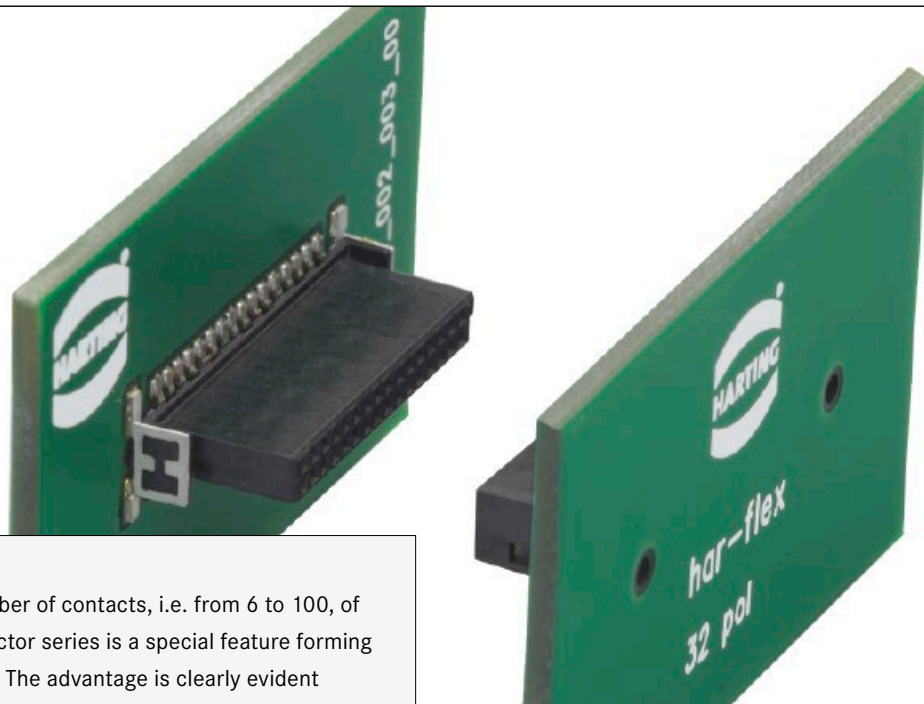


14. har-flex® Connectors



The continuous scalability by an even number of contacts, i.e. from 6 to 100, of the HARTING's har-flex® mezzanine connector series is a special feature forming an ideal basis for customized applications. The advantage is clearly evident considering that the connector is always optimized to suit specific applications on the device PCB, while also covering the medium- and small-scale volume range that is typical for the production of industrial devices.

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			PCB termination			Application standard				
Han-Quick Lock®	IDC	Crimp	THT	SMC	SMT	SCSI				
Screw	Cage clamp	Axial screw	Press-in	Housing integration						
				Separate housing	Integrated housing					

Contents

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<i>har-flex</i> ® connector system – introduction	14.02
Technical characteristics	14.04
Male connectors, straight	14.08
Female connectors, straight	14.10
Male connectors, angled	14.12
Female connectors, angled	14.14
Cable assemblies	14.16

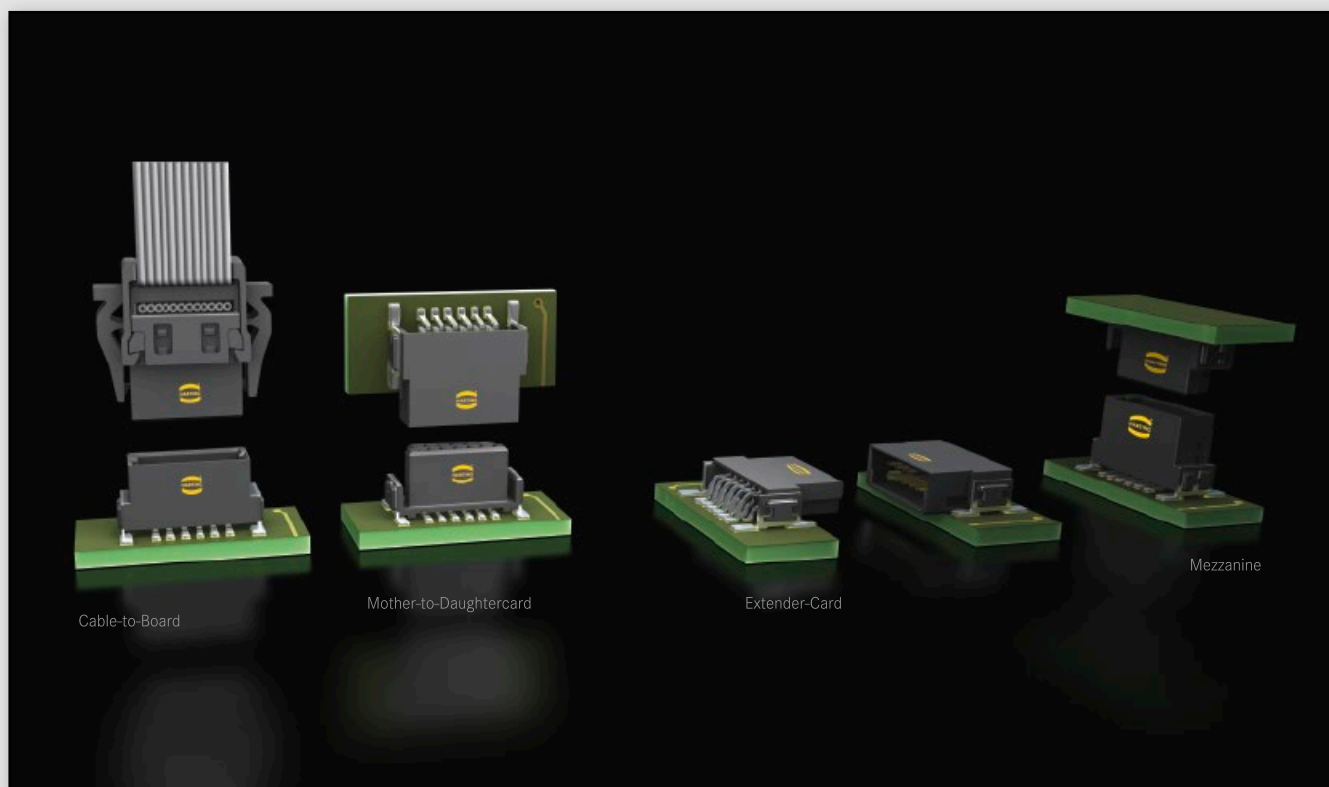
har-flex® CONNECTORS

With *har-flex*®, HARTING has developed a general-purpose PCB connector series for internal and external Device Connectivity. The continuous scalability by an even number of contacts, i.e. from 6 to 100, of the HARTING's *har-flex*® mezzanine connector series is a special feature forming an ideal basis for customized applications. The advantage is clearly evident considering that the connector is always optimized to suit specific applications on the device PCB, while also covering the medium- and small-scale volume range that is typical for the production of industrial devices.

This flexibility is new – HARTING turns an individual design into a standard component. No special tooling changes are needed for customer-specific solutions, thus HARTING can realize a short delivery time.

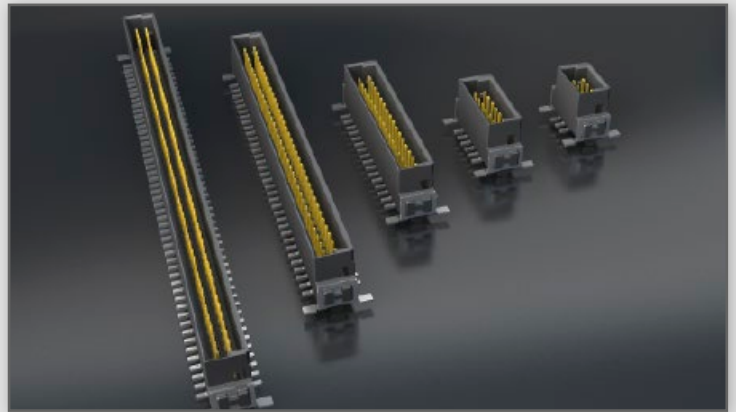
PRODUCT DIVERSITY

The *har-flex*® product range with SMT termination technology is based on a 1.27 mm grid. With its diverse variants, HARTING provides connectivity solutions for many different board-to-board and cable-to-board applications. For example, two straight connectors are used for the mezzanine application, two angled connectors for PCBs on one level, and a combination allows the well-known pairing of mother and daughter cards. By using an IDC flat band cable, two PCBs with large space between can be connected.



