



# har-flex<sup>®</sup> straight male connector



## GENERAL INFORMATIONS

|  |  |
|--|--|
| No. of contacts  | from 6 to 100poles, all even numbers               |
| Contact spacing  | 1,27mm x 1,27mm [0,050"x0,050"]                    |
| Test Voltage   | 500V   |
| Contact resistance   | < 25 mOhm  |
| Insulation resistance  | ≥ 10x10 <sup>9</sup> Ω                             |
| 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<br>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<br>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  |

## INSULATOR MATERIAL

|                                 |                                  |
|---------------------------------|----------------------------------|
| Material                        | LCP (liquid crystalline polymer) |
| Color                           | Black                            |
| UL classification               | UL94-V0                          |
| Material group acc. IEC 60664-1 | IIIa (175 ≤ CTI < 400)           |

## CONTACT MATERIAL

|                              |  |
|------------------------------|--|
| Contact material             | Copper alloy                             |
| Plating termination zone     | Sn                                       |
| Plating contact sliding side | Au over PdNi (acc. to Performance level) |

## 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<sub>max</sub>\*0,8 (IEC 60512-5-2)



## 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 0,094mm<sup>3</sup>, for the hold down it is 0,33mm<sup>3</sup>. For example, this can be achieved with the following stencil data :

| Stencil thickness | PCB pad size | Signal pins                    |                                |
|-------------------|--------------|--------------------------------|--------------------------------|
|                   |              | proposal stencil aperture size | calculated solder paste volume |
| 120 μm            | 1,1 x 0,8 mm | 1,05 x 0,75 mm                 | 0,095 mm <sup>3</sup>          |
| 150 μm            | 1,1 x 0,8 mm | 0,99 x 0,72 mm                 | 0,107 mm <sup>3</sup>          |

| Stencil thickness | PCB pad size | Hold-downs                     |                                |
|-------------------|--------------|--------------------------------|--------------------------------|
|                   |              | proposal stencil aperture size | calculated solder paste volume |
| 120 μm            | 2,5 x 1,2 mm | 2,45 x 1,15 mm                 | 0,338 mm <sup>3</sup>          |
| 150 μm            | 2,5 x 1,2 mm | 2,25 x 1,08 mm                 | 0,365 mm <sup>3</sup>          |

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 deposition 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 80 pin: ≤ 0,1mm  
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 . . . . .

|                          |                       |   |              |                 |            |               |  |
|--------------------------|-----------------------|---|--------------|-----------------|------------|---------------|--|
|                          | All rights reserved   | Created by                                  | Inspected by | Standardisation | Date       | State         | Doc-Key / ECM-Nr.<br>100577896/UGD/001/B<br>500000135280 |
|                          | Department EC PD - CN | ZHUANGJ                                     | LUOK         | HOFFMANN        | 2018-05-21 | Final Release |  |
| HARTING Electronics GmbH |                       | Title                                       |              |                 | Date       |               | Rev. B   |
| D-32339 Espelkamp        |                       | har flex male stacking height 1.75 and 3.25 |              |                 | 2018-05-21 |               |  |
|                          |                       | Type  | Number       |                 |            |               | Page   |
|                          |                       | DS  | 15111100301  |                 |            |               | 1/2  |



# har-flex straight male connector



## TAPE LAYOUT & PACKAGING

Tape acc. to IEC 60286-3

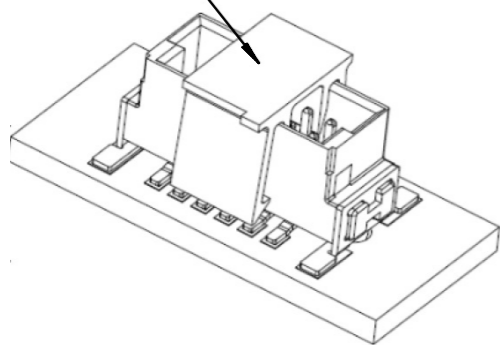
Reel off direction →



| 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)

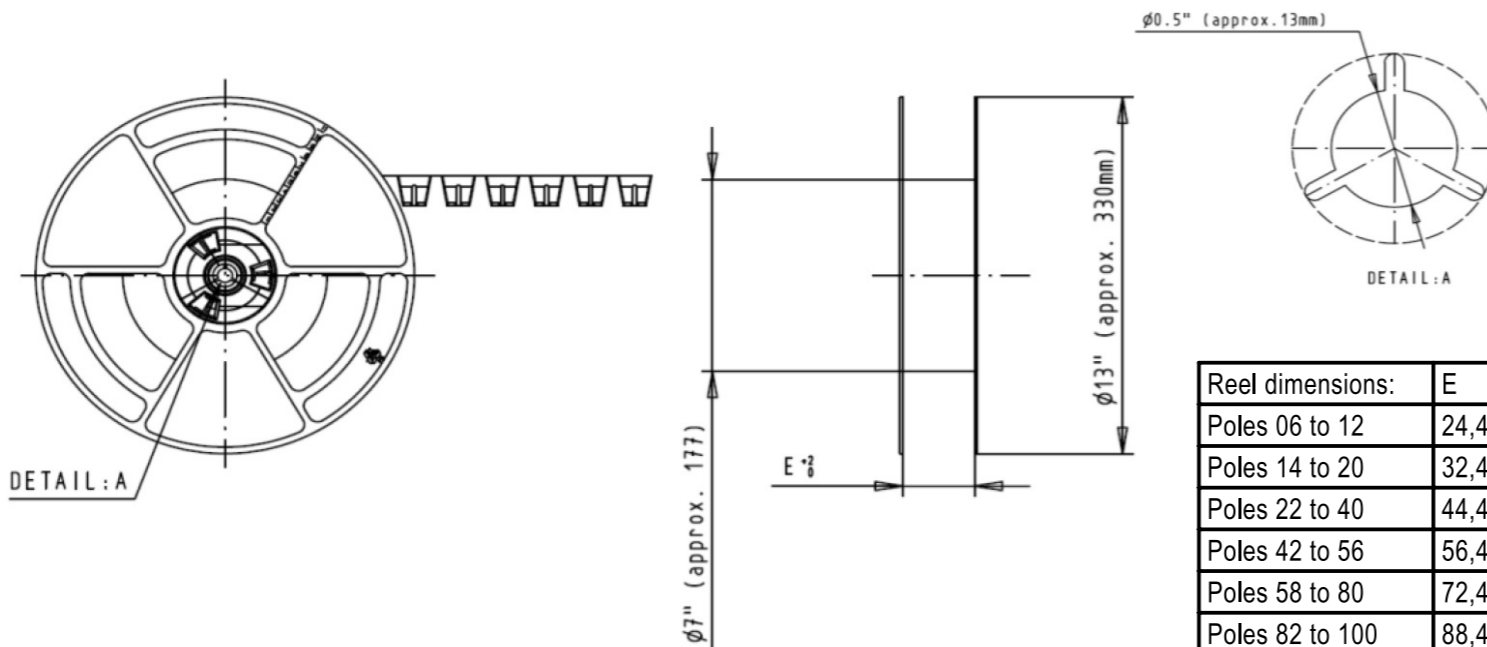
Pick & place pad 6,4±0,1 x 4,5±0,1



### Packaging indices ("XXX" in part number)

| Index | Packaging unit | Packaging   |
|-------|----------------|-------------|
| 000   | 280            | Tape & reel |
| 333   | 1              | