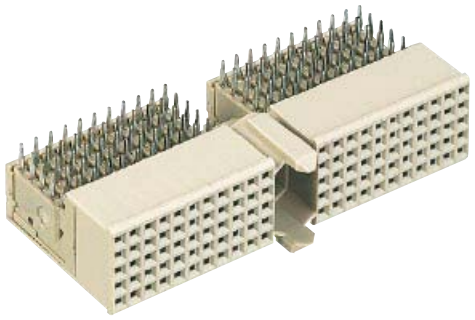




Board drillings



Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

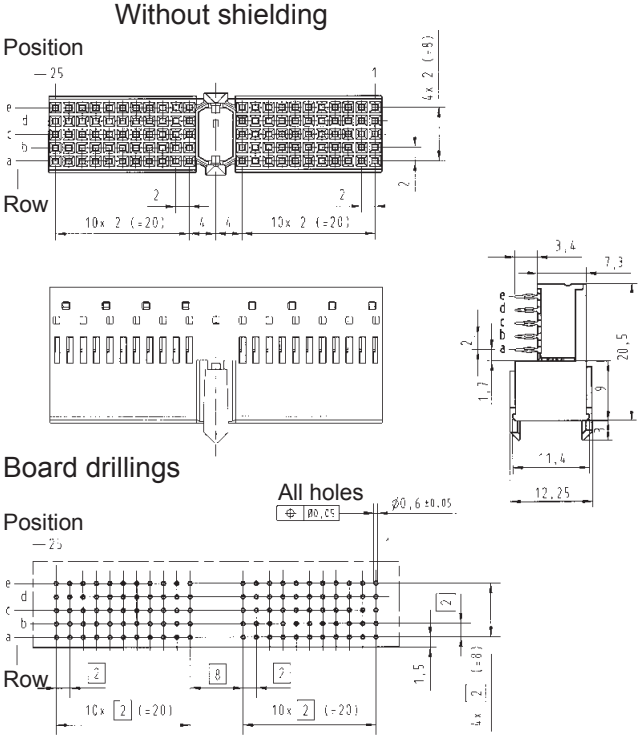


Female connectors, angled

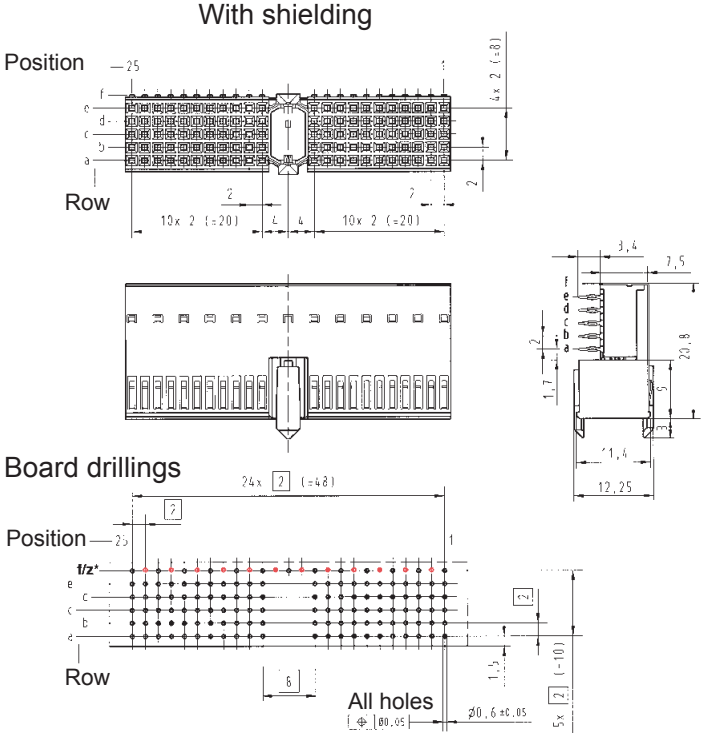
Identification	No. of contacts	Contact length [mm] termination side	Part number
Type A	110	3.4	17 21 110 1101 **17 21 110 2101**
Type A with upper shield CompactPCI Positions J1, J4	110	3.4	17 21 110 1102 **17 21 110 2102**
Lower shield for type A connectors			17 21 000 4102
Type A with split upper shield CompactPCI computer telephony Position J4	90	3.4	17 21 090 1103 **17 21 090 2103**
Lower shield for type A connectors (rows 1 – 5) CompactPCI computer telephony			17 29 000 4102
Lower shield for type A connectors (rows 15 – 25) CompactPCI computer telephony			17 23 000 4102

Dimensions [mm]

Without shielding

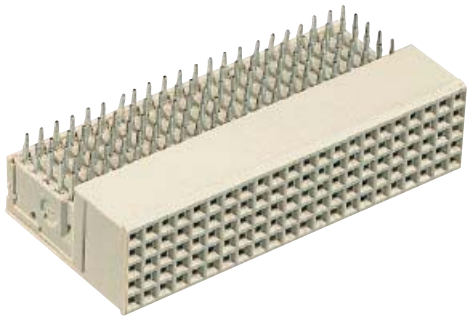


With shielding



Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

* hole on even contact numbers only needed for lower shielding



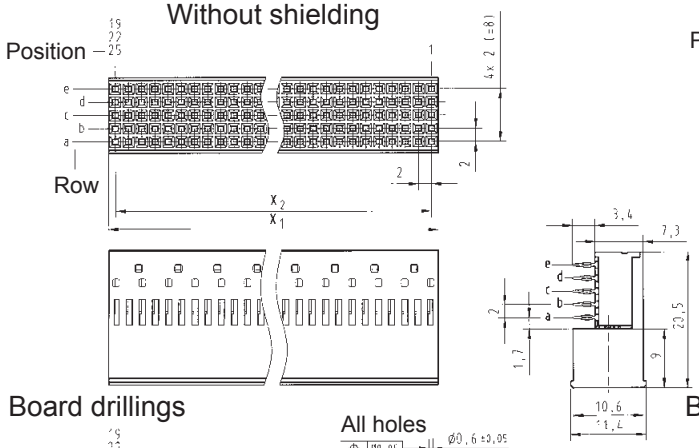
Female connectors, angled

Identification	No. of contacts	Contact length [mm] termination side	Part number
Type B_{19} VME, Position P0	95	3.4	17 25 095 1101 **17 25 095 2101**
Type B_{19} with upper shield CompactPCI, Position J3 – VME, Position P0	95	3.4	17 25 095 1102 **17 25 095 2102**
Lower shield for type B_{19} connectors			17 25 000 4102
Type B_{22}	110	3.4	17 24 110 1101 **17 24 110 2101**
Type B_{22} with upper shield CompactPCI, Positions J2, J5	110	3.4	17 24 110 1102 **17 24 110 2102**
Lower shield for type B_{22} connectors			17 24 000 4102
Type B_{25}	125	3.4	17 22 125 1101 **17 22 125 2101**
Type B_{25} with upper shield	125	3.4	17 22 125 1102 **17 22 125 2102**
Lower shield for type B_{25} connectors			17 22 000 4102

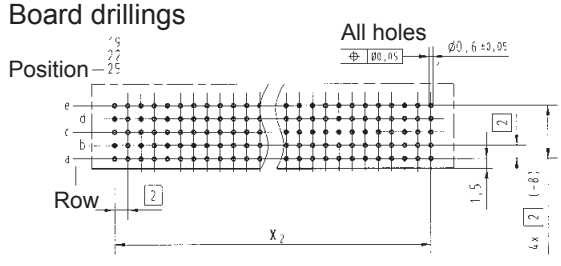
Dimensions [mm]

Contact positions	x_1	x_2
19	37.9	18 x 2 (= 36)
22	43.9	21 x 2 (= 42)
25	49.9	24 x 2 (= 48)

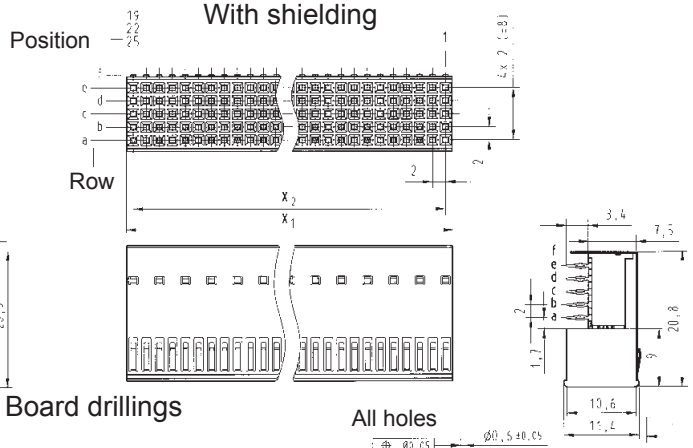
Without shielding



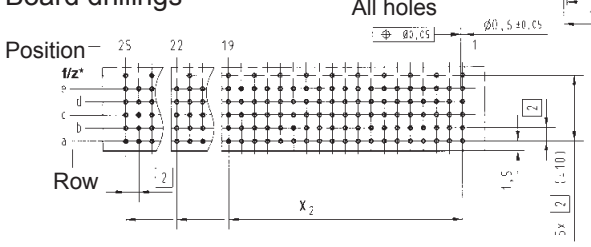
Board drillings



With shielding

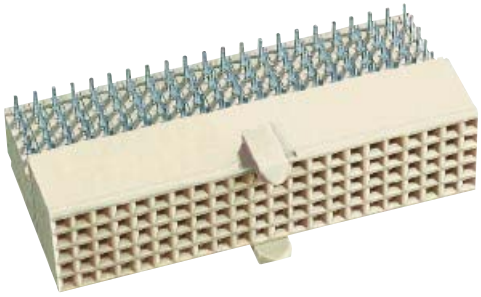


Board drillings



Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

* hole on even contact numbers only needed for lower shielding



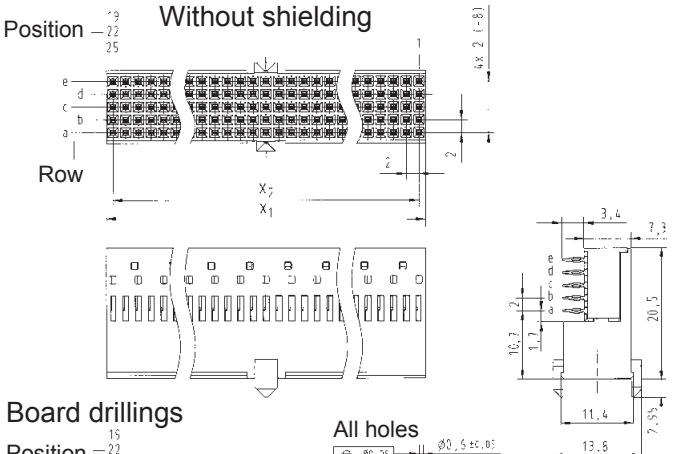
Female connectors, angled

Identification	No. of contacts	Contact length [mm] termination side	Part number
Type AB_{19}	95	3.4	17 33 095 1101 **17 33 095 2101**
Type AB_{19} with upper shield CompactPCI, Position RJ3	95	3.4	17 33 095 1102 **17 33 095 2102**
Lower shield for type AB_{19} connectors			17 33 000 4102
Type AB_{22}	110	3.4	17 34 110 1101 **17 34 110 2101**
Type AB_{22} with upper shield CompactPCI, Positions RJ2, RJ5	110	3.4	17 34 110 1102 **17 34 110 2102**
Lower shield for type AB_{22} connectors			17 34 000 4102
Type AB_{25}	125	3.4	17 35 125 1101 **17 35 125 2101**
Type AB_{25} with upper shield	125	3.4	17 35 125 1102 **17 35 125 2102**
Lower shield for type AB_{25} connectors			17 21 000 4102

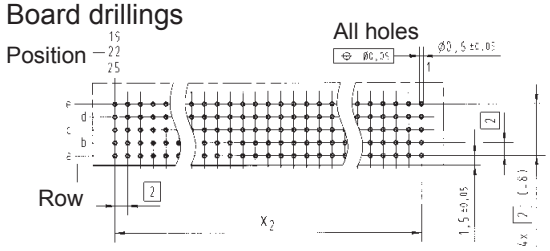
Dimensions [mm]

Contact positions	x_1	x_2
19	37.9	18 x 2 (= 36)
22	43.9	21 x 2 (= 42)
25	49.9	24 x 2 (= 48)

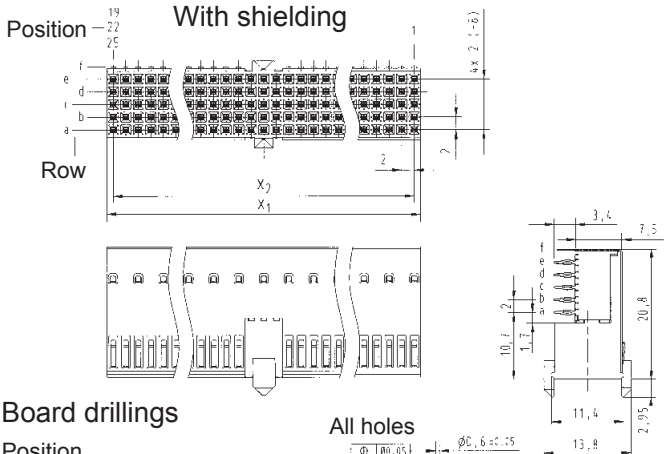
Without shielding



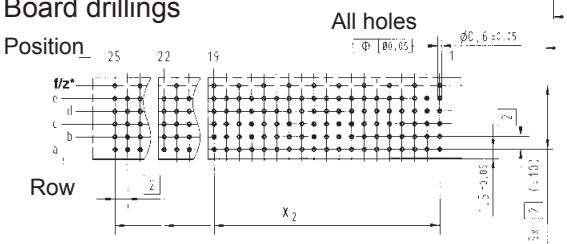
Board drillings



With shielding

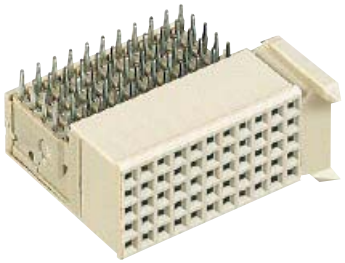


Board drillings



Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

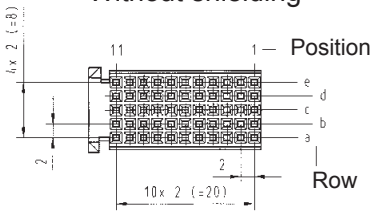
* hole on even contact numbers only needed for lower shielding

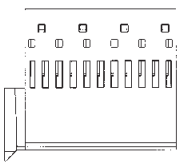


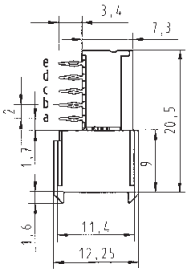
Female connectors, angled

Identification	No. of contacts	Contact length [mm] termination side	Part number
Type C	55	3.4	17 23 055 1101 **17 23 055 2101**
Type C with upper shield	55	3.4	17 23 055 1102 **17 23 055 2102**
Lower shield for type C connectors			17 23 000 4102

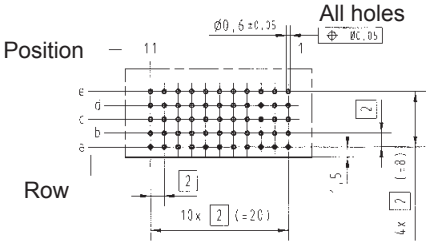
Without shielding



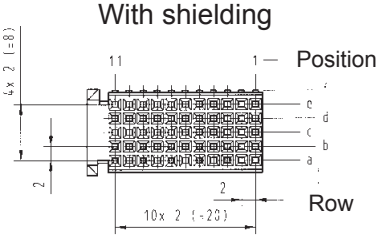


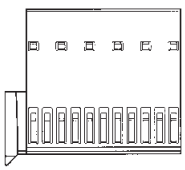


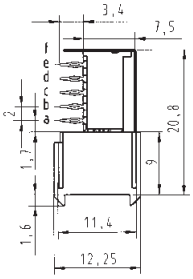
Board drillings



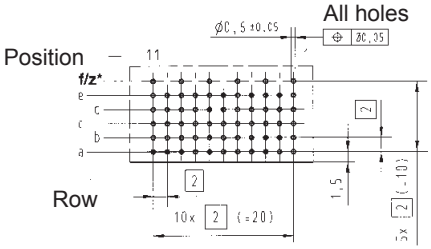
With shielding







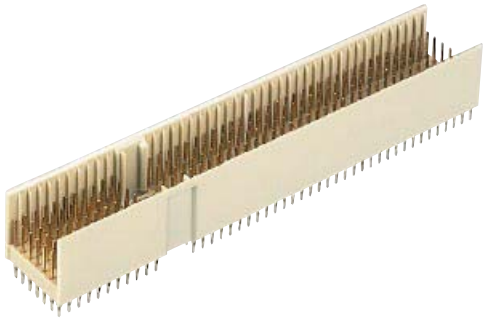
Board drillings



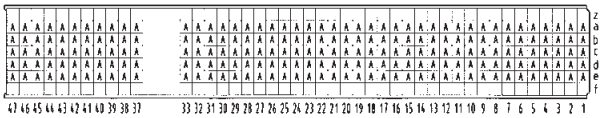
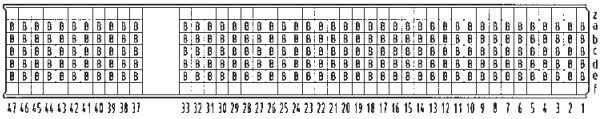
Dimensions [mm]

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

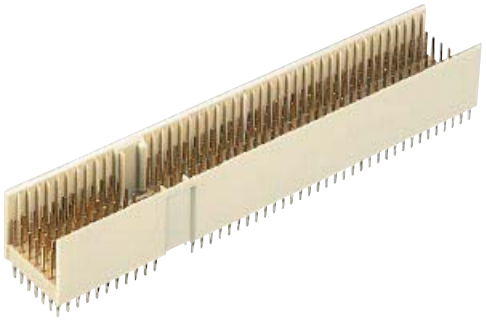
* hole on even contact numbers only needed for lower shielding



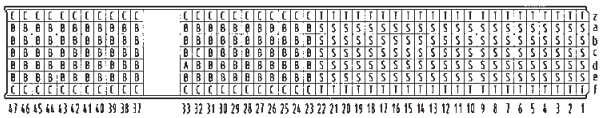
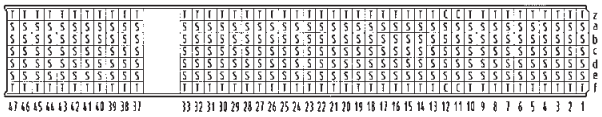
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type Monoblock 47	220	8.2	3.7	17 06 220 1201 **17 06 220 2201**	
Type Monoblock 47	308	8.2/ 11.2	3.7	17 06 308 1201 **17 06 308 2201**	
Type Monoblock 47	220	9.7	3.7	17 06 220 1202 **17 06 220 2202**	
Type Monoblock 47 CompactPCI Positions P1 and P2	308	8.2/ 9.7/ 11.2	3.7	17 06 308 1202 **17 06 308 2202**	
Type Monoblock 47 CompactPCI hot swap	308	8.2/ 9.7/ 11.2	3.7	17 06 308 1203 **17 06 308 2203**	
Type Monoblock 47 CompactPCI computer telephony	232	8.2/ 9.7/ 11.2	3.7	17 06 232 1201 **17 06 232 2201**	

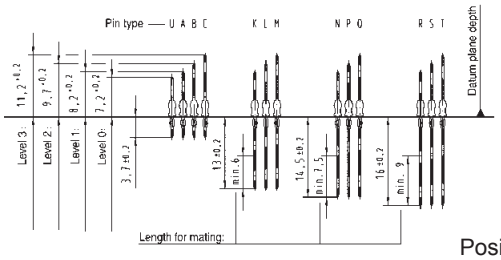
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2
Connector dimensions see page 00.29



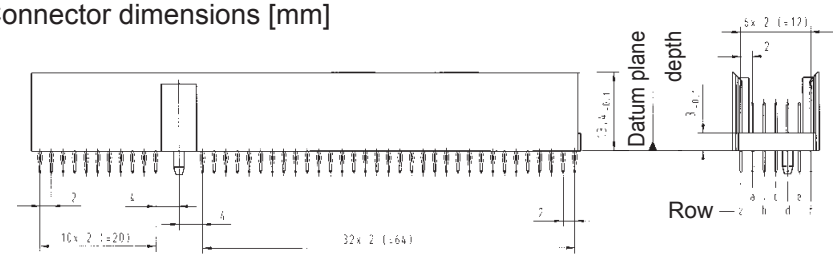
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type Monoblock 47 CompactPCI I/O	308	8.2/ 9.7/ 11.2	3.7/ 16.0	17 06 308 1001 **17 06 308 2001**	
Type Monoblock 47 CompactPCI AB friendly Positions P4 and P5	308	9.7/ 11.2	3.7/ 16.0	17 06 308 1005 **17 06 308 2005**	

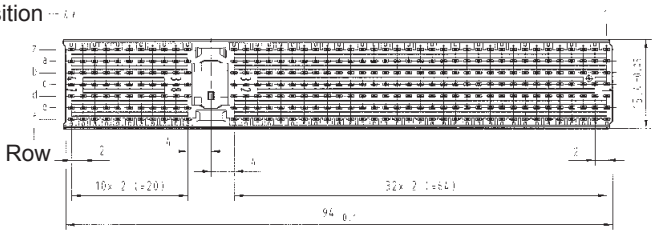
Contact dimensions [mm]



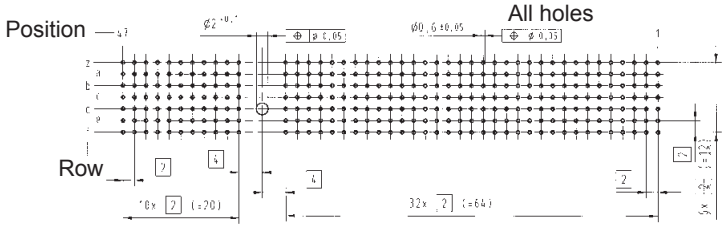
Connector dimensions [mm]



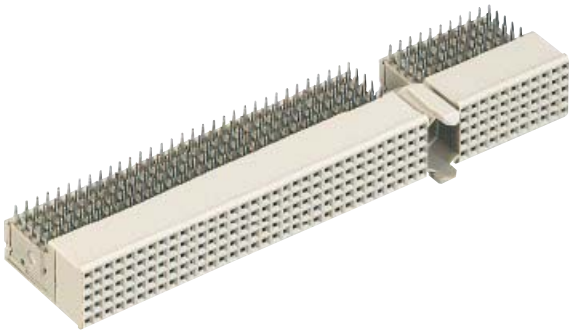
Position —



Board drillings



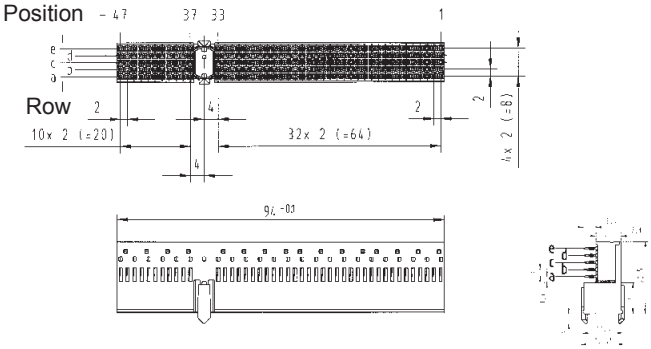
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



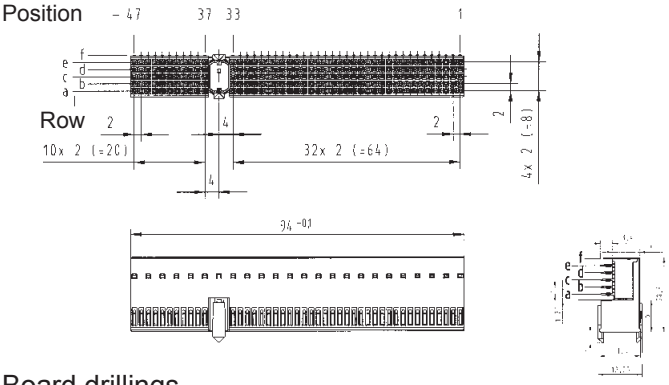
Female connectors, angled

Identification	No. of contacts	Contact length [mm] termination side	Part number
Type Monoblock 47	220	3.4	17 26 220 1101 **17 26 220 2101**
Type Monoblock 47 with upper shield	220	3.4	17 26 220 1102 **17 26 220 2102**
Type Monoblock 47 with upper shield CompactPCI computer telephony	200	3.4	17 26 200 1103 **17 26 200 2103**
Lower shield for type Monoblock 47 connectors			17 26 000 4102
Lower shield for type Monoblock 47 connectors (rows 1 – 22) CompactPCI computer telephony			17 24 000 4102
Lower shield for type Monoblock 47 connectors (rows 23 – 27) CompactPCI computer telephony			17 29 000 4102
Lower shield for type Monoblock 47 connectors (rows 37 – 47) CompactPCI computer telephony			17 23 000 4102

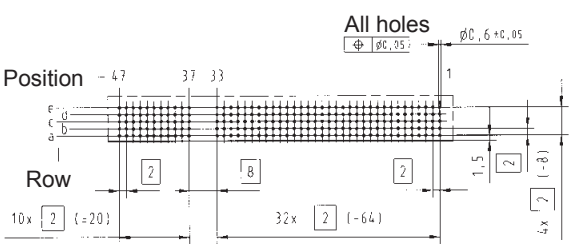
Without shielding



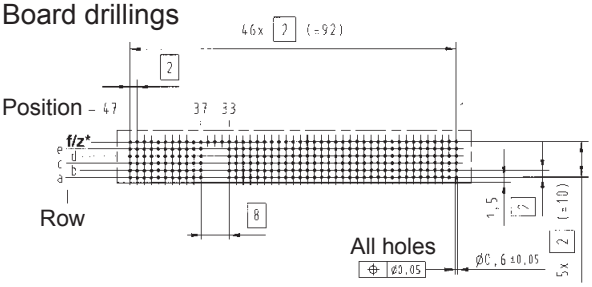
With shielding



Board drillings



Board drillings

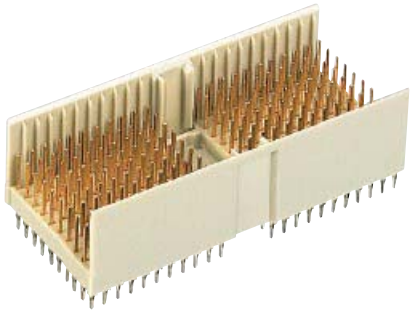


Dimensions [mm]

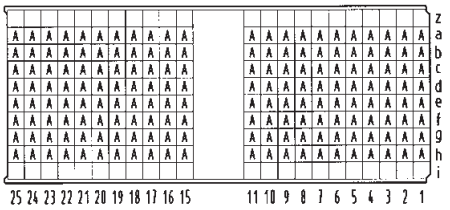
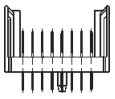
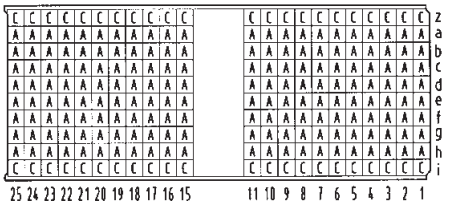
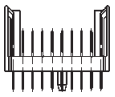
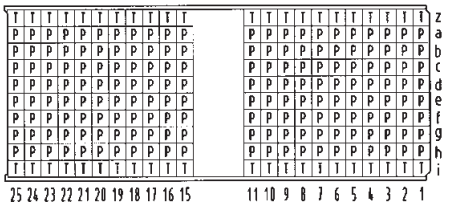
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

* hole on even contact numbers only needed for lower shielding

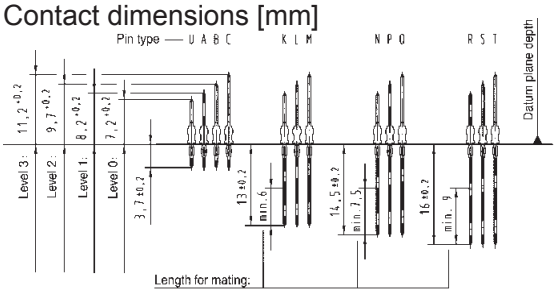
Notes



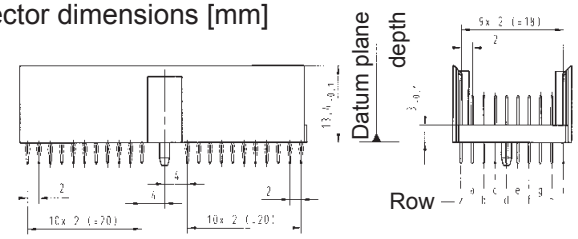
Male connectors, straight

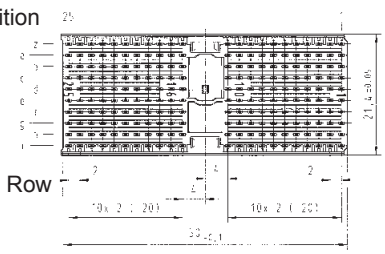
Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type D	176	8.2	3.7	17 11 176 1201 **17 11 176 2201**	 
Type D	220	8.2/ 11.2	3.7	17 11 220 1201 **17 11 220 2201**	 
Type D	220	9.7/ 11.2	14.5/ 16.0	17 11 220 1001 **17 11 220 2001**	 

Contact dimensions [mm]

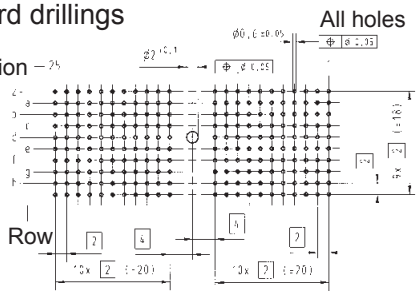


Connector dimensions [mm]

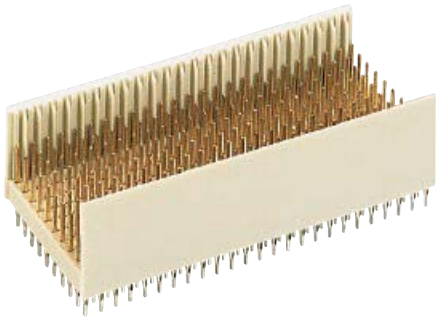




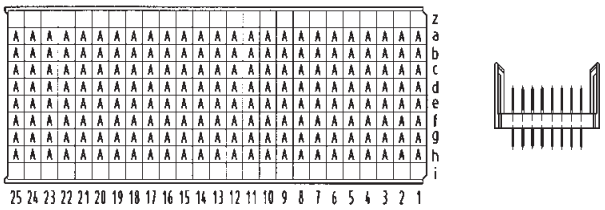
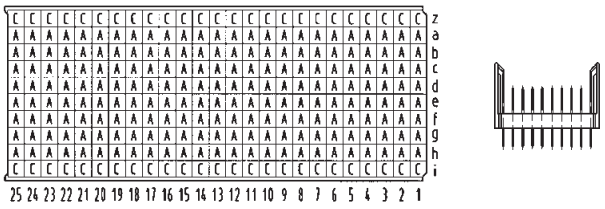
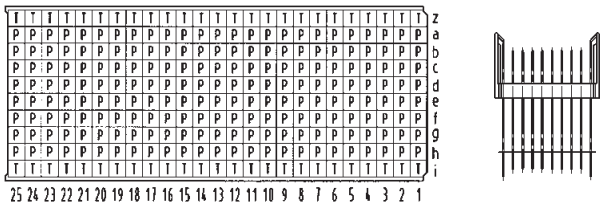
Board drillings



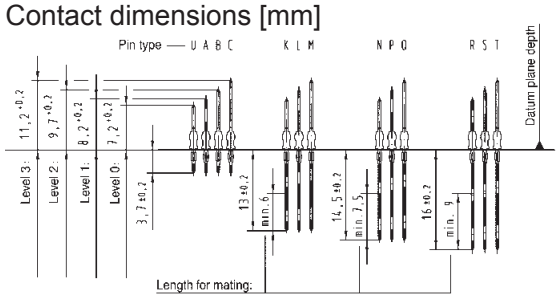
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



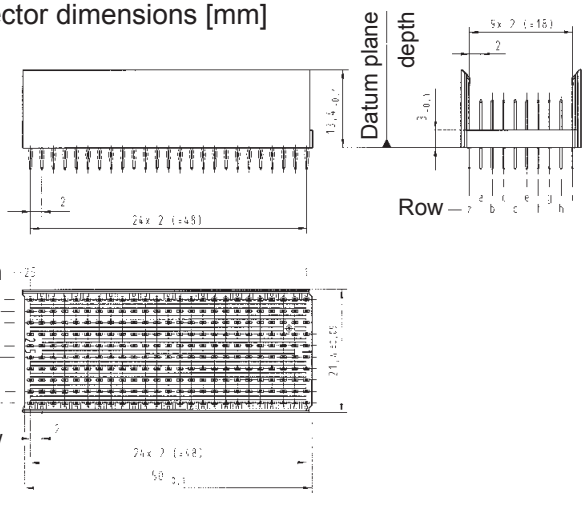
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type E	200	8.2	3.7	17 12 200 1201 **17 12 200 2201**	
Type E	250	8.2/ 11.2	3.7	17 12 250 1201 **17 12 250 2201**	
Type E	250	9.7/ 11.2	14.5/ 16.0	17 12 250 1001 **17 12 250 2001**	

