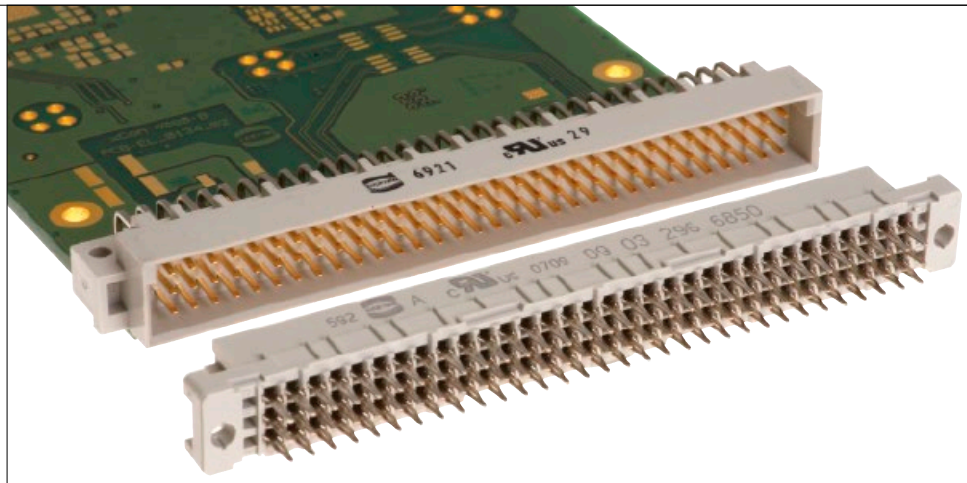
09. DIN 41 612 Connectors



Connectors that comply with DIN 41 612 have been in use for years for both board-to-board applications and cable-to-board applications. Their robustness and universality are legendary. The classic signal connectors are supplemented by power solutions for allowing insertion of up to 40 A. Plastic, metallized and full metal housings, used in combination with shielded or unshielded cables with a high number of poles, are available for cable-to-board connectors. HARTING offers a wide range of DIN 41 612 connectors and accessories. The following catalogue pages contain an extract from the DIN 41 612 connector program. The complete DIN 41 612 connector program for data, signals and power can be found in the complete DIN 41 612 catalogue.

Application profile:

CONNECTION TYPE		ENVIRONMENT		APPLICATION						
Board to Board	Cable/ Wire to Board	IP20	IP65 / IP67	Data	Signal	Power	high performance			
							Data transfer rate	Shielding	Number of contacts, contact density	Voltage, working current
●	●	●		●	●	●	●	●	●	●