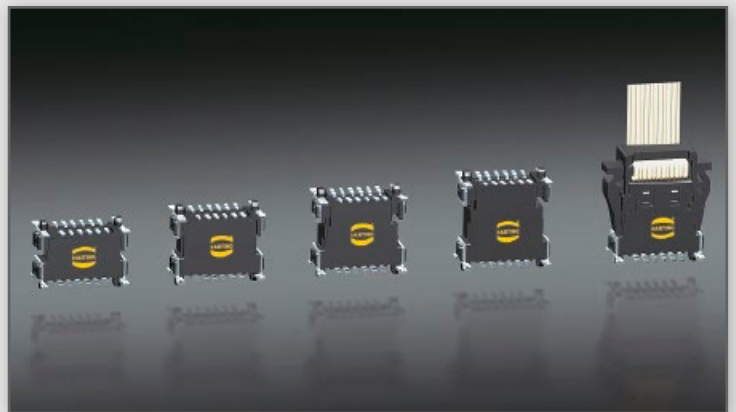
Many pin count options

HARTING has developed a modular tooling concept which offers a broad choice of configurations between 6 and 100 poles in even numbered positions. This flexibility in the choice of number of contacts, combined with high density contact spacing, allow the designer to maximize the use of PCB real estate, thereby achieving overall space savings and cost efficiencies.



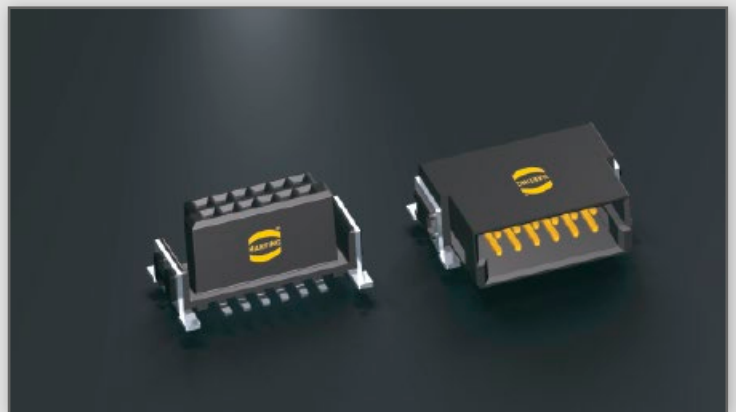
Flexible board-to-board distances

HARTING covers mezzanine applications with a range of straight versions for four different stacking heights that can be used to interconnect PCBs arranged in parallel stacks with spacing between 8.0 mm and 13.8 mm. Additional stacking heights are in development. For applications requiring larger spacing between boards HARTING offers compatible cable assemblies terminated with insulation displacement technology.



Robust design

The special SMT fixing ensures a robust and enduring connection to the PCB and helps to absorb mechanical stress on the solder contacts resulting from insertion and removal forces.



Automated processing features

The *har-flex*® SMT connectors meet the highest demands in terms of their processing capabilities. Special blister packaging provides protection during shipping and handling, while the "pick and place" pads enable automated assembly of the PCBs. The temperature resistant materials of the insulating body, in combination with consistent testing of the coplanarity of contacts, ensure reliable soldering capabilities of the connectors in the reflow process.



Number of contacts 6, 8, 10 ... 96, 98, 100

Connector pitch 1.27 mm x 1.27 mm [0.050" x 0.050"]

Clearance and creepage distance
 Board connectors (SMT) min. 0.4 mm
 Cable connectors (IDC)
 AWG 30/1 (solid) min. 0.35 mm
 AWG 30/7 (stranded) min. 0.4 mm

Test voltage $U_{r.m.s.}$ 500 V
 Contact resistance < 25 mΩ
 Insulation resistance > 10 GΩ

Insertion and withdrawal force approx. 0.5 N / contact

Working temperature range
 for connectors: - 55 °C ... + 125 °C
 for flat cable assembly: depends on cable type
 The higher temperature limit includes the local ambient and heating effects of the contacts under load
 Temperature during reflow soldering (acc. to ECA/IPC/JEDEC J-STD-075 Level PSL R0) min. 150 s > 217 °C
 min. 30 s > 240 °C

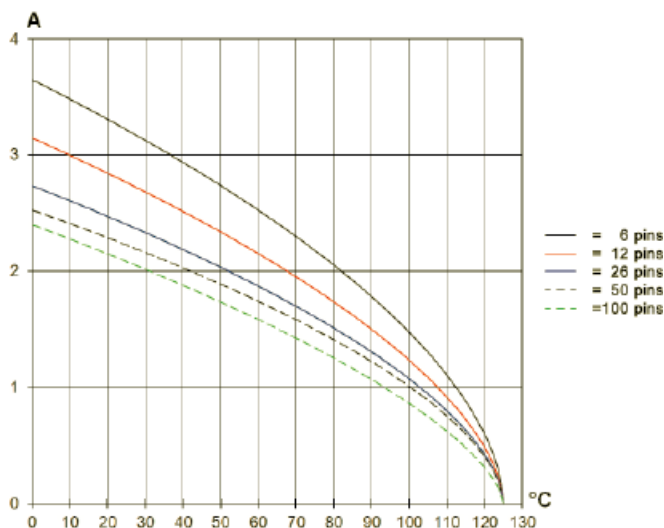
Electrical termination
 Board connectors SMT (Surface Mount Technology)
 Cable connectors IDC (Insulation Displacement Connection)

Materials
 Moulding material LCP
 UL approval UL 94-V0
 CTI value (Comparative Tracking Index) 175
 Contacts base material Copper alloy
 Contact surface
 Mating side
 Board connectors Au over PdNi (acc. performance level)
 Cable connectors Au over PdNi (acc. performance level)
 Termination side
 Board connectors (SMT) Sn
 Cable connectors (IDC) Sn

Current carrying capacity acc. to IEC 60512-5-2

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity-curve is valid for continuous, not interrupted current-loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60512-5-2.



Derating curve at $I_{max} * 0.8$ (IEC 60512-5-2)

Durability

Performance level 1 (recommended for majority of applications)

Initial 250 mating cycles, 10 days gas test (25 °C/75 % r.h.) using H₂S 10 ppb, NO₂ 200 ppb, CL₂ 10 ppb, SO₂ 200 ppb. Measurement of contact resistance. The remaining 250 mating cycles are subject to measurement of contact resistance and visual inspection. Visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.

Part number definition:

Performance level 2

Initial 125 mating cycles, 4 days gas test (25 °C/75% r.h.) using H₂S 10 ppb, NO₂ 200 ppb, CL₂ 10 ppb, SO₂ 200 ppb. Measurement of contact resistance. The remaining 125 mating cycles are subject to measurement of contact resistance and visual inspection. Visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.

Part number definition:

Performance level S4

Defined contact surface of min. 0.06 μm Au over 0.7+0.2 μm PdNi.

Part number definition:

har-flex

Working voltage acc. to IEC 60664-1

The working voltage depends on user specific operational conditions. Depending on the installation category, the degree of pollution and the entire electrical environment, the working voltage is different. The standard IEC 60664-1 specifies, in general, the minimum insulation distances for equipment. But it can also be used to determine the maximum working voltage with given requirements.

The following table shows the most common conditions applicable for the har-flex® connectors and exemplary calculations for the working voltage. For installation category, degree of pollution and other requirements which are not shown in the table we refer to the IEC 60664-1.