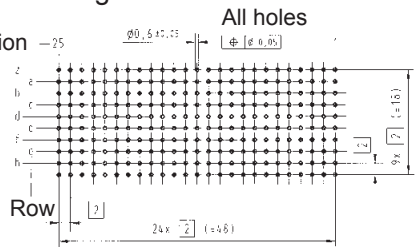
Contact dimensions [mm]



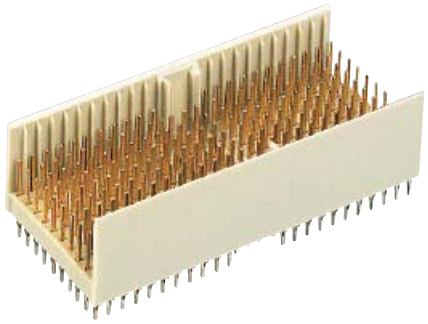
Connector dimensions [mm]



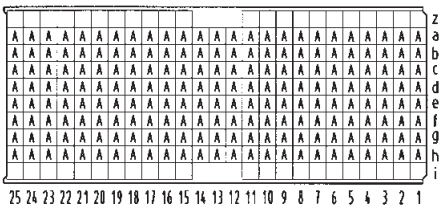
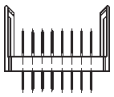
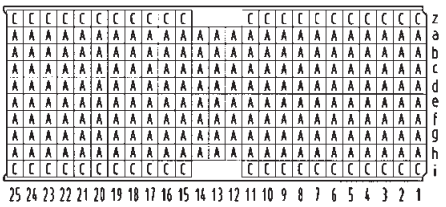
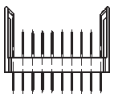
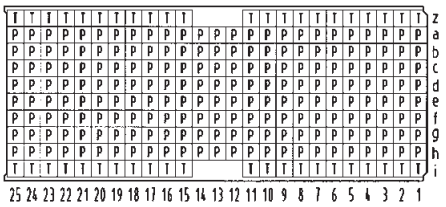
Board drillings



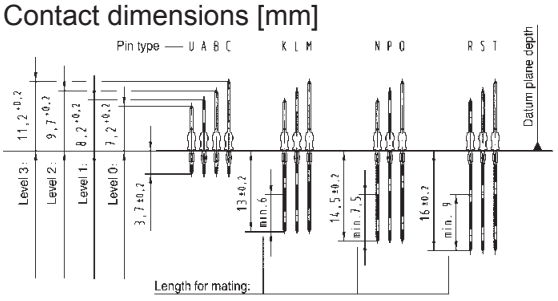
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



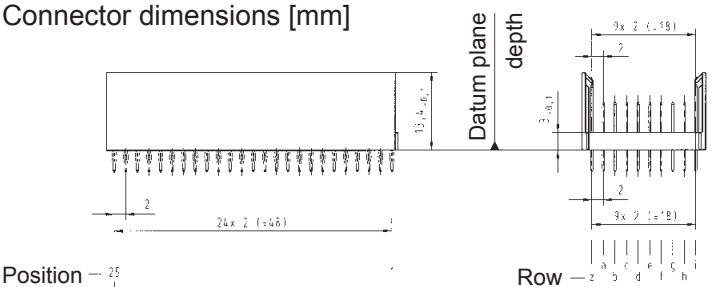
Male connectors, straight

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Type DE	200	8.2	3.7	17 10 200 1201 **17 10 200 2201**	 
Type DE	244	8.2/ 11.2	3.7	17 10 244 1201 **17 10 244 2201**	 
Type DE	244	9.7/ 11.2	14.5/ 16.0	17 10 244 1001 **17 10 244 2001**	 

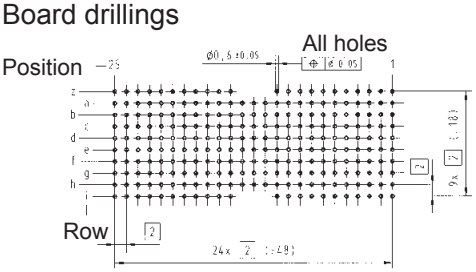
Contact dimensions [mm]



Connector dimensions [mm]



Board drillings



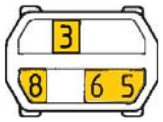
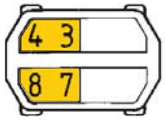
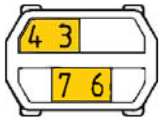
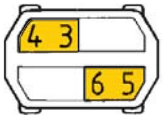
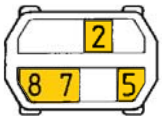
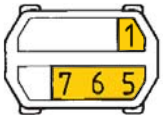
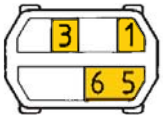
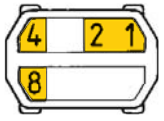
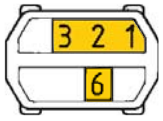
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

Coding keys are used to prevent mismating of boards. They can be inserted into the multifunctional area of male and female connectors with special tooling. This can be easily done after the connectors have been pressed in.

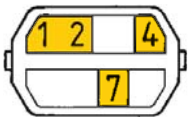
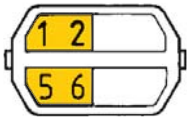
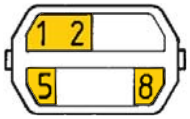
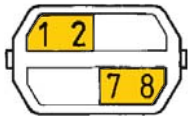
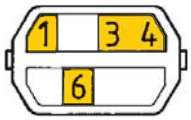
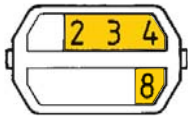
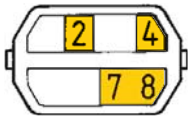
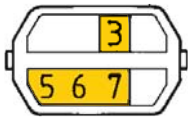
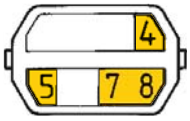
Coding keys have different bright and pre-defined RAL colours to simplify the identification. In the table below the colours and code numbers in acc. with the IEC 61076-4-101 are listed. They are used for the following applications:

- Cadmium yellow for CompactPCI to identify 3.3 V bus signalling
- Brilliant blue for CompactPCI to identify 5.0 V bus signalling
- Reseda green to prevent accidental board insertion in VME64x on CompactPCI applications
- Strawberry red to prevent accidental board insertion in telephony applications
- Pastel orange for user defined bus
- Nut brown for rear I/O and user I/O

Coding keys for male connectors

Coding key	Code number	Colour	Part number
	3568	Pastel orange RAL 2003	17 79 000 0010
	3478	Steel blue RAL 5011	17 79 000 0011
	3467	Slate grey RAL 7015	17 79 000 0012
	3456	Cadmium yellow RAL 1021 for CPCI, 3.3 V	17 79 000 0013
	2578	Reseda green Ral 6011	17 79 000 0014
	1567	Brilliant blue RAL 5007 for CPCI, 5.0 V	17 79 000 0015
	1356	Blue lilac RAL 4005	17 79 000 0016
	1248	Strawberry red RAL 3018	17 79 000 0018
	1236	Nut brown RAL 8011	17 79 000 0019

Coding keys for female connectors

Coding key	Code number	Colour	Part number
	1247	Pastel orange RAL 2003	17 79 000 0020
	1256	Steel blue RAL 5011	17 79 000 0021
	1258	Slate grey RAL 7015	17 79 000 0022
	1278	Cadmium yellow RAL 1021 for CPCI, 3.3 V	17 79 000 0023
	1346	Reseda green Ral 6011	17 79 000 0024
	2348	Brilliant blue RAL 5007 for CPCI, 5.0 V	17 79 000 0025
	2478	Blue lilac RAL 4005	17 79 000 0026
	3567	Strawberry red RAL 3018	17 79 000 0028
	4578	Nut brown RAL 8011	17 79 000 0029

All codings are in acc. with the IEC 61076-4-101 specification

HARTING's har:bus® HM shrouds protect the pins protruding the rear side of the backplane from irregular mating tolerances, thus ensuring a quality connection.

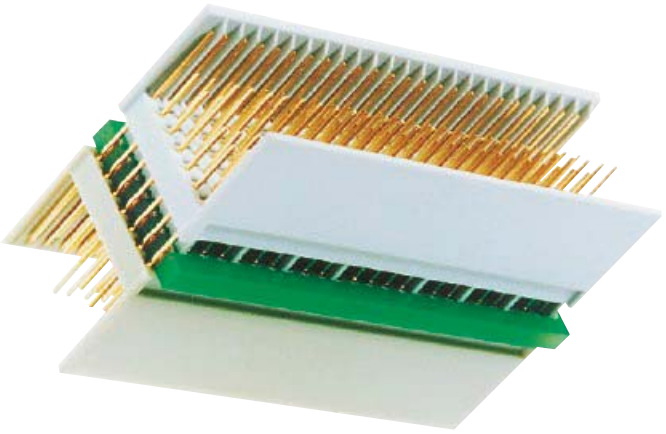
To accommodate pcb thickness, from 1.6 up to 4 mm nominal, the shrouds have integrated standoffs of corresponding height.

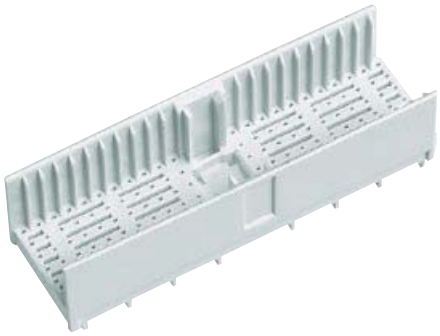
Thus forming a one piece solution that reduces assembling cost significantly.

The shroud can be mounted without the additional requirement of spacers to ensure the desired pin lengths on the rear side of the pcb.

Fixing of the component is carried out on the rear post via a smooth friction fit process.

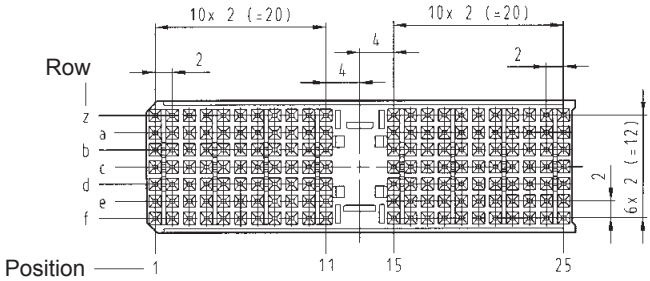
For ease of assembly the same tooling as for the press-in connectors on the front side is utilised for assembly.

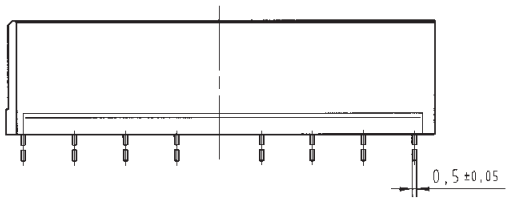


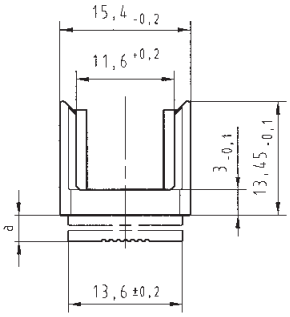


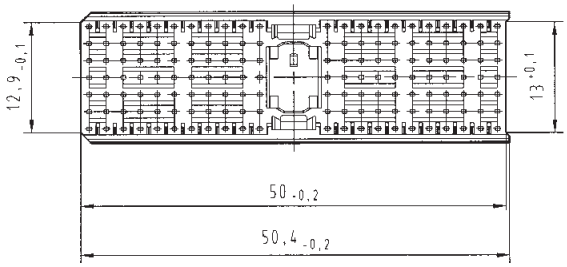
Identification	Board thickness [mm]	Part number
Type A shroud 25 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 1001 17 70 000 1002 17 70 000 1003 17 70 000 1004

Dimensions









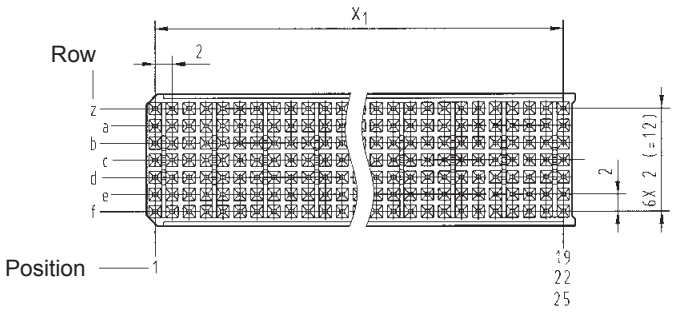
Board thickness [mm]	a [mm]
1.6 ± 0.4	3.1 ± 0.05
2.4 ± 0.4	2.3 ± 0.05
3.2 ± 0.4	1.5 ± 0.05
4.0 ± 0.4	0.7 ± 0.05

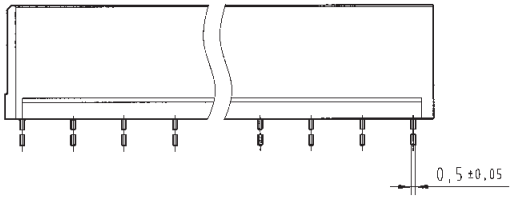
Dimensions [mm]

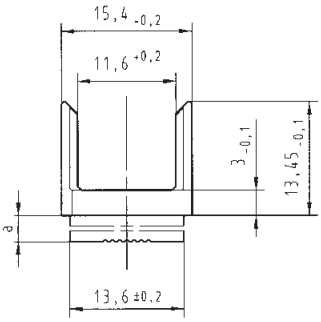
Shrouds type B

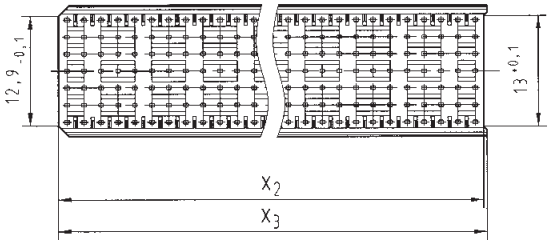
Identification	Board thickness [mm]	Part number
Type B shroud 25 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 2001 17 70 000 2002 17 70 000 2003 17 70 000 2004
22 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 4001 17 70 000 4002 17 70 000 4003 17 70 000 4004
19 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 5001 17 70 000 5002 17 70 000 5003 17 70 000 5004

Dimensions









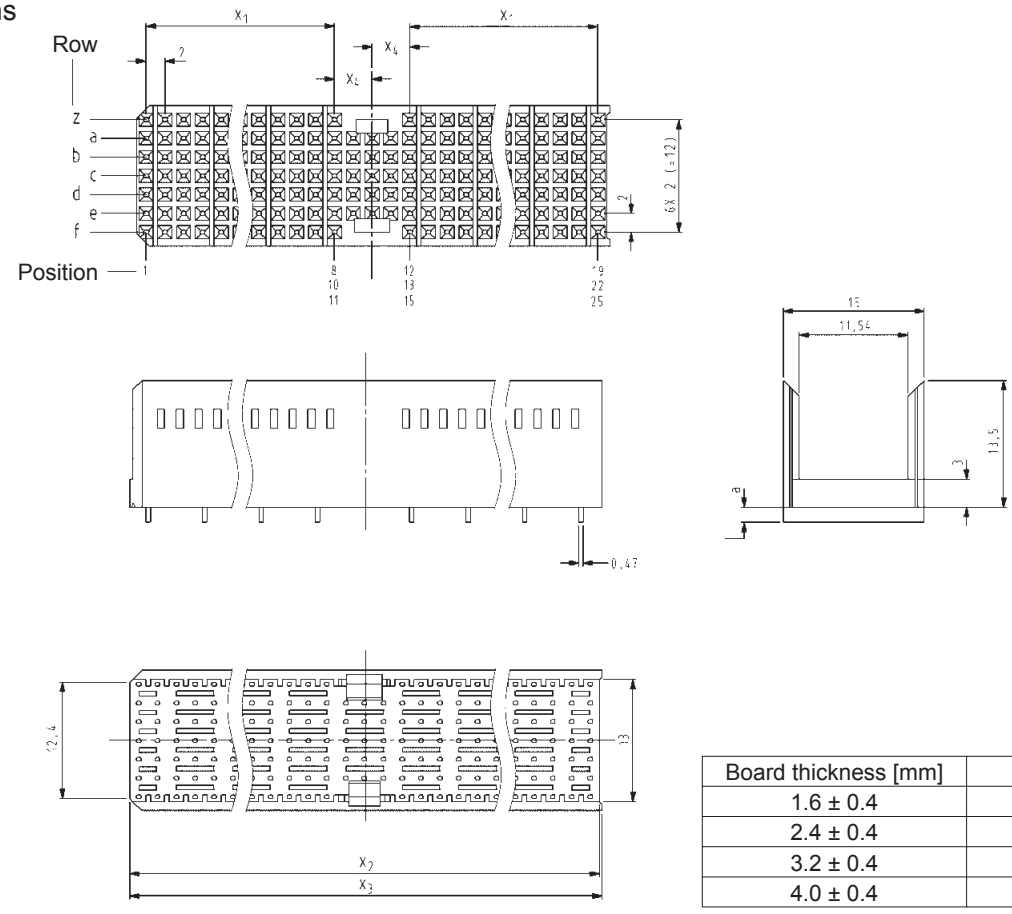
Board thickness [mm]	a [mm]
1.6 ± 0.4	3.1 ± 0.05
2.4 ± 0.4	2.3 ± 0.05
3.2 ± 0.4	1.5 ± 0.05
4.0 ± 0.4	0.7 ± 0.05

Contact positions	x_1 [mm]	x_2 [mm]	x_3 [mm]
19	18 x 2 (= 36)	38 – 0.2	38.4 – 0.2
22	21 x 2 (= 42)	44 – 0.2	44.4 – 0.2
25	24 x 2 (= 48)	50 – 0.2	50.4 – 0.2

Dimensions [mm]

Identification	Board thickness [mm]	Part number
Type AB shroud 25 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 8001 17 70 000 8002 17 70 000 8003 17 70 000 8004
22 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 7001 17 70 000 7002 17 70 000 7003 17 70 000 7004
19 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 6001 17 70 000 6002 17 70 000 6003 17 70 000 6004

Dimensions



Board thickness [mm]	a [mm]
1.6 ± 0.4	3.1 ± 0.05
2.4 ± 0.4	2.3 ± 0.05
3.2 ± 0.4	1.5 ± 0.05
4.0 ± 0.4	0.7 ± 0.05

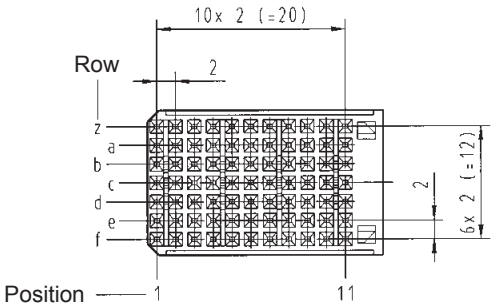
Contact positions	x_1 [mm]	x_2 [mm]	x_3 [mm]	x_4 [mm]
19	7 x 2 (= 14)	37.9	38.2	4
22	8 x 2 (= 16)	43.9	44.2	3
25	10 x 2 (= 20)	49.9	50.2	4

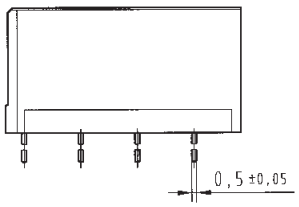
Dimensions [mm]

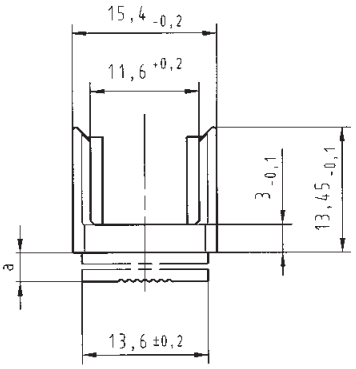
Shrouds type C

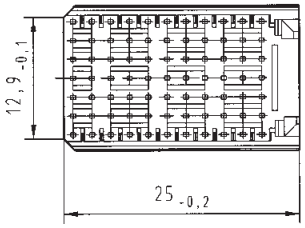
Identification	Board thickness [mm]	Part number
Type C shroud 11 positions	1.6 ± 0.4 2.4 ± 0.4 3.2 ± 0.4 4.0 ± 0.4	17 70 000 3001 17 70 000 3002 17 70 000 3003 17 70 000 3004

Dimensions



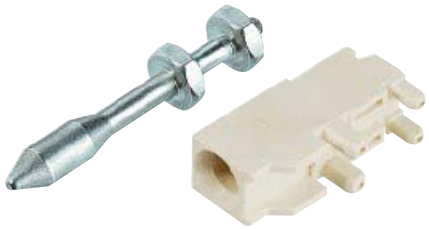






Board thickness [mm]	a [mm]
1.6 ± 0.4	3.1 ± 0.05
2.4 ± 0.4	2.3 ± 0.05
3.2 ± 0.4	1.5 ± 0.05
4.0 ± 0.4	0.7 ± 0.05

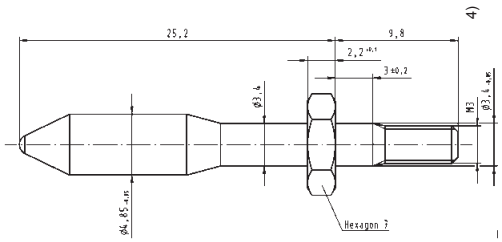
Dimensions [mm]



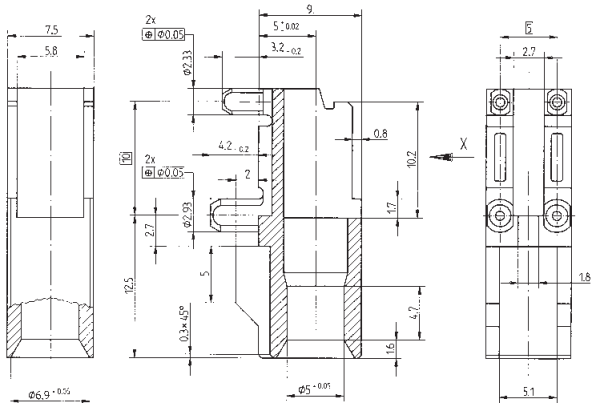
Identification	Part number
Guide pin	17 79 000 0080
Receptacle for guide pin	07 73 000 0280

Dimensions [mm]

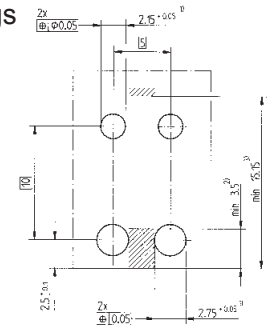
Guide pin



Receptacle for guide pin



Board drillings (View-X)



1) Non-metallised drillings
2) No tracks, except solder eyes
3) Limit area of components (valid for both pcb sides)
4) Recommended board drilling is 3.5 (-0.05) mm

General information

The guide pin solution from HARTING allows safe mating under sometimes extreme conditions. This might be large and heavy boards that bow under their own weight. Also insufficiently aligned or worn out rack systems can be tolerated better with the use of HARTING's guiding system, which also reduces the potential danger of damaging cards when being forced into flexing racks.

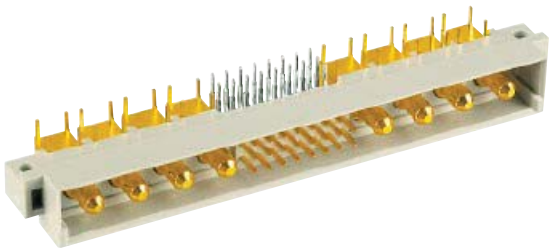
The guide pin and receptacle's design solution allows to overcome a 3 mm [.118'] offset between the backplane and the mating daughtercard. The reducing diameter of the pin (from 4.85 mm to 3.4 mm) ensures that its positioning task is smoothly transferred to the connectors as soon as they start to engage. Finally the thin diameter section of the guide pin is no longer positioned by the ferrule of the receptacle, ensuring that the pin is able to freely follow any movement imposed by the engaging connector. This ensures that there is no static stress between the connectors and the guiding system.

The rugged metal designed guide pin is screwed to the backplane with standard hexagon screws. Whereas the molded receptacle is designed with four press-in pegs that can be installed to the board together with the connectors.

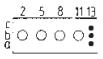
The tooling can be ordered with the part numbers **07 79 000 0157** (top tool) and **07 79 000 0158** (bottom tool).

Recommended accessories: hexagon nut ISO 4032-M3-8
serrated lock washer DIN 6798-A-3.2 FSt

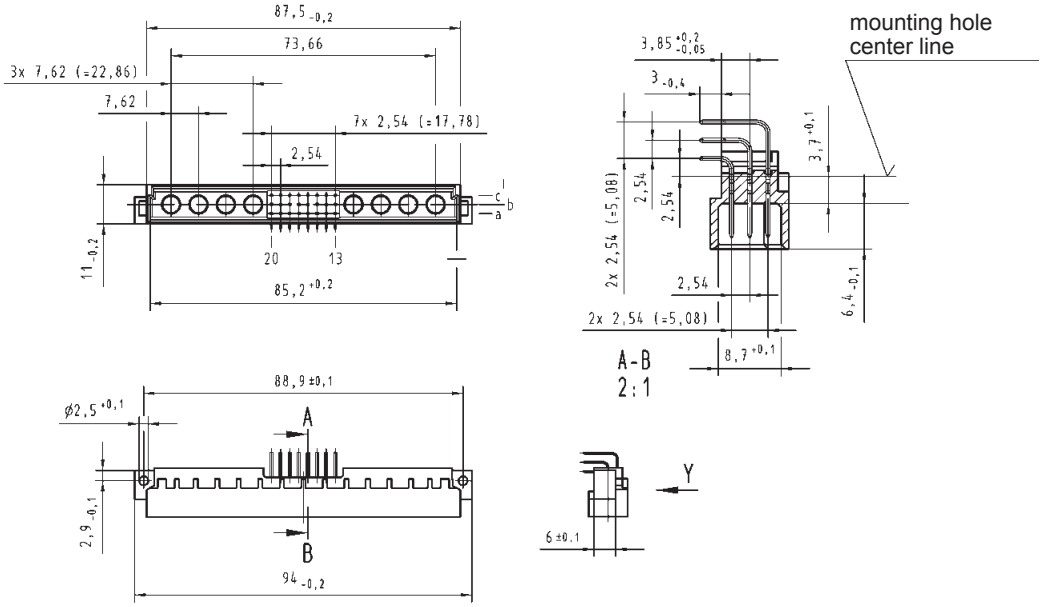
Special connectors for VME64x



DIN 41612
Type M male connectors

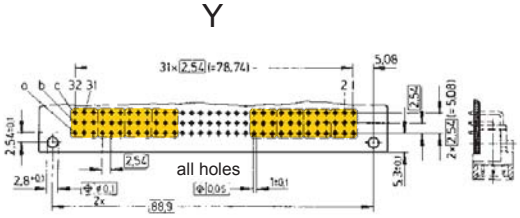
Identification	Number of contacts	Contact arrangement	Part Number 3	Performance levels according to IEC 60603-2 2	1
Male connector with angled solder pins	24 + 8		09 03 124 7901	09 03 124 6901	09 03 124 2901

Dimensions



Order high current **contacts separately**, see page 00.44

Board drillings
Mounting side

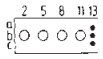


≙ Board drillings depend on type and special contact loading

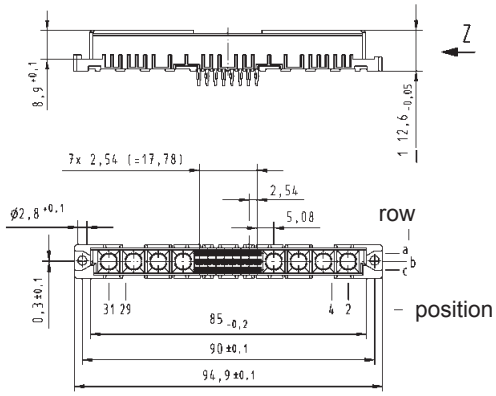
Dimensions in mm

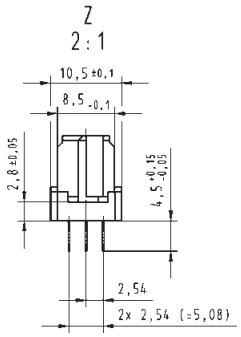
Pre-loaded with special contacts on request
Further types see DIN 41612 catalogue

DIN 41 612
Complementary type M-flat female connectors

Identification	Number of contacts	Contact arrangement	Part number 3	Performance levels according to IEC 60 603-2 2	1
Female connector with press-in terminations 4.5 mm	24 + 8		Performance level 3 on request	09 03 224 6830	Performance level 1 on request

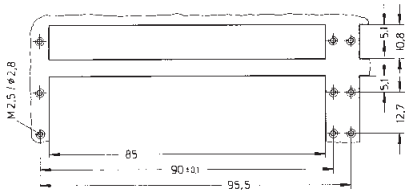
Dimensions



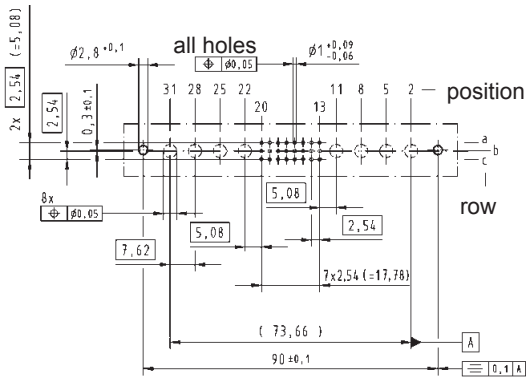


Order high current **contacts separately**, see page 00.44

Panel cut out



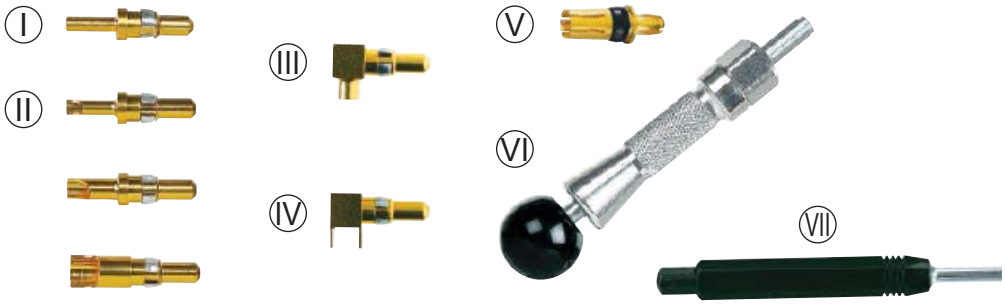
Board drillings
Mounting side



Dimensions in mm

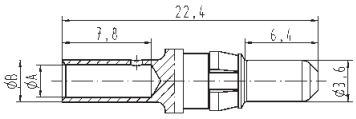
Pre-loaded with special contacts on request
Further types see DIN 41 612 catalogue

Special connectors for VME64x

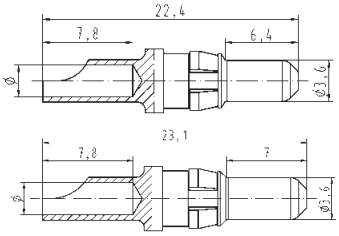


High current contacts

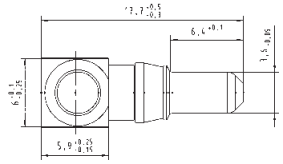
Identification			Part number Performance level 1
High current male contacts for male connectors[1]			acc. to DIN 41626
(I) for straight crimp termination		10 A	09 03 000 6113
		20 A	09 03 000 6114
		40 A	09 03 000 6115
(II) for straight solder termination		10 A	09 03 000 6101
		20 A	09 03 000 6102
		40 A	09 03 000 6103
Leading contact		10 A	09 03 000 6111
		20 A	09 03 000 6122
		40 A	09 03 000 6133
(III) for angled pcb termination		max. 40 A*	09 03 000 6110
(IV)		max. 40 A*	09 03 000 6104
Leading contact		max. 40 A*	09 03 000 6134
* depending on the pcb design			
High current female contacts for female connectors[1] **for type M-flat**			
(V) for press-in termination		40 A	09 03 000 6250
for solder termination		40 A	09 03 000 6225
Crimping tool for high current contacts			09 99 000 0196
Removal tool (VI) incl. removal jacket for contact replacement in male and female connectors			09 99 000 0174
Replacement removal jacket			09 99 000 0243
Removal tool (VII) for contact replacement in male connectors			09 99 000 0328

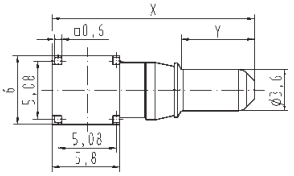


	ø A	ø B	wire gauge [mm²]	AWG
10 A	1.85	2.55	1.5	16
20 A	2.85	3.70	4	12
40 A	4.40	5.60	10	8