Cable termination

Han-Quick Lock®	*IDC*	*Crimp*
	●	●

Screw	*Cage clamp*	*Axial screw*
	●	

PCB termination

THT	*SMC*	*SMT*
●	●	

Press-in
●

Application standard

VMEbus Technology

Housing integration

Separate housing	*Integrated housing*
●	

09. DIN 41 612 Connectors

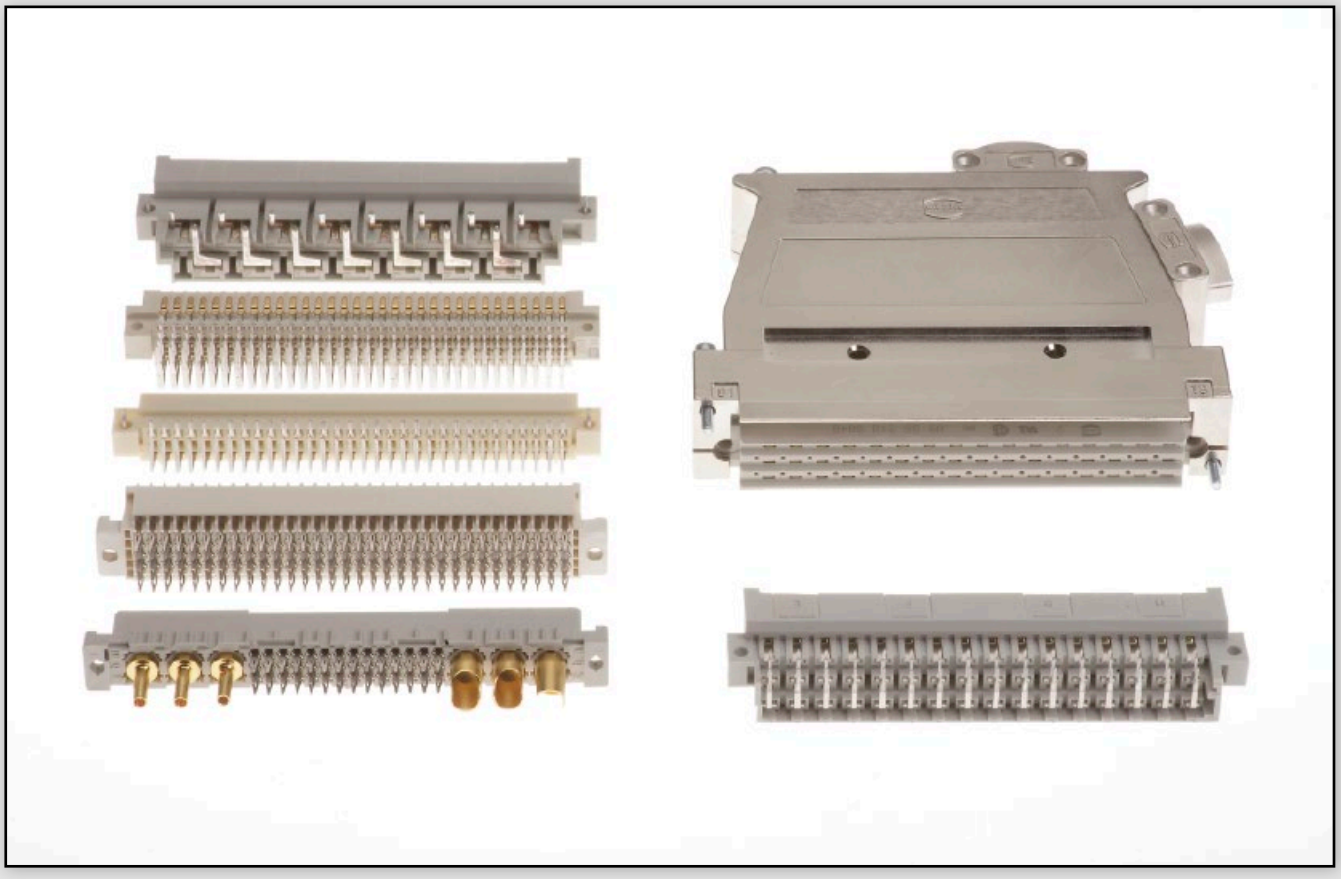
Contents

09. DIN 41 612 Connectors

In devices for industrial automation and measurement techniques, the DIN 41 612 connector is the standard for board-to-board and cable-to-board connections as both data and power connectors. HARTING offers a wide range of standard connectors complying with DIN 41 612 and IEC 60 603-2, as well as a great selection of complementary types and customer specific solutions. Depending on the application, the 3 to 160 way connectors are offered with various termination methods, each contact capable of carrying from 2 A to 40 A.

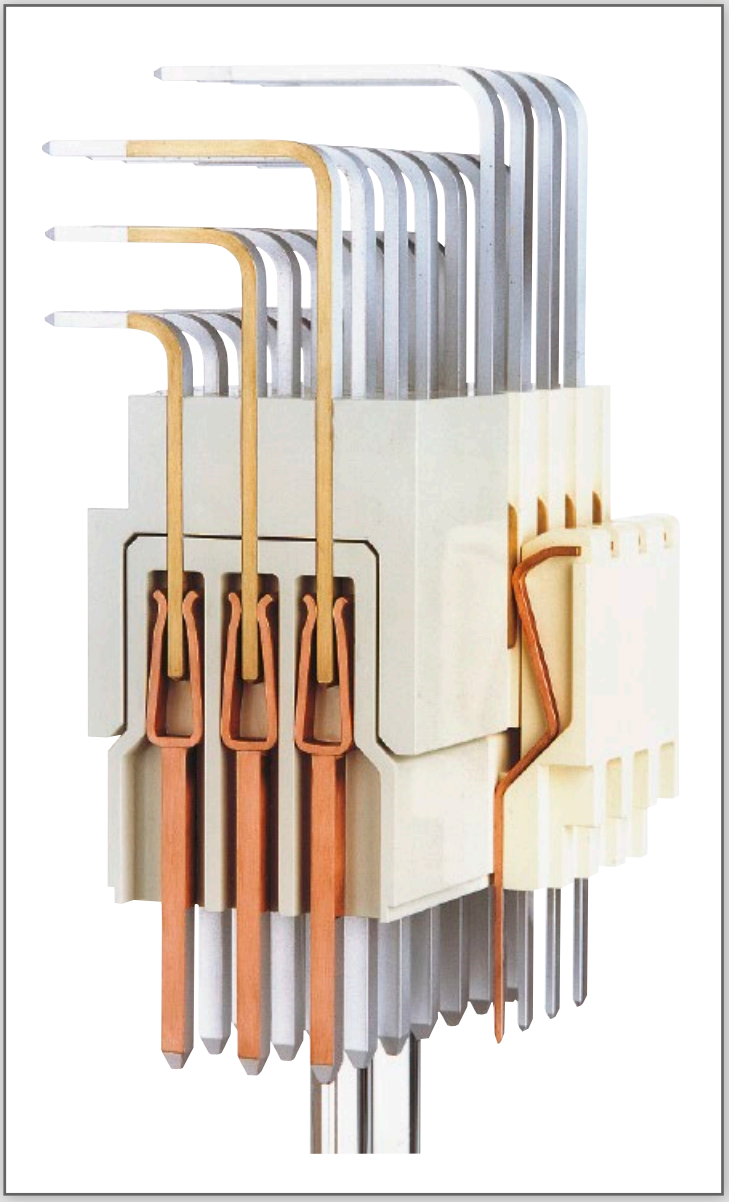
HARTING differentiates between DIN Signal and DIN Power connectors depending on the maximum allowed working current per contact: up to 2 A for DIN Signal and over 2 A for DIN Power connectors.