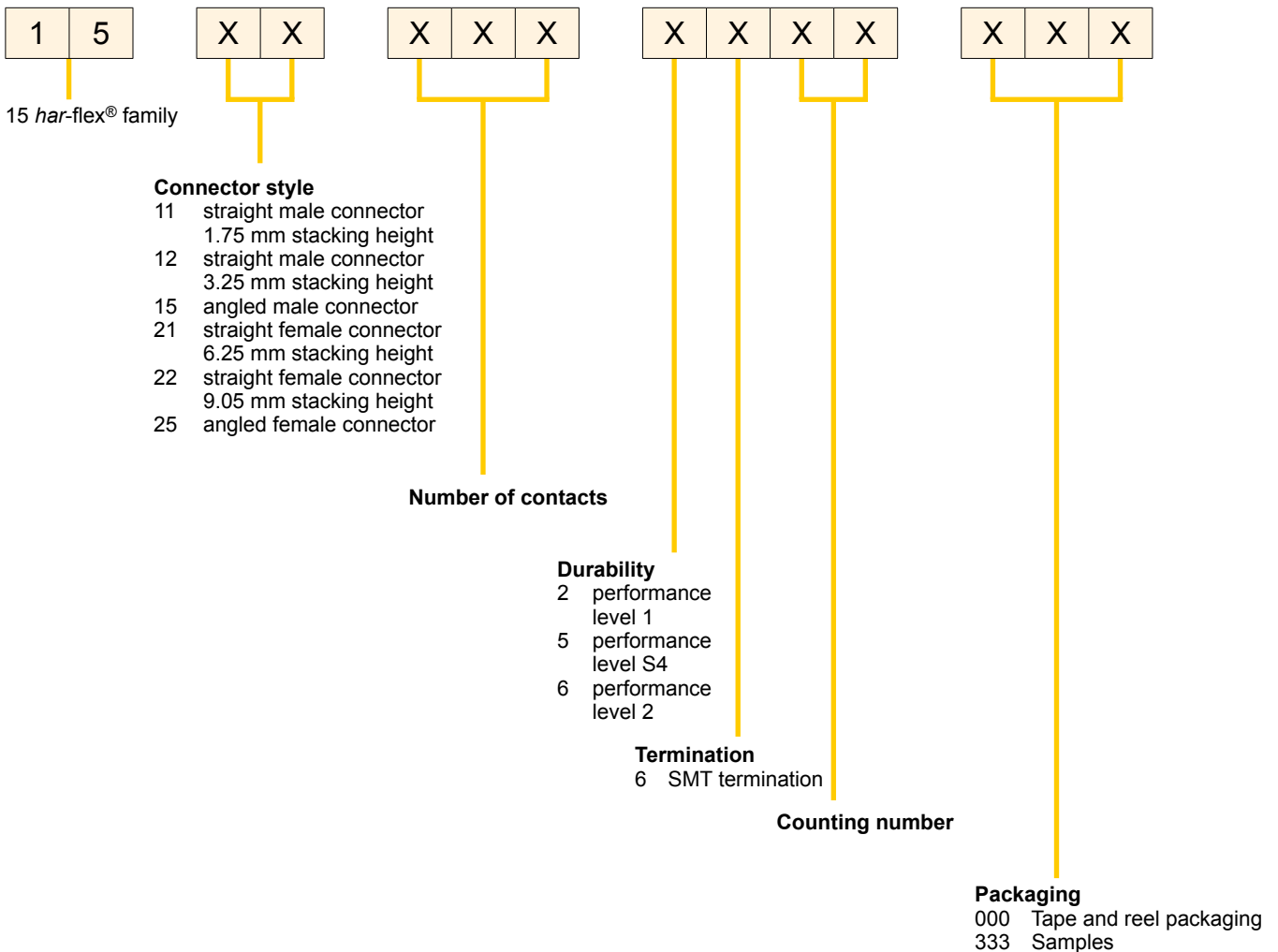
Clearance / Creepage distance	0.4 mm			
CTI-Value	< 400			
Isolation group	III a/b			
Electrical field type	Case A (Inhomogeneous field)		Case B (Homogeneous field)	
Installation category	I	II	I	II
Degree of pollution	1	1	1	1
Working voltage max.	150 V	100 V	150 V	150 V

Explanations:

- CTI value and isolation group are fixed values by the har-flex® connector characteristics.
- Installation category I: Equipment is intended for use only in appliances or installation parts, in which no overvoltages can occur. Equipment in this installation category is normally operated at extra low voltage.
- Installation category II: Equipment is intended for use in installations or parts of installations, in which lightning overvoltages need not be considered. Overvoltages caused by switching must be taken into account.
- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
- Pollution degree 2: Only non-conductive pollution occurs. A temporary conductive caused by condensation must be expected occasionally.

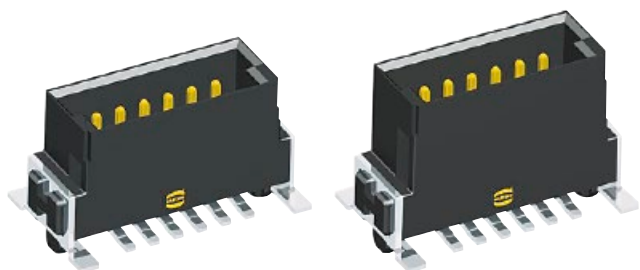
Part number definition

The har-flex® part numbers have 14 digits and are based on the following scheme:



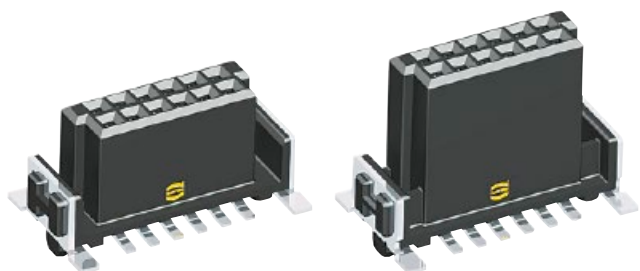
Stacking heights of straight connector versions

The har-flex® connectors cover mezzanine applications with a range of straight versions for four different stacking heights that can be used to interconnect PCBs arranged in parallel stacks with spacing between 8.0 mm and 13.8 mm.



Male 1.75 mm

Male 3.25 mm



Female 6.25 mm

Female 9.05 mm

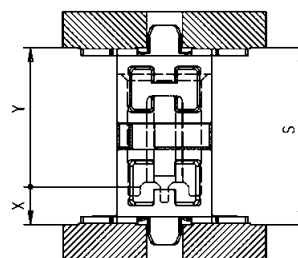
Due to the wiping lengths of 1.5 mm, these four connectors cover the distance of 8 mm to 13.8 mm continuously.

14 mm				
13 mm				
12 mm				
11 mm				
10 mm				
9 mm				
8 mm				
stacking heights	male 1.75 mm female 6.25 mm	male 3.25 mm female 6.25 mm	male 1.75 mm female 9.05 mm	male 3.25 mm female 9.05 mm
PCB distance	8 mm - 9.5 mm	9.5 mm - 11 mm	10.8 mm - 12.3 mm	12.3 mm - 13.8 mm
part numbers	15 11 ... 15 21 ...	15 12 ... 15 21 ...	15 11 ... 15 22 ...	15 12 ... 15 22 ...

Mating options

Mezzanine connection

straight female



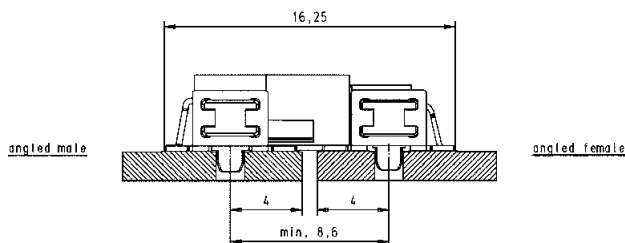
straight male

3.25	9.05	12.3	13.8
1.75	9.05	10.8	12.3
3.25	6.25	9.5	11
1.75	6.25	8	9.5
X	Y	Smin	* Smax

* Smax = Smin + 1.5 wiping length with additional contact overlap security

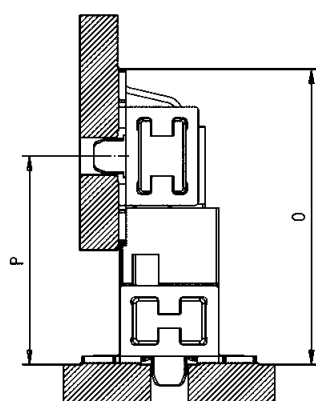
Extender Card connection

EXTENDER CARD CONFIGURATION

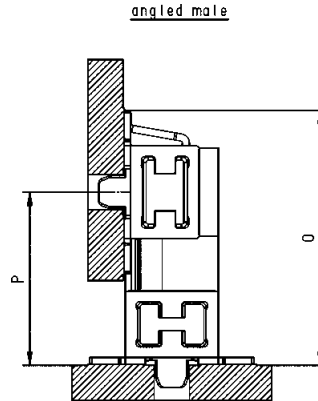


Mother-to-Daughtercard connection

angled female



angled male



straight male

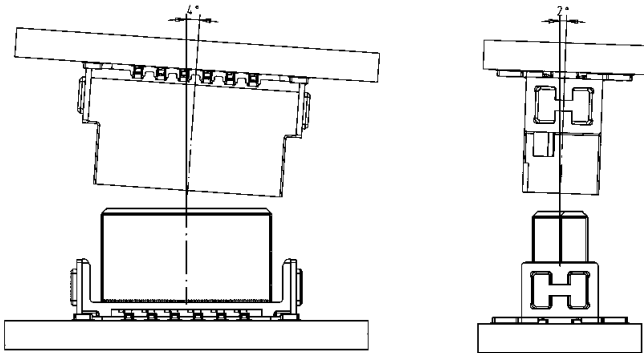
3.25	10.25	14.08
1.75	8.75	12.58
X	P min.	O

straight female

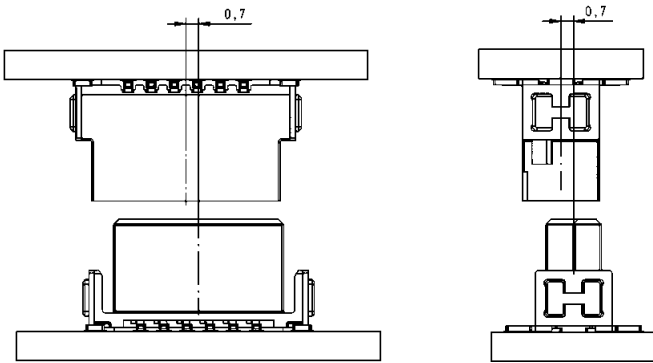
9.05	10.5	14.33
6.25	7.7	11.53
Y	P min.	O