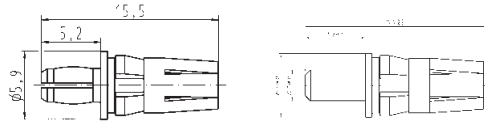


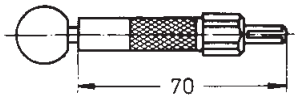
	ø
10 A	1.7
20 A	2.8
40 A	4.8

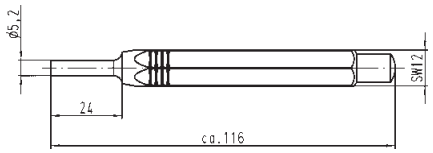




	x	y
… 6104	17.7	6.4
… 6134	18.4	7.0







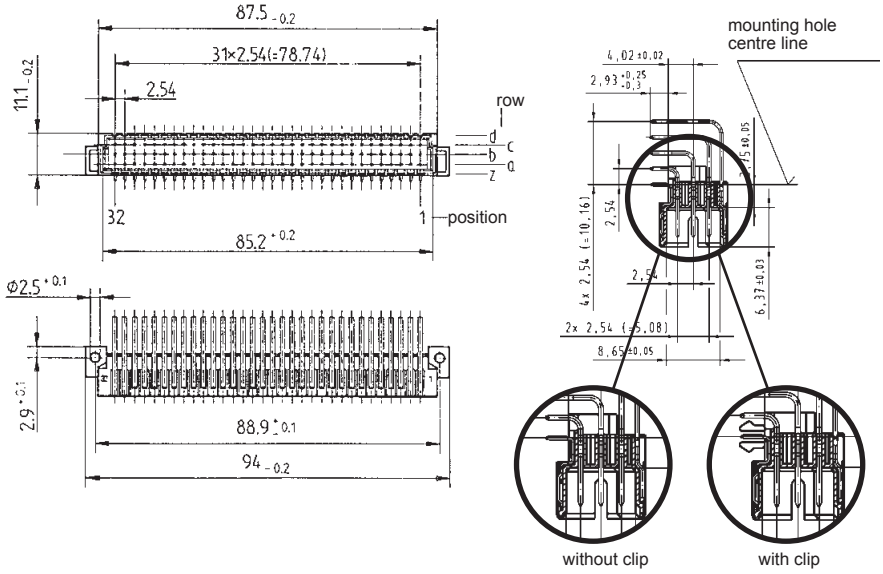
[1] Contact resistance max. 1.5 mΩ

har:bus® 64

Male connectors

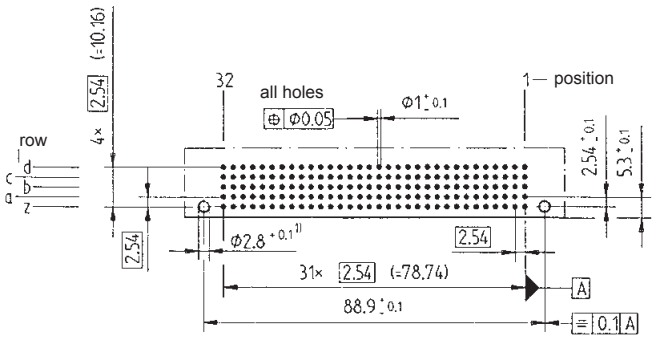
Identification	Number of contacts	Contact arrangement	Part number 2	Performance levels according to IEC 61 076-4-113 1
Male connector* without retention clip	160	z, a, b, c, d	02 01 160 2101	02 01 160 1101 02 01 160 1105[2)]
with retention clip	160	z, a, b, c, d	02 01 160 2102	02 01 160 1102 02 01 160 1106[2)]

Dimensions



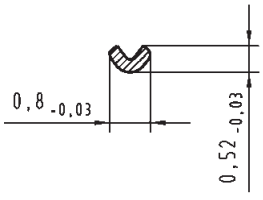
Board drillings

Mounting side

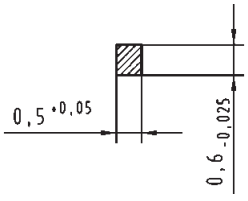


Cross section of solder terminations

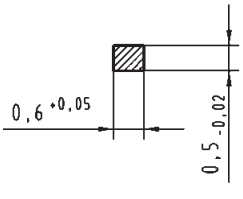
Row z:
A = 0.21 - 0.25 mm²



Rows a, b, c:
A = 0.29 - 0.33 mm²



Row d:
A = 0.29 - 0.32 mm²



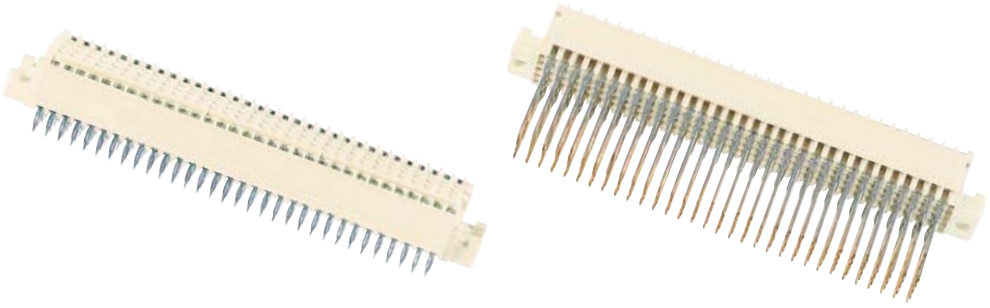
A = cross area of contacts

Dimensions in mm

* Pre-leading contacts at positions d1, d2, d31 and d32

[1)] Recommendation for variants with clip: Drillings can be enlarged up to 3.1 mm ø to reduce standard mounting force

[2)] Special variant with min. 1.27 µm (50 µinch) Au and SnPb on termination

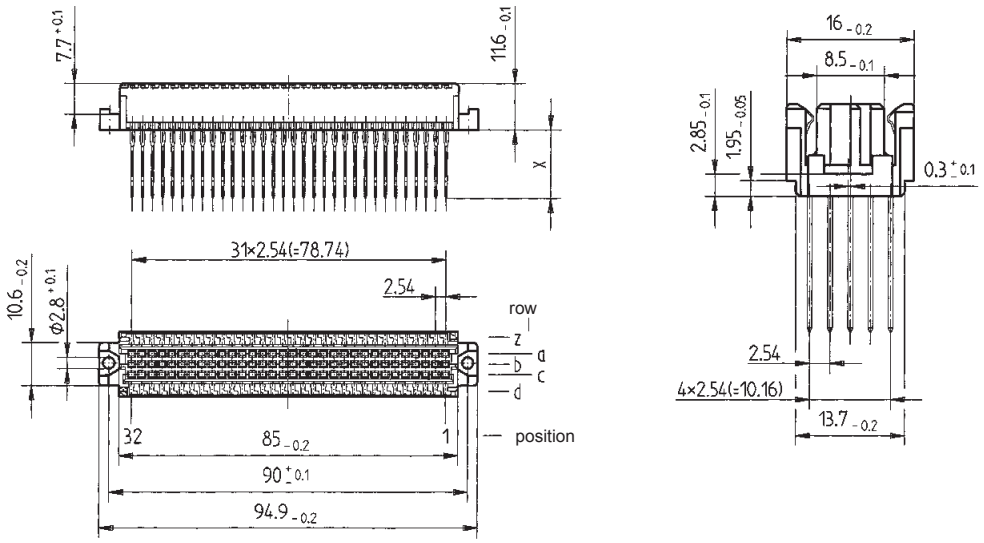


harbus® 64

Female connectors

Identification	Number of contacts	Contact arrangement	Part number Performance levels according to IEC 61 076-4-113 2	1
Female connectors, straight with press-in terminations				
with 3.7 mm	160	z, a, b, c, d		02 02 160 1601
fixing flange 4.5 / 5 mm	160	z, a, b, c, d	02 02 160 2201	02 02 160 1201
17 mm*	160	z, a, b, c, d	02 02 160 2301	02 02 160 1301
without 5 mm	160	z, a, b, c, d	02 02 160 2202	02 02 160 1202
fixing flange 17 mm*	160	z, a, b, c, d	02 02 160 2302	02 02 160 1302

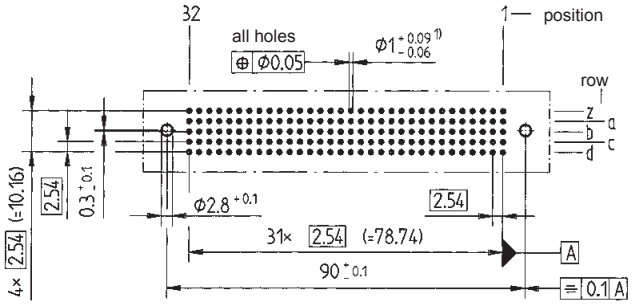
Dimensions



Part number	Dimension "X" for row z	a	b	c	d
02 02 160 1601	3.7	3.7	3.7	3.7	3.7
02 02 160 2201 / 02 02 160 1201	5.0	4.5	4.5	4.5	5.0
02 02 160 2301 / 02 02 160 1301	17.0	17.0	17.0	17.0	17.0
02 02 160 2202 / 02 02 160 1202	5.0	5.0	5.0	5.0	5.0
02 02 160 2302 / 02 02 160 1302	17.0	17.0	17.0	17.0	17.0

Board drillings

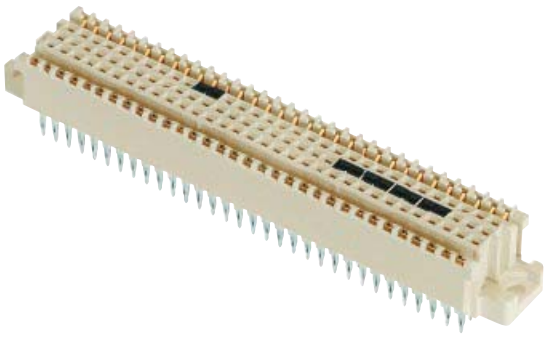
Mounting side



Dimensions in mm

1) Selectively gold-plated

Further types see DIN 41 612 catalogue

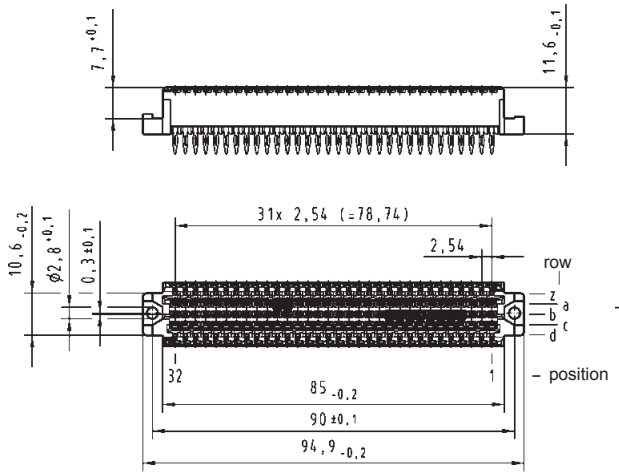


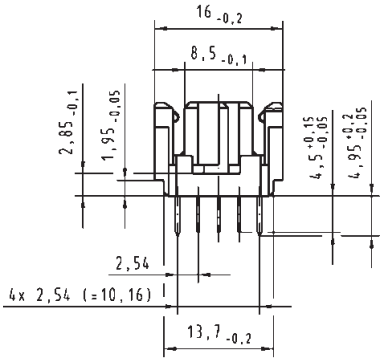
harbus® 64

Female connectors

Identification	Number of contacts	Contact arrangement	Part number Performance level 2 according to IEC 61 076-4-113
Female connectors, straight with switches[1)] with press-in terminations with flange 4.5 / 5 mm	160	z, a, b, c, d	02 03 160 2201

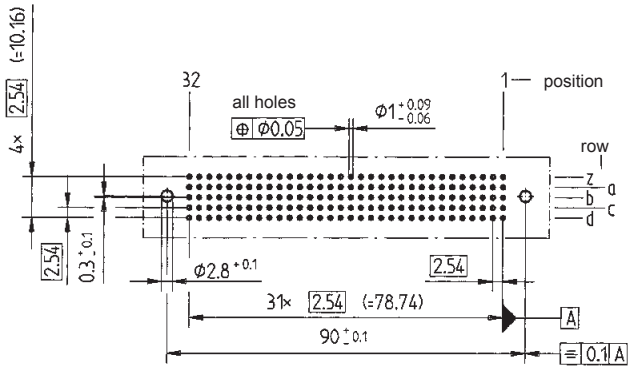
Dimensions





Board drillings

Mounting side



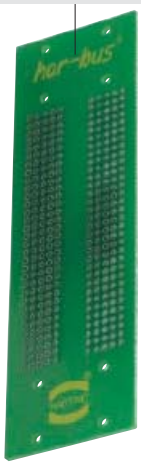
Dimensions in mm

[1)] Switching elements at positions a21-22, b4-5, b6-7, b8-9 and b10-11
Further types see DIN 41 612 catalogue

Application 1*

Female connector
02 02 160 2301

Backplane



Pin shroud
02 44 000 0007

Fixing brackets
02 44 000 0009

Shell housing C
09 05 048 0501

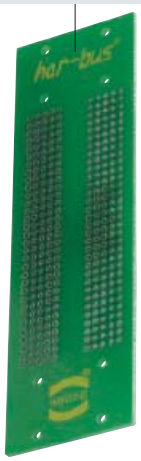
Female connector
with crimp contacts
02 05 000 0004

Locking lever
left 09 02 000 9902
right 09 02 000 9903

Application 2*

Female connector
02 02 160 2301

Backplane



Pin shroud
02 44 000 0007

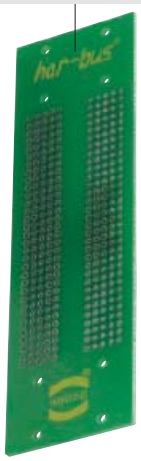
Locking lever
09 03 000 9913

Female connector
for crimp contacts
02 05 000 0004

Application 3

Female connector
02 02 160 2301

Backplane



Pin shroud
02 44 000 0007

Shroud insert
02 44 000 0008

Female connector
09 73 296 6801

* Only for applications without rear P0-connector

har:bus® HM with 6 rows, 2.00 mm pitch

General information

In comparison to the standard 5-row *har-bus® HM* series, this new 6-row version offers a significantly higher contact density, thus permitting applications where very high contact density is important. Typically, for a signal transmission of 1.5 Gbps it is possible to obtain 7.5 differential pairs per cm of card edge (see figure 1). For a signal transmission of 2.5 Gbps at least 5 differential pairs per cm of card edge can be obtained (see figure 2).

Male and female connectors are both available with 72 or 144 contacts and can be supplied in reel or tube packaging.

A	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-
B	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G
C	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-
D	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G
E	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-
F	G	G	+	-	G	G	+	-	G	G	+	-	G	G	+	-	G	G

Figure 1

A	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G
B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
C	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G
D	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
E	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G	+	-	G
F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

Figure 2

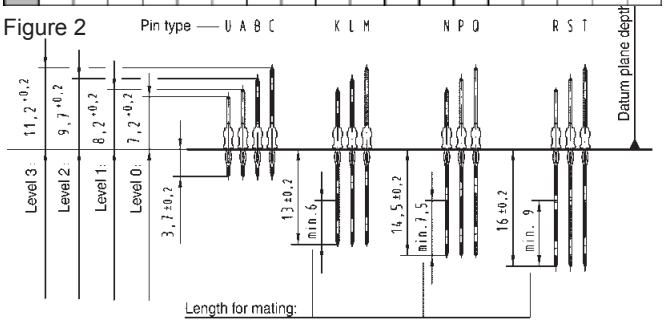
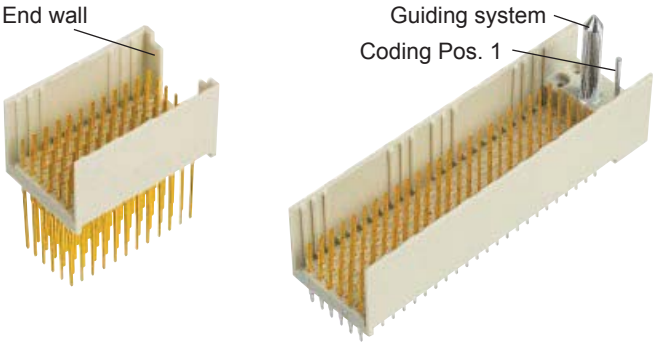


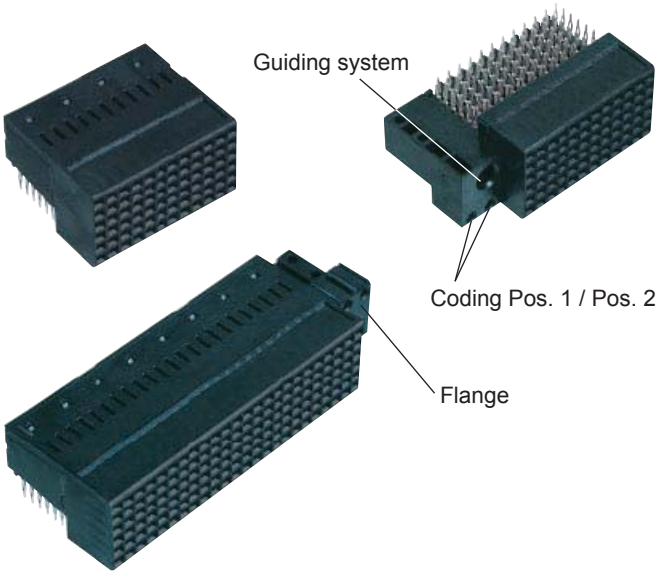
Figure 3

All male connectors can be supplied with end wall, coding pins and guiding system.



Female connectors with press-in termination

The 6-row female connector needs comparable space on the daughter card as the 5-row versions, as it has similar outer dimensions. Compared to the male connectors, coding pins and a guiding system are available upon request too.



Female connectors in SMC (Surface Mount Compatible) technology

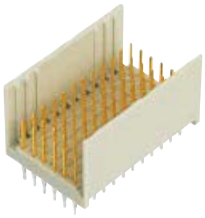
Using the reflow soldering process, these 6-row female connectors in SMC technology can be soldered to the PCB at the same time as other SMC components. So the handling cost can be reduced significantly and there is no need for a separate press-in process. These connectors are made from a high temperature plastic material that can withstand up to 260°C (lead free soldering). To hold the connector securely on the PCB before the solder process, kinked contacts are offered as standard on both connector sides. Further SMC information see chapter 01.

Design	:	complementary to IEC 61 076-4-101 (2 mm hard metric specification)
Number of contacts	:	72 or 144
Contact spacing	:	2.00 mm (1.50 mm between contact rows on the termination side of female connectors)
Working current	:	1.0 A (24 °C temp. raise) 1.5 A (52 °C temp. raise) 2.0 A (88 °C temp. raise)
Test voltage $U_{r.m.s.}$	:	min. 750 V
Contact resistance	:	< 20 mΩ
Impedance (differential)	:	100 Ω
Typical differential data rate	:	1.5 - 2.5 Gbps
Temperature range during reflow soldering	:	- 55 °C ... + 125 °C max. 260 °C (peak temperature)
Performance level*	:	performance level 2 = 250 mating cycles performance level 1 = 500 mating cycles
Termination technique	:	press-in for male and female connectors SMC for female connectors, compatible with lead-free solder process
Pcb characteristics	:	min. 1.4 mm for male and female connectors with press-in terminations 1.6 mm - 2.4 mm for female connectors with SMC terminations
Recommended configuration of plated through holes	:	

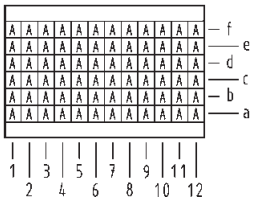
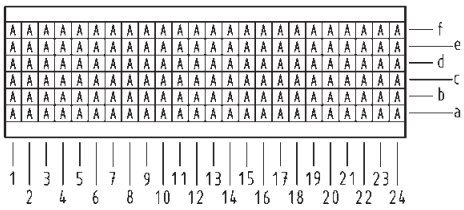
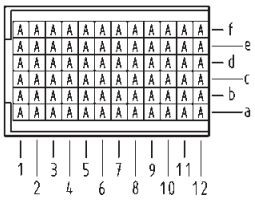
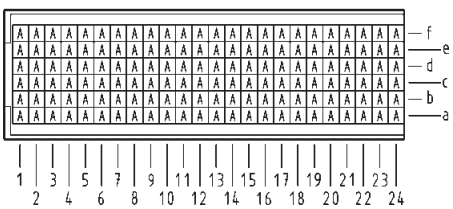
	press-in	SMC
Plated hole-Ø	0.6 $^{\pm 0.05}$ mm	0.7 $^{+0.07}_{-0.05}$ mm
Hole-Ø	0.7 $^{\pm 0.02}$ mm	0.8 $^{\pm 0.02}$ mm
Cu	30 - 50 µm	30 - 50 µm
Sn	5 - 15 µm	5 - 15 µm

Mating force	:	< 0.75 N/pin
Materials		
Mouldings	:	Thermoplastic resin, glass-fibre filled, UL 94-V0
Contacts	:	Copper alloy
Contact surface	:	Au/Ni
Packaging		
Tube	:	Male connectors and female connectors with press-in terminations
Tape & Reel	:	Female connectors with SMC terminations

* Other platings on request

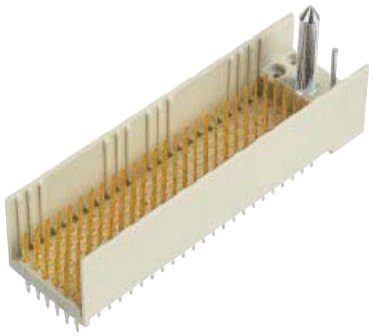


Male connectors straight, with press-in termination

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number	Contact configuration
Connectors without flange without coding without endwall	72	8.2	3.7	17 41 072 1204 **17 41 072 2204**	
	144	8.2	3.7	17 44 144 1205 **17 44 144 2205**	
Connectors without flange without coding with endwall	72	8.2	3.7	17 42 072 1203 **17 42 072 2203**	
	144	8.2	3.7	17 45 144 1204 **17 45 144 2204**	

Connector dimensions see pages 02.06 and 02.07.
The pin types A, B, C … R, S, T can be mixed in any configuration.
Please request the part number.

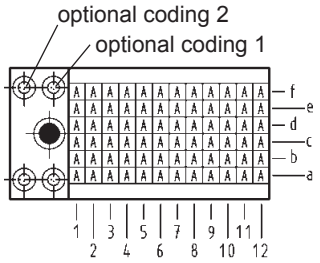
Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

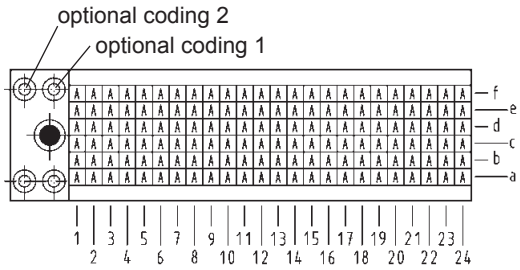


Male connectors straight, with press-in termination

Identification	Number of contacts	Contact length [mm] mating side	Contact length [mm] termination side	Part number
Connectors with flange without coding without endwall	72	8.2	3.7	17 43 072 1209 **17 43 072 2209**
	144	8.2	3.7	17 46 144 1207 **17 46 144 2207**
Connectors with flange with coding 1 without endwall	72	8.2	3.7	17 43 072 1211 **17 43 072 2211**
	144	8.2	3.7	17 46 144 1209 **17 46 144 2209**
Connectors with flange with coding 2 without endwall	72	8.2	3.7	17 43 072 1210 **17 43 072 2210**
	144	8.2	3.7	17 46 144 1208 **17 46 144 2208**
Connectors with flange with coding 3 (= coding 1 + 2) without endwall	72	8.2	3.7	17 43 072 1212 **17 43 072 2212**
	144	8.2	3.7	17 46 144 1210 **17 46 144 2210**

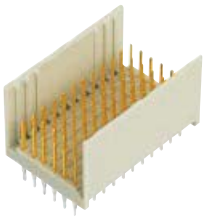
Contact configuration





Connector dimensions see pages 02.06 and 02.07.
The pin types A, B, C … R, S, T can be mixed in any configuration.
Please request the part number.

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

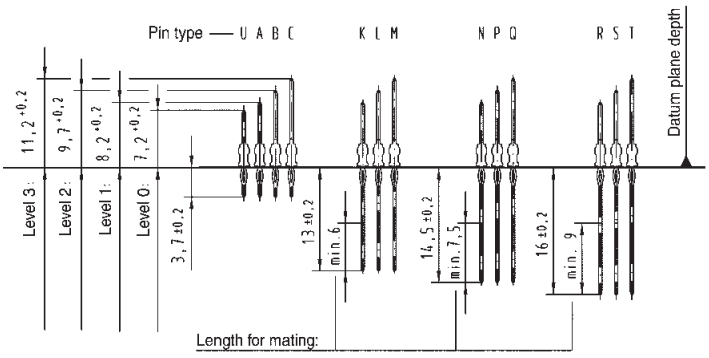


Male connectors straight, with press-in termination

Drawing

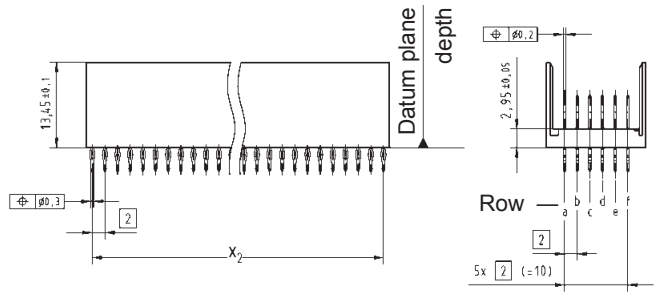
Dimensions in mm

Connector dimensions [mm]

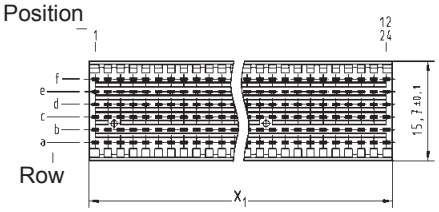


Contact positions	x_1	x_2	x_3
72	23.9	11 x 2 (= 22)	24.9
144	47.9	23 x 2 (= 46)	48.9

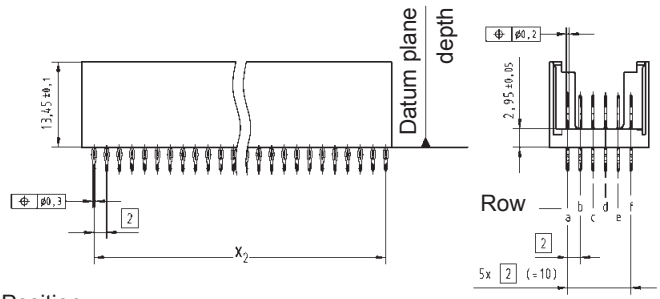
without flange
without coding
without endwall



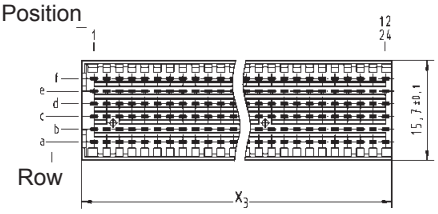
Position



without flange
without coding
<u>with</u> endwall

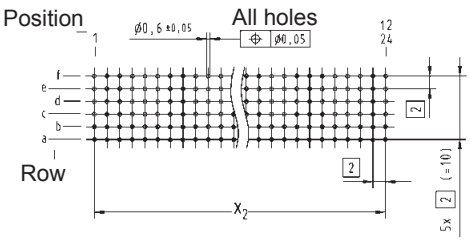


Position



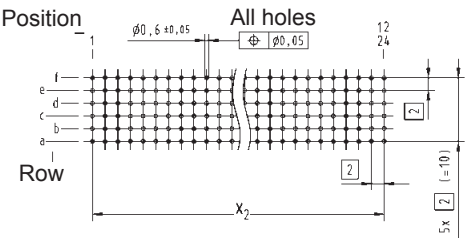
Board drillings

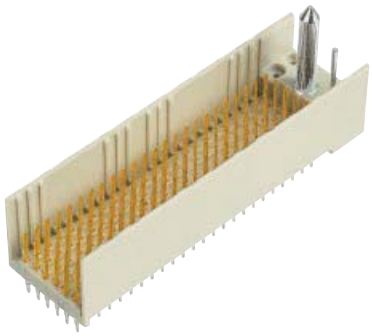
Position



Board drillings

Position



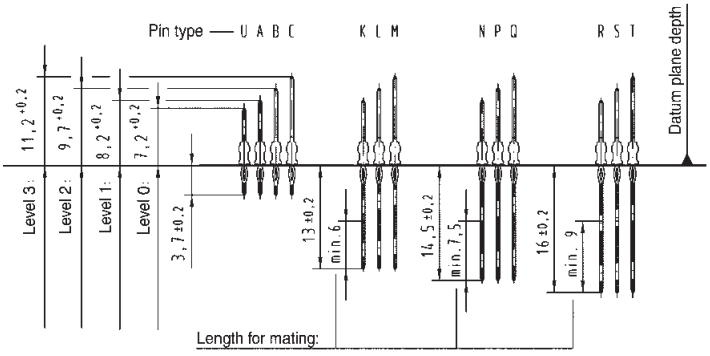


Male connectors straight, with press-in termination

Drawing

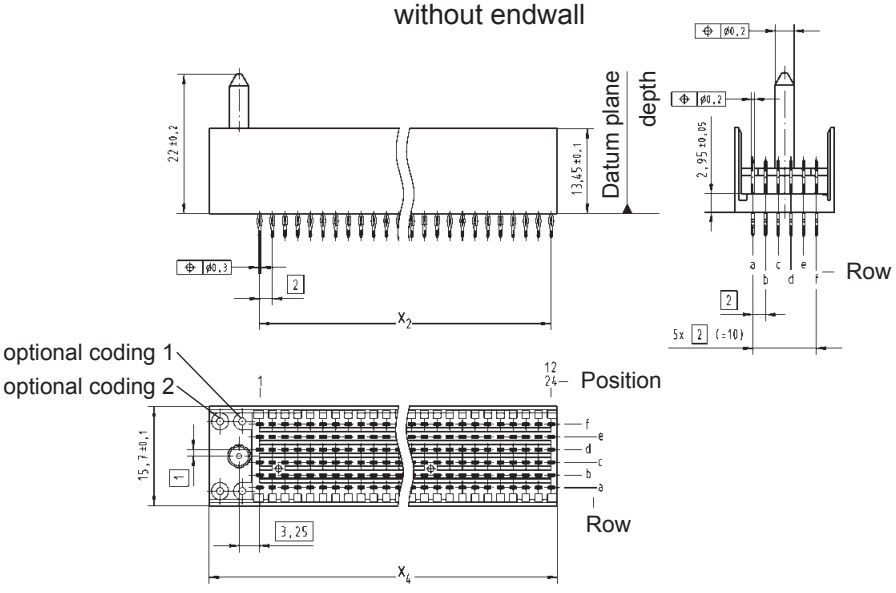
Dimensions in mm

Connector dimensions [mm]

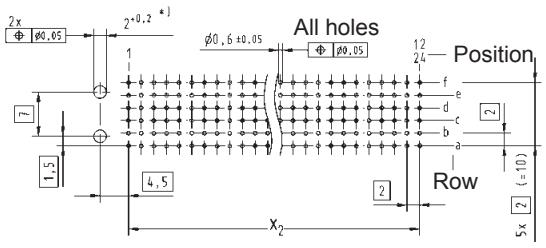


Contact positions	x_2	x_4
72	11 x 2 (= 22)	30.9
144	23 x 2 (= 46)	54.9

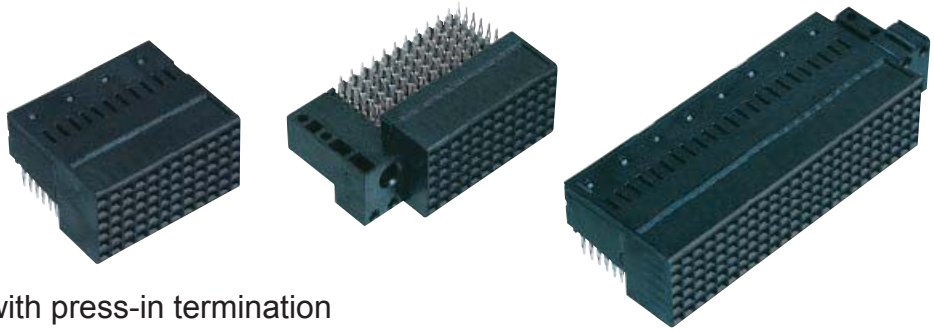
with flange
with coding
without endwall



Board drillings



* Non-metallized drillings

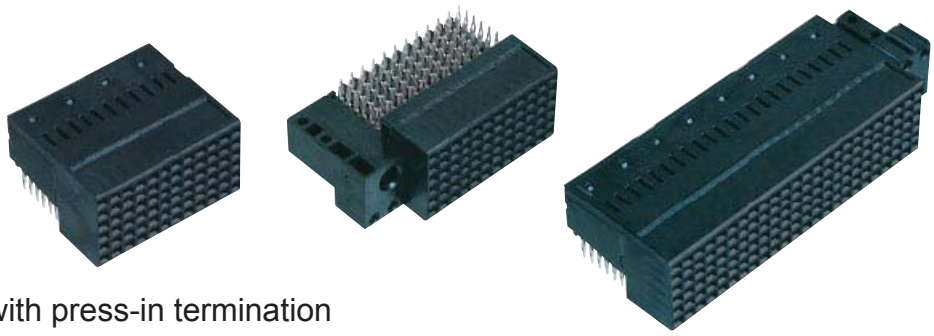


Female connectors angled, with press-in termination

Identification	Number of contacts	Contact length [mm] termination side	Part number
Connectors without flange without coding	72	3.35	17 51 072 1102 **17 51 072 2102**
	144	3.35	17 54 144 1102 **17 54 144 2102**
Connectors with flange without coding	72	3.35	17 52 072 1105 **17 52 072 2105**
	144	3.35	17 55 144 1105 **17 55 144 2105**
Connectors with flange with coding 1	72	3.35	17 52 072 1106 **17 52 072 2106**
	144	3.35	17 55 144 1106 **17 55 144 2106**
Connectors with flange with coding 2	72	3.35	17 52 072 1107 **17 52 072 2107**
	144	3.35	17 55 144 1107 **17 55 144 2107**
Connectors with flange with coding 3 (= coding 1 + 2)	72	3.35	17 52 072 1108 **17 52 072 2108**
	144	3.35	17 55 144 1108 **17 55 144 2108**

Connector dimensions see page 02.09.