HARTING's range *har-bus® 64* features 160 contacts and is an extension of the 3 row 96 way DIN 41 612 C type range with 2 additional rows. The 5 row *har-bus® 64* connector is 100 % forwards and backwards compatible with the type C connectors according to DIN 41 612. The design of male and female connectors allows the mating of any combination of the 5 or the 3 row variants.

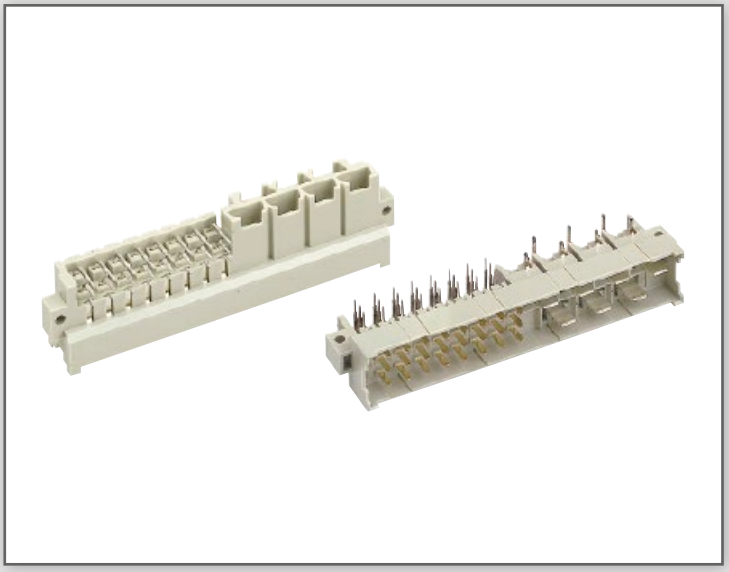


Specific features of the product range

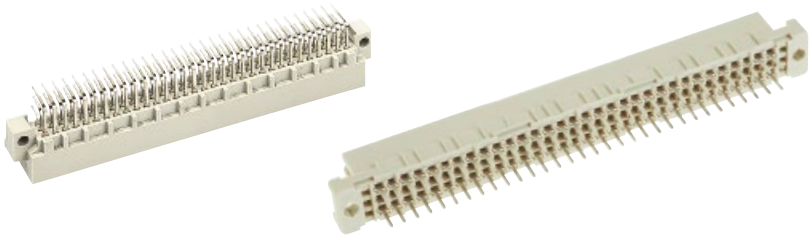
The design of the *har-bus® 64* female allows mating of any combinations of the 5 or 3 row standard male connectors. It is also possible to mate 5 row male connectors with 3 row female connectors.
This kind of backwards compatibility allows the user the staged transition to a higher performance category and simultaneous use of daughter cards in the slots of the previous generation.
Therefore all existing bus systems, for which the 3 row C96 pin connectors are no longer sufficient, can be adapted to the latest requirements without a complete system redesign.



Variety of DIN 41 612 types
Due to the large variety of complementary types, accessories and different kinds of shell housings which are available in plastic, metallized plastic and full metal, DIN 41 612 connector range is considered to be ideal for your robust, reliable and cost-efficient connectivity solution.
The special requirements of industrial electronics can be satisfied with standard types.