Mating conditions

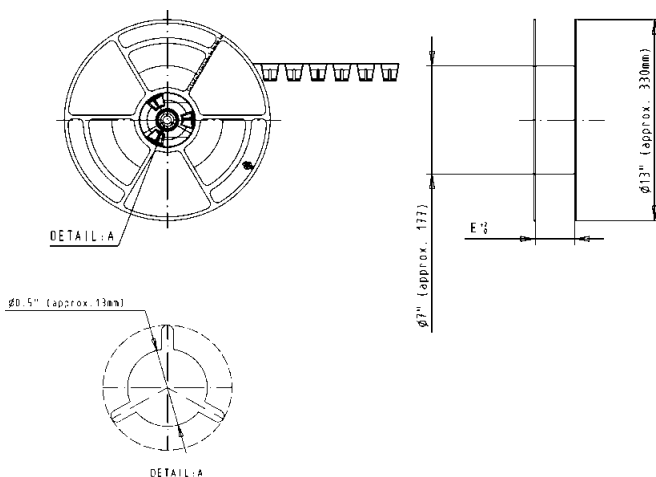
Inclination



Mismatching



Tape acc. to IEC 60286-3

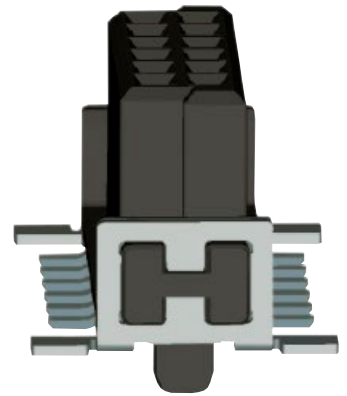


Tape dimensions:	E
poles 6 to 12	24.4
poles 14 to 20	32.4
poles 22 to 40	44.4
poles 42 to 56	56.4
poles 58 to 80	72.4
poles 82 to 100	88.4

SMT processing notes

The har-flex® SMT connectors meet the highest demands in terms of their processing capabilities.

The connectors are delivered in a tape and reel packaging optimized for automatic assembly machines. A vacuum cover enables the automatic assembly with a vacuum nozzle.



The insulation body material is high temperature resistant, and due to the black colour a secure camera recognition is ensured.

For a reliable SMT solder process, the termination pins are 100 % checked for coplanarity.

Process / Moisture Sensitivity

During the reflow solder process, the connector has to resist extreme variations in temperature. Connectors consist in general of both plastic and metal parts, which have a different behaviour during the solder process. The Process Sensivity and also the Moisture Sensivity are tested according the ECA/IPC/JEDEC J-STD-075 specification.

Process Sensivity:

PSL means Process Sensivity Level. PSL is a rating used to identify a component that is solder process sensitive. Damages of the connector after three times soldering are not permitted (e.g. melted edges).

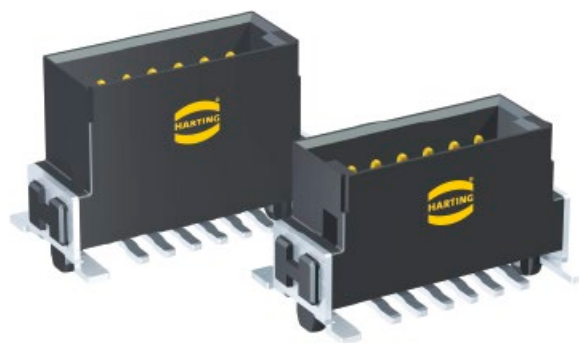
Moisture Sensivity:

MSL means Moisture Sensivity Level. MSL is a rating indicating a component's susceptibility to damage due to absorbed moisture during storage. Damages of the connector after storage in damp heat and three times soldering are not permitted (e.g. blisters).

The har-flex® connectors are rated with **PSL R0** and **MSL 1**. This is the maximum possible rating in both categories. The har-flex® connector resists three times soldering at the following conditions without damages:

- min. 150 s beyond 217 °C (liquidus temperature, the melting point of the solder paste)
- min. 30 s beyond classification temperature (240 °C / 245 °C for har-flex®)
- Temperature solder profile according to ECA/IPC/JEDEC J-STD-075
- For MSL test, a storage of 168 hours at 85 °C and 85 % rel. humidity was carried out

As the result, the har-flex® connectors are not process sensitive and not moisture sensitive according to ECA/IPC/JEDEC J-STD-075.



Male connectors, straight

Identification	No. of contacts	Part number	Dimensions in mm						
			A	B	C	D	E	F	G
Male connector, straight, stacking heights 1.75 / 3.25 mm	6	15 1 . 006 . 601 ...	2.54	6.96	8.89	5.76	4.76	6.56	1.05
	8	15 1 . 008 . 601 ...	3.81	8.23	10.16	7.03	6.03	7.83	1.69
	10	15 1 . 010 . 601 ...	5.08	9.50	11.43	8.30	7.30	9.10	2.32
	12	15 1 . 012 . 601 ...	6.35	10.77	12.70	9.57	8.57	10.37	2.96
	14	15 1 . 014 . 601 ...	7.62	12.04	13.97	10.84	9.84	11.64	3.59
	16	15 1 . 016 . 601 ...	8.89	13.31	15.24	12.11	11.11	12.91	4.23
	18	15 1 . 018 . 601 ...	10.16	14.58	16.51	13.38	12.38	14.18	4.88
	20	15 1 . 020 . 601 ...	11.43	15.85	17.78	14.65	13.65	15.45	5.50
	22	15 1 . 022 . 601 ...	12.70	17.12	19.05	15.92	14.92	16.72	6.13
	24	15 1 . 024 . 601 ...	13.97	18.39	20.32	17.19	16.19	17.99	6.77
	26	15 1 . 026 . 601 ...	15.24	19.66	21.59	18.46	17.46	19.26	7.40
	28	15 1 . 028 . 601 ...	16.51	20.93	22.86	19.73	18.73	20.53	8.04
	30	15 1 . 030 . 601 ...	17.78	22.20	24.13	21.00	20.00	21.80	8.67
	32	15 1 . 032 . 601 ...	19.05	23.47	25.40	22.27	21.27	23.07	9.31
	34	15 1 . 034 . 601 ...	20.32	24.74	26.67	23.54	22.54	24.34	9.94
	36	15 1 . 036 . 601 ...	21.59	26.01	27.94	24.81	23.81	25.61	10.58
	38	15 1 . 038 . 601 ...	22.86	27.28	29.21	26.08	25.08	26.88	11.21
	40	15 1 . 040 . 601 ...	24.13	28.55	30.48	27.35	26.35	28.15	11.85
	42	15 1 . 042 . 601 ...	25.40	29.82	31.75	28.62	27.62	29.42	12.48
	44	15 1 . 044 . 601 ...	26.67	31.09	33.02	29.89	28.89	30.69	13.12
	46	15 1 . 046 . 601 ...	27.94	32.36	34.29	31.16	30.16	31.96	13.75
	48	15 1 . 048 . 601 ...	29.21	33.63	35.56	32.43	31.43	33.23	14.39
	50	15 1 . 050 . 601 ...	30.48	34.90	36.83	33.70	32.70	34.50	15.02
	52	15 1 . 052 . 601 ...	31.75	36.17	38.10	34.97	33.97	35.77	15.66
	54	15 1 . 054 . 601 ...	33.02	37.44	39.37	36.24	35.24	37.04	16.29
	56	15 1 . 056 . 601 ...	34.29	38.71	40.64	37.51	36.51	38.31	16.93
	58	15 1 . 058 . 601 ...	35.56	39.98	41.91	38.78	37.78	39.58	17.56
	60	15 1 . 060 . 601 ...	36.83	41.25	43.18	40.05	39.05	40.85	18.20
	62	15 1 . 062 . 601 ...	38.10	42.52	44.45	41.32	40.32	42.12	18.83
	64	15 1 . 064 . 601 ...	39.37	43.79	45.72	42.59	41.59	43.39	19.47
	66	15 1 . 066 . 601 ...	40.64	45.06	46.99	43.86	42.86	44.66	20.10
	68	15 1 . 068 . 601 ...	41.91	46.33	48.26	45.13	44.13	45.93	20.74
	70	15 1 . 070 . 601 ...	43.18	47.60	49.53	46.40	45.40	47.20	21.37
	72	15 1 . 072 . 601 ...	44.45	48.87	50.80	47.67	46.67	48.47	22.01
	74	15 1 . 074 . 601 ...	45.72	50.14	52.07	48.94	47.94	49.74	22.64
	76	15 1 . 076 . 601 ...	46.99	51.41	53.34	50.21	49.21	51.01	23.28
	78	15 1 . 078 . 601 ...	48.26	52.68	54.61	51.48	50.48	52.28	23.91
	80	15 1 . 080 . 601 ...	49.53	53.95	55.88	52.75	51.75	53.55	24.55
	82	15 1 . 082 . 601 ...	50.80	55.22	57.15	54.02	53.02	54.82	25.18
	84	15 1 . 084 . 601 ...	52.07	56.49	58.42	55.29	54.29	56.09	25.82
	86	15 1 . 086 . 601 ...	53.34	57.76	59.69	56.56	55.56	57.36	26.45
	88	15 1 . 088 . 601 ...	54.61	59.03	60.96	57.83	56.83	58.63	27.09
	90	15 1 . 090 . 601 ...	55.88	60.30	62.23	59.10	58.10	59.90	27.72
	92	15 1 . 092 . 601 ...	57.15	61.57	63.50	60.37	59.37	61.17	28.36
	94	15 1 . 094 . 601 ...	58.42	62.84	64.77	61.64	60.64	62.44	28.99
	96	15 1 . 096 . 601 ...	59.69	64.11	66.04	62.91	61.91	63.71	29.63
	98	15 1 . 098 . 601 ...	60.96	65.38	67.31	64.18	63.18	64.98	30.26
	100	15 1 . 100 . 601 ...	62.23	66.65	68.58	65.45	64.45	66.25	30.90