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2



Female connectors angled, with press-in termination

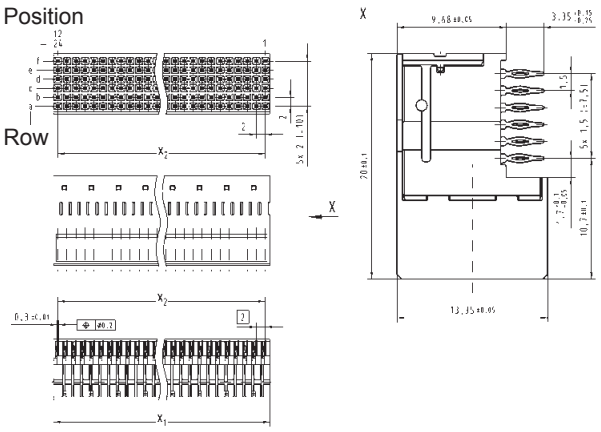
Drawing

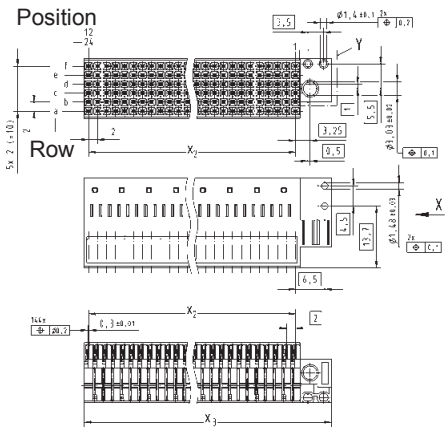
Dimensions in mm

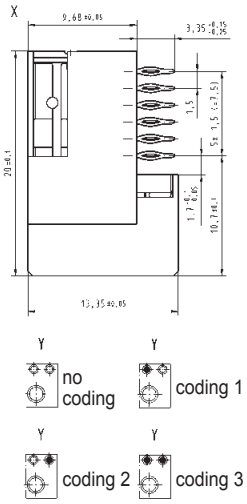
Connector dimensions [mm]

without flange
without coding

<u>with</u> flange
<u>with</u> coding

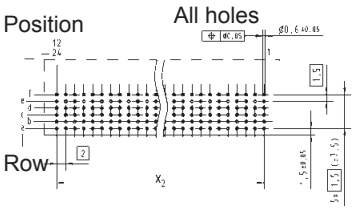




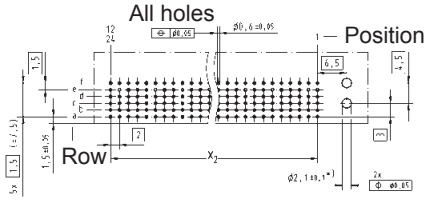


Contact positions	x_1	x_2	x_3
72	24.0	11 x 2 (= 22)	31.0
144	48.0	23 x 2 (= 46)	55.0

Board drillings



Board drillings



* Non-metallized drillings

Female connectors angled, with solder (SMC) termination

Identification	Number of contacts	Contact length [mm] termination side	Part number
Connectors without flange without coding	72	2.5	17 51 072 1802 **17 51 072 2802**
	144	2.5	17 54 144 1802 **17 54 144 2802**
Connectors with flange without coding	72	2.5	17 52 072 1805 **17 52 072 2805**
	144	2.5	17 55 144 1805 **17 55 144 2805**
Connectors with flange with coding 1	72	2.5	17 52 072 1806 **17 52 072 2806**
	144	2.5	17 55 144 1806 **17 55 144 2806**
Connectors with flange with coding 2	72	2.5	17 52 072 1807 **17 52 072 2807**
	144	2.5	17 55 144 1807 **17 55 144 2807**
Connectors with flange with coding 3 (= coding 1 + 2)	72	2.5	17 52 072 1808 **17 52 072 2808**
	144	2.5	17 55 144 1808 **17 55 144 2808**

Connector dimensions see page 02.11.

Thin print part numbers: performance level 1
Bold print part numbers: performance level 2

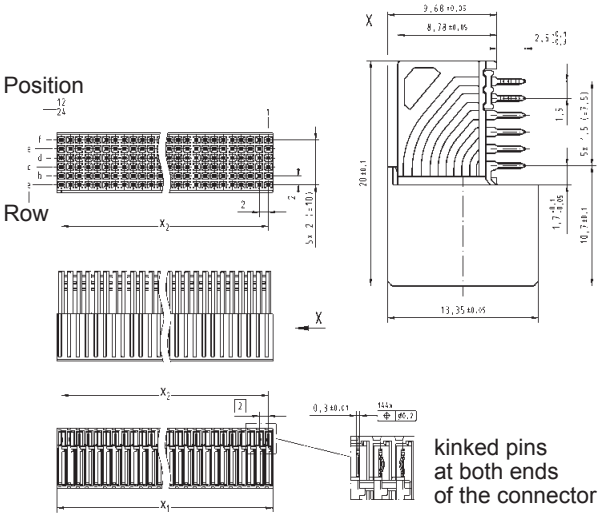
Female connectors angled, with solder (SMC) termination

Drawing

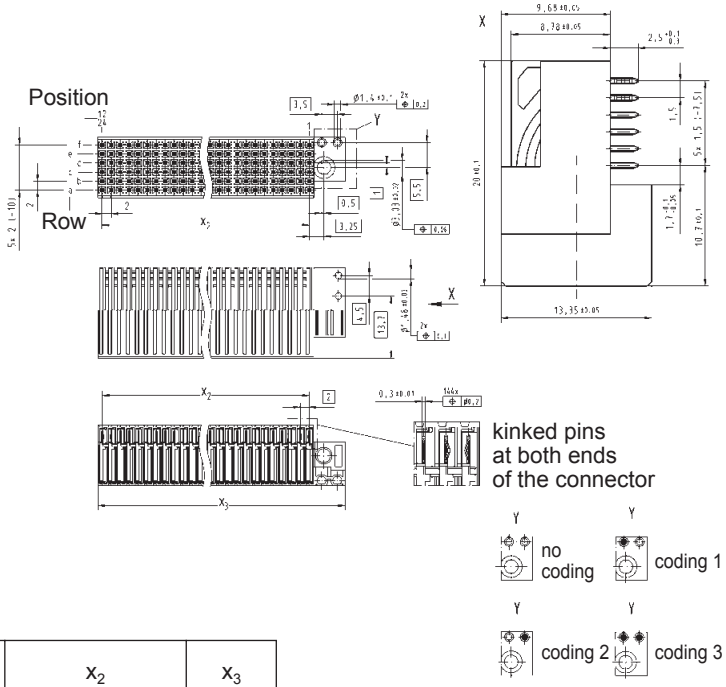
Dimensions in mm

Connector dimensions [mm]

without flange
without coding

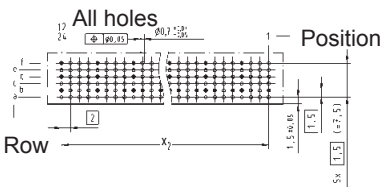


with flange
with coding

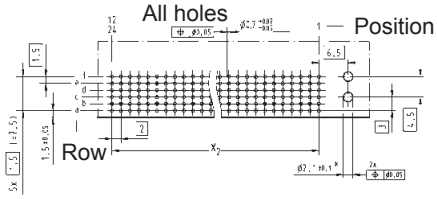


Contact positions	x_1	x_2	x_3
72	24.0	11 x 2 (= 22)	31.0
144	48.0	23 x 2 (= 46)	55.0

Board drillings



Board drillings



* Non-metallized drillings

Compatibility with OBSAI

HARTING is a supporter member of OBSAI since September 2003.

The Open Base Station Architecture Initiative (OBSAI) has developed a comprehensive set of open specifications for key module interfaces within the base station architecture. This development will enable an open market of base station modules.

The OBSAI architecture provides a clear split in functionality and detailed internal interface specifications. This allows companies to create modules that are truly compatible in all OBSAI compliant base stations. OBSAI provides the entry for a new, competitive market for functionally standardized modules.

HARTING's *har-bus® HM* Signal and *HM* Power connectors meet OBSAI specifications and provide a reliable and cost effective solution for connecting plug-in units to the backplane. The connector solution available from HARTING technology group will offer full compatibility and intermateability with base station modules.

HARTING's activities in the wireless market are in line with those of OBSAI.

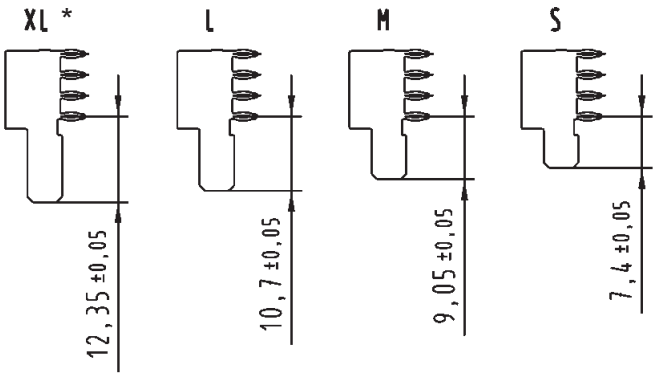
The OBSAI specifications allow HARTING the opportunity to support a large group of wireless base station manufacturers and module manufacturers with unified, state of art interconnection solutions.

har:bus® HM Power

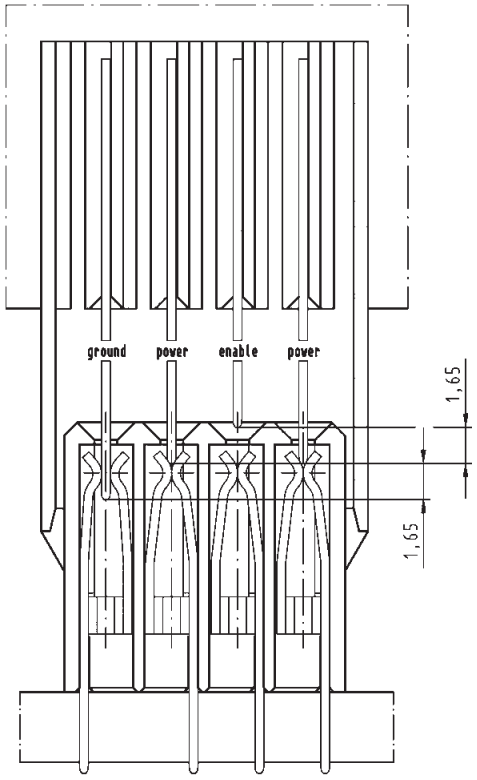
Page

The *har:bus® HM* Power connector is designed according to the OBSAI Specification V 1.1. It is well-suited to be used in conjunction with 2 mm har:bus® HM connectors. The durability is according to IEC 61076-4-101 (250 mating cycles).

The straight female connector for the backplane is fitted with press-in contacts, the right angled male connector for daugther cards can be supplied with either press-in or PIHIR (Pin In Hole Intrusive Reflow) termination.

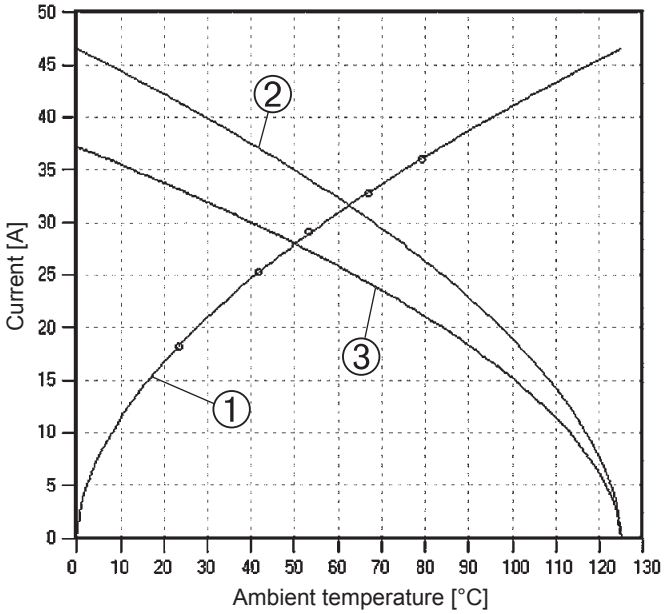


The compact, high temperature moulding can be loaded with up to four high current contacts. Four different contact lengths are available from 7.4 mm to 12.35 mm. This makes sequenced and non sequenced loadings possible (e.g. with GND and ENA). Any other contact assignments, also partially loaded, are available on request.



Loaded with four power contacts, each contact can carry up to 20 A @ 70 °C / 80 % derating.

With a configuration of two power contacts, GND and ENA, the current carrying capacity is even up to 23 A @ 70 °C / 80 % derating per contact.



① Temperature raise
② Derating
③ Derating curve at I_{max} x 0.8 (DIN EN 60 512-5-2)

The distance between adjacent contacts is 3 mm, which enables wider pcb traces, larger solder paste areas and an improved heat dissipation. For the female backplane connector no special tooling is necessary due to the flatrock design. For the male connector HARTING offers a special press-in tool (see chapter 15).

HARTING's har:bus® HM Signal and Power connectors meet OBSAI (Open Base Station Architecture Initiative) specifications and provide a reliable and cost effective solution for connecting plug-in units to the backplane. The connector solutions available from the HARTING technology group will offer full compatibility and intermateability with base station modules.

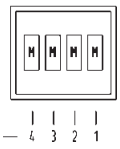
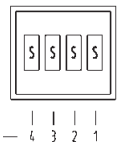
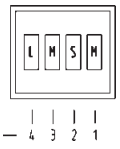
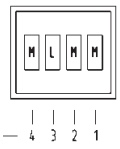
Benefits:

- Small form factor
- High current rating up to 23 A per contact (OBSAI configuration)
- 3 level staggering (or even 4)
- Flatrock design
- Matched with har:bus® HM 2 mm connectors

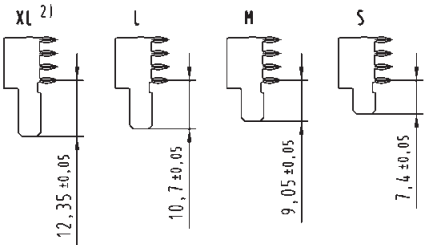
* Type XL on request

Design according	:	OBSAI System Spezifikation V 1.1
Approvals Underwriters Laboratories Inc.®	:	c UL us with their respective ratings documented in file E 102079
Number of contacts	:	up to 4
Contact spacing	:	3.00 mm
Clearance and creepage distances between contacts	:	> 2.3 mm
Working current	:	23 A max. (OBSAI configuration) 20 A max. (fully loaded with power contacts)
Test voltage $U_{r.m.s.}$	:	AC 1500 V min.
Contact resistance	:	< 1 mΩ
Insulation resistance:	:	> 10 GΩ
Temperature range during reflow soldering	:	- 55 °C ... + 125 °C 220 °C for 2 minutes, 260 °C max. short-term
Durability as per IEC 61 076-4-101	:	*Performance level 2 = 250 mating cycles in total.* First 125 mating cycles, then 4 days gas test using 0.5 ppm SO_2 and 0.1 ppm H_2S (at 25 + 2 °C and 75 + 3 % humidity). Measurement of contact resistance. The remaining 125 mating cycles are subject to measurement of contact resistance and visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.
Termination technique		
Male connectors	:	Press-in or solder termination, suitable for (lead-free) pin-in-hole reflow soldering
Female connectors	:	Press-in termination
Mating force	:	max. 4 N / contact
Withdrawal force	:	min. 0.5 N / contact
Materials		
Mouldings	:	Thermoplastic resin, glass-fibre filled, UL 94-V0
Contacts	:	Copper alloy
Contact surface	:	Selectively gold plated (contact zone)
Contact styles	:	Standard, leading, lagging
Packaging		
Tube	:	Male and female connectors
Tape & Reel	:	On request for male solder connectors

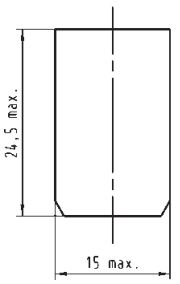
Male connectors angled, with press-in termination

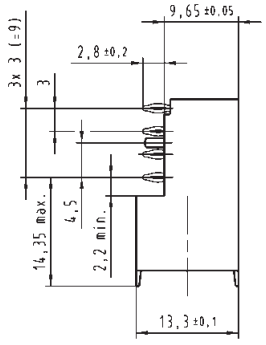
Identification	Number of contacts	Contact length [mm] termination side	Part number	Contact loading
Connector with same sized contacts	4	2.8	17 61 004 2102	
Connector with same sized contacts	4	2.8	17 61 004 2103	
Connector with leading/lagging contacts OBSAI configuration	4	2.8	17 61 004 2101	
Connector with leading contact	4	2.8	17 61 004 2104	

Contact dimensions [mm]

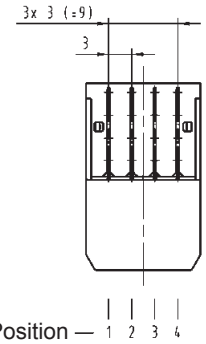


Connector dimensions [mm]

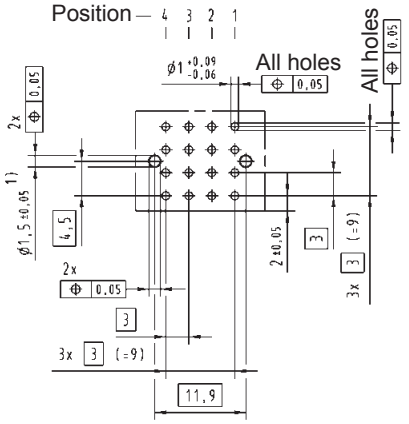




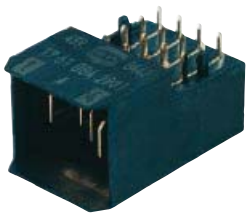
(View magnified)



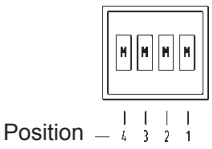
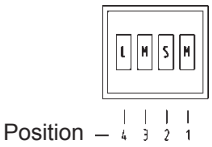
Board drillings



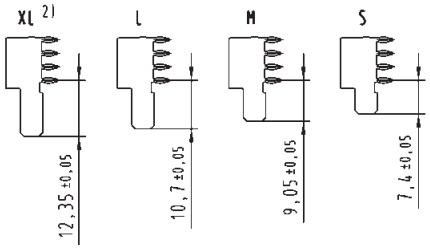
[1] Non-metallized drillings
[2] Type XL on request
Tooling see chapter 15



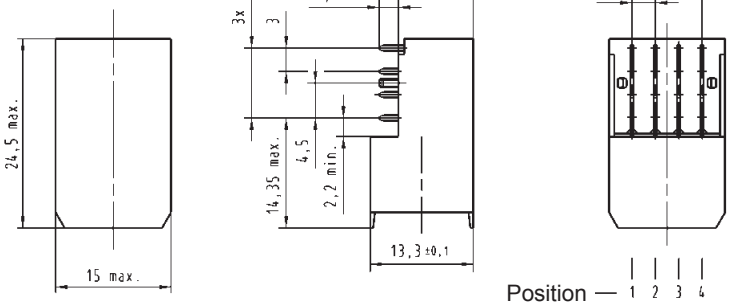
Male connectors angled, with solder (SMC) termination

Identification	Number of contacts	Contact length [mm] termination side	Part number	Contact loading
Connector with same sized contacts	4	2.5	17 61 004 2802	
Connector with leading/lagging contacts OBSAI configuration	4	2.5	17 61 004 2801	

Contact dimensions [mm]

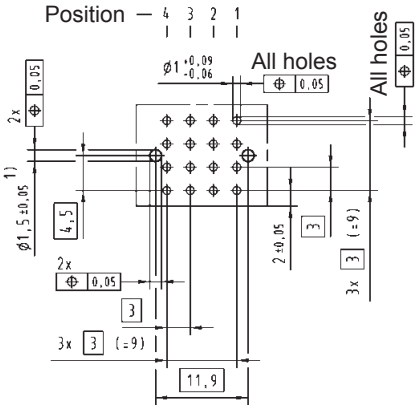


Connector dimensions [mm]



(View magnified)

Board drillings

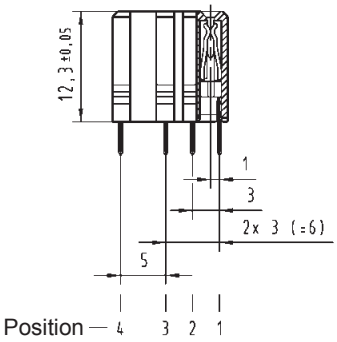


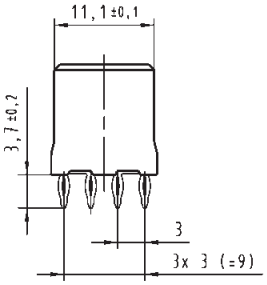
1) Non-metallized drillings
2) Type XL on request

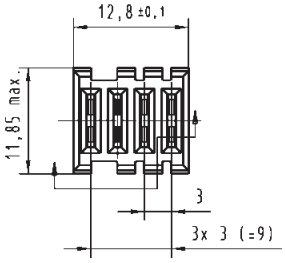
Female connector straight, with press-in termination

Identification	Number of contacts	Contact length [mm] termination side	Part number
Connector	4	3.7	17 66 004 2201

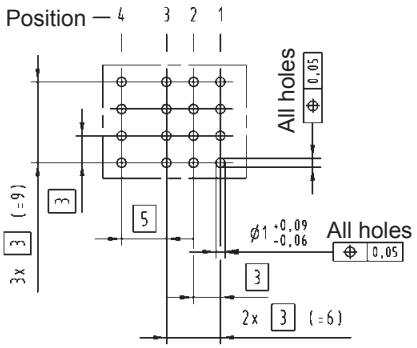
Connector dimensions [mm]







Board drillings



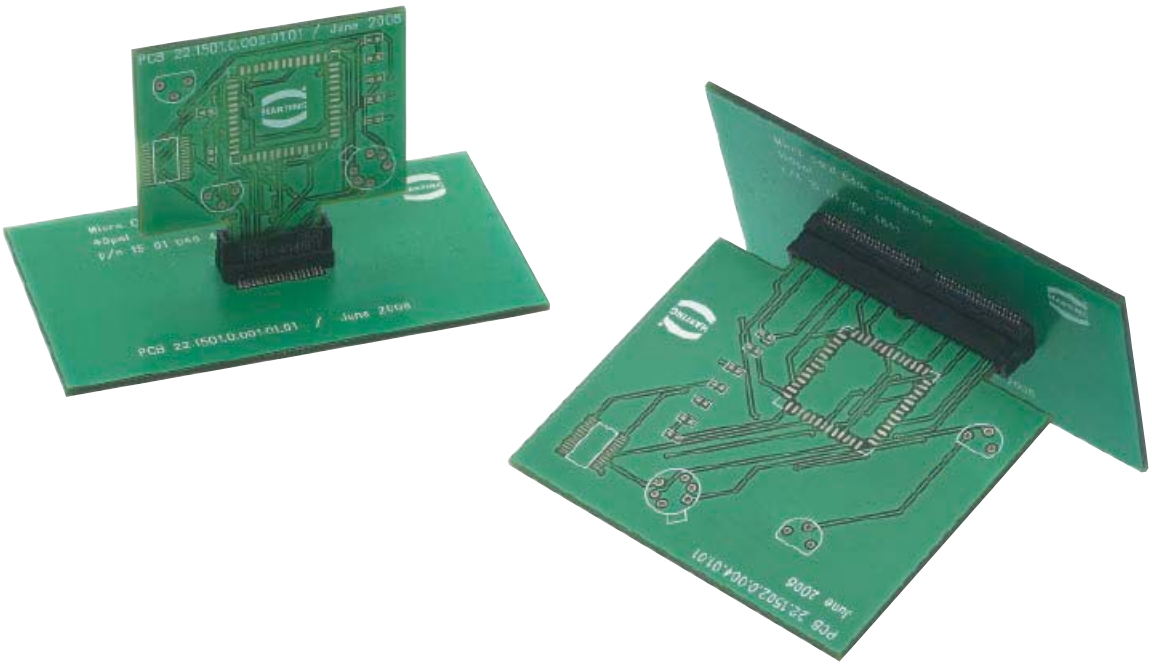
Micro Card Edge connector, 0.8 mm pitch	Page

HARTING offers the new Micro Card Edge connector in surface mount technology for PCBs with the thickness of 1.6 mm. The new connector is suitable for board-to-board mezzanine as well as for small „pluggable daughter card" applications. The key feature of the new connector in mezzanine applications is the achievement of flexible staple heights of parallel boards.

The HARTING Micro Card Edge connector allows data transfer rates up to 14Gbps and is suitable for high-speed applications in the telecom, medical and industrial markets. The connector is available with 40 or 100 contacts in 0.8 mm pitch.

An extremely smooth contact surface achieved by the usage of high performance stamping tools and a special surface finish ensures low insertion forces and a high contact reliability.

HARTING´s Micro Card Edge connector offers excellent features for high volume manufacturing like tape-and-reel packaging and a pad for nozzle in high volume productions.

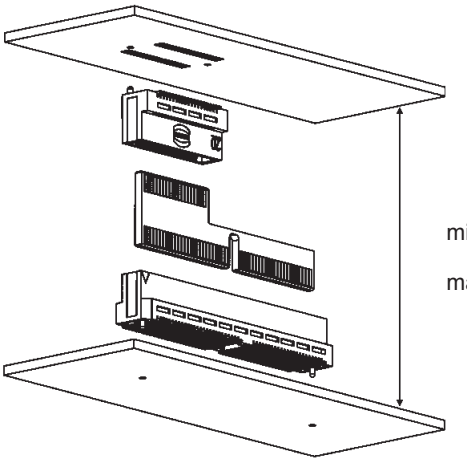


Features

- High speed data transmission between mezzanine or daughter card boards in telecom, medical, datacom and industrial applications.
- The key feature for mezzanine application is that the distance between parallel boards is flexible by utilizing a small board between the connectors. This gives flexibility in the mechanical design of the system.
- SMT termination gives good signal integrity characteristics for the card edge connector.

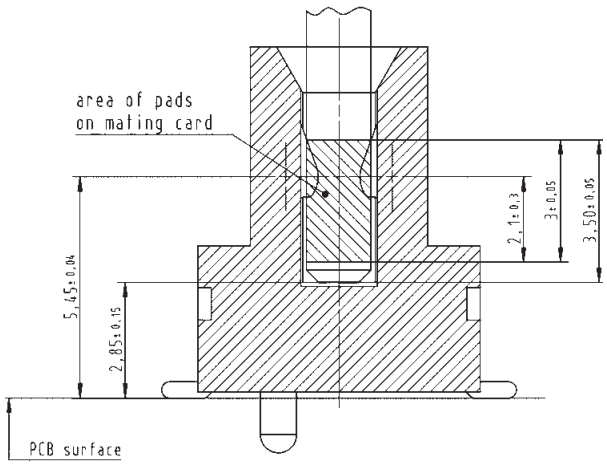
Contact spacing	: 0.8 mm
Working current Test voltage	: 1.7 A at 80 °C ambient : 600 V AC
Mating cycles	: 200
Number of contacts	: 40, 100
Mating card thickness	: 1.6 + 0.1 mm
Operating temperature Max processing temperature	: -55 °C up to +125 °C : 230 °C for 60 sec. or 260 °C for 20 sec.
ROHS-compliance	: yes
Materials	
Mouldings	: LCP, glass-fibre filled, UL 94-V0
Contacts	: Copper alloy with Ni plating
Contact surface Contact zone Termination zone	 : Pd/Ni plating with Au flash : Sn/Ni plating

Board dimensions



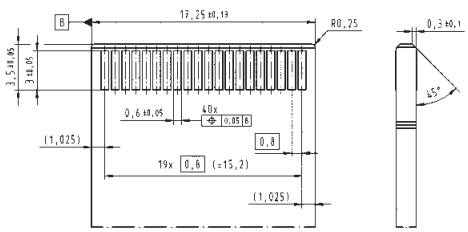
min. 20 mm

max. ∞

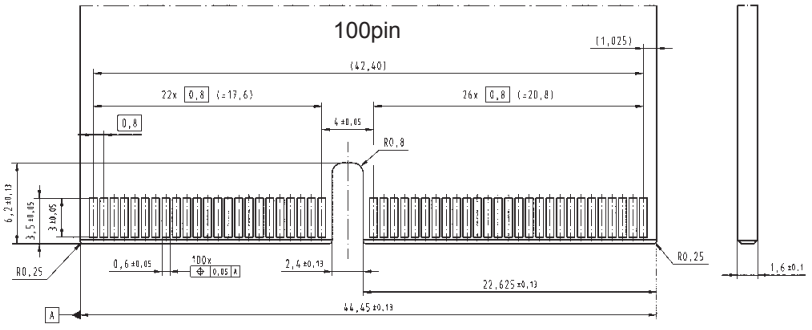


Recommended mating card layout

40pin

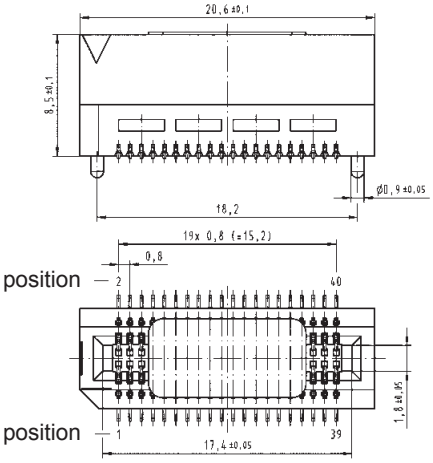


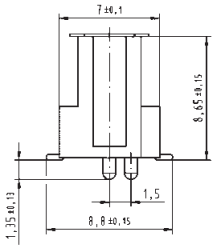
100pin

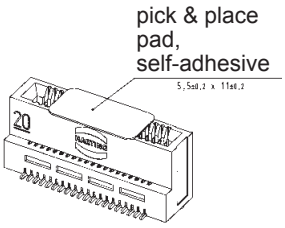


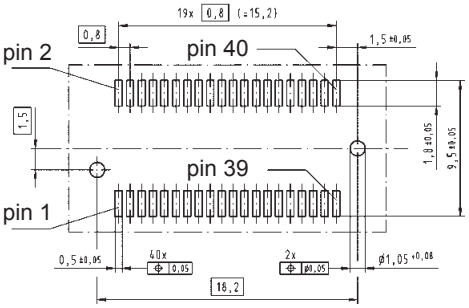
40pin connector

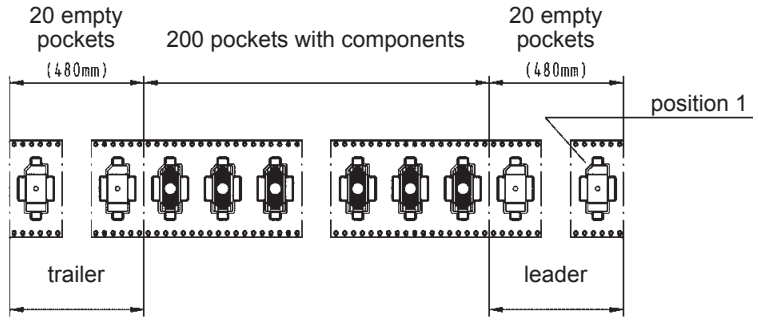
Identification	Number of contacts	Part number	Drawing	Dimensions in mm
Micro Card Edge connector				
2800 pieces in a “Tape and Reel” packaging (14 reels with 200 pcs.)	40	15 01 040 4601 040		
200 pieces in a “Tape and Reel” packaging	40	15 01 040 4601 042		
Single connector sample	40	15 01 040 4601 333		
Board layout				
“Tape and Reel” packaging				
Reel dimensions				

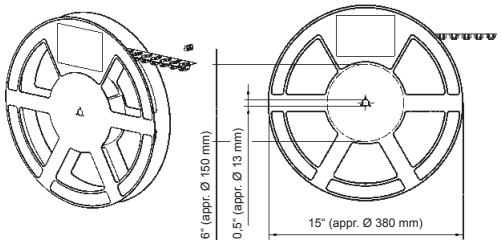












Micro Card Edge connector

100pin connector

Identification	Number of contacts	Part number	Drawing	Dimensions in mm
Micro Card Edge connector				
1800 pieces in a “Tape and Reel” packaging (9 reels with 200 pcs.)	100	15 02 100 4601 040		
200 pieces in a “Tape and Reel” packaging	100	15 02 100 4601 042		
Single connector sample	100	15 02 100 4601 333		
Board layout				
“Tape and Reel” packaging				
Reel dimensions				

Notes

Mini Coax modules (press-in)	Page

Mini Coax tooling see chapter 15

The Mini Coax connector is a multi line RF connector for blind mating of board-to-board, board-to-cable or cable-to-cable applications. The Mini Coax connector is mainly used in both RF (Radio Frequency) and IF (Intermediate Frequency) signal transmission and is specified for a frequency range from DC to 2.5 GHz and beyond. Thanks to its compact size (a 10 coaxial contacts' connector is as small as a PC's enter key) and excellent crosstalk features, this connector system is ideal for high end equipment within cellular telecom infrastructure.