DIN Signal overview



For detailed information see catalogue DIN 41612 or www.HARTING.com

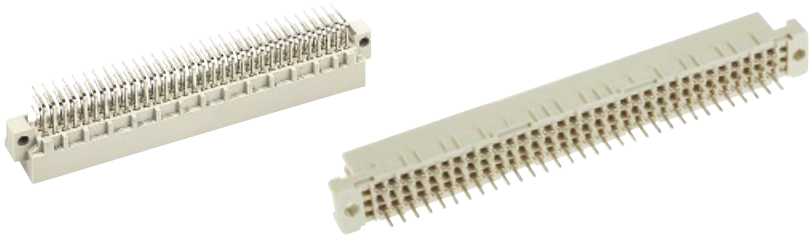
				Termination						
Type	Maximum number of contacts			Solder	Reflow Soldering (SMC)	Solder lug	Press-in	Crimp	Wire wrap	IDC
B	64		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm 13.0 mm	2.9 mm 4.5 mm	X	4.5 mm 13.2 mm	X	13.0 mm	X
2 B	32		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm	2.9 mm 4.5 mm		4.5 mm		13.0 mm	
3 B*	20		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm	2.9 mm		4.5 mm			
C	96		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm 13.0 mm	2.9 mm 4.5 mm	X	4.5 mm 13.2 mm 17.0 mm	X	13.0 mm	X
2 C	48		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm 13.0 mm	2.9 mm 4.5 mm	X	3.7 mm 4.5 mm	X	13.0 mm	
3 C*	30		male	3.0 mm	3.0 mm					
			female	2.9 mm 4.5 mm	2.9 mm		4.5 mm	X		
M	78 + 2 60 + 4 42 + 6 24 + 8		male	3.0 mm						
			female	2.9 mm 4.5 mm			4.5 mm			

DIN 41612

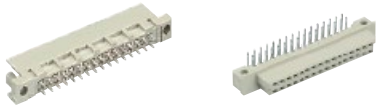
09 | 04

* Available with and without flange

DIN Signal overview



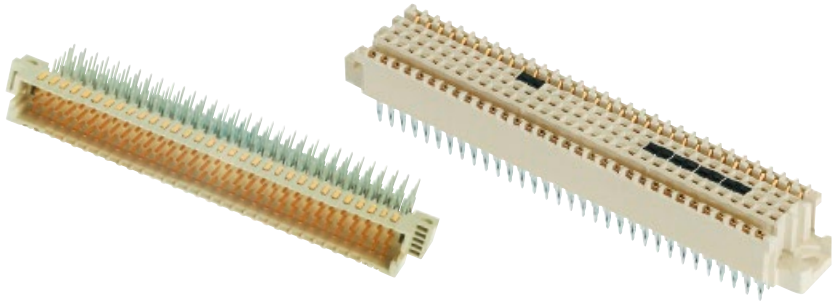
For detailed information see catalogue DIN 41612 or www.HARTING.com

				Termination						
Type	Maximum number of contacts			Solder	Reflow Soldering (SMC)	Solder lug	Press-in	Crimp	Wire wrap	IDC
M flat	78 + 2 60 + 4 42 + 6 24 + 8		female	2.9 mm 4.5 mm			4.5 mm			
M inverse	78 + 2 60 + 4 42 + 6 24 + 8 6 + 10		male	2.5 mm 4.0 mm			5.5 mm 13.0 mm		13.0 mm	
			female	3.0 mm						
Q	64		male	2.5 mm 4.0 mm 13.0 mm			5.0 mm 13.0 mm		13.0 mm 17.0 mm	
			female	3.0 mm						
2 Q	32		male	2.5 mm 4.0 mm 13.0 mm			5.0 mm		13.0 mm	
			female	3.0 mm						
3 Q*	20		male	2.5 mm 4.0 mm 13.0 mm	2.5 mm 4.0 mm 13.0 mm		5.0 mm 13.0 mm		13.0 mm	
R	96		male	2.5 mm 4.0 mm 13.0 mm	2.5 mm 4.0 mm 13.0 mm		5.0 mm 13.0 mm		13.0 mm	
			female	2.8 mm	2.8 mm					
R (HE 11)	96		male	2.5 mm 4.0 mm					13.0 mm	
			female	2.9 mm						
RM	96		male				5.0 mm 13.0 mm			
2 R	48		male	2.5 mm 4.0 mm 13.0 mm	2.5 mm 4.0 mm 13.0 mm		5.0 mm 13.0 mm		13.0 mm	
			female	3.0 mm						
3 R*	30		male	2.5 mm 4.0 mm 13.0 mm	2.5 mm 4.0 mm 13.0 mm		5.0 mm 13.0 mm		13.0 mm	

