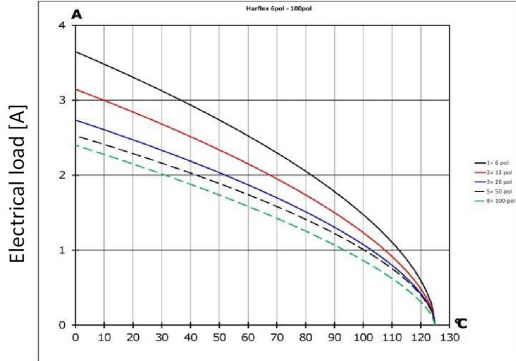


1	2	3	4	5	6	7	8																																																																																																																										
HARTING har-flex®straight male connector RoHS compliant				RECOMMENDATION FOR SOLDER PROCESSING Solder paste recommendation The har-flex connectors are solderable with established lead-free SAC / SnNi solder but also leaded solder e.g. SnPb40 PCB pad plating The har-flex connectors are solderable on lead-free pad surfaces like HAL, NiAu, Immersion Sn. Stencil recommendation The solder deposition has to be placed on the pad area of the contact solder tines. Ideally, the solder deposition has the same length-to-width ratio and center point like the PCB pads. The size of the solder stencil apertures is depending on the thickness of the stencil. In general, the thinner stencils will need larger apertures to result in the required volume of solder paste. The minimum required solder paste volume for the signal pins is 0,094mm³, for the hold down it is 0,33mm³. For example, this can be achieved with the following stencil data : <table><tr><td></td><td colspan="3">Signal pins</td></tr><tr><td>Stencil thickness</td><td>PCB pad size</td><td>proposal stencil aperture size</td><td>calculated solder paste volume</td></tr><tr><td>120 µm</td><td>1,1 x 0,8 mm</td><td>1,05 x 0,75 mm</td><td>0,095 mm³</td></tr><tr><td>150 µm</td><td>1,1 x 0,8 mm</td><td>0,99 x 0,72 mm</td><td>0,107 mm³</td></tr></table> <table><tr><td></td><td colspan="3">Hold-downs</td></tr><tr><td>Stencil thickness</td><td>PCB pad size</td><td>proposal stencil aperture size</td><td>calculated solder paste volume</td></tr><tr><td>120 µm</td><td>2,5 x 1,2 mm</td><td>2,45 x 1,15 mm</td><td>0,338 mm³</td></tr><tr><td>150 µm</td><td>2,5 x 1,2 mm</td><td>2,25 x 1,08 mm</td><td>0,365 mm³</td></tr></table> If a stencil with lower thickness shall be used, please insure the minimum required solder paste volume by enlarging the stencil aperture. Depending on the PCB design, the solder depostion may protrude the PCB pads. But to achieve a good sealing during solder paste printing and to reduce the cleaning interval of the stencil, the aperture should be smaller than the PCB pad about 10% or 25µm encircling. Coplanarity of contacts All connectors are tested for coplanarity of contacts and are in the range of 6 pin to 50 pin: ≤ 0,1mm 50 pin to 68 pin: ≤ 0,12mm 70 pin to 80 pin: ≤ 0,13mm 82 pin to 100 pin: ≤ 0,15mm Performance level 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 : 15 2 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 : 15 6 Performance level S4 Defined contact surface of min. 0,06 µm Au over 0,7+0,2µm PdNi Part number definition : 15 5 <table><tr><td></td><td>All rights reserved</td><td>Created by ZHUANGJ</td><td>Inspected by LUOK</td><td>Standardisation HOFFMANN</td><td>Date 2020-07-29</td><td>State Final Release</td></tr><tr><td colspan="2">Department EL PD</td><td colspan="4">Title har flex male stacking height1.75 , 3.25 and 4.85</td><td>Doc-Key / ECM-Nr. 100577896/UGD/001/E 500000177026</td></tr><tr><td colspan="2">HARTING Electronics GmbH</td><td>Type DS</td><td colspan="3">Number 15111100301</td><td>Rev. E</td></tr><tr><td colspan="2">D-32339 Espelkamp</td><td colspan="4"></td><td>Page 1/2</td></tr></table>					Signal pins			Stencil thickness	PCB pad size	proposal stencil aperture size	calculated solder paste volume	120 µm	1,1 x 0,8 mm	1,05 x 0,75 mm	0,095 mm³	150 µm	1,1 x 0,8 mm	0,99 x 0,72 mm	0,107 mm³		Hold-downs			Stencil thickness	PCB pad size	proposal stencil aperture size	calculated solder paste volume	120 µm	2,5 x 1,2 mm	2,45 x 1,15 mm	0,338 mm³	150 µm	2,5 x 1,2 mm	2,25 x 1,08 mm	0,365 mm³		All rights reserved	Created by ZHUANGJ	Inspected by LUOK	Standardisation HOFFMANN	Date 2020-07-29	State Final Release	Department EL PD		Title har flex male stacking height1.75 , 3.25 and 4.85				Doc-Key / ECM-Nr. 100577896/UGD/001/E 500000177026	HARTING Electronics GmbH		Type DS	Number 15111100301			Rev. E	D-32339 Espelkamp						Page 1/2	GENERAL INFORMATIONS <table><tr><td>No. of contacts</td><td>stacking height 1,75mm, 3,25mm from 6 to 100poles, all even numbers stacking height 4,85mm from 6 to 80poles, all even numbers</td></tr><tr><td>Contact spacing</td><td>1,27mm x 1,27mm [0,050"x0,050"]</td></tr><tr><td>Test Voltage</td><td>500V</td></tr><tr><td>Contact resistance</td><td><25 mOhm</td></tr><tr><td>Insulation resistance</td><td>≥ 10x10^9Ω</td></tr><tr><td>Working current acc. to IEC 60512, at 70°C, 80% derating</td><td>see derating diagram</td></tr><tr><td>Working temperature range</td><td>-55°C ... +125°C</td></tr><tr><td>Termination technology</td><td>SMT</td></tr><tr><td>Reflow processing temperature (acc. to ECA/IPC/JEDEC J-STD-075 Level PSL R0)</td><td>min. 150s > 217°C min. 30s > 240°C</td></tr><tr><td>Clearance & creepage distance</td><td>0,4mm min.