The isolated coaxial lines are implemented in a plastic housing that defines the module size in a metric scale from 1.00, 1.25 and 1.50 SU (SU = System Unit = 25 mm). The Mini Coax connectors are available as straight sockets and right angled plugs. Both types are executed in press-in technology for the PCB (Printed Circuit Board) termination. The straight modules are delivered with an inserted plastic cap that protects the coaxial contacts against dust and dirt, as well as being used as an upper press-in tool. In this way, an easy and safe flat rock process is guaranteed.

The contacts of the Mini Coax single-row connector are single line, as opposed to the standard connector. This delivers enhanced performance, especially in terms of isolation, and is also suitable for slim cabinet applications.

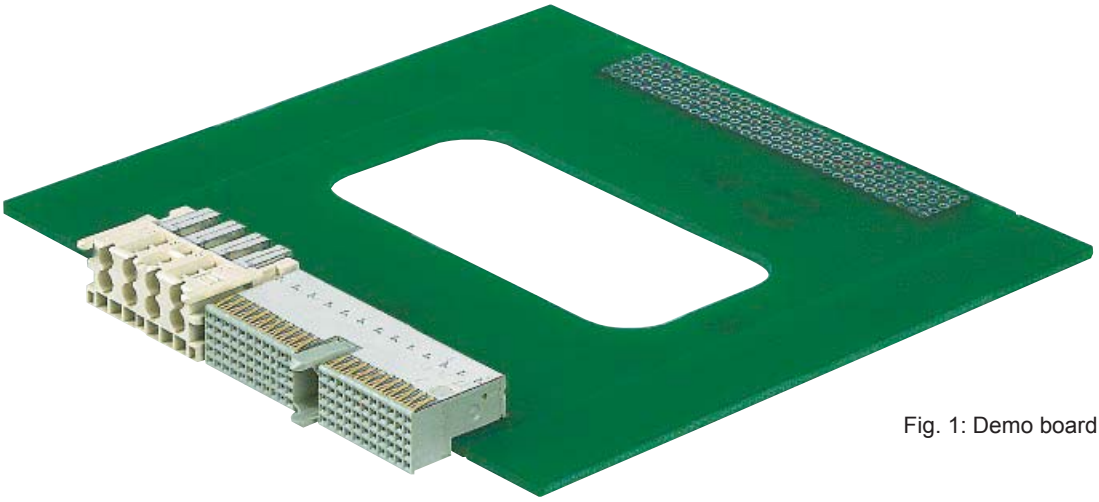


Fig. 1: Demo board

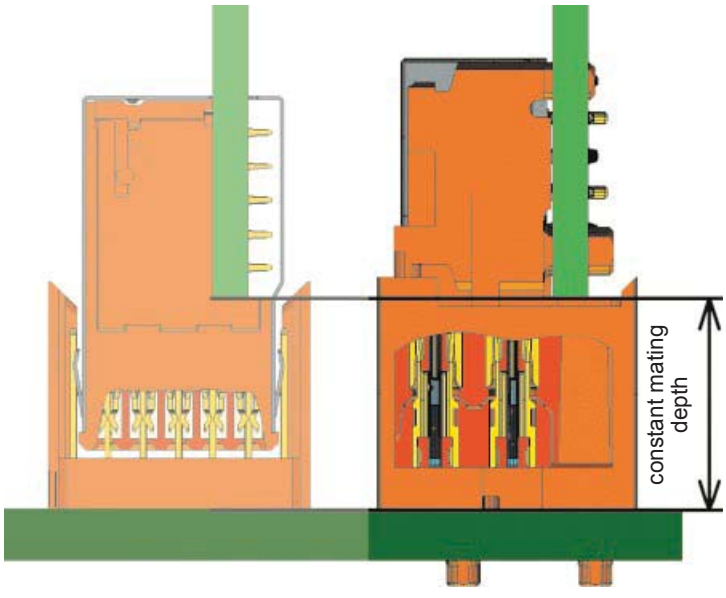


Fig. 2: Cross section of both connector types

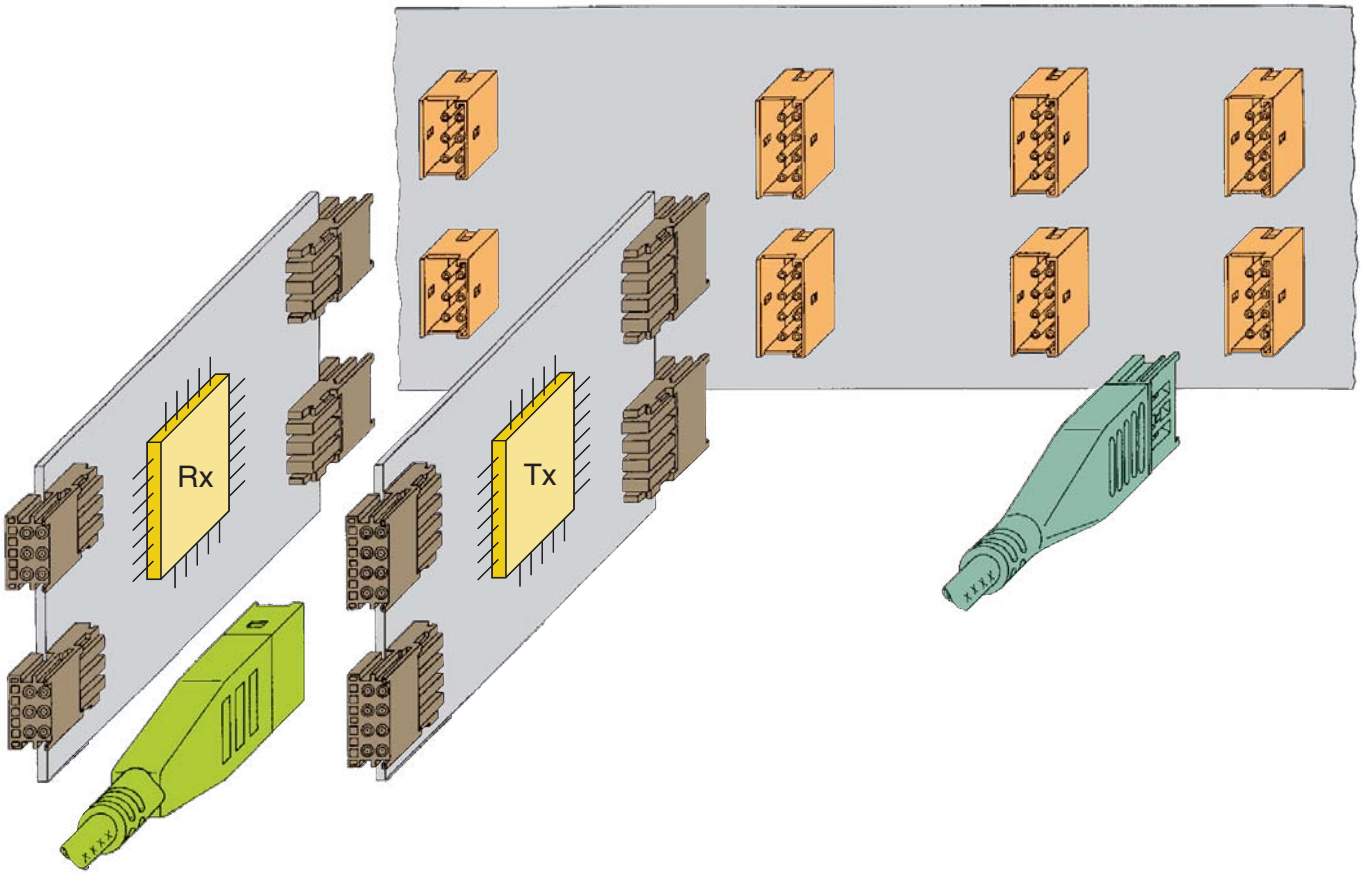


Fig. 3: Typical pcb configurations

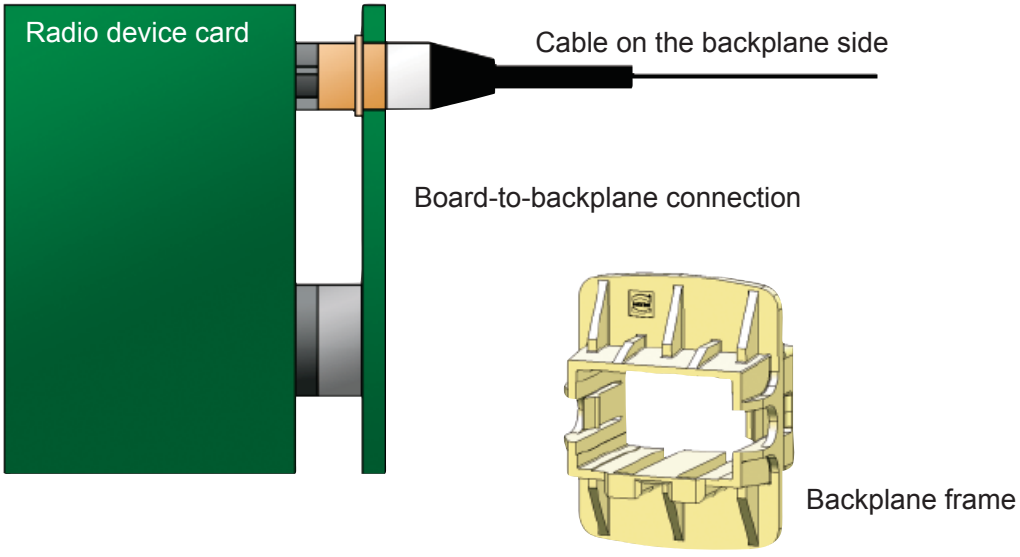


Fig. 4: Mini Coax backplane feed through

Number of contacts	:	1, 2, 4, 6, 8 or 10 coaxial contacts
Grid pattern	:	4.40 x 6.25 mm (within a twin x between twins); 8.80 mm for Mini Coax single-row connectors
Dielectric withstanding Voltage $U_{r.m.s.}$	:	≤ 1000 V (for 60 s)
DC-contact resistance		
Centre contact	:	≤ 12 mΩ
Ground contact	:	≤ 6 mΩ
Insulation resistance	:	≥ 5000 MΩ
Power	:	≤ 40 W (at 2.5 GHz)
Frequency range	:	DC … 2.5 GHz
Nominal impedance	:	50 Ω
Return loss	:	< - 20 dB
VSWR	:	< 1.22
Insertion loss	:	< 0.25 dB
Near end crosstalk (NEXT)	:	

Pin distance	Board-to-Board	Board-to-Cable	Cable-to-Cable
∆x = 4.40 mm	50 dB	60 dB	90 dB
∆x = 6.25 mm	60 dB	70 dB	90 dB
∆x = 7.64 mm	75 dB	80 dB	90 dB
∆x = 8.80 mm	–	75 dB	–
∆x = 12.50 mm	90 dB	90 dB	90 dB

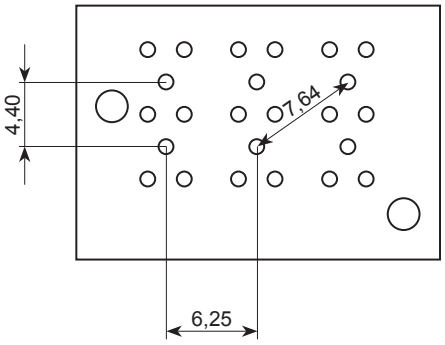


Fig. 5: Grid pattern
Mini Coax Standard

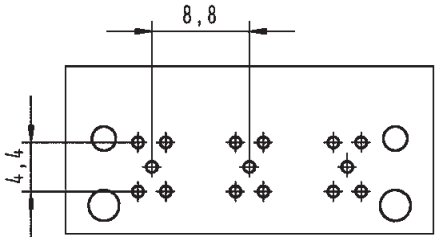


Fig. 6: Grid pattern
Mini Coax single-row

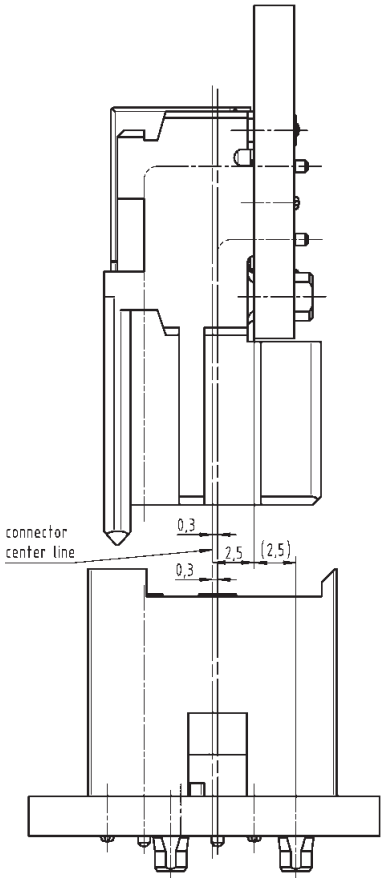
Temperature range	:	– 55 °C ... + 125 °C
Moulding material	:	Liquid Cristal Polymer (LCP), UL 94-V0
Contact surface		
Contact zone	:	Au
Termination area		
Centre pin	:	Au
Ground pin	:	Ni

Mating cycles	:	max. 500
Recommended configuration of plated through holes	:	

Tin plated PCB (HAL) acc. EN 60 352-5	Hole-Ø	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Sn	max. 15 µm
	Plated hole-Ø	0.94-1.09 mm
Chemical tin plated PCB	Hole-Ø	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Sn	min. 0.8 µm
	Plated hole-Ø	1.00-1.10 mm
Au / Ni plated PCB	Hole-Ø	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Ni	3-7 µm
	Au	0.05-0.12 µm
	Plated hole-Ø	1.00-1.10 mm
Silver plated PCB	Hole-Ø	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Ag	0.1-0.3 µm
	Plated hole-Ø	1.00-1.10 mm
OSP copper plated PCB	Hole-Ø	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Plated hole-Ø	1.00-1.10 mm

PCB board thickness: ≥ 1.6 mm

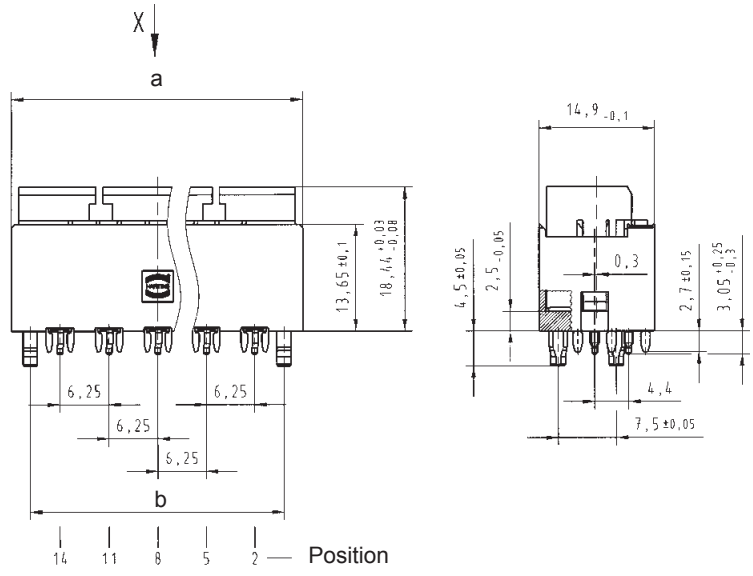
Mating force	:	≤ 10 N/contact
Withdrawal force	:	> 1 N/contact
Mating distance	:	12.5 … 15 mm
Wiping length	:	2.5 mm
Acceptable radial mating offset	:	max. ± 1.5 mm

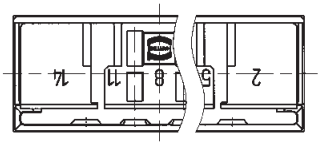


Straight modules

Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax modules, press-in termination	10	1.50	2, 5, 8, 11, 14	07 11 100 0026
	8	1.25	2, 5, 8, 11	07 11 100 0024
	6	1	2, 5, 8	07 11 100 0023
	4	1	2, 8	07 11 900 0024
	2	1	2	07 11 900 0023

Dimensions

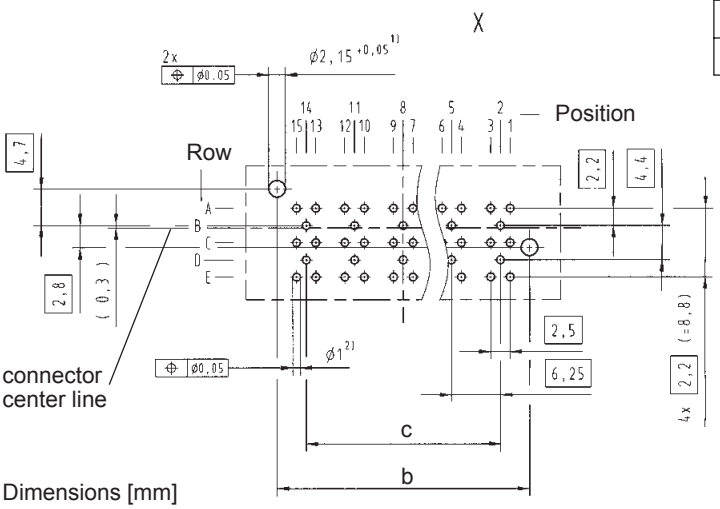




View with protection-cap

Straight module	Dimension [mm] a	b	c
1.50 SU	37.3	32.5	25
1.25 SU	31.05	26.25	18.75
1.00 SU	24.8	20	12.5

Board drillings



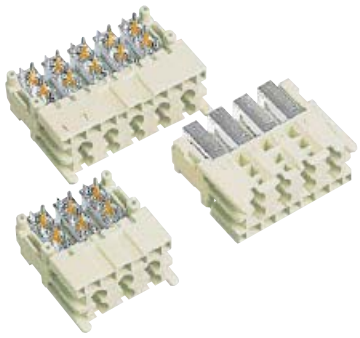
Dimensions [mm]

Row B, D: position 2, 5, 8, 11, 14 for signal line

Row A, C, E: position 1, 3, 4, 6, 7, 9, 10, 12, 13, 15 for ground-line

1) Non-metallised drillings

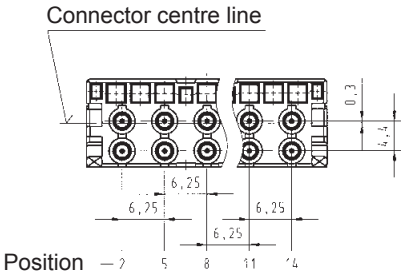
2) Details see page 07.05

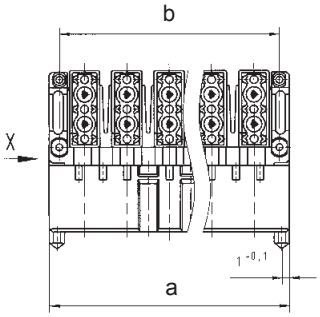


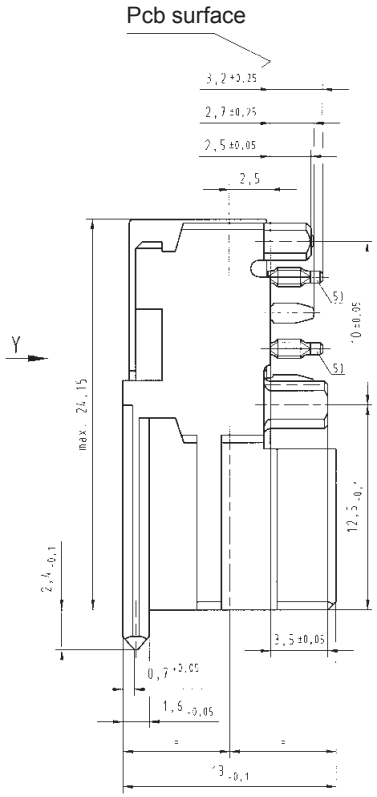
Angled modules

Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax modules, press-in termination	10	1.50	2, 5, 8, 11, 14	07 31 100 0021
	8	1.25	2, 5, 8, 11	07 31 100 0020
	6	1	2, 5, 8	07 31 100 0019
	4	1	2, 8	07 31 900 0022
	2	1	2	07 31 900 0021

Dimensions

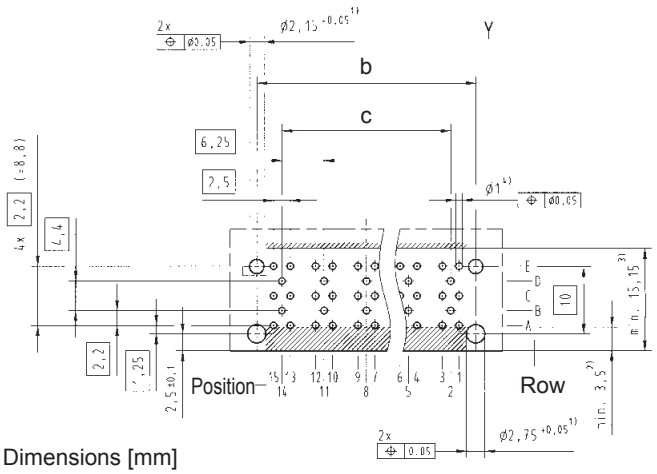






(View magnified)

Board drillings



Angled module	Dimension [mm] a	b	c
1.50 SU	35.45	32.5	25
1.25 SU	29.15	26.25	18.75
1.00 SU	22.9	20	12.5

Row B, D: position 2, 5, 8, 11, 14 for signal line

Row A, C, E: position 1, 3, 4, 6, 7, 9, 10, 12, 13, 15 for ground-line

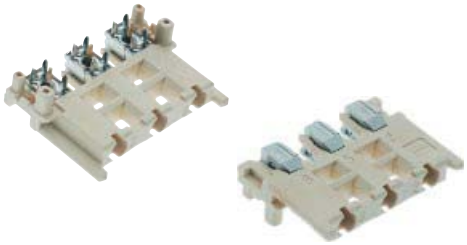
1) Non-metallised drillings

2) No tracks, except solder eyes

3) Limit area of components (valid for both pcb-sides)

4) Details see page 07.05

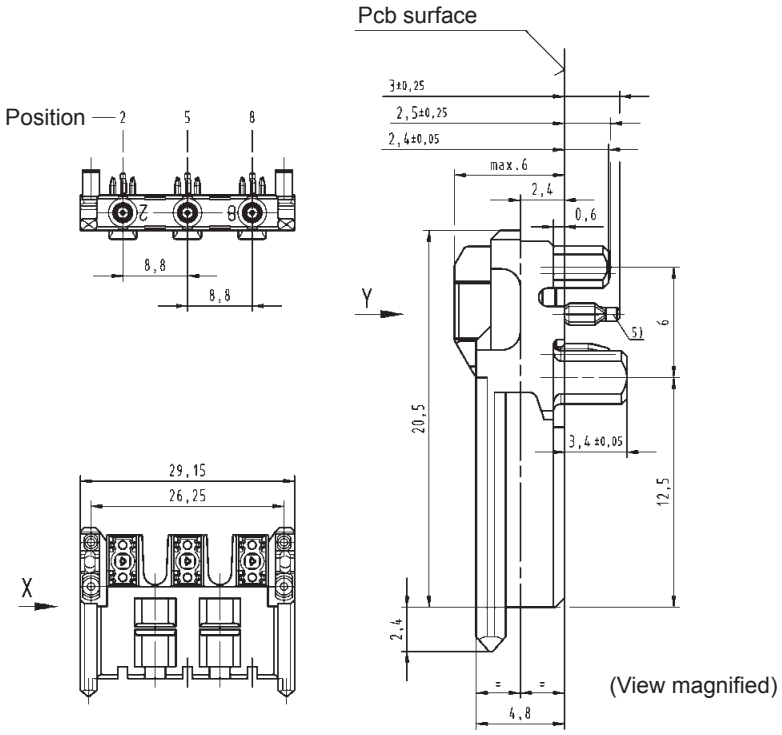
5) Press-in zone in any angular position related to it's longitudinal axis possible



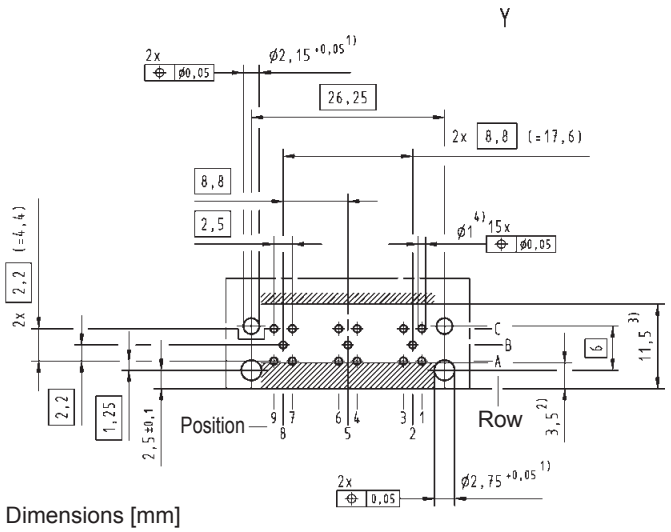
Angled modules

Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax single-row module, press-in termination	3	1	2, 5, 8	07 31 100 0028

Dimensions



Board drillings



Dimensions [mm]

Row B: position 2, 5, 8 for signal line

Row A, C: position 1, 3, 4, 6, 7, 9 for ground-line

1) Non-metallised drillings

2) No tracks, except solder eyes

3) Limit area of components (valid for both pcb-sides)

4) Details see page 07.05

5) Press-in zone in any angular position related to it's longitudinal axis possible

Mini Coax cable assemblies and accessories	Page

The Mini Coax product range also includes various cable assemblies and accessories, which provide customers with flexible application options.

The Mini Coax cable connector is available as plug and socket and is crimped to a coaxial cable that can be individually assembled with RF-cable connectors (SMA, SMB, N-type …). While delivering high RF transmission performance, the moulded Mini Coax cable assemblies provide robust connections. The various angle mould types meet different cable routing requirements according to the available space.

Thanks to various accessories, such as backplane frame, Han® housing insert and press-in cable housing …, customized connecting requirements can be met.

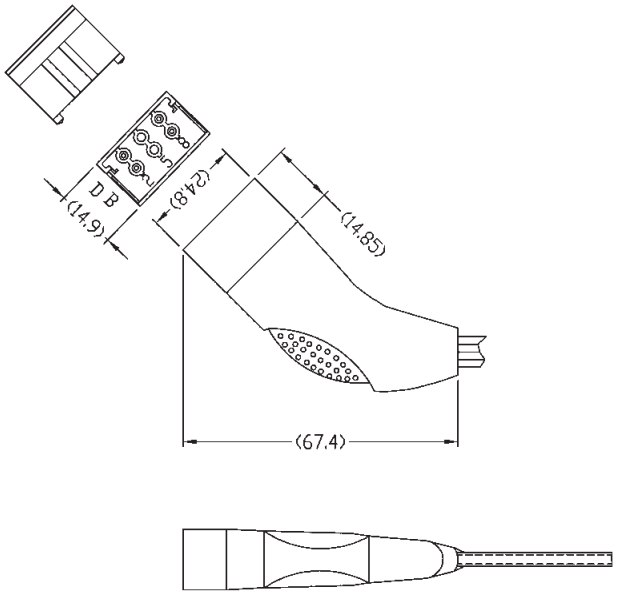
Remark:

The cable assemblies and accessories shown are part of the overall product range.

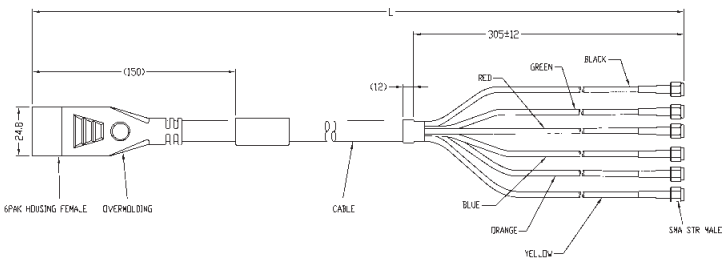
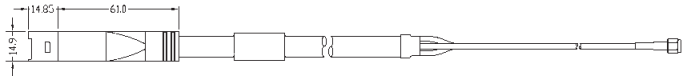
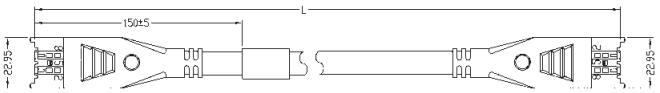
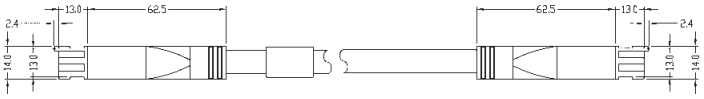
Additional, customized parts are available on request.