Please insert digit for stacking height

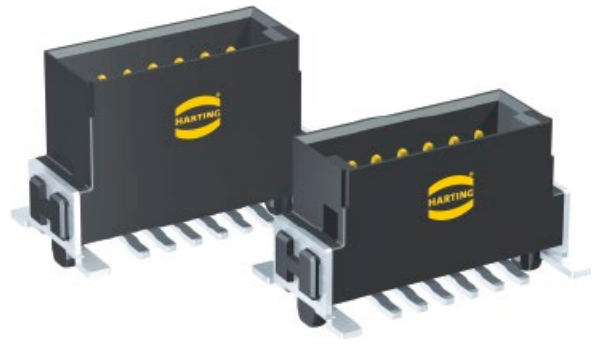
1.75 mm ▶ 1
3.25 mm ▶ 2

for performance level 1
for performance level S4
for performance level 2

2
5
6

333
000

for samples
for 280 pieces on reel



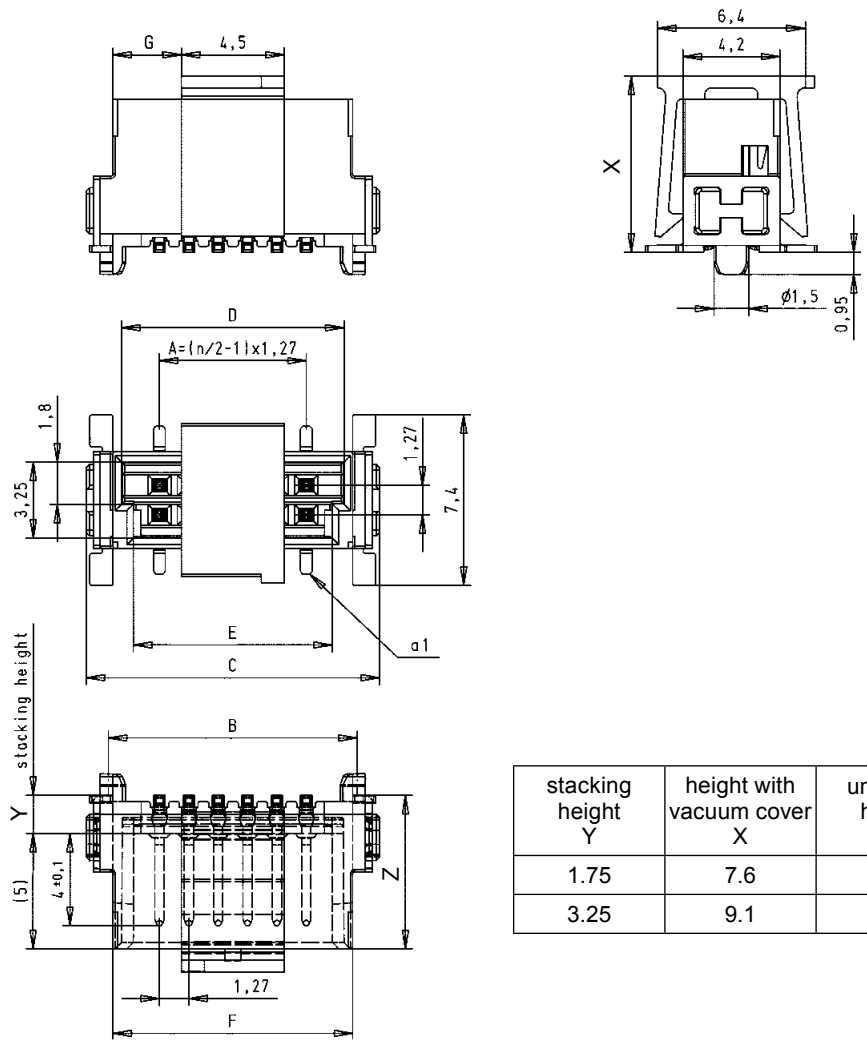
Male connectors, straight

Identification

Drawing

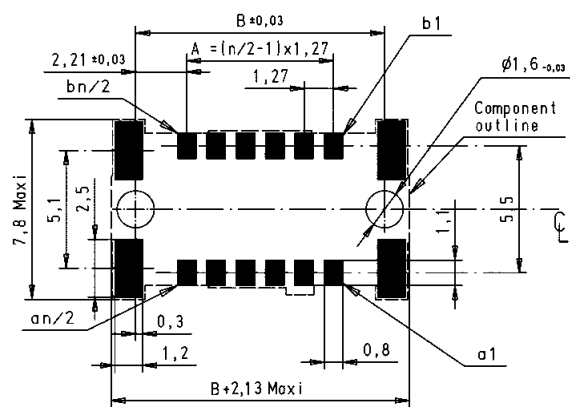
Dimensions in mm

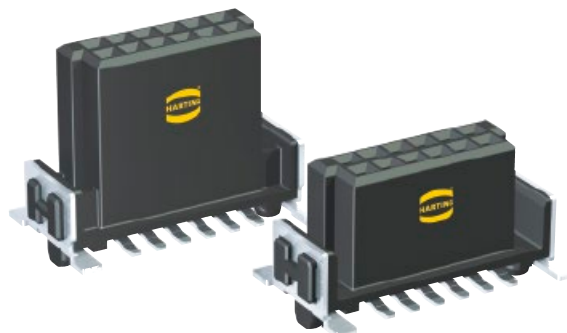
Dimensions



stacking height Y	height with vacuum cover X	unmated height Z
1.75	7.6	6.6
3.25	9.1	8.1