DIN 41612

* Available with and without flange

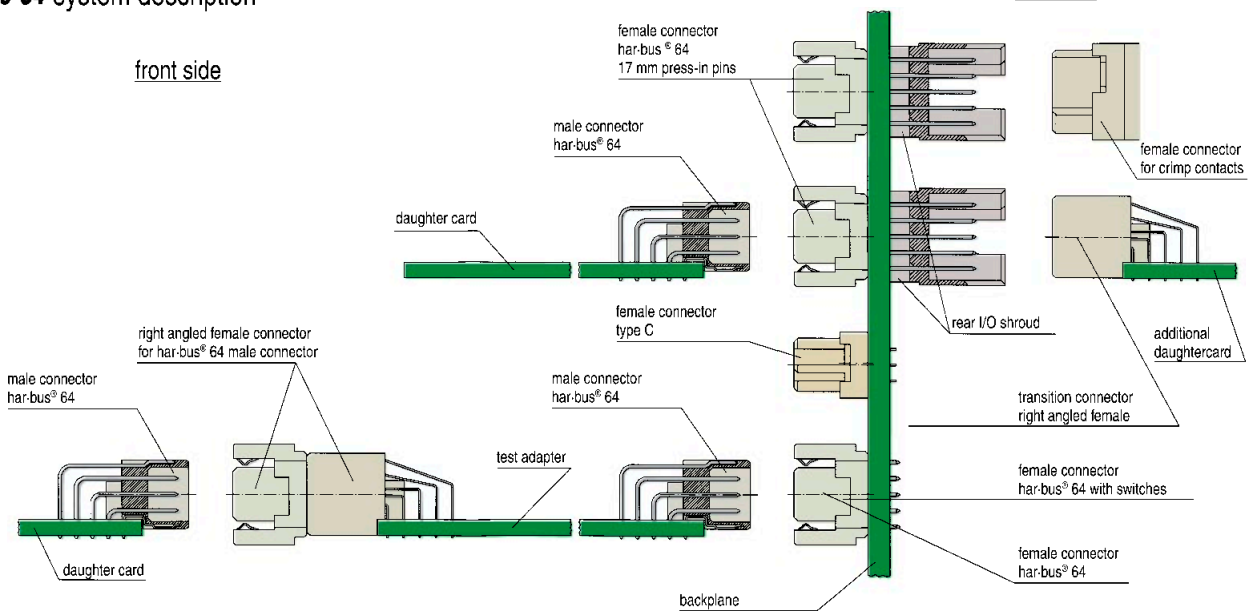
har-bus® 64 overview



For detailed information see catalogue DIN 41612 or www.HARTING.com

Type	Maximum number of contacts			Termination						
				Solder	Reflow Soldering (SMC)	Solder lug	Press-in	Crimp	Wire wrap	IDC
har-bus® 64	160		male	3.0 mm	3.0 mm					
			female	2.9 mm			3.7 mm 5.0 mm 17.0 mm	X		
			female with switches				4.5 / 5.0 mm			

har-bus® 64 system description



DIN 41612

Technical characteristics DIN Signal / har-bus® 64

Number of contacts	16 – 160
Contact spacing	2.54
Working current (all contacts are loaded)	2 A 1 A for har-bus® 64 at 70 °C 1 A with insulation displacement 40 A max. type M
Test voltage $U_{r.m.s}$	1 KV
Contact resistance	≤ 15 mΩ for solder and wire wrap connection ≤ 20 mΩ for crimp connection ≤ 20 mΩ har-bus® 64 rows a,b,c ≤ 30 mΩ har-bus® 64 rows z,d
Insulation resistance	≥ 10^{10} Ω har-bus® 64 ≥ 10^{12} Ω DIN Signal
Temperature range	-40 °C ... +105 °C for press-in connectors -55 °C ... +125 °C max. + 240 °C for 15 s during reflow soldering (only SMC)

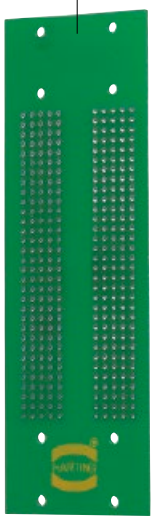
Insertion and withdrawal force	16-pol. ≤ 15 N 30-pol. ≤ 30 N 32-pol. ≤ 30 N 48-pol. ≤ 45 N 64-pol. ≤ 60 N 96-pol. ≤ 90 N 160-pol. ≤ 160 N
Materials	
Mouldings	thermoplastic resin, glass-fibre filled, UL 94-V0 Liquid Cristal Polymer (LCP), UL 94-V0 Poly Cyclohexylene Terephthalate (PCT), UL 94-V0 NFF classification up to F1/I2
Contacts	copper alloy
Contact surface	
Contact zone	selectively plated according to performance level