</td></tr><tr><td>Insertion force (depending on mating connector)</td><td>approximately 0,5N/contact</td></tr><tr><td>Withdrawal force (depending on mating connector)</td><td>approximately 0,5N/contact</td></tr><tr><td>Mating cycles</td><td>PL1 : 500 mating cycles PL2 : 250 mating cycles</td></tr><tr><td>RoHS - compliant</td><td>Yes</td></tr><tr><td>Leadfree</td><td>Yes</td></tr><tr><td>Working voltage acc. to IEC 60664-1</td><td>100V / 150V (depending on installation category)</td></tr><tr><td>UL file acc. UL 1977</td><td>ECBT2.E102079</td></tr><tr><td>UL file acc. CSA-C22.2 (for Canada)</td><td>ECBT8.E102079</td></tr><tr><td>PSL level acc. ECA/IPC/JEDEC J-STD-075</td><td>PSL R0</td></tr><tr><td>MSL level acc. ECA/IPC/JEDEC J-STD-020D</td><td>MSL 1</td></tr></table> INSULATOR MATERIAL <table><tr><td>Material</td><td>LCP (liquid crystalline polymer)</td></tr><tr><td>Color</td><td>Black</td></tr><tr><td>UL classification</td><td>UL94-V0</td></tr><tr><td>Material group acc. IEC 60664-1</td><td>IIIa (175 ≤ CTI < 400)</td></tr></table> CONTACT MATERIAL <table><tr><td>Contact material</td><td>Copper alloy</td></tr><tr><td>Plating termination zone</td><td>Sn</td></tr><tr><td>Plating contact sliding side</td><td>Au over PdNi (acc. to Performance level)</td></tr></table> DERATING DIAGRAM acc. to IEC 60512-5 (Current carrying capacity) 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, non 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 derating curve at I_{max}*0,8 (IEC 60512-5-2) 				No. of contacts	stacking height 1,75mm, 3,25mm from 6 to 100poles, all even numbers stacking height 4,85mm from 6 to 80poles, all even numbers	Contact spacing	1,27mm x 1,27mm [0,050"x0,050"]	Test Voltage	500V	Contact resistance	<25 mOhm	Insulation resistance	≥ 10x10^9Ω	Working current acc. to IEC 60512, at 70°C, 80% derating	see derating diagram	Working temperature range	-55°C ... +125°C	Termination technology	SMT	Reflow processing temperature (acc. to ECA/IPC/JEDEC J-STD-075 Level PSL R0)	min. 150s > 217°C min. 30s > 240°C	Clearance & creepage distance	0,4mm min.	Insertion force (depending on mating connector)	approximately 0,5N/contact	Withdrawal force (depending on mating connector)	approximately 0,5N/contact	Mating cycles	PL1 : 500 mating cycles PL2 : 250 mating cycles	RoHS - compliant	Yes	Leadfree	Yes	Working voltage acc. to IEC 60664-1	100V / 150V (depending on installation category)	UL file acc. UL 1977	ECBT2.E102079	UL file acc. CSA-C22.2 (for Canada)	ECBT8.E102079	PSL level acc. ECA/IPC/JEDEC J-STD-075	PSL R0	MSL level acc. ECA/IPC/JEDEC J-STD-020D	MSL 1	Material	LCP (liquid crystalline polymer)	Color	Black	UL classification	UL94-V0	Material group acc. IEC 60664-1	IIIa (175 ≤ CTI < 400)	Contact material	Copper alloy	Plating termination zone	Sn	Plating contact sliding side	Au over PdNi (acc. to Performance level)				
	Signal pins																																																																																																																																
Stencil thickness	PCB pad size	proposal stencil aperture size	calculated solder paste volume																																																																																																																														
120 µm	1,1 x 0,8 mm	1,05 x 0,75 mm	0,095 mm³																																																																																																																														
150 µm	1,1 x 0,8 mm	0,99 x 0,72 mm	0,107 mm³																																																																																																																														
	Hold-downs																																																																																																																																
Stencil thickness	PCB pad size	proposal stencil aperture size	calculated solder paste volume																																																																																																																														
120 µm	2,5 x 1,2 mm	2,45 x 1,15 mm	0,338 mm³																																																																																																																														
150 µm	2,5 x 1,2 mm	2,25 x 1,08 mm	0,365 mm³																																																																																																																														
	All rights reserved	Created by ZHUANGJ	Inspected by LUOK	Standardisation HOFFMANN	Date 2020-07-29	State Final Release																																																																																																																											
Department EL PD		Title har flex male stacking height1.75 , 3.25 and 4.85				Doc-Key / ECM-Nr. 100577896/UGD/001/E 500000177026																																																																																																																											
HARTING Electronics GmbH		Type DS	Number 15111100301			Rev. E																																																																																																																											
D-32339 Espelkamp						Page 1/2																																																																																																																											