Notes

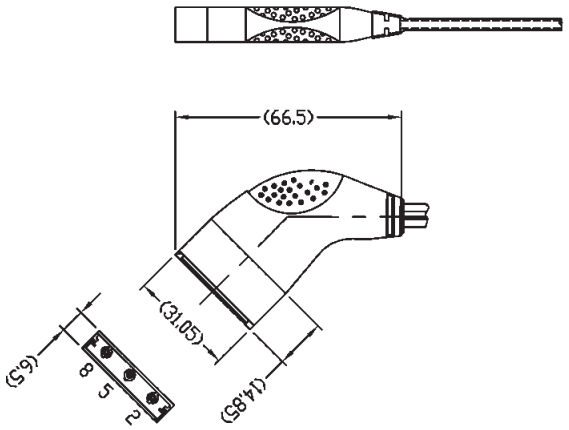
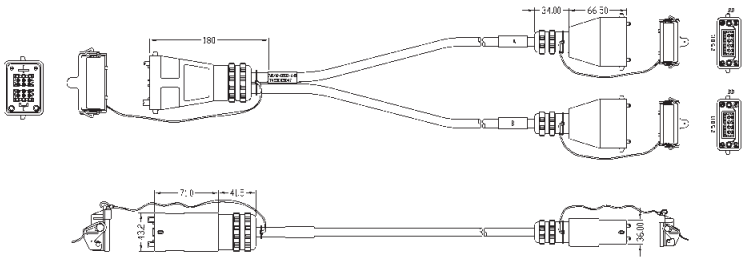
Cable assemblies

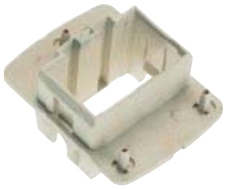
Identification	Number of contacts	Part number	Drawing	Dimensions [mm]
Cable assembly for mating with the angled standard module	1–10	on request		

Cable assemblies

Identification	Part number	Drawing	Dimensions [mm]
Cable assembly Mini Coax, 6 position female connector (straight) to SMA crimp connector Hood: overmoulded with top entry Wiring: 1:1			
Length: L = 0.5 m L = 1.5 m L = 2.0 m	33 07 233 0500 109 33 07 233 1500 110 33 07 233 2000 111		
Cable assembly Mini Coax, 6 pole male Cable: Mini Coax cable Hood: overmoulded with top entry Wiring: 1:1			
Length: L = 0.5 m L = 1.5 m L = 2.0 m	33 07 223 0500 112 33 07 223 1500 113 33 07 223 2000 114		

Cable assemblies

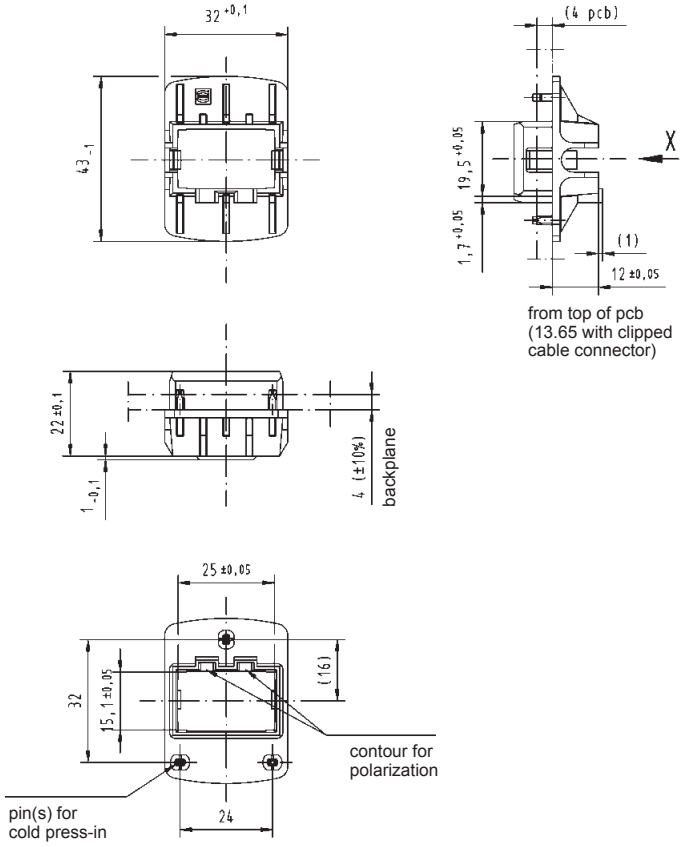
Identification	Number of contacts	Part number	Drawing	Dimensions [mm]
Cable assembly for mating with the angled single-row module	1–3	on request		
Cable assembly with heavy duty hoods/housings	1–10	on request		



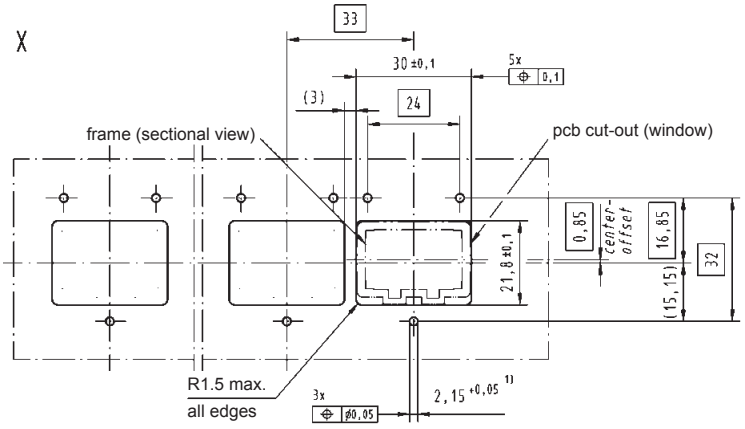
Accessories

Identification	Part number
Backplane frame	07 71 100 0042

Dimensions [mm]



Board drillings



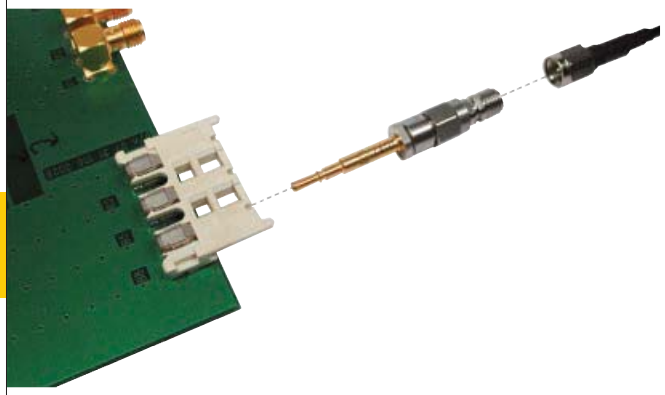
1) Non-metallized drillings

Accessories

Identification	Part number
Test adapter SMA – Mini Coax	
male for straight modules	07 73 000 0394
female for angled modules	07 73 000 0393

General information

The Mini Coax-to-SMA Adapter can be directly connected to measurement instrument cables. This allows the precise RF transmission characterization of module cards, backplanes and cable assemblies.



Features:
- SMA connector directly attached to the Mini Coax
- Impedance deviations between adapters < 1.5 Ω
- Good reproducibility of test results
- Test results between different labs are comparable
- Precise measurements of Mini Coax connector system

Electrical characteristics

Mini Coax test adapter	Impedance values @ 31.5 ps rise time at reference plane (10% - 90%):		Max. impedance deviation [Ω]
	Max. [Ω]	Min. [Ω]	
SMA to male	52.5	47.5	1.5
SMA to female	53.5	48.0 40.5*	1.0

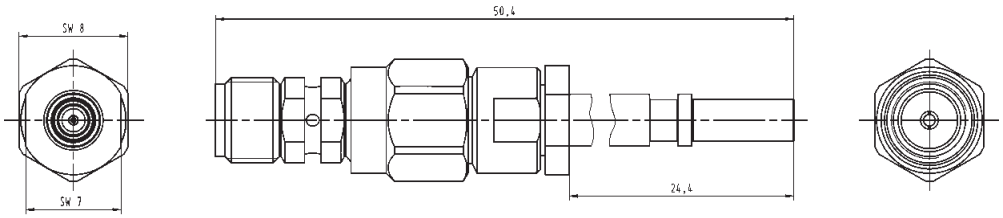
Connector	Electrical length [ps]
Mated SMA to male / female adapter	262.2

Frequency [GHz]	Return loss [dB] mated adapter pairs	Insertion loss [dB] mated adapter pairs
< 1	- 26.9	- 0.17
< 2	- 22.5	- 0.24
< 3	- 19.9	- 0.26
< 4	- 16.4	- 0.34
< 5	- 14.4	- 0.42

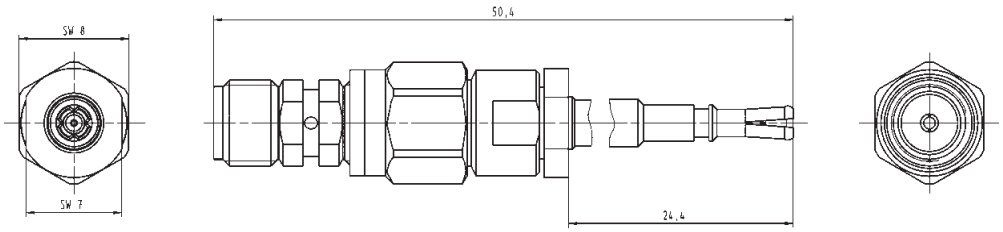
*: Impedance drop is due to the female Mini Coax connector design.

Dimensions [mm]

Male test adapter



Female test adapter



har:link® Modular metric high speed connectors

The har:link® connector system of HARTING complies with the requirements of IEC 61 076-4-107 and is a compact and robust pcb-to-cable interface with excellent data transmission properties for high-speed networking and telecommunications.

All dimensions of the har:link® connector are in accordance with IEC 917 and IEEE P 1301 requirements, which allows for easy implementation into both metric and inch-based systems. In addition, har:link® supports hot plugging as required by modern bus systems such as CompactPCI, S-bus and VME.

har:link® allows data transmission up to 2 Gbit/s per pair and is therefore perfectly suited for modern transmission protocols such as Low Voltage Differential Signals (see Fig. 1). The design of the har:link® connector allows differential pairs to be placed horizontally (parallel to the pcb), thus reducing the skew at high frequencies and considering high signal integrity.

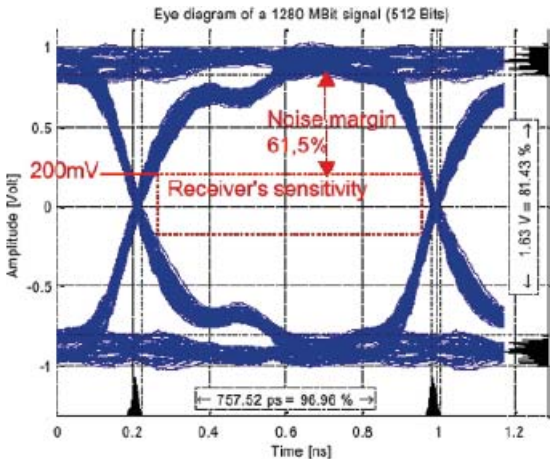


Fig. 1: Eye diagram of a 1280 MBit signal (512 Bits)

The metal shells of the har:link® connector are a guarantee for its superior performance in the EMI-polluted environment (see Fig. 2).

Fig. 2: 360° screened-can construction with locking levers

To reach a screening attenuation of more than 50 dB up to 1 GHz, HARTING offers brackets covering each connector in conjunction with a gasket, which is compressed between the bracket and the front panel (see Fig. 3).

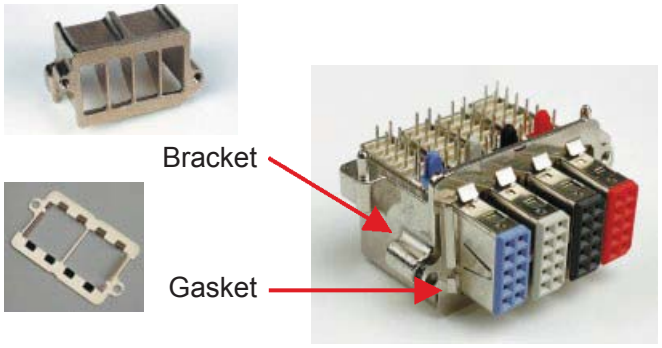


Fig. 3: 4 cavities bracket and gasket

Once plugged, the mated pair shows excellent mating safety. Due to the locking levers on both sides of the male connector, the connection withstands a pulling force of up to 80 N (see Fig. 2).

The high temperature resistant material of the har:link® female connector body supports the safe reflow soldering process. For easy identification of female modules, six different colours are available (see Fig. 4).

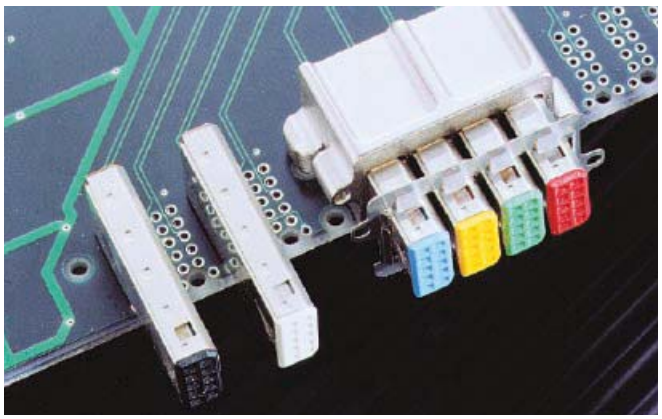
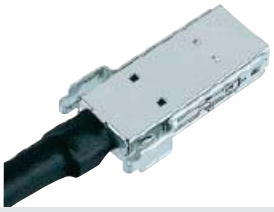


Fig. 4: Female modules

In addition to single connectors, HARTING provides cable assemblies with unshielded twisted pairs or with shielded twisted pairs for high speed applications such as IEEE 1355. A crimping tool range for terminating the male har:link® connectors is available.

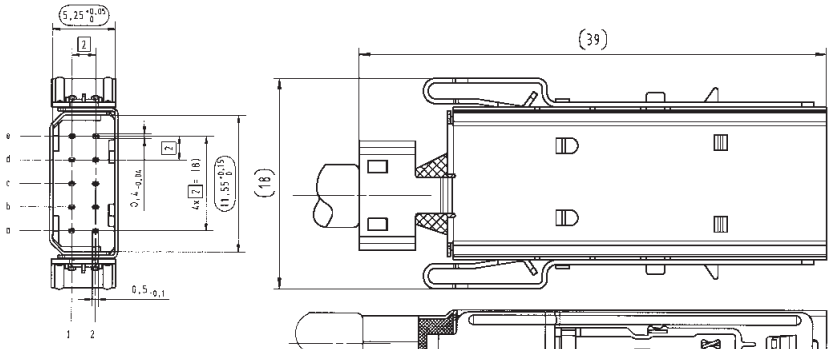
Number of contacts	10
Approvals	IEC 61 076-4-107 UL recognized: E102079
Contact pitch Connector pitch	2 mm 6 mm
Working current	1.5 A at 70 °C
Test voltage $U_{r.m.s.}$	750 V
Contact resistance Insulation resistance	≤ 35 mΩ ≥ 10^{10} Ω
Temperature range during reflow soldering	-55 °C … +125 °C female: max. + 260 °C for 60 s
Mating cycles	250, performance level 2
Terminations	Solder buckets (male), AWG 24-30, outer insulation Ø 5.33 ± 0.25 mm Solder pins for ø 0.6 mm min. (female)
Insertion force Withdrawal force	10 N max. / module 2 N min. / module (without locking levers)
Latching system	Locking levers
Materials	
Mouldings	Male connector: Polyester, UL 94-V0 Female connector: High temperature plastic material, UL 94-V0
Contacts	Copper alloy
Shells	Male connector: Stainless steel Female connector: Silver nickel
Contact surface	
Contact zone	Selectively plated according to performance level

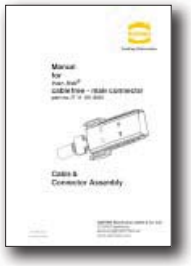


Male connectors, straight
Female connectors, angled

Identification	No. of contacts	Colour	Part number
Male connector			
with solder buckets	10	Black	27 11 122 2001
Female connector			
with solder pins	10	Beige (standard)	27 21 121 8000
	10	Red	27 21 121 8002
	10	Yellow	27 21 121 8004
	10	Green	27 21 121 8005
	10	Blue	27 21 121 8006
	10	Black	27 21 121 8010

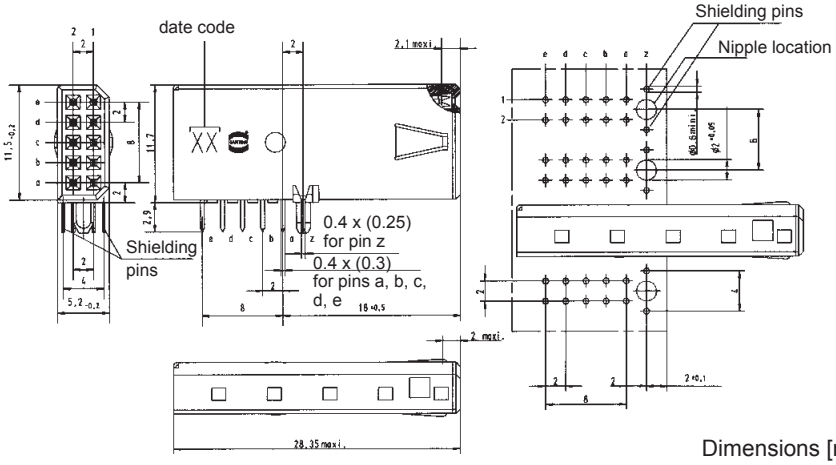
Male connector
(delivered in piece parts)





Manuals for the *har-link*® cable free connector assemblies are available in our online catalogue *HARKIS*® or on demand at your local HARTING representative.

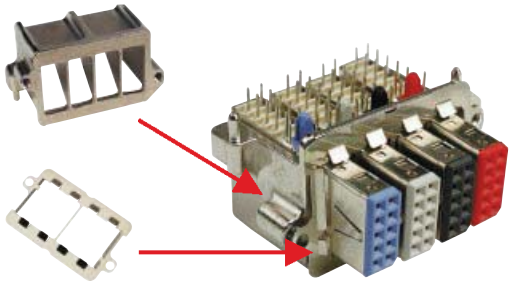
Female connector



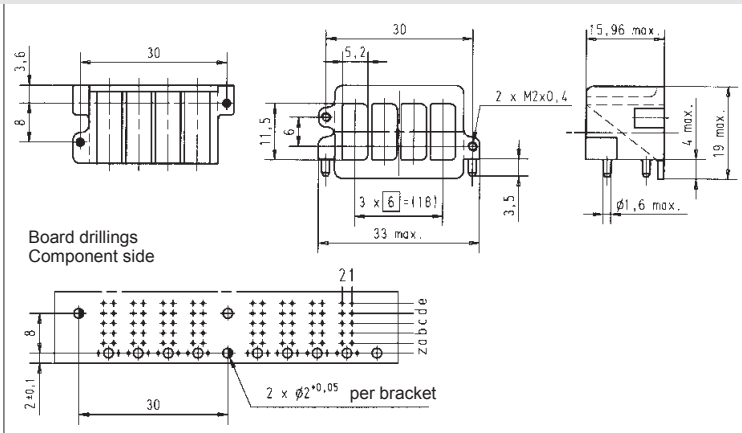
Dimensions [mm]

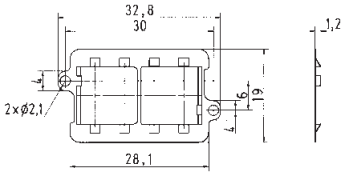
Tooling see chapter 20

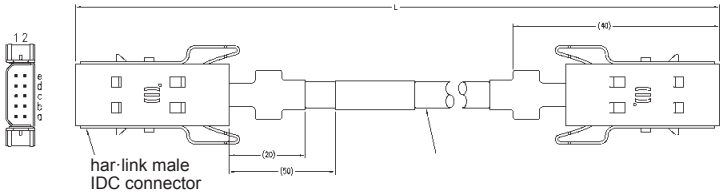
Accessories and cable assemblies



Identification	Part number	Drawing	Dimensions in mm
Bracket with four cavities	27 71 040 0001		
Gasket with four cavities	27 71 040 0002		
Standard *har-link*® cable assembly Cable: 5 twisted pairs, AWG 28, shielded, PVC Wiring: 1:1			
Length: L = 0.5 m	33 27 243 0500 001		
L = 1.0 m	33 27 243 1000 002		
L = 2.0 m	33 27 243 2000 003		
High end *har-link*® cable assembly Cable: 5 twisted pairs, AWG 30, double shielded, PVC Wiring: 1:1			
Length: L = 0.5 m	33 27 243 0500 006		
L = 1.0 m	33 27 243 1000 007		
L = 2.0 m	33 27 243 2000 008		
Cable: 5 twisted pairs, AWG 30, double shielded, PVC Wiring: acc. to IEEE 1355			
Length: L = 0.5 m	33 27 243 0500 015		
L = 1.0 m	33 27 243 1000 016		
L = 2.0 m	33 27 243 2000 017		







IEEE 1355 wiring

Connector 1	Connector 2
2-e	1-a
1-e	2-a
2-d	1-b
1-d	2-b
2-c	2-c

Connector 1	Connector 2
1-c	1-c
2-b	1-d
1-b	2-d
2-a	1-e
1-a	2-e

Notes

Directory chapter 15

[1)] See separate catalogue

For economical and safe press-in of har:bus® HM connectors with 5+2 and 8+2 rows, HARTING has developed a discrete tooling system.

Due to its modular structure it can be adapted to any connector configuration that needs to be pressed-in extremely quickly and securely.

Therefore a top and a bottom tool for each connector style is available. These tools are inserted in a top or bottom carrier tool with a groove, thus guaranteeing exact position of the top and bottom tools and the connectors.

To use identical carrier tools for all connector configurations, HARTING offer spacer blocks to fill gaps between adjacent top or bottom tools.

The carrier tool is either completely filled with top or bottom tools or respective spacer blocks, making it possible to press-in single modules.

To press-in female connectors with pre-installed upper shields, separate top and bottom tools are available.

For lower shield press-in the tooling can be changed easily.

For further information please check our operating instructions or contact your HARTING representative.

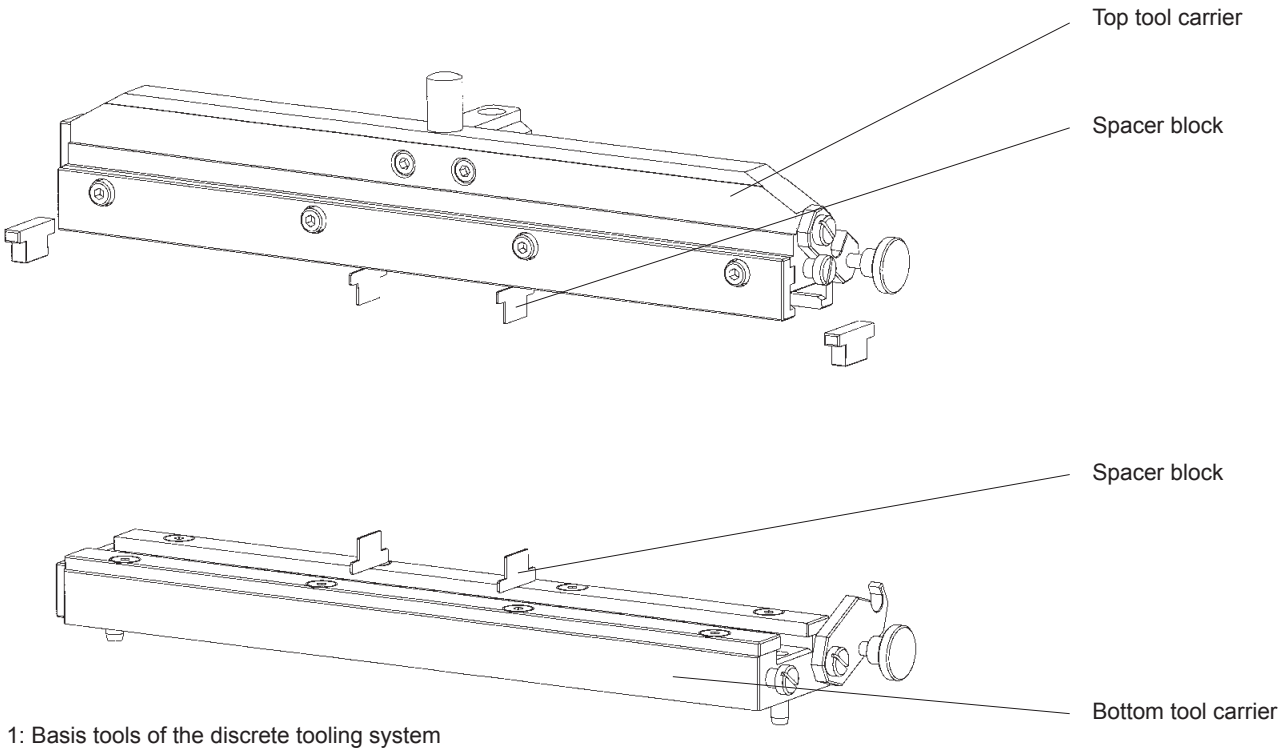


Fig. 1: Basis tools of the discrete tooling system

Basis tools for all connector types

Part number connector	Tool identification	Part number tool
17 xx xxx xxxx	Top tool carrier har:bus® HM	17 99 000 0012
17 xx xxx xxxx	Bottom tool carrier har:bus® HM	17 99 000 0013
17 xx xxx xxxx	Top tool carrier har:bus® HM 3U	17 99 000 0073
17 xx xxx xxxx	Bottom tool carrier har:bus® HM 3U	17 99 000 0074
17 xx xxx xxxx	Spacer block 0.67 mm (CompactPCI)	17 99 000 0057
17 xx xxx xxxx	Spacer block 5 mm	17 99 000 0056

Part number connector	Tool identification	Part number tool
17 xx xxx xxxx	Spacer block 25 mm	17 99 000 0055
17 xx xxx xxxx	Spacer block 38 mm	17 99 000 0054
17 xx xxx xxxx	Spacer block 44 mm	17 99 000 0053
17 xx xxx xxxx	Spacer block 50 mm	17 99 000 0052
17 xx xxx xxxx	Centering plate female left	17 99 000 0060
17 xx xxx xxxx	Centering plate female right	17 99 000 0061

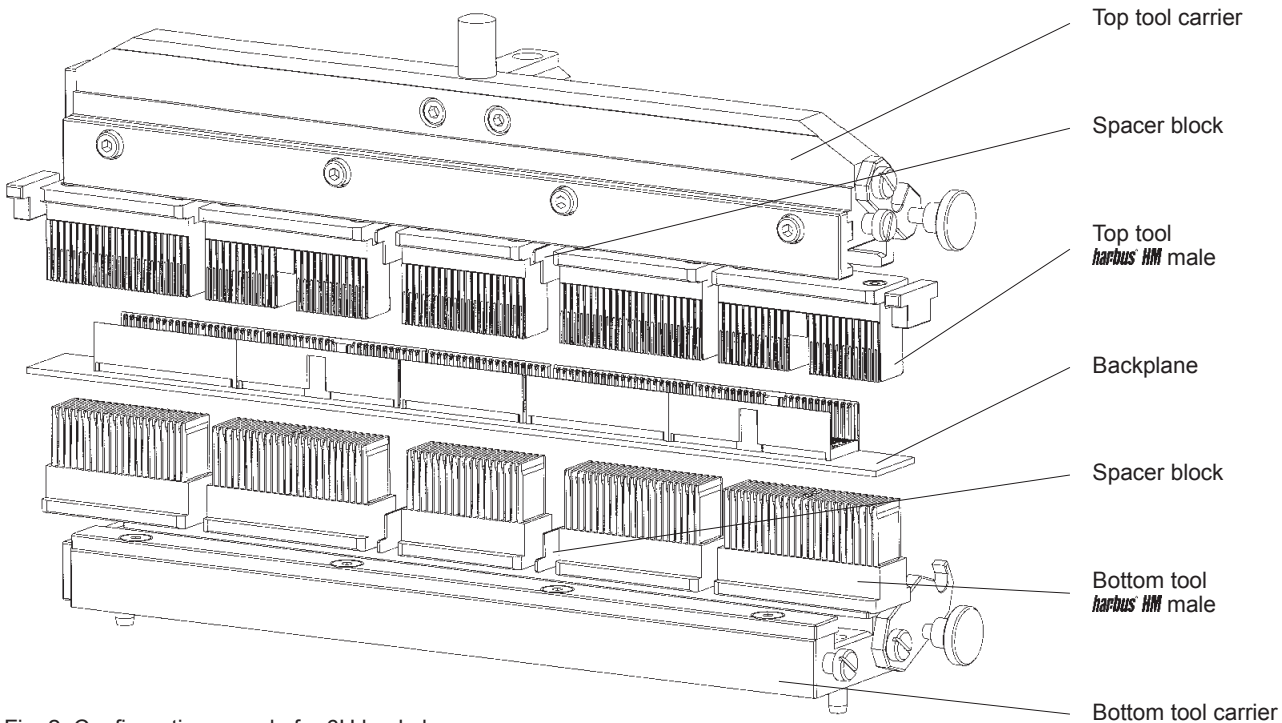


Fig. 2: Configuration sample for 6U backplane

Tools for straight male connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 01 xxx xxxx	Top tool, male, type A	17 99 000 0014	17 11 xxx xxxx	Top tool, male, type D	17 99 000 0022
17 01 xxx xxxx	Bottom tool, male, type A	17 99 000 0026	17 11 xxx xxxx	Bottom tool, male, type D	17 99 000 0028
17 02 xxx xxxx	Top tool, male, type B	17 99 000 0020	17 12 xxx xxxx	Top tool, male, type E	17 99 000 0023
17 02 xxx xxxx	Bottom tool, male, type B	17 99 000 0026	17 12 xxx xxxx	Bottom tool, male, type E	17 99 000 0028
17 04 xxx xxxx	Top tool, male, type B	17 99 000 0019	17 13 xxx xxxx	Top tool, male, type AB	17 99 000 0015
17 04 xxx xxxx	Bottom tool, male, type B	17 99 000 0025	17 13 xxx xxxx	Bottom tool, male, type AB	17 99 000 0024
17 05 xxx xxxx	Top tool, male, type B	17 99 000 0018	17 14 xxx xxxx	Top tool, male, type AB	17 99 000 0016
17 05 xxx xxxx	Bottom tool, male, type B	17 99 000 0024	17 14 xxx xxxx	Bottom tool, male, type AB	17 99 000 0025
17 03 xxx xxxx	Top tool, male, type C	17 99 000 0021	17 15 xxx xxxx	Top tool, male, type AB	17 99 000 0017
17 03 xxx xxxx	Bottom tool, male, type C	17 99 000 0027	17 15 xxx xxxx	Bottom tool, male, type AB	17 99 000 0026

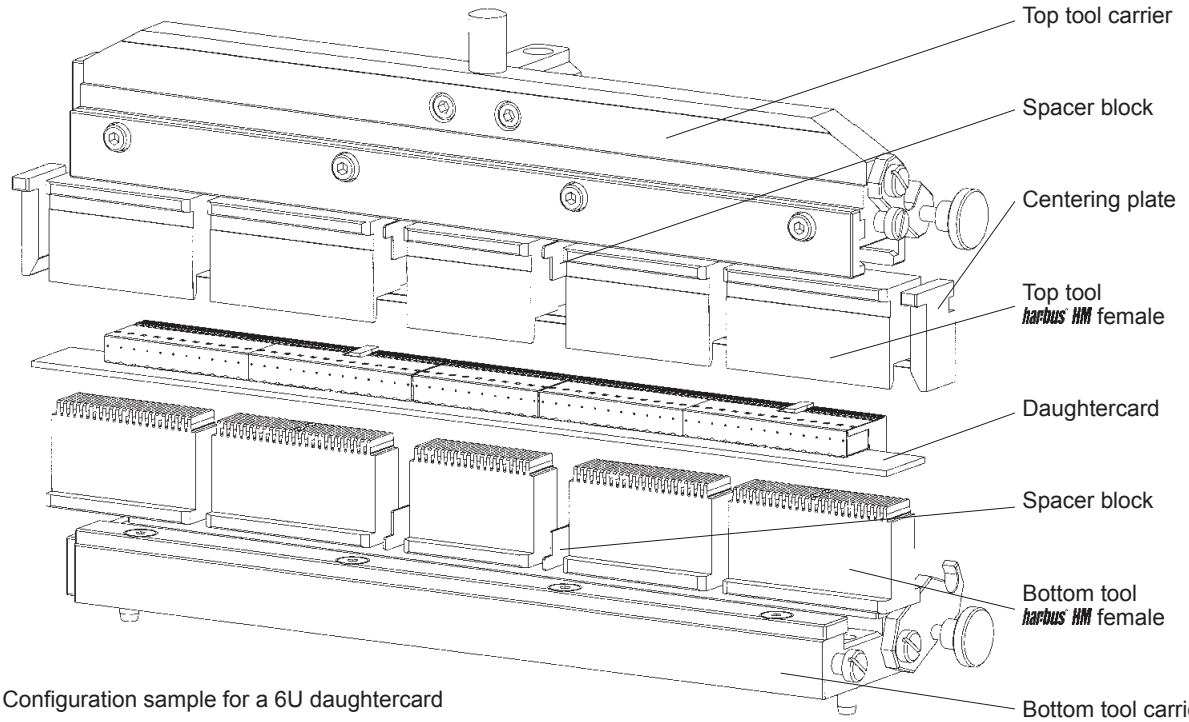


Fig. 3: Configuration sample for a 6U daughtercard

Tools for angled female connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 21 xxx xxxx	Top tool, female, type A	17 99 000 0029	17 31 xxx xxxx	Top tool, female, type D	17 99 000 0042
17 21 xxx xxxx	Bottom tool, female, type A	17 99 000 0046	17 31 xxx xxxx	Bottom tool, female, type D	17 99 000 0048
17 22 xxx xxxx	Top tool, female, type B	17 99 000 0038	17 32 xxx xxxx	Top tool, female, type E	17 99 000 0042
17 22 xxx xxxx	Bottom tool, female, type B	17 99 000 0046	17 32 xxx xxxx	Bottom tool, female, type E	17 99 000 0048
17 24 xxx xxxx	Top tool, female, type B	17 99 000 0036	17 33 xxx xxxx	Top tool, female, type AB	17 99 000 0032
17 24 xxx xxxx	Bottom tool, female, type B	17 99 000 0045	17 33 xxx xxxx	Bottom tool, female, type AB	17 99 000 0044
17 25 xxx xxxx	Top tool, female, type B	17 99 000 0034	17 34 xxx xxxx	Top tool, female, type AB	17 99 000 0058
17 25 xxx xxxx	Bottom tool, female, type B	17 99 000 0044	17 34 xxx xxxx	Bottom tool, female, type AB	17 99 000 0045
17 23 xxx xxxx	Top tool, female, type C	17 99 000 0040	17 35 xxx xxxx	Top tool, female, type AB	17 99 000 0029
17 23 xxx xxxx	Bottom tool, female, type C	17 99 000 0047	17 35 xxx xxxx	Bottom tool, female, type AB	17 99 000 0046

Tools for angled shielded female connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 21 xxx xxxx	Top tool, female, type A upper shield	17 99 000 0030	17 34 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0059
17 21 xxx xxxx	Top tool, female, type A divided shield computer telephony	17 99 000 0031	17 35 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0030
17 22 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0039	17 21 xxx xxxx	Press-in die lower shield type A	17 99 000 0051
17 24 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0037	17 22 xxx xxxx	Press-in die lower shield type B	17 99 000 0051
17 25 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0035	17 24 xxx xxxx	Press-in die lower shield type B	17 99 000 0050
17 23 xxx xxxx	Top tool, female, type C upper shield	17 99 000 0041	17 25 xxx xxxx	Press-in die lower shield type B	17 99 000 0049
17 31 xxx xxxx	Top tool, female, type D upper shield	17 99 000 0043	17 31 xxx xxxx	Press-in die lower shield type D	17 99 000 0051
17 32 xxx xxxx	Top tool, female, type E upper shield	17 99 000 0043	17 32 xxx xxxx	Press-in die lower shield type E	17 99 000 0051
17 33 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0033	17 33 xxx xxxx	Press-in die lower shield type AB	17 99 000 0049
			17 34 xxx xxxx	Press-in die lower shield type AB	17 99 000 0050
			17 35 xxx xxxx	Press-in die lower shield type AB	17 99 000 0051

For 6U backplanes with CompactPCI configuration, HARTING has developed this start-up tooling.