Application examples

Application 1

Female connector
09 03 296 6861

Backplane



Pin shroud
09 03 000 9957

Locking lever
09 03 000 9914

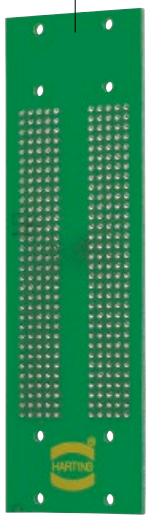
Female connector
09 03 264 6828

Female connector
09 03 096 3214

Application 2

Female connector
09 03 296 6862

Backplane



Pin shroud
09 03 000 9953

Locking lever
09 03 000 9913

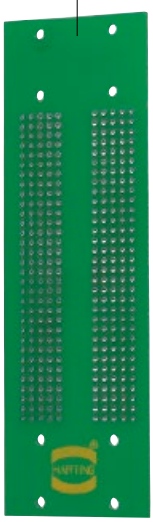
Female connector
09 73 296 6801

Daughtercard

Application 3

Female connector
09 03 296 6861

Backplane



Pin shroud
09 03 000 9957

Fixing brackets
09 03 000 9921

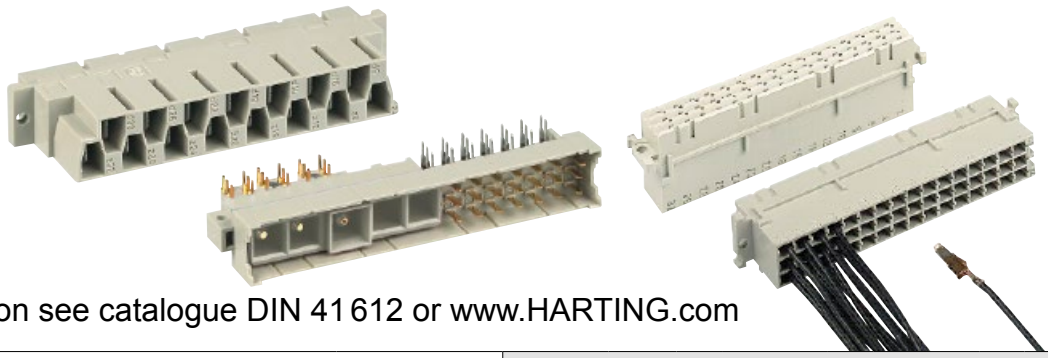
Female connector
09 03 096 3214

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

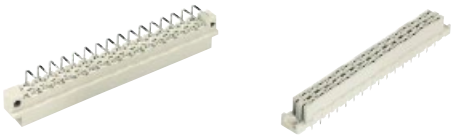
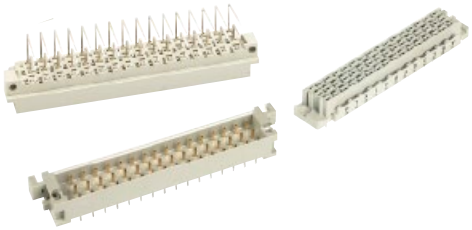
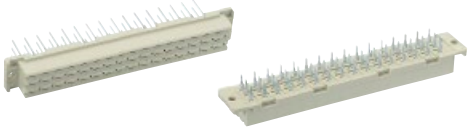
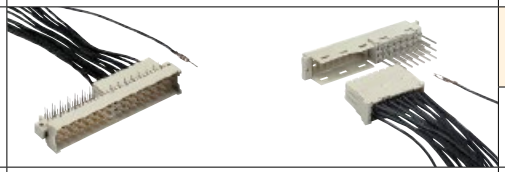
Shell housing C
09 03 096 0501