PCB layout





Female connectors, straight

Identification	No. of contacts	Part number	Dimensions in mm					
			A	B	C	D	E	G
Female connector, straight, stacking heights 6.25 / 9.05 mm	6	15 2 . 006 . 601 ...	2.54	6.96	8.89	5.56	4.56	1.19
	8	15 2 . 008 . 601 ...	3.81	8.23	10.16	6.83	5.83	1.19
	10	15 2 . 010 . 601 ...	5.08	9.50	11.43	8.10	7.10	2.46
	12	15 2 . 012 . 601 ...	6.35	10.77	12.70	9.37	8.37	2.46
	14	15 2 . 014 . 601 ...	7.62	12.04	13.97	10.64	9.64	3.73
	16	15 2 . 016 . 601 ...	8.89	13.31	15.24	11.91	10.91	3.73
	18	15 2 . 018 . 601 ...	10.16	14.58	16.51	13.18	12.18	5.00
	20	15 2 . 020 . 601 ...	11.43	15.85	17.78	14.45	13.45	5.00
	22	15 2 . 022 . 601 ...	12.70	17.12	19.05	15.72	14.72	6.27
	24	15 2 . 024 . 601 ...	13.97	18.39	20.32	16.99	15.99	6.27
	26	15 2 . 026 . 601 ...	15.24	19.66	21.59	18.26	17.26	7.54
	28	15 2 . 028 . 601 ...	16.51	20.93	22.86	19.53	18.53	7.54
	30	15 2 . 030 . 601 ...	17.78	22.20	24.13	20.80	19.80	8.81
	32	15 2 . 032 . 601 ...	19.05	23.47	25.40	22.07	21.07	8.81
	34	15 2 . 034 . 601 ...	20.32	24.74	26.67	23.34	22.34	10.08
	36	15 2 . 036 . 601 ...	21.59	26.01	27.94	24.61	23.61	10.08
	38	15 2 . 038 . 601 ...	22.86	27.28	29.21	25.88	24.88	11.35
	40	15 2 . 040 . 601 ...	24.13	28.55	30.48	27.15	26.15	11.35
	42	15 2 . 042 . 601 ...	25.40	29.82	31.75	28.42	27.42	12.62
	44	15 2 . 044 . 601 ...	26.67	31.09	33.02	29.69	28.69	12.62
	46	15 2 . 046 . 601 ...	27.94	32.36	34.29	30.96	29.96	13.89
	48	15 2 . 048 . 601 ...	29.21	33.63	35.56	32.23	31.23	13.89
	50	15 2 . 050 . 601 ...	30.48	34.90	36.83	33.50	32.50	15.16
	52	15 2 . 052 . 601 ...	31.75	36.17	38.10	34.77	33.77	15.16
	54	15 2 . 054 . 601 ...	33.02	37.44	39.37	36.04	35.04	16.43
	56	15 2 . 056 . 601 ...	34.29	38.71	40.64	37.31	36.31	16.43
	58	15 2 . 058 . 601 ...	35.56	39.98	41.91	38.58	37.58	17.70
	60	15 2 . 060 . 601 ...	36.83	41.25	43.18	39.85	38.85	17.70
	62	15 2 . 062 . 601 ...	38.10	42.52	44.45	41.12	40.12	18.97
	64	15 2 . 064 . 601 ...	39.37	43.79	45.72	42.39	41.39	18.97
	66	15 2 . 066 . 601 ...	40.64	45.06	46.99	43.66	42.66	20.24
	68	15 2 . 068 . 601 ...	41.91	46.33	48.26	44.93	43.93	20.24
	70	15 2 . 070 . 601 ...	43.18	47.60	49.53	46.20	45.20	21.51
	72	15 2 . 072 . 601 ...	44.45	48.87	50.80	47.47	46.47	21.51
	74	15 2 . 074 . 601 ...	45.72	50.14	52.07	48.74	47.74	22.78
	76	15 2 . 076 . 601 ...	46.99	51.41	53.34	50.01	49.01	22.78
	78	15 2 . 078 . 601 ...	48.26	52.68	54.61	51.28	50.28	24.05
	80	15 2 . 080 . 601 ...	49.53	53.95	55.88	52.55	51.55	24.05
	82	15 2 . 082 . 601 ...	50.80	55.22	57.15	53.82	52.82	25.32
	84	15 2 . 084 . 601 ...	52.07	56.49	58.42	55.09	54.09	25.32
	86	15 2 . 086 . 601 ...	53.34	57.76	59.69	56.36	55.36	26.59
	88	15 2 . 088 . 601 ...	54.61	59.03	60.96	57.63	56.63	26.59
	90	15 2 . 090 . 601 ...	55.88	60.30	62.23	58.90	57.90	27.86
	92	15 2 . 092 . 601 ...	57.15	61.57	63.50	60.17	59.17	27.86
	94	15 2 . 094 . 601 ...	58.42	62.84	64.77	61.44	60.44	29.13
	96	15 2 . 096 . 601 ...	59.69	64.11	66.04	62.71	61.71	29.13
	98	15 2 . 098 . 601 ...	60.96	65.38	67.31	63.98	62.98	30.40
	100	15 2 . 100 . 601 ...	62.23	66.65	68.58	65.25	64.25	30.40

Please insert digit for stacking height

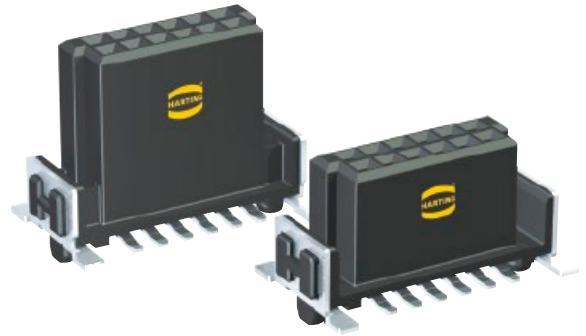
6.25 mm ▶ 1
9.05 mm ▶ 2

for performance level 1
for performance level S4
for performance level 2

2
5
6

333
000

for samples
for 280 pieces on reel



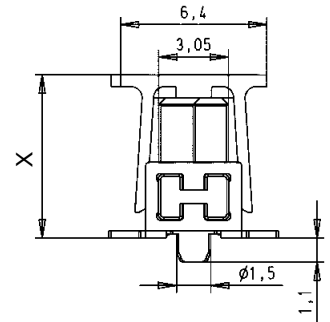
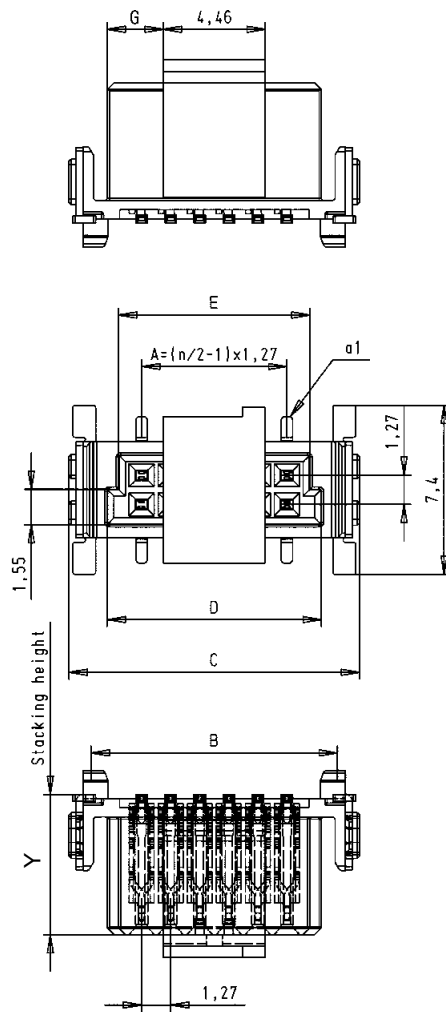
Female connectors, straight