No. of contacts	stacking height 1,75mm, 3,25mm from 6 to 100poles, all even numbers stacking height 4,85mm from 6 to 80poles, all even numbers																																																																																																																																
Contact spacing	1,27mm x 1,27mm [0,050"x0,050"]																																																																																																																																
Test Voltage	500V																																																																																																																																
Contact resistance	<25 mOhm																																																																																																																																
Insulation resistance	≥ 10x10^9Ω																																																																																																																																
Working current acc. to IEC 60512, at 70°C, 80% derating	see derating diagram																																																																																																																																
Working temperature range	-55°C ... +125°C																																																																																																																																
Termination technology	SMT																																																																																																																																
Reflow processing temperature (acc. to ECA/IPC/JEDEC J-STD-075 Level PSL R0)	min. 150s > 217°C min. 30s > 240°C																																																																																																																																
Clearance & creepage distance	0,4mm min.																																																																																																																																
Insertion force (depending on mating connector)	approximately 0,5N/contact																																																																																																																																
Withdrawal force (depending on mating connector)	approximately 0,5N/contact																																																																																																																																
Mating cycles	PL1 : 500 mating cycles PL2 : 250 mating cycles																																																																																																																																
RoHS - compliant	Yes																																																																																																																																
Leadfree	Yes																																																																																																																																
Working voltage acc. to IEC 60664-1	100V / 150V (depending on installation category)																																																																																																																																
UL file acc. UL 1977	ECBT2.E102079																																																																																																																																
UL file acc. CSA-C22.2 (for Canada)	ECBT8.E102079																																																																																																																																
PSL level acc. ECA/IPC/JEDEC J-STD-075	PSL R0																																																																																																																																
MSL level acc. ECA/IPC/JEDEC J-STD-020D	MSL 1																																																																																																																																
Material	LCP (liquid crystalline polymer)																																																																																																																																
Color	Black																																																																																																																																
UL classification	UL94-V0																																																																																																																																
Material group acc. IEC 60664-1	IIIa (175 ≤ CTI < 400)																																																																																																																																
Contact material	Copper alloy																																																																																																																																
Plating termination zone	Sn																																																																																																																																
Plating contact sliding side	Au over PdNi (acc. to Performance level)																																																																																																																																
1	2	3	4	5	6	7	8																																																																																																																										