DIN 41612

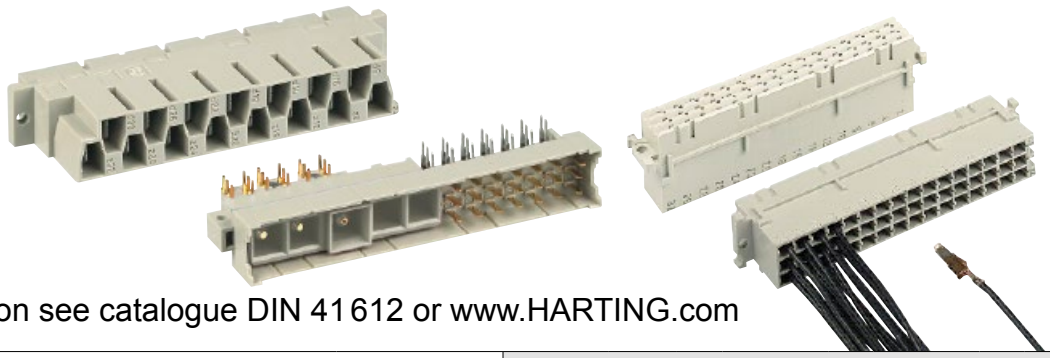
DIN Power overview



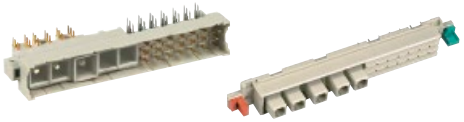
For detailed information see catalogue DIN 41612 or www.HARTING.com

Type	Maximum number of contacts			Termination							
				Solder	Reflow Soldering (SMC)	Solder lug	Press-in	Crimp	Wire wrap	Faston	Cage clamp
D	32		male	3.0 mm	X						
			female	2.9 mm 4.5 mm		X		X	20.0 mm		
E	48		male	3.0 mm	X						
			female	2.9 mm 4.5 mm		X	4.5 mm 11.5 mm	X	20.0 mm		
			Interface connector I	4.0 mm							
F	48		male	3.0 mm	X						
			female	3.7 mm 4.5 mm		X		X	22.0 mm		
F Low profile	48		female	3.7 mm 4.5 mm			4.5 mm 13.0 mm				
			Interface connector I	3.5 mm				X	22.0 mm		
F 9	9		male					X			
			female					X			
FM	45		male	3.0 mm				X			
			female	4.5 mm				X	22.0 mm		
2 F	24		female					X			
			Interface connector I					X			

DIN Power overview



For detailed information see catalogue DIN 41612 or www.HARTING.com

				Termination							
Type	Maximum number of contacts			Solder	Reflow Soldering (SMC)	Solder lug	Press-in	Crimp	Wire wrap	Faston	Cage clamp
H	15		male	3.0 mm						X	
			female	2.7 mm 4.0 mm 5.5 mm 7.0 mm 10.0 mm			3.6 mm			X	X
H	16		male	3,0 mm							
			female							X	
H 3	3		male	3.0 mm							
			female	4.0 mm							
MH	24 + 7		male	3.0 mm						X	
			female	4.5 mm				X	22.0 mm		
MH	21 + 5		male	3.1 mm							
			female	3.2 mm							

DIN 41612

Technical characteristics DIN Power

Number of contacts	3 – 48
Contact spacing	5.08 mm; 2.54 mm
Working current (all contacts are loaded)	
Type D, E, F, F9, FM, 2F	6 A max.
Type H, H 3	15 A max.
Test voltage $U_{r.m.s}$	
Type D, E, F, F9, FM, 2F	≥ 1.55 KV
Type H	≥ 3.1 KV
Type H 3	≥ 2.5 KV
Contact resistance	≤ 15 mΩ Solder and Wire wrap connection ≤ 20 mΩ Crimp connection
Insulation resistance	≥ 10^{12} Ω
Temperature range	-40 °C ... +105 °C Press-in connector -55 °C ... +125 °C max. + 240 °C for 15 s during reflow soldering (only SMC)

Insertion and withdrawal force	
Type D, E	32-pol. ≤ 40 N 48-pol. ≤ 75 N
Type F, F9, FM, 2F	24-pol. ≤ 37 N 32-pol. ≤ 50 N 45-pol. ≤ 70 N 48-pol. ≤ 75 N
Type H	≤ 90 N
Type H 3	≤ 20 N
Materials	
Mouldings	thermoplastic resin, glass-fibre filled, UL 94-V0 Poly Cyclohexylene Terephthalate (PCT), UL 94-V0 NFF classification up to F1/I2
Contacts	copper alloy
Contact surface	
Contact zone	selectively plated according to performance level hard silver plated or gold plated