Identification

Drawing

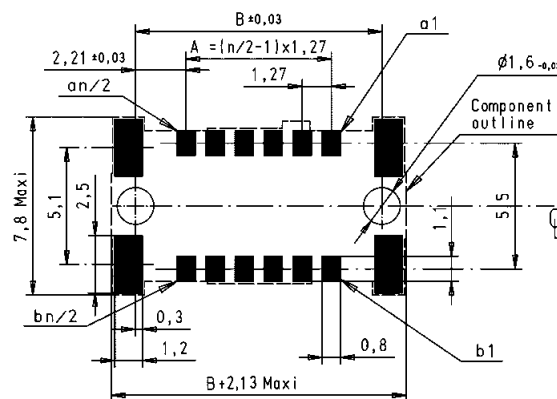
Dimensions in mm

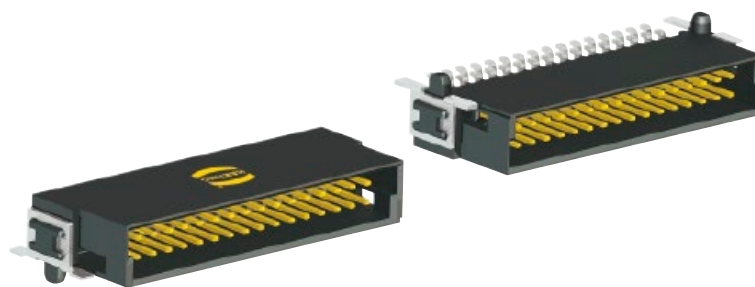
Dimensions



stacking height Y	height with vacuum cover X
6.25	7.1
9.05	9.9

PCB layout





Male connectors, angled

Identification	No. of contacts	Part number	Dimensions in mm				
			A	B	C	D	E
Male connector, angled	6	15 15 006 . 601 . . .	2.54	6.96	8.89	5.76	4.76
	8	15 15 008 . 601 . . .	3.81	8.23	10.16	7.03	6.03
	10	15 15 010 . 601 . . .	5.08	9.50	11.43	8.30	7.30
	12	15 15 012 . 601 . . .	6.35	10.77	12.70	9.57	8.57
	14	15 15 014 . 601 . . .	7.62	12.04	13.97	10.84	9.84
	16	15 15 016 . 601 . . .	8.89	13.31	15.24	12.11	11.11
	18	15 15 018 . 601 . . .	10.16	14.58	16.51	13.38	12.38
	20	15 15 020 . 601 . . .	11.43	15.85	17.78	14.65	13.65
	22	15 15 022 . 601 . . .	12.70	17.12	19.05	15.92	14.92
	24	15 15 024 . 601 . . .	13.97	18.39	20.32	17.19	16.19
	26	15 15 026 . 601 . . .	15.24	19.66	21.59	18.46	17.46
	28	15 15 028 . 601 . . .	16.51	20.93	22.86	19.73	18.73
	30	15 15 030 . 601 . . .	17.78	22.20	24.13	21.00	20.00
	32	15 15 032 . 601 . . .	19.05	23.47	25.40	22.27	21.27
	34	15 15 034 . 601 . . .	20.32	24.74	26.67	23.54	22.54
	36	15 15 036 . 601 . . .	21.59	26.01	27.94	24.81	23.81
	38	15 15 038 . 601 . . .	22.86	27.28	29.21	26.08	25.08
	40	15 15 040 . 601 . . .	24.13	28.55	30.48	27.35	26.35
	42	15 15 042 . 601 . . .	25.40	29.82	31.75	28.62	27.62
	44	15 15 044 . 601 . . .	26.67	31.09	33.02	29.89	28.89
	46	15 15 046 . 601 . . .	27.94	32.36	34.29	31.16	30.16
	48	15 15 048 . 601 . . .	29.21	33.63	35.56	32.43	31.43
	50	15 15 050 . 601 . . .	30.48	34.90	36.83	33.70	32.70
	52	15 15 052 . 601 . . .	31.75	36.17	38.10	34.97	33.97
	54	15 15 054 . 601 . . .	33.02	37.44	39.37	36.24	35.24
	56	15 15 056 . 601 . . .	34.29	38.71	40.64	37.51	36.51
	58	15 15 058 . 601 . . .	35.56	39.98	41.91	38.78	37.78
	60	15 15 060 . 601 . . .	36.83	41.25	43.18	40.05	39.05
	62	15 15 062 . 601 . . .	38.10	42.52	44.45	41.32	40.32
	64	15 15 064 . 601 . . .	39.37	43.79	45.72	42.59	41.59
	66	15 15 066 . 601 . . .	40.64	45.06	46.99	43.86	42.86
	68	15 15 068 . 601 . . .	41.91	46.33	48.26	45.13	44.13
	70	15 15 070 . 601 . . .	43.18	47.60	49.53	46.40	45.40
	72	15 15 072 . 601 . . .	44.45	48.87	50.80	47.67	46.67
	74	15 15 074 . 601 . . .	45.72	50.14	52.07	48.94	47.94
	76	15 15 076 . 601 . . .	46.99	51.41	53.34	50.21	49.21
	78	15 15 078 . 601 . . .	48.26	52.68	54.61	51.48	50.48
80	15 15 080 . 601 . . .	49.53	53.95	55.88	52.75	51.75	
82	15 15 082 . 601 . . .	50.80	55.22	57.15	54.02	53.02	
84	15 15 084 . 601 . . .	52.07	56.49	58.42	55.29	54.29	
86	15 15 086 . 601 . . .	53.34	57.76	59.69	56.56	55.56	
88	15 15 088 . 601 . . .	54.61	59.03	60.96	57.83	56.83	
90	15 15 090 . 601 . . .	55.88	60.30	62.23	59.10	58.10	
92	15 15 092 . 601 . . .	57.15	61.57	63.50	60.37	59.37	
94	15 15 094 . 601 . . .	58.42	62.84	64.77	61.64	60.64	
96	15 15 096 . 601 . . .	59.69	64.11	66.04	62.91	61.91	
98	15 15 098 . 601 . . .	60.96	65.38	67.31	64.18	63.18	
100	15 15 100 . 601 . . .	62.23	66.65	68.58	65.45	64.45	

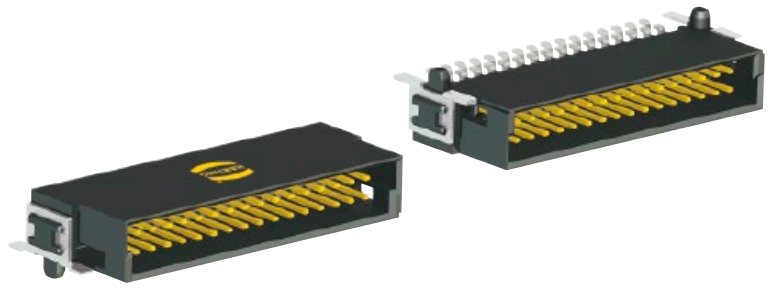
har:lex

for performance level 1
for performance level S4
for performance level 2

2
5
6

333
000

for samples
for 560 pieces on reel



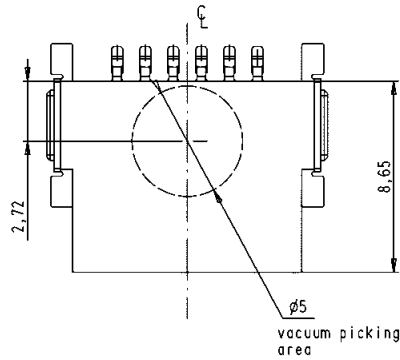
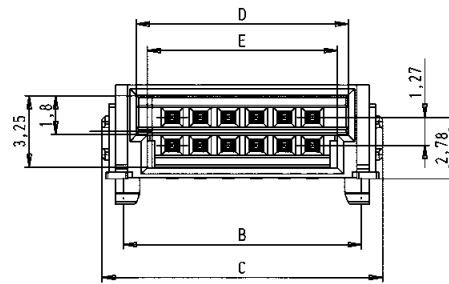
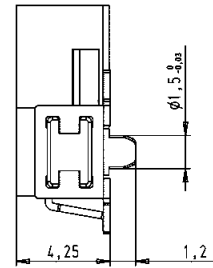
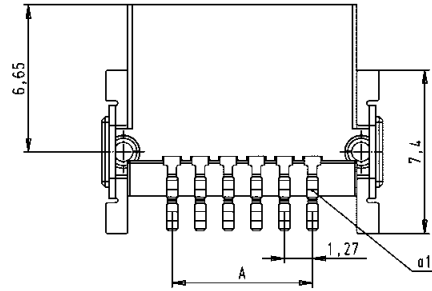
Male connectors, angled