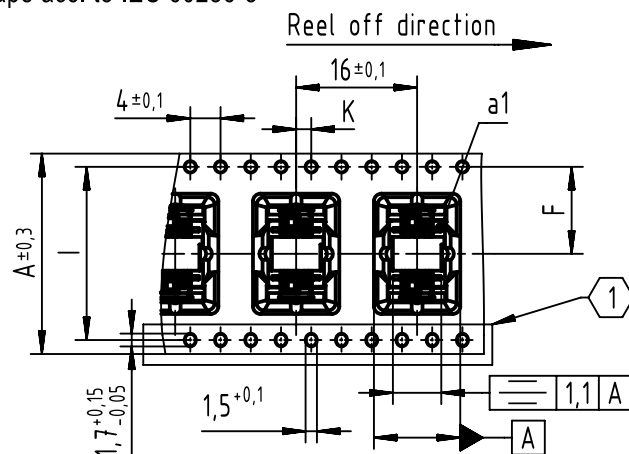


har-flex® straight male connector



TAPE LAYOUT & PACKAGING

Tape acc. to IEC 60286-3



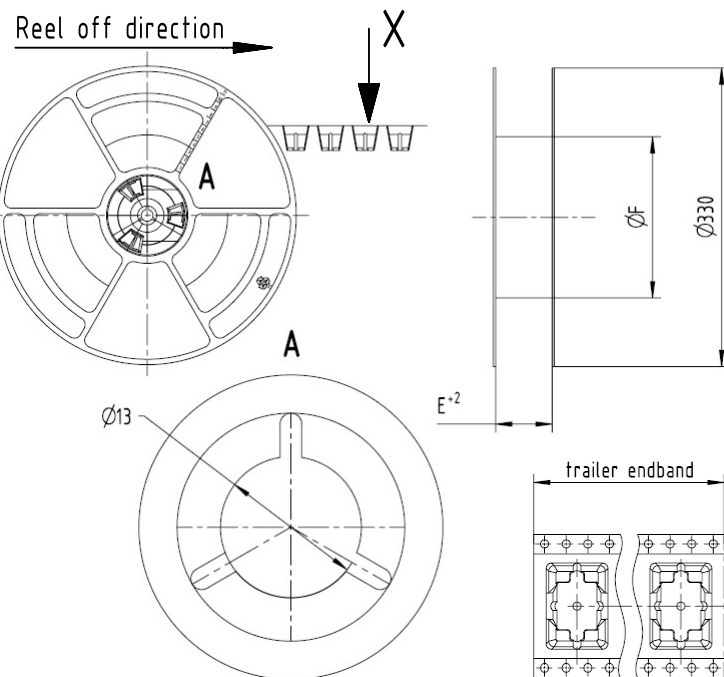
Tape dimensions:	A	F	I	K
poles 06 to 12	24,0	11,5±0,1	-	2±0,1
poles 14 to 20	32,0	14,2±0,1	28,4	2±0,1
poles 22 to 40	44,0	20,2±0,15	40,4	2±0,15
poles 42 to 56	56,0	26,2±0,15	52,4	2±0,15
poles 58 to 80	72,0	34,2±0,3	68,4	2±0,2
poles 82 to 100	88,0	42,2±0,3	84,4	2±0,2

- (1) NO DOUBLE SPROCKET HOLES FOR 06, 08, 10 AND 12 POLE NUMBERS (TAPE SIZE 24)
- (2) Not available for stacking height 4,85mm

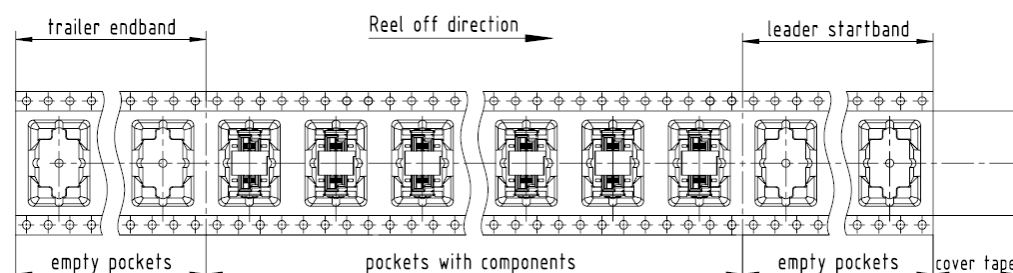
Packaging indices ("XXX" in part number)