The basis is a top tool carrier with tooth inserts, that are engaged alternately.

Therefore this tooling assembly can be used without any additional set-up time.

The tooth inserts are interchangeable, so that the tooling can be used for other connector configurations as well as for CompactPCI.

The bottom tool should preferably be a loadnest, which carries and aligns the pcb.

For detailed information please contact your local HARTING representative.

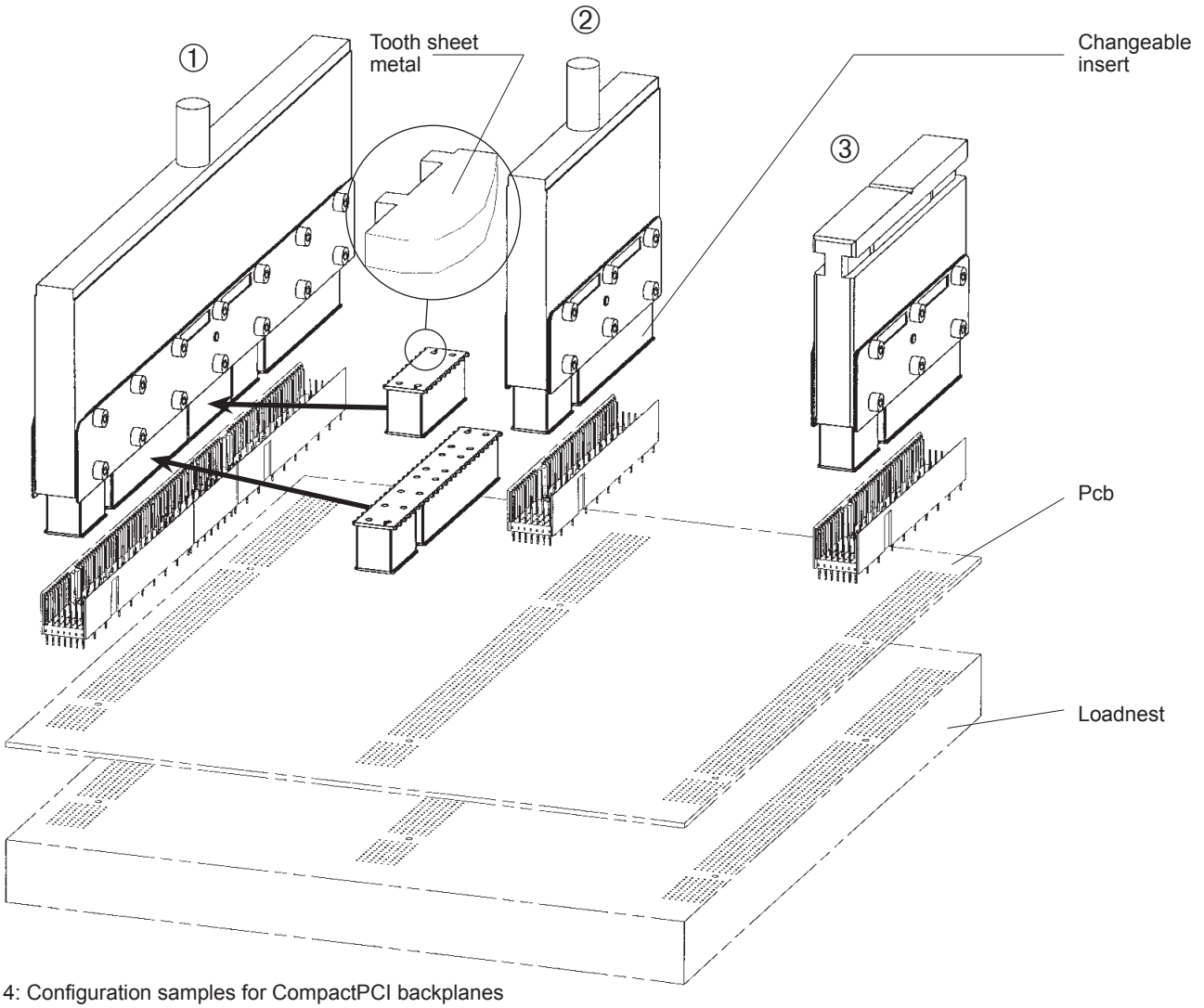


Fig. 4: Configuration samples for CompactPCI backplanes

Tools for straight male connectors

Tool identification	Part number tool	Tool identification	Part number tool
① Insert top tool for 6U CompactPCI	17 99 000 0063	Tooth insert for type Monoblock 47	17 99 000 0066
② Insert top tool for 3U CompactPCI	17 99 000 0065	Tooth insert for type B 19 positions	17 99 000 0068
③ Insert top tool for rotatable tool changer	on request		

The insert blocks can be used to press-in harbus® HM male connectors without any special top tool. These blocks will be put into the connectors manually or automatically (using insertion removal station, see page 15.13).

To press-in the connector no precise position is needed and can be done by a simple flat rock die. This will accelerate the cycle time of the press-in process dramatically.
Insert blocks are developed for use with a loadnest.

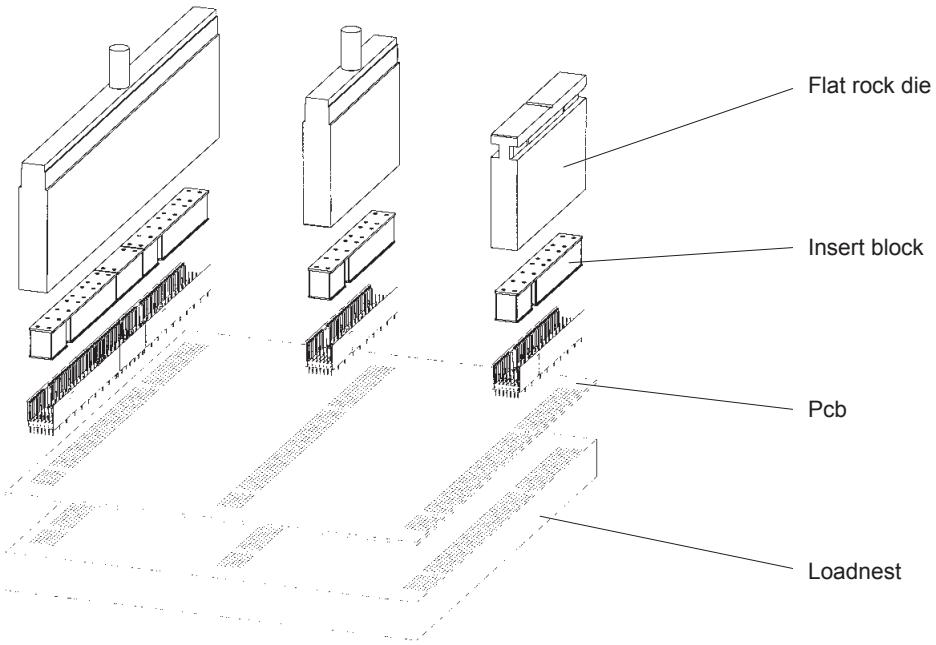


Fig. 5: Application samples for insert blocks

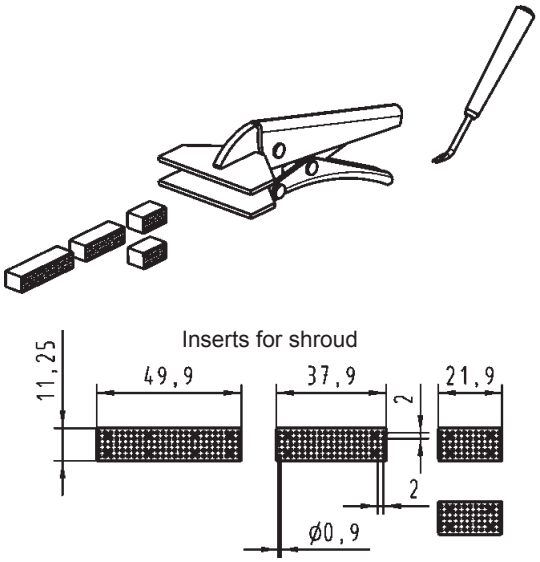
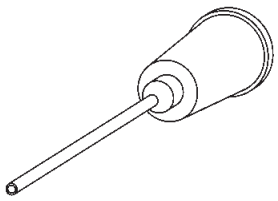
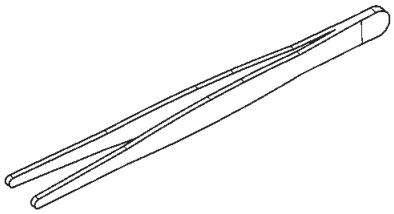
Insert blocks for straight male connectors

Part number connector	Tool identification	Quantity and part number tool
17 01 xxx xxxx	Insert block for type A	1 x 17 99 000 0009 or (2 x 17 99 000 0001)
17 04 xxx xxxx	Insert block for type B	1 x 17 99 000 0004
17 05 xxx xxxx	Insert block for type B	1 x 17 99 000 0002
17 02 xxx xxxx	Insert block for type B	1 x 17 99 000 0003
17 03 xxx xxxx	Insert block for type C	1 x 17 99 000 0001
17 06 xxx xxxx	Insert block for type Monoblock 47	1 x 17 99 000 0008 or (1 x 17 99 000 0001 and 1 x 17 99 000 0005)
17 11 xxx xxxx	Insert block for type D	2 x 17 99 000 0006
17 12 xxx xxxx	Insert block for type E	1 x 17 99 000 0007
17 13 xxx xxxx	Insert block for type AB	1 x 17 99 000 0069
17 14 xxx xxxx	Insert block for type AB	1 x 17 99 000 0070
17 15 xxx xxxx	Insert block for type AB	1 x 17 99 000 0071
17 10 xxx xxxx	Insert block for type DE	1 x 17 99 000 0072
17 4x xxx xxxx	Insert block for type 6-row with 72 contacts	1 x 17 99 000 0090
17 4x xxx xxxx	Insert block for type 6-row with 144 contacts	1 x 17 99 000 0091

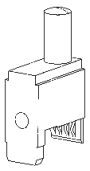
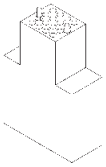
Flat rock dies

Part number connector	Tool identification	Part number tool
17 xx xxx xxxx	Flat rock die for 6U	07 79 000 0155
17 xx xxx xxxx	Flat rock die for 3U	07 79 000 0156

The insert block 17 99 000 0001 e.g. can be used for the types A, C and Monoblock 47.

Identification	for use with	Part number	Drawing	Dimensions [mm]
Tool kit shroud removal	har:bus® HM	17 99 000 0095		
Insertion and repair tool for single contact	har:bus® HM	17 99 000 0094		
Removal tool for single male contacts	har:bus® HM	09 99 000 0239		
Mounting tool for coding key	har:bus® HM	17 99 000 0093		

har:bus® HM Power Tooling for angled male connectors

Identification	for use with	Part number	Drawing	Dimensions [mm]
Top tool for angled male connectors	har:bus® HM Power	17 99 000 0102		
Bottom tool for angled male connectors	har:bus® HM Power	17 99 000 0103		

Straight Mini Coax connectors can be pressed-in with a flat die and a top tool delivered with the connectors. This top tool can be used as contact protection and remains in the connector until the daughtercard is mated.

Angled Mini Coax connectors will be pressed-in with separate top and bottom tools, which will be mounted into a common body.

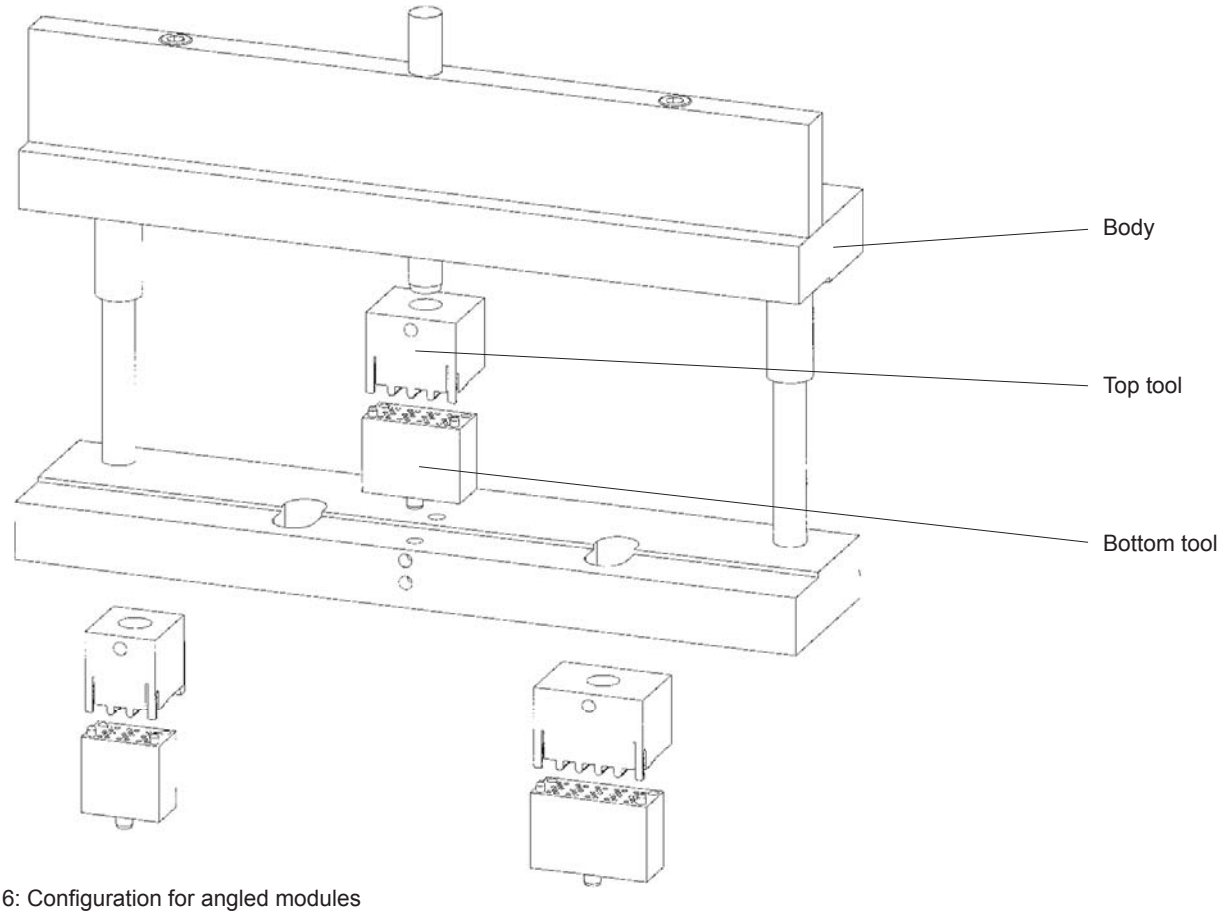


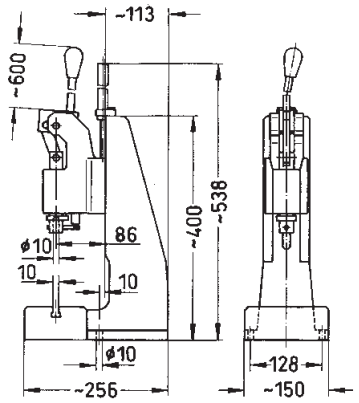
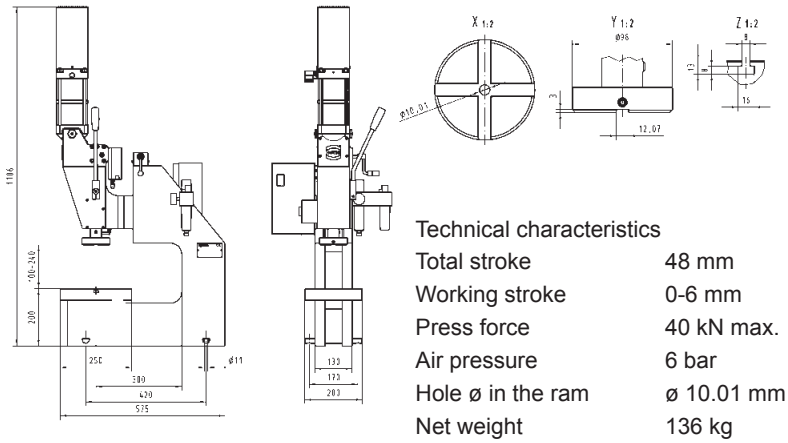
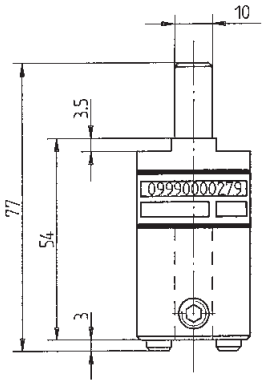
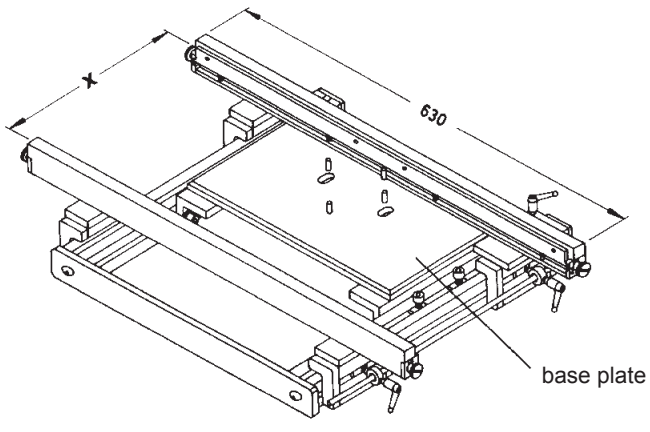
Fig. 6: Configuration for angled modules

Tools for straight modules

Part number connector	Tool identification	Part number tool
07 11 xxx xxxx	1 SU Mini Coax Standard bottom tool	on request
07 11 xxx xxxx	1.25 SU Mini Coax Standard bottom tool	on request
07 11 xxx xxxx	1.50 SU Mini Coax Standard bottom tool	on request

Tools for angled modules

Part number connector	Tool identification	Part number tool
07 31 xxx xxxx	Body	07 79 000 0061
07 31 xxx xxxx	1 SU Mini Coax Standard bottom tool	07 79 000 0045
07 31 xxx xxxx	1 SU Mini Coax Standard top tool	07 79 000 0080
07 31 xxx xxxx	1.25 SU Mini Coax Standard bottom tool	07 79 000 0034
07 31 xxx xxxx	1.25 SU Mini Coax Standard top tool	07 79 000 0081
07 31 xxx xxxx	1.50 SU Mini Coax Standard bottom tool	07 79 000 0171
07 31 xxx xxxx	1.50 SU Mini Coax Standard top tool	07 79 000 0170
07 31 xxx xxxx	1 SU Mini Coax single-row bottom tool	07 79 000 0205
07 31 xxx xxxx	1 SU Mini Coax single-row top tool	07 79 000 0204

Identification	Part number	Drawing	Dimensions in mm
Hand bench press	09 99 000 0201		Technical characteristics Working stroke 25 mm Press force 15 kN max. Hole ø in the ram ø 10 mm Net weight approx. 23 kg
Pneumatic press **40 kN**	09 99 000 0282		Technical characteristics Total stroke 48 mm Working stroke 0-6 mm Press force 40 kN max. Air pressure 6 bar Hole ø in the ram ø 10.01 mm Net weight 136 kg Power supply 110 V / 220 V AC
Adaptor for height compensation[1)]	09 99 000 0279		
Guide frame with base plate Standard type for pcb size x = 123,5 - 309,5 mm Long type[2)] for pcb size x = 123,5 - 668,5 mm Base plate	09 99 000 0244 09 99 000 0261 09 99 000 0255		

[1)] suitable for 09 99 000 0282 and all CPM machines (see page 15.11 pp.)
[2)] not suitable for hand bench press

Notes

The **CPM *prestige*** press-in machine with a graphical user interface

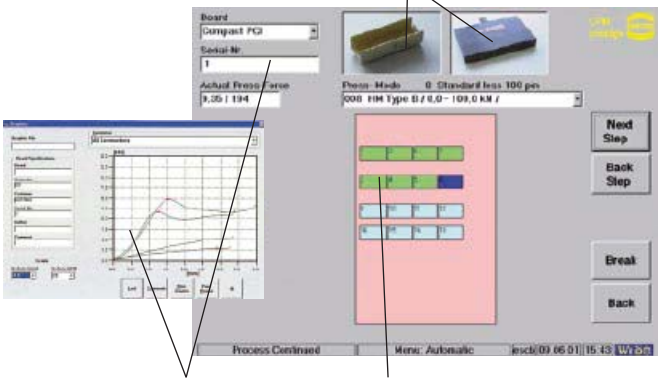
The **CPM *prestige*** is a consequential development of the successful CPM 2001 press-in machines. The excellent design, supported by a wide range of tools presents a convenient, easy and comfortable way of processing backplanes and daughtercards. The machine is fully programmable and is supplied with a graphical user interface for control and visualisation of the complete process. The use of a microprocessor control allows the recognition and storage of different component heights, so that the pressing-in of different components is initiated simultaneously with only one button. The user-friendly touch-screen guides the user through the menu-orientated process controls.

The visualisation of the entire press-in process (the position of the connector, press-in forces etc.) allows the rapid recognition and eradication of the possible error sources. With the addition of a barcode reader (1D and 2D)[1)] the parameters of every pcb layout can be stored, recalled and loaded into the automated press-in programme. The extensive operation monitor functions simplify the service and support of the machine.

The machine employs the automatic switch-off system “autosense”, known worldwide for its reliability. The different connector types and the tolerances of the pcb are automatically recognised and taken into consideration at the press-in operation, thus maximising the process security.

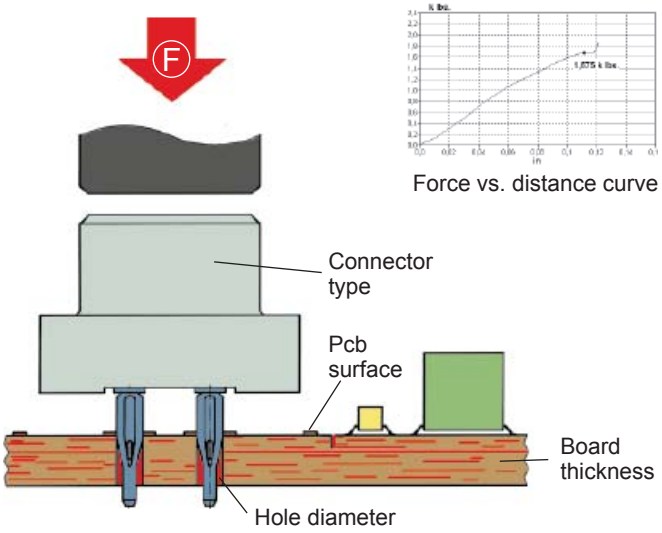
Visual guiding system via touch monitor

Real photos of connectors and tools



Process data

Layout with current position highlighted

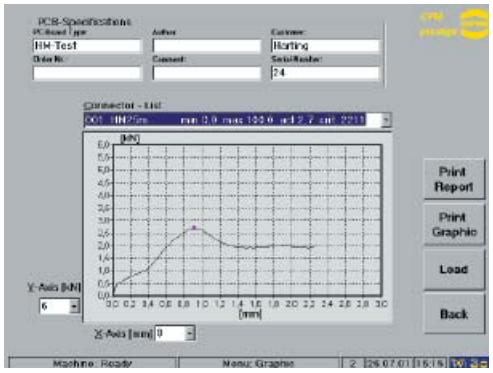


Force vs. distance curve

Shown are the four most considerable influences of the press-in process.

Tooling

1) optional



Quality control of press-in termination

The press-in force correlates with the diameter of the plated through hole and with the friction coefficient of the surface; therefore it can be used for a continuous monitoring of the process.

The retention force, as an indirect measure of the normal force, serves to qualify the process or random tests.

Part number	**09 89 040 0000**
Technical characteristics	
Drive	electro-mechanical, servo
Press-in force	100 kN
max. pcb dimensions	600 x 1000 mm
Floor space	1200 x 1150 mm
Weight	980 kg
Power supply	208 / 380 / 400 / 415 V
Consumption	< 1 kW
Colour	on request

Fig. 7: **CPM *prestige***
(incl. PC, control software, barcode reader, keyboard, touch screen)

Built-in features:

- Guiding rails (carbon/spring-loaded) for the secure positioning of the pcb
- Touch-screen and Industrial PC with UPS (uninterruptable power supply)
- Barcode reader for management ease of press-in programs
- All dimensions allow an easy integration into production lines

Process monitoring and quality assurance:

- Touch screen interface with graphical and verbal menus for all machine functions
- Autosense: automated press-in interruption at incorrect press-in forces
- Storage and validation of all press-in parameters via quality assurance software (press-in force tolerances)
- Continuous high-precision measurement and recording of press-in forces and distances
- Remote determination of errors and maintenance
- High flexibility through a modular tool range

Options:

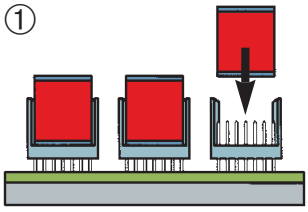
- Rotatable tool changer
- Insertion removal station

Insertion removal station

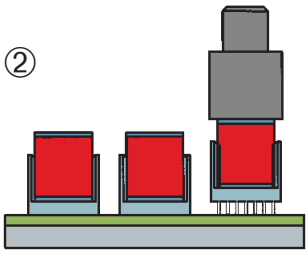
Power supply	220 V / 50 Hz
Air pressure	6 bar (15-16 l/min.)
Part number	**on request**
	for pcb dimensions of max. 710 mm x 540 mm

Fig. 8: Bestseller **CPM *prestige* with insertion removal station**, adaptable to all HARTING press-in machines.

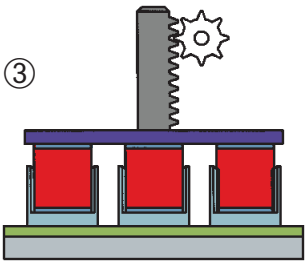
Principle:



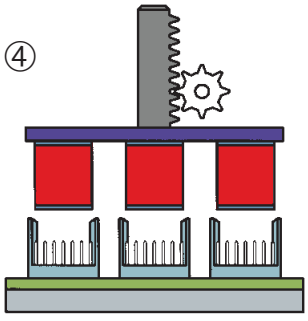
① Load all headers with inserts **for <u>one</u> press-in cycle**



② Press-in all connectors with a flat die



③ Position the magnetic plate



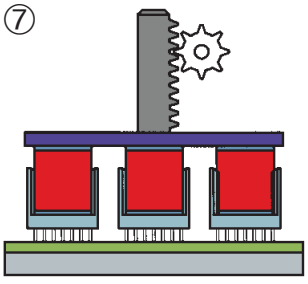
④ Remove all press-in inserts in one operation

Remove the processed pcb from the machine

⑤

⑥

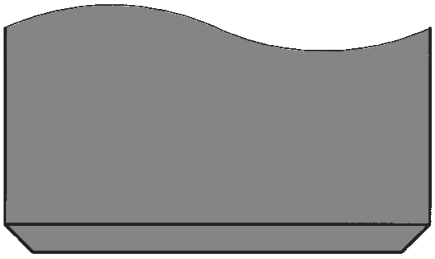
Move the next pre-assembled pcb to the insert station

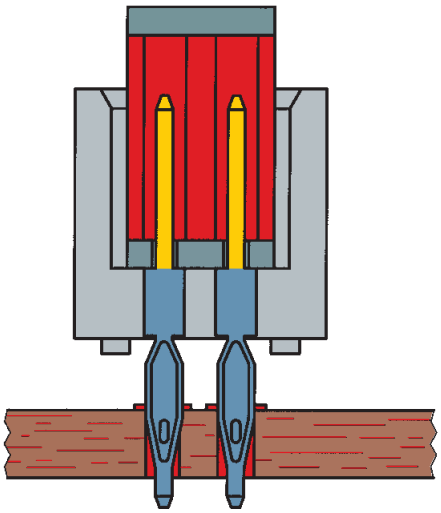


⑦ Load all headers in one operation

The insertion removal station has been developed both for the **CPM *prestige*** and the CPM 2001/s. It can additionally be used as stand alone equipment.

Today nearly all female connectors are designed for flat rock tooling. For every type of male connector specific tooling and a high degree of X-Y-process accuracy is required. Therefore HARTING offers press-in insert blocks that transfer all well known assembling advantages from female connectors to male headers.



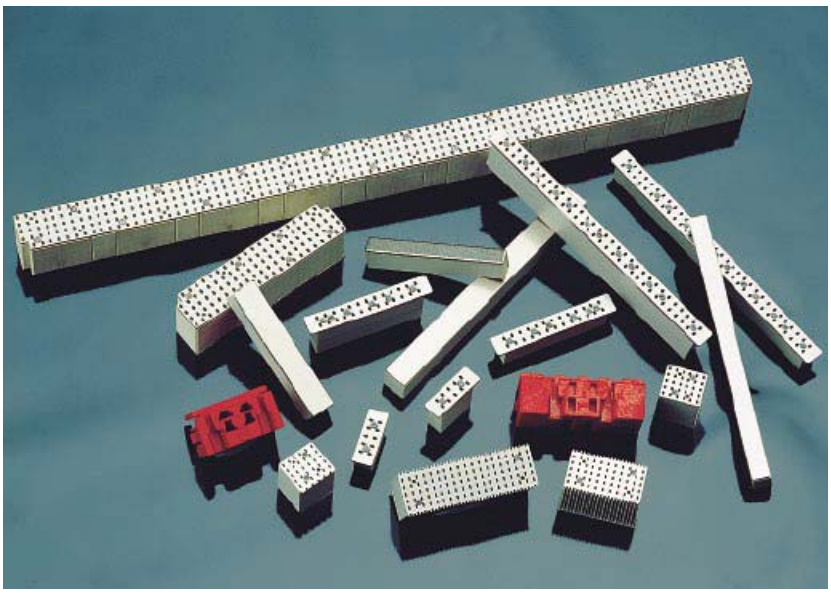


Advantages of press inserts

Robust tooling

No lateral force to pcb hole

No abrasion of the contact mating surface by the press tool



HARTING has already developed press-in inserts for all major male connector families on 2.54 mm, 2.5 mm and 2 mm pitches.

Inserts for any other special components can be developed on request.

The additional process for inserting and removing the press-in inserts can be efficiently done with the insertion removal station. This station removes all press-in inserts with a magnetic plate in one operation and inserts them into the next pre-assembled pcb with the necessary precision. (Principle see page 15.13).

The cycle time for loading all headers is between 4 and 6 seconds, independent from the amount of press-in inserts.

To load the inserts automatically means also that connectors assembled in a wrong way will be recognised and errors consequently prevented.

Directory chapter 16

Introduction

HARTING Electronics provides end customers with signal integrity support. We also deliver simulation models and evaluation kits along with our products for signal integrity investigations. The evaluation kits are assembled with SMA's in order to connect them directly with the measurement instruments. Customers benefit from savings in terms of time and the costs for the preliminary evaluation of the connector. We offer test boards suitable for the connector evaluation itself and have built back-planes for measurements within applications such as VME and CompactPCI. Reference structures and well established measurement techniques allow a full de-embedding of the propagation characteristics of the interconnect itself for testing and verification. Furthermore, we have developed a high-speed test backplane with different connector areas and PCB design topologies. We can provide footprint and routing recommendations for each of our products. A variety of test boards and technical data for different products are available on request.

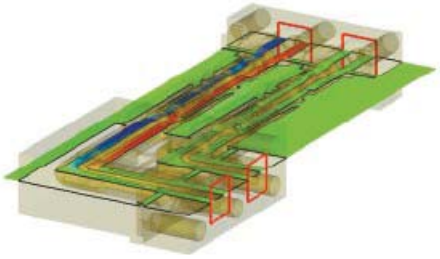
HARTING Electronics is also an active member in standardization groups such as VITA, PICMG, OBSAI and supports sub-committees for new interconnect solutions. We engage in close cooperation with universities and industrial partners for research activities.

Signal integrity capabilities

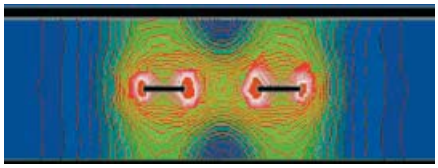
- Simulation and modeling
- Measurement and verification
- Test board design
- Design-in support

Simulation and modeling

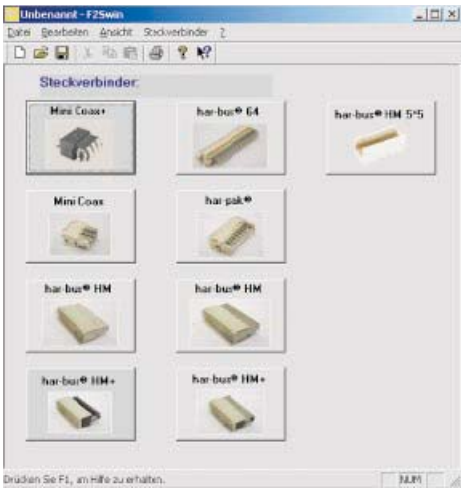
We have the capability to perform full 3D-FEM simulations of the CAD geometry with different well established tools such as CST Microwave Studio and Ansoft HFSS. This enables us to post-process the data for field distribution and full S-Parameter analysis.