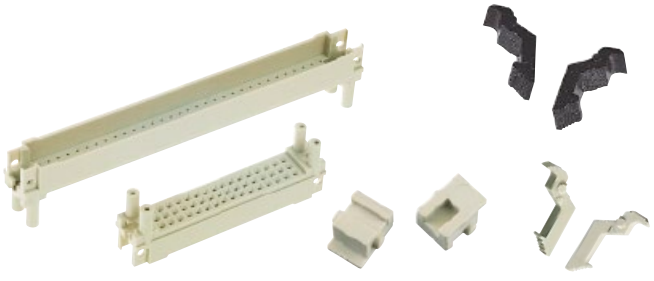
Shell housing overview

For detailed information
see catalogue DIN 41612 or www.HARTING.com

DIN 41612

		Shell housings										Open hood		Junction element O	Locking lever O
		A	B	C	2C	3C	D15	D20	D20 metallized	D20 metal	A for 2F	2F	G		
Number of cable entries		2	4	4	3	3	2	4	4	4	1	2	4	2	2
for screw fixing		X	X	X	X	X	X	X	X	X	X	X	X	X	
for fixing with locking lever		X	X	X	X	X	X								X
for straight pcb connector				X	X	X									
for front side of the rack		X	X	X	X	X	X	X	X	X	X	X	X	X	X
for pin shrouds				X	X										
for Interface connector I or U		X	X	X			X				X	X	X	X	
EMC									X	X					
IP20		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Coding included in shell housing								X	X	X					
for types	B / Q			X											
	2C / 2R				X										
	3C / 3R					X									
	C / R			X											
	harbus 64			X											
	D			X											
	E			X									X		
	F	X	X				X	X	X	X			X	X	X
	2F										X	X			
	H		X				X	X	X	X			X		X
	MH		X				X	X	X	X			X		X

Pin shrouds	for types						
	C	2C	R	2R	harbus 64	E	F
screw fixing	X	X	X	X			X
press-in fixing	X	X	X	X	X	X	X



Male and female connectors with pcb fixings

Snap-in clips

In the soldering process, all component terminations including the snap-in clips are soldered and therefore mechanically secured. This provides mechanical protection for the soldered contacts during mating and unmating of the connector.

Mouldings with snap-in clips offer the following advantages:

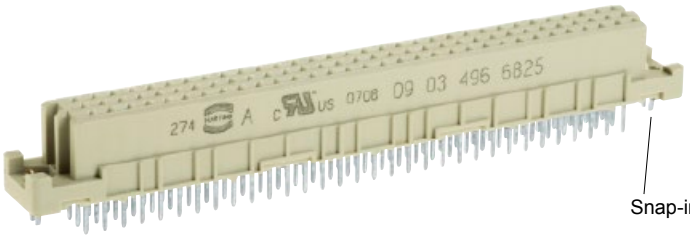
- Cost reduction when compared with the screw or rivet assembly methods due to the soldering of the clip along with other components in one process.
- The orientation of the clip after soldering in the plated through hole provides mechanical protection against the tensile forces arising from the mating and unmating of the connector.

It is possible to supply the majority of male and female connectors with solder termination with snap-in clips.

For pcb thickness
1.6 ± 0.2 mm
Ø = 2.8 $^{+0.1}$ mm

Mounting force
40 - 60 N

For pcb thickness
1.6 - 4.0 mm
Ø = 2.8 $^{+0.1}$ mm



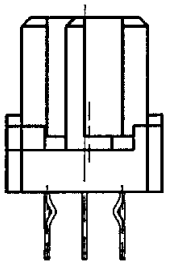
Snap-in clip

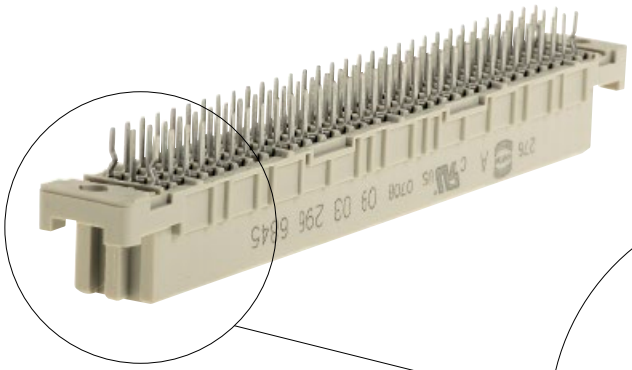
DIN 41612

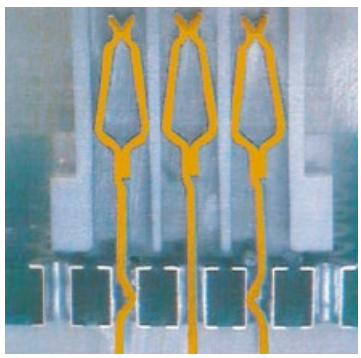
Kinked pins

Before and during soldering, the connectors are fixed onto the pcb with four kinked contacts located in the rows a and c, e.g. the positions a1, c1, a32 and c32 for a fully loaded connector.

Connectors with kinked pins are a reliable alternative for female connectors with straight terminations because no additional elements like screws, rivets or clips are necessary.







Cross section of a connector with kinked contacts assembled to a pcb