Index	Stacking height	Packaging unit	Packaging
000	4,85mm	250	Tape&reel
	1,75mm&3,25mm	280	
333	All	1	Tape

REEL DIMENSIONS



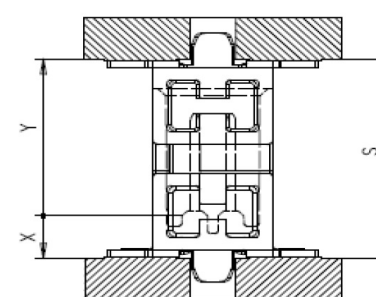
Reel dimensions:	E	F
Poles 06 to 12	24,4	178mm for stacking height 1,75mm & 3,25mm
Poles 14 to 20	32,4	
Poles 22 to 40	44,4	
Poles 42 to 56	56,4	100mm for stacking height 4,85mm
Poles 58 to 80	72,4	
Poles 82 to 100	88,4	



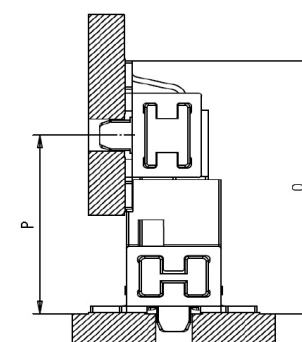
APPLICATION INFORMATION

S	X&Y	20mm	19mm	18mm	17mm	16mm	15mm	14mm	13mm	12mm	11mm	10mm	9mm	8mm
stacking heights		male 1.75mm female 6.25mm	male 3.25mm female 6.25mm	male 4.85mm female 6.25mm	male 1.75mm female 9.05mm	male 3.25mm female 9.05mm	male 4.85mm female 9.05mm	male 1.75mm female 13.65mm	male 3.25mm female 13.65mm	male 4.85mm female 13.65mm				
PCB distance		8mm-9.5mm	9.5mm-11mm	11.1mm-12.6mm	10.8mm-12.3mm	12.3mm-13.8mm	13.9mm-15.4mm	15.4mm-16.9mm	16.9mm-18.4mm	18.5mm-20mm				
part numbers		1511... 1521...	1512... 1521...	1513... 1521...	1511... 1522...	1512... 1522...	1513... 1522...	1511... 1523...	1512... 1523...	1513... 1523...				

straight female



angled female

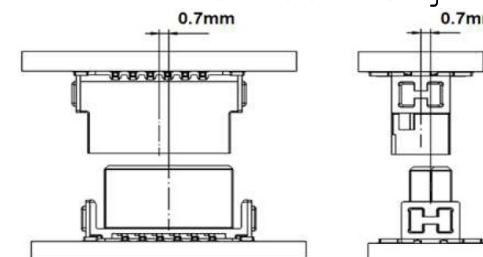


straight male

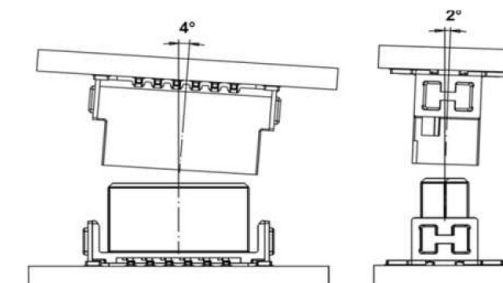
4,85	13,65	18,5	20
3,25	13,65	16,9	18,4
1,75	13,65	15,4	16,9
4,85	9,05	13,9	15,4
3,25	9,05	12,3	13,8
1,75	9,05	10,8	12,3
4,85	6,25	11,1	12,6
3,25	6,25	9,5	11
1,75	6,25	8	9,5
X	Y	Smin	* Smax

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

Admissible mismatching



Admissible inclination



All Dimensions in mm

Original Size DIN A3

Scale

1:1

Free size tol.

Ref.

Sub.



All rights reserved

Department EL PD

Created by

ZHUANGJ

Inspected by

LUOK

Standardisation

HOFFMANN

Date

2020-07-29

State

Final Release

HARTING Electronics GmbH

D-32339 Espelkamp

Title har flex male stacking height 1.75, 3.25 and 4.85

Type

DS

Number

15111100301

Doc-Key / ECM-Nr.
100577896/UGD/001/E
500000177026

Rev.

E

Page

2/2