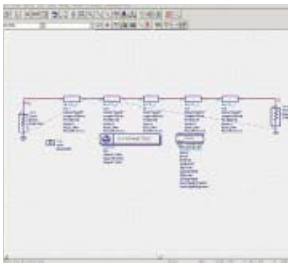
In conducting SPICE modeling, impedance calculation and field distribution analysis of the geometry, we draw on static 3D-FEM, 2D-FEM and planar field solvers.

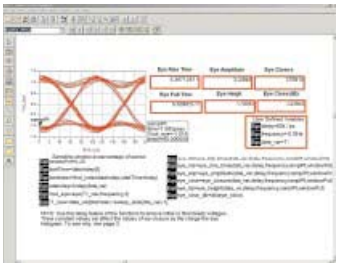


We have developed tools for SPICE netlist conversion based on R, L, C, G files for the post-processing of the data.



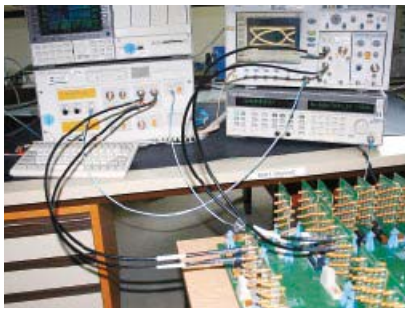
System simulation, including particular chip, trace, vias and connector sub-circuits are performed with tools such as HSPICE and ADS.

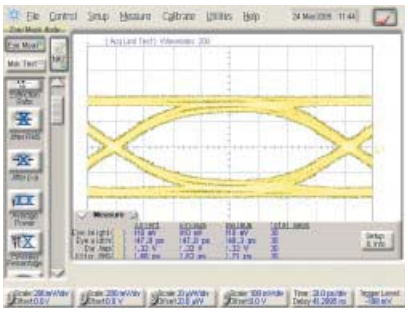




Measurement and verification

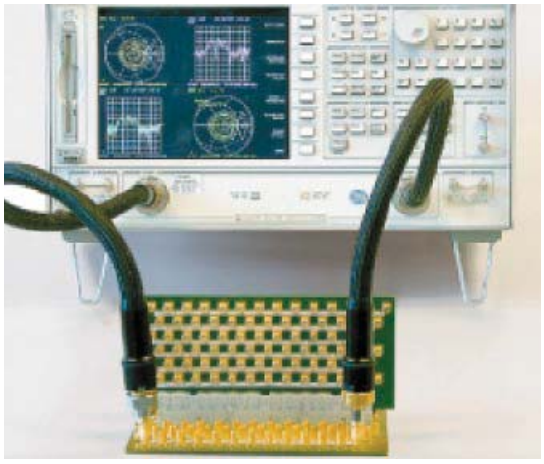
Time-domain measurements





Parameters:
- Characteristic impedance
- Propagation delay
- Reflection
- Crosstalk
- Eye-diagram and mask-test
- Bit-error rate testing (BERT) up to 12.5 Gbps per differential line

Frequency-domain measurements

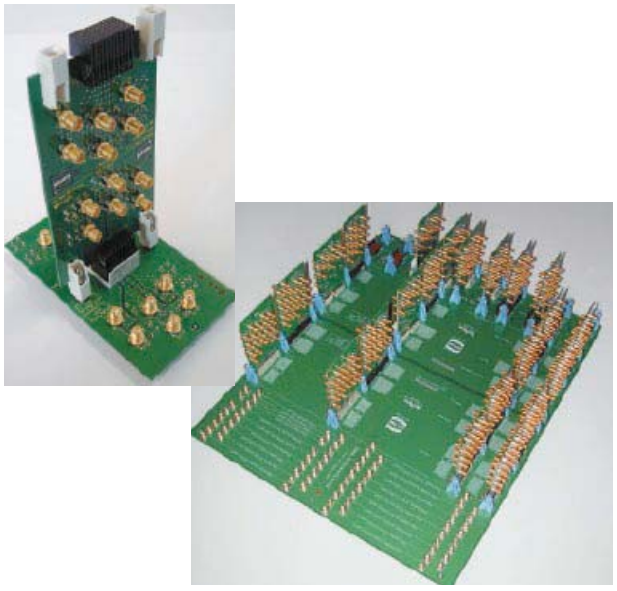


Parameters:
- S-parameter analysis (up to 40 GHz)
- Insertion- and return loss, crosstalk
- Fourier-transformation, gating, error-location

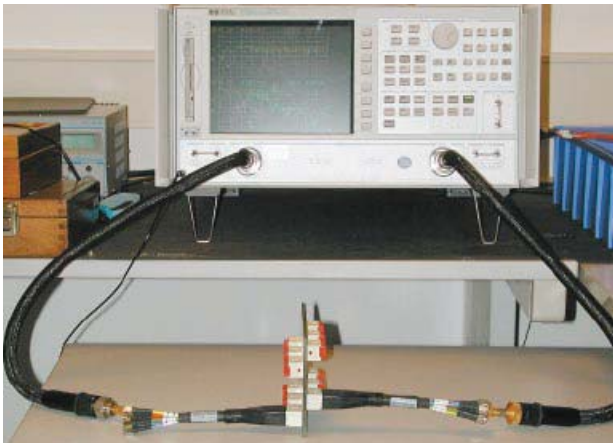
ISO/IEC 11801/CAT 5 measurements

Parameters:
- Near-end crosstalk (NEXT)
- Power sum NEXT (PS NEXT)
- Far-end crosstalk (FEXT)
- Power sum FEXT (PS FEXT)
- Return loss
- Attenuation
- Attenuation to Crosstalk Ratio (ACR)
- Power sum ACR (PS ACR)

Test board design



Design-in support



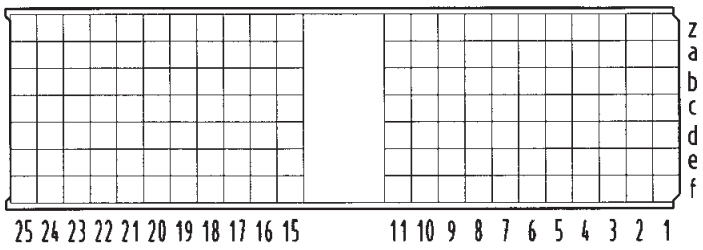
- Customized PCB design close to the real application
- Footprint and routing recommendations
- Full measurement characterization

Notes

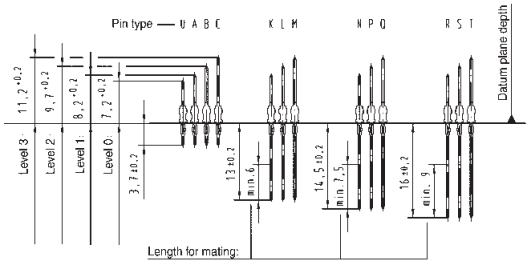
HARTING customer request form*

Should you need a specially loaded connector for your application, please use this request form. Fill out the drawing for the desired connector style and mark each position with the required contact length (A, B, …, S, T).

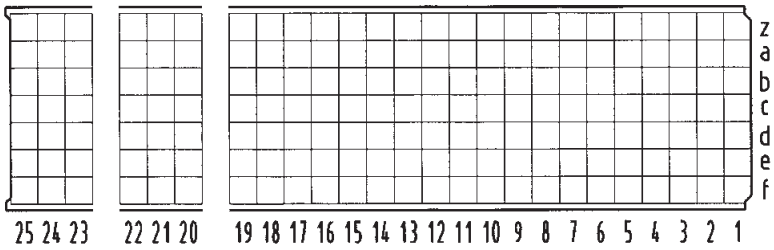
Type A



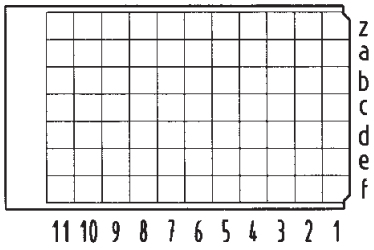
Contact dimensions [mm]



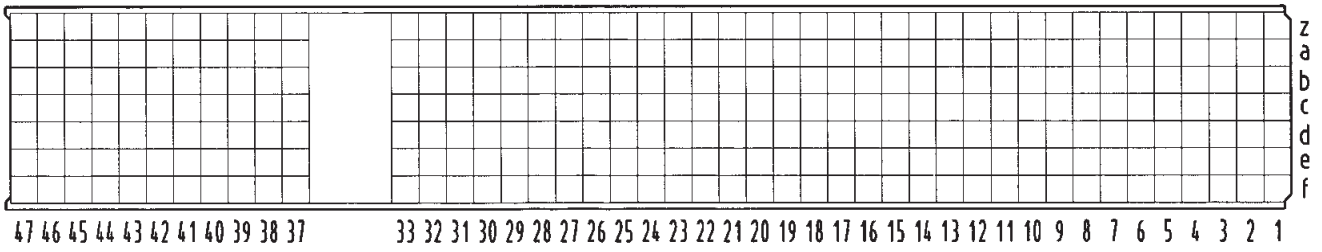
Type B (19, 22 or 25 positions)



Type C



Type Monoblock 47



Name: _____

Company: _____

Address: _____

_____

Phone: _____

Fax: _____

E-Mail: _____

Performance level: ☐ 1 ☐ 2

Drawing: ☐ yes ☐ no

Samples: ☐ no ☐ yes, quantity

Volume (pcs./year): _____

_____

Special requirements: _____

_____

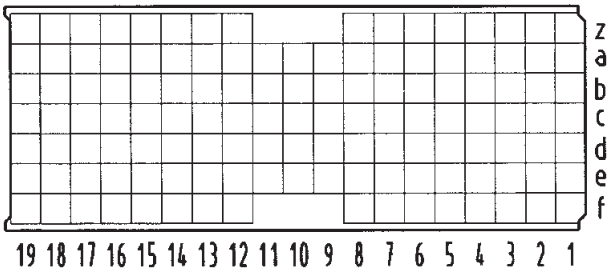
Customer request form

* For AB types see page 20.02
For D, E and DE types see page 20.03

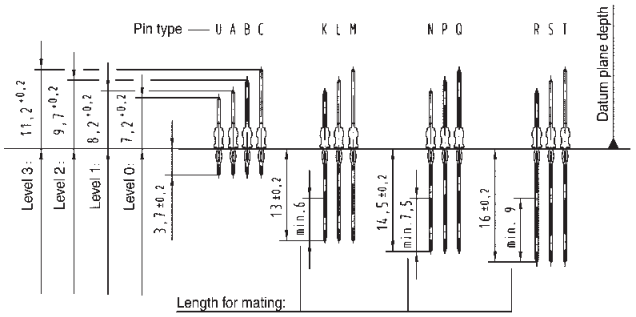
HARTING customer request form

Should you need a specially loaded connector for your application, please use this request form. Fill out the drawing for the desired connector style and mark each position with the required contact length (A, B, …, S, T).

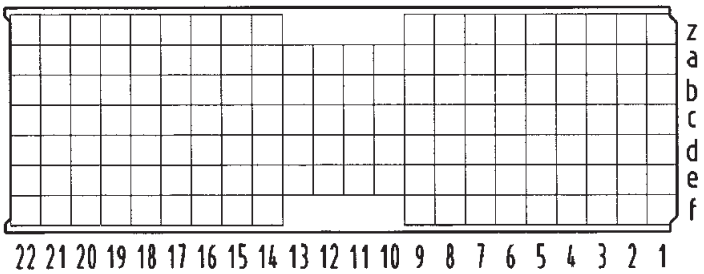
Type AB (19 positions)



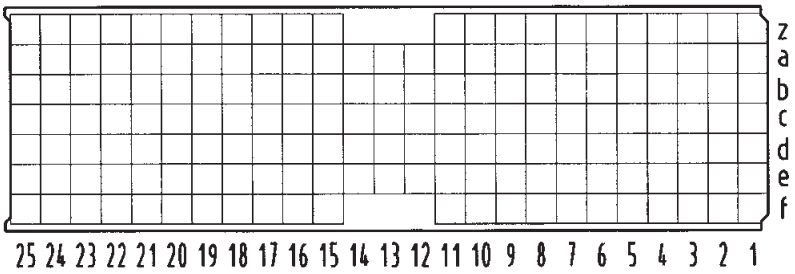
Contact dimensions [mm]



Type AB (22 positions)



Type AB (25 positions)



Name: _____

Company: _____

Address: _____

_____

Phone: _____

Fax: _____

E-Mail: _____

Performance level: ☐ 1 ☐ 2

Drawing: ☐ yes ☐ no

Samples: ☐ no ☐ yes, quantity

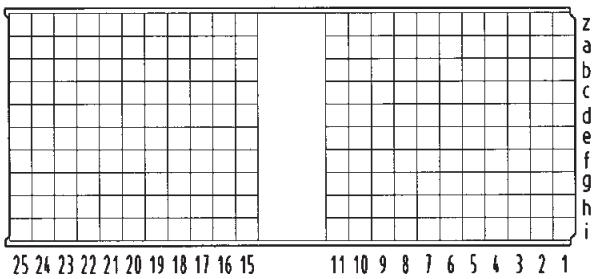
Volume (pcs./year): _____

Special requirements: _____

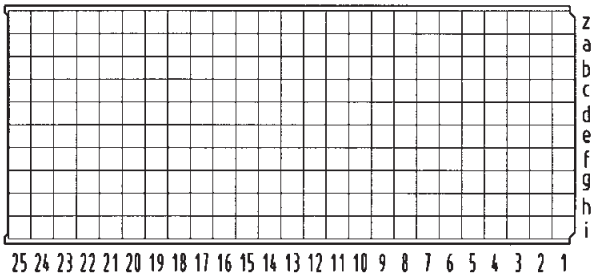
HARTING customer request form

Should you need a specially loaded connector for your application, please use this request form. Fill out the drawing for the desired connector style and mark each position with the required contact length (A, B, …, S, T).

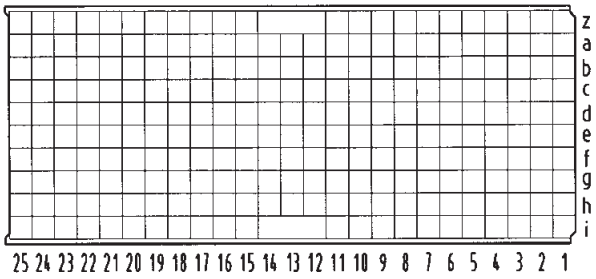
Type D



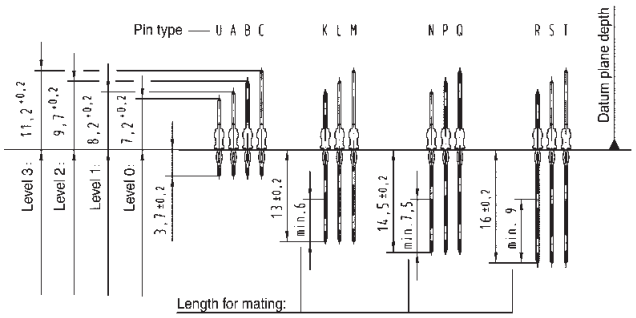
Type E



Type DE



Contact dimensions [mm]



Name: _____

Company: _____

Address: _____

_____

Phone: _____

Fax: _____

E-Mail: _____

Performance level: ☐ 1 ☐ 2

Drawing: ☐ yes ☐ no

Samples: ☐ no ☐ yes, quantity

Volume (pcs./year): _____

Special requirements: _____

List of part numbers

List of part numbers

Catalogue order information

Please send me further information:

☐ 

Interface Connectors

☐ 

Device Connectivity

☐ 

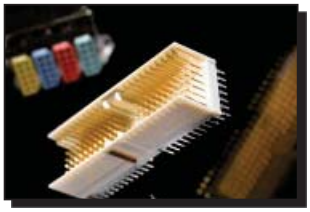
Industrial Connectors Han®

☐ 

Connectors DIN 41612

☐ 

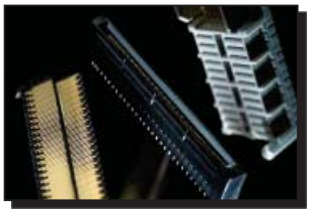
Intelligent Network Solutions

☐ 

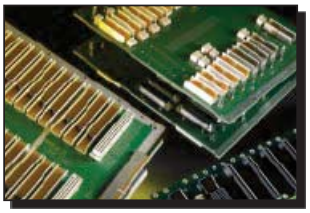
Coaxial and Metric Connectors

☐ 

Application brochure

☐ 

TCA Connectors

☐ 

High Speed Backplanes

Sender:

Company: _____ Street: _____

Department: _____ Postcode/Town: _____

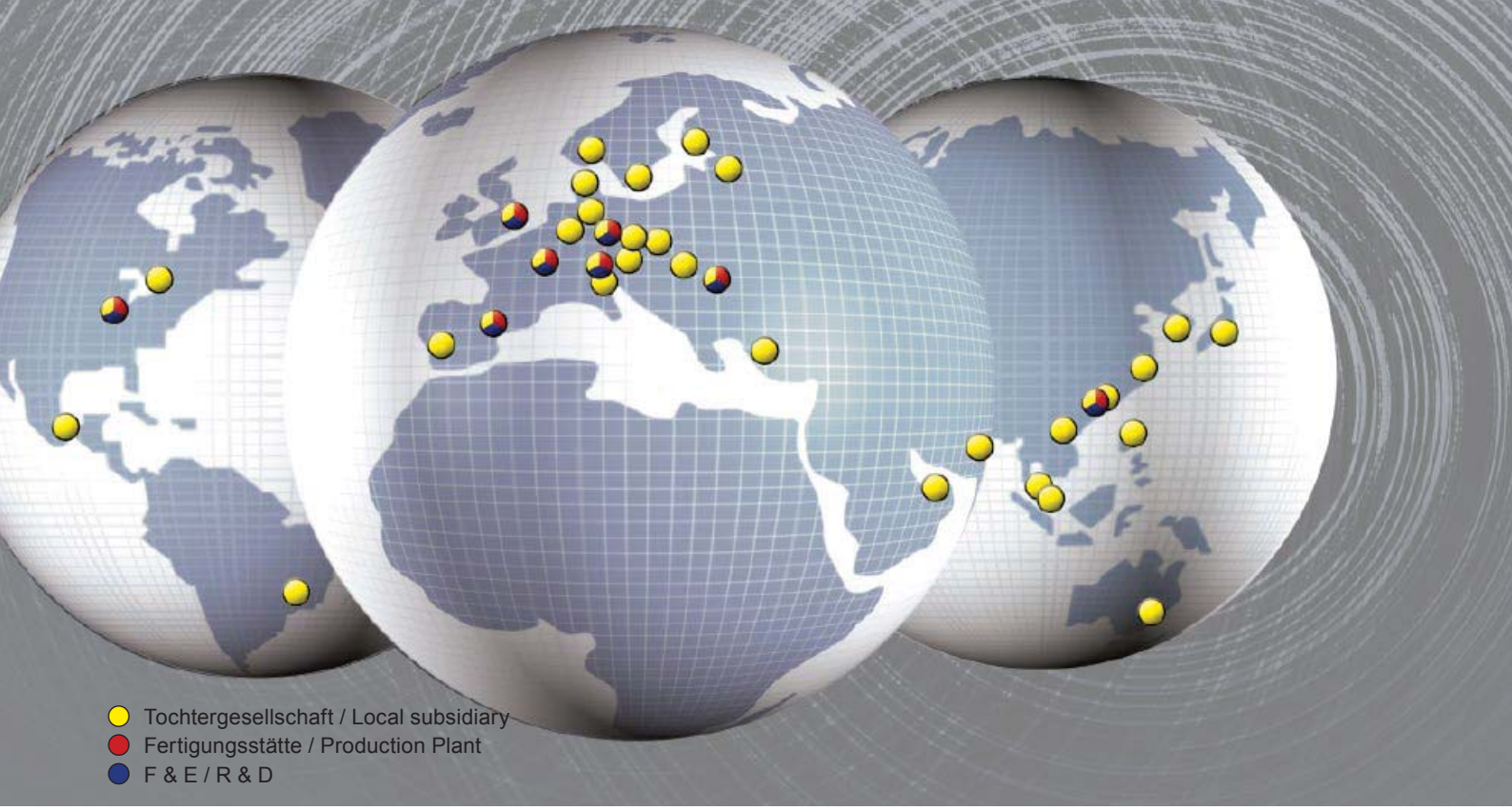
Name: _____ Country: _____

Prename: _____ Phone: _____

Function: _____ Fax: _____

E-Mail: _____

Please send it by post or fax to your local HARTING representatives (see page addresses) or visit us under www.HARTING.com.



Sales Network – worldwide

Afghanistan
see United Arab Emirates

Albania
see Eastern Europe

Argentina
Condelectric S.A.
Hipólito Yrigoyen 2591, 1640 - Martínez
Buenos Aires – Argentina
Phone +54 11 4836 1053
Fax +54 11 4836 1053
comercial@condelectric.com.ar

Armenia
see Eastern Europe

Australia
HARTING Pty Ltd
Suite 11 / 2 Enterprise Drive
Bundoora 3083, AUS-Victoria
Phone +61 3 9466 7088
Fax +61 3 9466 7099
au@HARTING.com
www.HARTING.com.au

Austria
HARTING Ges.m.b.H.
Deutschstraße 19, A-1230 Wien
Phone +431 6162121
Fax +431 6162121-21
at@HARTING.com
www.HARTING.at

Azerbaijan
see Eastern Europe

Bahrain
see United Arab Emirates

Belgium
HARTING N.V./S.A.
Z.3 Doornveld 23, B-1731 Zellik
Phone +32 2 466 0190
Fax +32 2 466 7855
be@HARTING.com
www.HARTING.be

Bosnia and Herzegovina
see Eastern Europe

Brazil
HARTING Ltda.
Rua Major Paladino 128 –
Prédio 11
CEP 05307-000 – São Paulo –
SP – Brasil
Phone +55 11 5035 0073
Fax +55 11 5034 4743
br@HARTING.com
www.HARTING.com.br

Brunei
see Singapore

Bulgaria
see Eastern Europe

Canada
HARTING Canada Inc.
8455 Trans-Canada Hwy., Suite 202
St. Laurent, QC, H4S1Z1, Canada
Phone 855-659-6653
Fax 855-659-6654
info.ca@HARTING.com
www.HARTING.ca

China
HARTING (Zhuhai)
Manufacturing Co., Ltd.
Shanghai Branch, Room 3501- 3503,
No. 1, Hong Qiao Road, Grand Gateway I
Xu Hui District, Shanghai 200030, China
Phone +86 21 6386 2200
Fax +86 21 6386 8636
cn@HARTING.com
www.HARTING.com.cn

Croatia
see Eastern Europe

Czech Republic
HARTING s.r.o.
Mlýnská 2, CZ-160 00 Praha 6
Phone +420 220 380 460
Fax +420 220 380 461
cz@HARTING.com
www.HARTING.cz

Denmark
HARTING ApS
Hjulmagervej 4a
DK - 7100 Vejle
Phone +45 70 25 00 32
Fax +45 75 80 64 99
dk@HARTING.com
www.HARTING.dk

Sales Network – worldwide

Eastern Europe
HARTING Eastern Europe GmbH
Bamberger Straße 7
D-01187 Dresden
Phone +49 351 4361 760
Fax +49 351 436 1770
Eastern.Europe@HARTING.com
www.HARTING.com

Egypt
see United Arab Emirates

Estonia
see Eastern Europe

Finland
HARTING Oy
Teknobulevardi 3-5
FI-01530 Vantaa
Phone +358 207 291 510
Fax +358 207 291 511
fi@HARTING.com
www.HARTING.fi

France
HARTING France
181 avenue des Nations, Paris Nord 2
BP 66058 Tremblay en France
F-95972 Roissy Charles de Gaulle Cédex
Phone +33 1 4938 3400
Fax +33 1 4863 2306
fr@HARTING.com
www.HARTING.fr

Germany
HARTING Deutschland GmbH & Co. KG
P.O. Box 2451, D-32381 Minden
Simeonscarré 1, D-32427 Minden
Phone +49 571 8896 0
Fax +49 571 8896 282
de@HARTING.com
www.HARTING.de

Georgia
see Eastern Europe

Great Britain
HARTING Ltd., Caswell Road
Brackmills Industrial Estate
GB-Northampton, NN4 7PW
Phone +44 1604 827 500
Fax +44 1604 706 777
gb@HARTING.com
www.HARTING.co.uk

Hong Kong
HARTING (HK) Limited
Regional Office Asia Pacific
3512 Metroplaza Tower 1
223 Hing Fong Road
Kwai Fong, N. T., Hong Kong
Phone +852 2423 7338
Fax +852 2480 4378
ap@HARTING.com
www.HARTING.com.hk

Hungary
HARTING Magyarország Kft.
Fehérvári út 89-95, H-1119 Budapest
Phone +36 1 205 34 64
Fax +36 1 205 34 65
hu@HARTING.com
www.HARTING.hu

India
HARTING India Pvt Ltd
7th Floor (West Wing), Central Square II
Unit No.B-19 Part, B 20&21
TVK Industrial Estate
Guindy, Chennai - 600032
Phone +91-44-43560415
+91-44-43456262
Fax +91-44-43560417
in@HARTING.com
http://www.HARTING.in

Indonesia
see Malaysia

Iran
see United Arab Emirates

Iraq
see United Arab Emirates

Israel
COMTEL
Israel Electronic Solutions Ltd.
Bet Hapamon, 20 Hataas st.
P.O.Box 66
Kefar-Saba 44425
Phone +972-9-7677240
Fax +972-9-7677243
sales@comtel.co.il
www.comtel.co.il

Italy
HARTING SpA
Via Dell' Industria 7
I-20090 Vimodrone (Milano)
Phone +39 02 250801
Fax +39 02 2650 597
it@HARTING.com
www.HARTING.it

Japan
HARTING K. K.
Yusen Shin-Yokohama 1 Chome Bldg., 2F
1-7-9, Shin-Yokohama, Kohoku
Yokohama 222-0033 Japan
Phone +81 45 476 3456
Fax +81 45 476 3466
jp@HARTING.com
www.HARTING.co.jp

Jemen
see United Arab Emirates

Jordan
see United Arab Emirates

Kazakhstan
see Eastern Europe

Kirghizia
see Eastern Europe

Korea (South)
HARTING Korea Limited
#308 Yatap Leaders Building
342-1, Yatap-dong, Bundang-gu
Sungnam-City, Kyunggi-do
463-828, Republic of Korea
Phone +82 31 781 4615
Fax +82 31 781 4616
kr@HARTING.com
www.HARTING.co.kr

Kosovo
see Eastern Europe

Kuwait
see United Arab Emirates

Latvia
see Eastern Europe

Lebanon
see United Arab Emirates

Lithuania
see Eastern Europe

Macedonia
see Eastern Europe

Malaysia (Office)
HARTING Singapore Pte Ltd
Malaysia Branch
11-02 Menara Amcorp
Jln. Persiaran Barat
46200 PJ, Sel. D. E., Malaysia
Phone +60 3 / 7955 6173
Fax +60 3 / 7955 5126
sg@HARTING.com

Montenegro
see Eastern Europe

Netherlands
HARTING B.V.
Larenweg 44
NL-5234 KA ,s-Hertogenbosch
Postbus 3526
NL-5203 DM ,s-Hertogenbosch
Phone +31 736 410 404
Fax +31 736 440 699
nl@HARTING.com
www.HARTINGbv.nl

New Zealand
see Australia

Norway
HARTING A/S
Østensjøveien 36, N-0667 Oslo
Phone +47 22 700 555
Fax +47 22 700 570
no@HARTING.com
www.HARTING.no

Oman
see United Arab Emirates

Pakistan
see United Arab Emirates

Philippines
see Malaysia

Sales Network – worldwide

Poland
HARTING Polska Sp. z o. o
ul. Duńska 9
PL- 54-427 Wrocław
Phone +48 71 352 81 71
Fax +48 71 350 42 13
pl@HARTING.com
www.HARTING.pl

Portugal
HARTING Iberia, S. A.
Avda. Josep Tarradellas 20-30 4º 6a
E-08029 Barcelona
Phone +351 219 673 177
Fax +351 219 678 457
es@HARTING.com
www.HARTING.es/pt

Qatar
see United Arab Emirates

Republic of Moldova
see Eastern Europe

Romania
HARTING Romania SCS
Europa Unita str. 21
550018-Sibiu, Romania
Phone +40 369-102 671
Fax +40 369-102 622
ro@HARTING.com
www.HARTING.com

Russia
HARTING ZAO
Maliy Sampsoniyevsky prospect 2A
194044 Saint Petersburg, Russia
Phone +7 812 327 6477
Fax +7 812 327 6478
ru@HARTING.com
www.HARTING.ru

Saudi Arabia
see United Arab Emirates

Serbia
see Eastern Europe

Singapore
HARTING Singapore Pte Ltd.
25 International Business Park
#04-108 German Centre
Singapore 609916
Phone +65 6225 5285
Fax +65 6225 9947
sg@HARTING.com
www.HARTING.sg

Slovakia
HARTING s.r.o.
Sales office Slovakia
J. Simora 5, SK - 940 52 Nové Zámky
Phone +421 356-493 993
Fax +421 356-402 114
sk@HARTING.com
www.HARTING.sk

Slovenia
see Eastern Europe

South Africa
HARTING South Africa (Pty) Ltd
Ground Floor, Twickenham Building
PO Box 67302
Johannesburg (Bryanston)
2021, South Africa
Phone +27 (0) 11 575 0017
Fax +27 (0) 11 576 6000
za@HARTING.com
www.HARTING.co.za

Spain
HARTING Iberia S.A.
Avda. Josep Tarradellas 20-30 4º 6ª
E-08029 Barcelona
Phone +34 93 363 84 75
Fax +34 93 419 95 85
es@HARTING.com
www.HARTING.es

Sweden
HARTING AB
Gustavslundsvägen 141 B 4tr
S-167 51 Bromma
Phone +46 8 445 7171
Fax +46 8 445 7170
se@HARTING.com
www.HARTING.se

Switzerland
HARTING AG
Industriestrasse 26
CH-8604 Volketswil
Phone +41 44 908 20 60
Fax +41 44 908 20 69
ch@HARTING.com
www.HARTING.ch

Syria
see United Arab Emirates

Taiwan
HARTING Taiwan Ltd.
Room 1, 5/F
495 GuangFu South Road
RC-110 Taipei, Taiwan
Phone +886 2 2758 6177
Fax +886 2 2758 7177
tw@HARTING.com
www.HARTING.com.tw

Tajikistan
see Eastern Europe

Thailand
see Malaysia

Turkey
HARTING TURKEI Elektronik Ltd. Şti.
Barbaros Mah. Dereboyu Cad.
Fesleğen Sok.
Uphill Towers, A-1b Kat:8 D:45
34746 Ataşehir, İstanbul
Phone +90 216 688 81 00
Fax +90 216 688 81 01
tr@HARTING.com
www.HARTING.com.tr

Turkmenistan
see Eastern Europe

Ukraine
see Eastern Europe

United Arab Emirates
HARTING Middle East FZ-LLC
Knowledge Village, Block 2A, Office F72
P.O. Box 454372, Dubai
United Arab Emirates
Phone +971 4 453 9737
Fax +971 4 439 0339
uae@HARTING.com
www.HARTING.ae

USA
HARTING Inc. of North America
1370 Bowes Road
USA-Elgin, Illinois 60123
Phone +1 (877) 741-1500 (toll free)
Fax +1 (866) 278-0307 (Inside Sales)
us@HARTING.com
www.HARTING-USA.com

Uzbekistan
see Eastern Europe

Vietnam
see Singapore

Distributors – worldwide

Digi-Key Corporation:
www.digikey.com

Farnell:
www.farnell.com

FUTURE Electronics:
www.futureelectronics.com

Mouser Electronics:
www.mouser.com

RS Components:
www.rs-components.com

Other countries and general contact

HARTING Electronics GmbH
P.O. Box 1433
32328 Espelkamp - Germany
Phone +49 5772/47-97200
Fax +49 5772/47-777
electronics@HARTING.com

Pushing Performance

HARTING.com –
the gateway to your country website.

www.HARTING.ae
www.HARTING.at
www.HARTING.com.au
www.HARTING.be
www.HARTING.com.br
www.HARTING.ca
www.HARTING.ch
www.HARTING.com.cn
www.HARTING.cz
www.HARTING.de
www.HARTING.dk
www.HARTING.es
www.HARTING-easterneurope.com
www.HARTING.fi
www.HARTING.fr
www.HARTING.co.uk
www.HARTING.com.hk
www.HARTING.hu
www.HARTING.co.in
www.HARTING.it
www.HARTING.co.jp
www.HARTING.co.kr
www.HARTINGbv.nl
www.HARTING.no
www.HARTING.pl
www.HARTING.pt
www.HARTING.ro
www.HARTING.ru
www.HARTING.se
www.HARTING.sg
www.HARTING.sk
www.HARTING.com.tr
www.HARTING.com.tw
www.HARTING-USA.com
www.HARTING.co.za

HARTING Technology Group
info@HARTING.com
www.HARTING.com

MO/2014-04-24/2.5 98 51 033 0201 Version 33 9