Identification

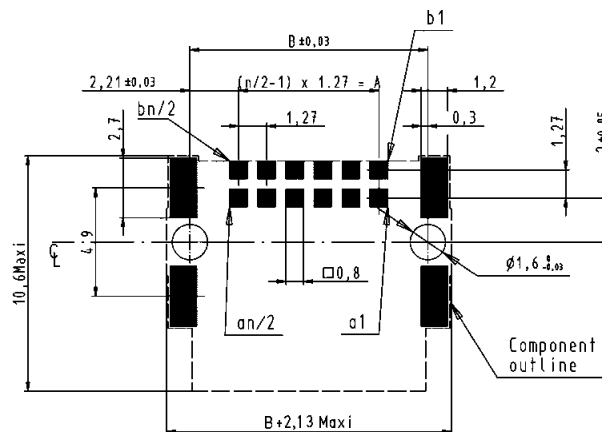
Drawing

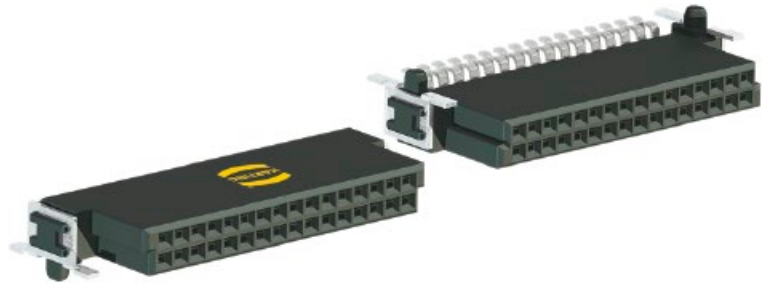
Dimensions in mm

Dimensions



PCB layout





Female connectors, angled

Identification	No. of contacts	Part number	Dimensions in mm				
			A	B	C	D	E
Female connector, angled	6	15 25 006 . 601 . . .	2.54	6.96	8.89	5.56	4.56
	8	15 25 008 . 601 . . .	3.81	8.23	10.16	6.83	5.83
	10	15 25 010 . 601 . . .	5.08	9.50	11.43	8.10	7.10
	12	15 25 012 . 601 . . .	6.35	10.77	12.70	9.37	8.37
	14	15 25 014 . 601 . . .	7.62	12.04	13.97	10.64	9.64
	16	15 25 016 . 601 . . .	8.89	13.31	15.24	11.91	10.91
	18	15 25 018 . 601 . . .	10.16	14.58	16.51	13.18	12.18
	20	15 25 020 . 601 . . .	11.43	15.85	17.78	14.45	13.45
	22	15 25 022 . 601 . . .	12.70	17.12	19.05	15.72	14.72
	24	15 25 024 . 601 . . .	13.97	18.39	20.32	16.99	15.99
	26	15 25 026 . 601 . . .	15.24	19.66	21.59	18.26	17.26
	28	15 25 028 . 601 . . .	16.51	20.93	22.86	19.53	18.53
	30	15 25 030 . 601 . . .	17.78	22.20	24.13	20.80	19.80
	32	15 25 032 . 601 . . .	19.05	23.47	25.40	22.07	21.07
	34	15 25 034 . 601 . . .	20.32	24.74	26.67	23.34	22.34
	36	15 25 036 . 601 . . .	21.59	26.01	27.94	24.61	23.61
	38	15 25 038 . 601 . . .	22.86	27.28	29.21	25.88	24.88
	40	15 25 040 . 601 . . .	24.13	28.55	30.48	27.15	26.15
	42	15 25 042 . 601 . . .	25.40	29.82	31.75	28.42	27.42
	44	15 25 044 . 601 . . .	26.67	31.09	33.02	29.69	28.69
	46	15 25 046 . 601 . . .	27.94	32.36	34.29	30.96	29.96
	48	15 25 048 . 601 . . .	29.21	33.63	35.56	32.23	31.23
	50	15 25 050 . 601 . . .	30.48	34.90	36.83	33.50	32.50
	52	15 25 052 . 601 . . .	31.75	36.17	38.10	34.77	33.77
	54	15 25 054 . 601 . . .	33.02	37.44	39.37	36.04	35.04
	56	15 25 056 . 601 . . .	34.29	38.71	40.64	37.31	36.31
	58	15 25 058 . 601 . . .	35.56	39.98	41.91	38.58	37.58
	60	15 25 060 . 601 . . .	36.83	41.25	43.18	39.85	38.85
	62	15 25 062 . 601 . . .	38.10	42.52	44.45	41.12	40.12
	64	15 25 064 . 601 . . .	39.37	43.79	45.72	42.39	41.39
	66	15 25 066 . 601 . . .	40.64	45.06	46.99	43.66	42.66
	68	15 25 068 . 601 . . .	41.91	46.33	48.26	44.93	43.93
	70	15 25 070 . 601 . . .	43.18	47.60	49.53	46.20	45.20
	72	15 25 072 . 601 . . .	44.45	48.87	50.80	47.47	46.47
	74	15 25 074 . 601 . . .	45.72	50.14	52.07	48.74	47.74
	76	15 25 076 . 601 . . .	46.99	51.41	53.34	50.01	49.01
78	15 25 078 . 601 . . .	48.26	52.68	54.61	51.28	50.28	
80	15 25 080 . 601 . . .	49.53	53.95	55.88	52.55	51.55	
82	15 25 082 . 601 . . .	50.80	55.22	57.15	53.82	52.82	
84	15 25 084 . 601 . . .	52.07	56.49	58.42	55.09	54.09	
86	15 25 086 . 601 . . .	53.34	57.76	59.69	56.36	55.36	
88	15 25 088 . 601 . . .	54.61	59.03	60.96	57.63	56.63	
90	15 25 090 . 601 . . .	55.88	60.30	62.23	58.90	57.90	
92	15 25 092 . 601 . . .	57.15	61.57	63.50	60.17	59.17	
94	15 25 094 . 601 . . .	58.42	62.84	64.77	61.44	60.44	
96	15 25 096 . 601 . . .	59.69	64.11	66.04	62.71	61.71	
98	15 25 098 . 601 . . .	60.96	65.38	67.31	63.98	62.98	
100	15 25 100 . 601 . . .	62.23	66.65	68.58	65.25	64.25	

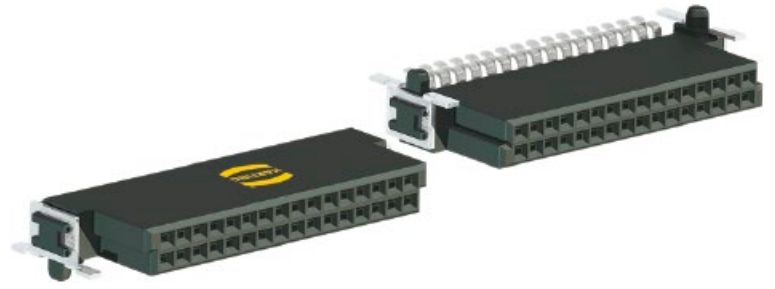
har-flex

for performance level 1
for performance level S4
for performance level 2

2
5
6

333
000

for samples
for 560 pieces on reel



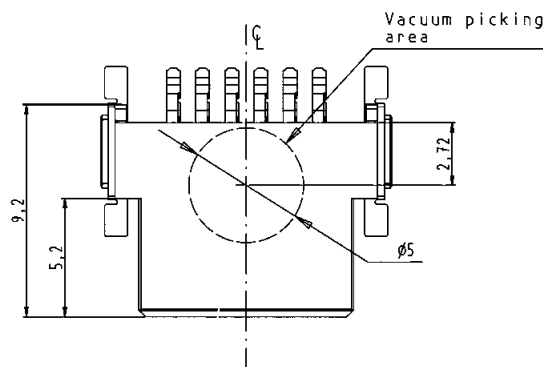
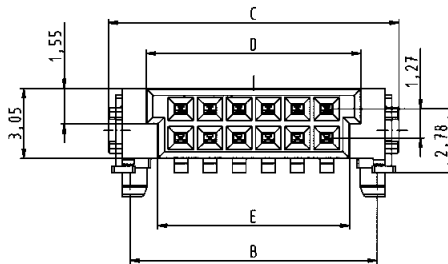
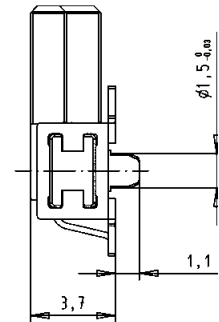
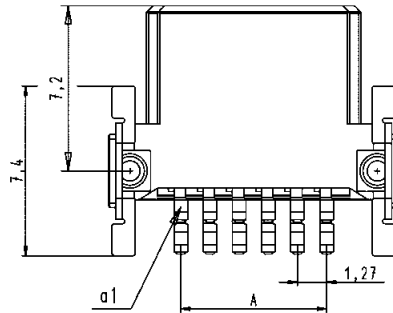
Female connectors, angled

Identification

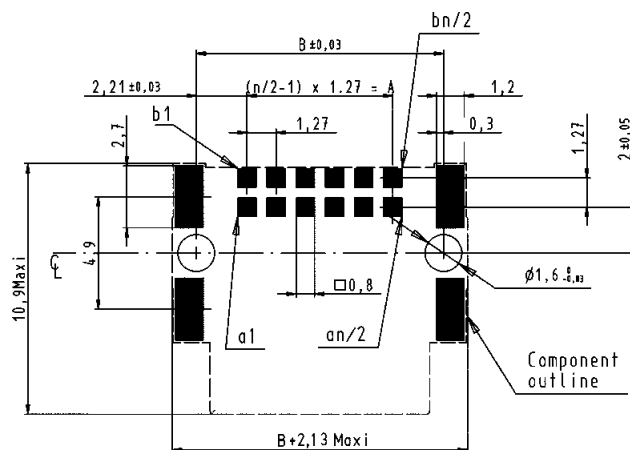
Drawing

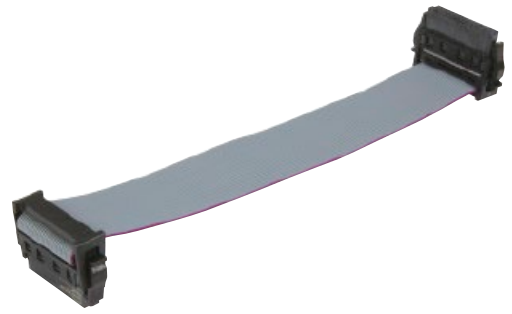
Dimensions in mm

Dimensions



PCB layout





Cable assemblies

Identification	Part number	Drawing	Dimensions in mm
<p>Cable assembly <i>har:flex</i>® Cable: Flat cable, AWG 30, 0.635 mm pitch Wiring: 1:1 Connectors with strain relief</p>			
<p>6 poles Length: L = 0.1 m L = 0.2 m L = 0.5 m</p>	<p>33 15 243 0100 001 33 15 243 0200 002 33 15 243 0500 003</p>		
<p>12 poles Length: L = 0.1 m L = 0.2 m L = 0.5 m</p>	<p>33 15 243 0100 004 33 15 243 0200 005 33 15 243 0500 006</p>		
<p>26 poles Length: L = 0.1 m L = 0.2 m L = 0.5 m</p>	<p>33 15 243 0100 007 33 15 243 0200 008 33 15 243 0500 009</p>		
<p>32 poles Length: L = 0.1 m L = 0.2 m L = 0.5 m</p>	<p>33 15 243 0100 010 33 15 243 0200 011 33 15 243 0500 012</p>		

har:flex



Cable assemblies

Identification		Part number	Drawing	Dimensions in mm
50 poles	Length: L = 0.1 m	33 15 243 0100 013		
	L = 0.2 m	33 15 243 0200 014		
	L = 0.5 m	33 15 243 0500 015		
68 poles	Length: L = 0.1 m	33 15 243 0100 122		
	L = 0.2 m	33 15 243 0200 122		
	L = 0.5 m	33 15 243 0500 122		
80 poles	Length: L = 0.1 m	33 15 243 0100 123		
	L = 0.2 m	33 15 243 0200 123		
	L = 0.5 m	33 15 243 0500 123		
100 poles	Length: L = 0.1 m	33 15 243 0100 124		
	L = 0.2 m	33 15 243 0200 124		
	L = 0.5 m	33 15 243 0500 124		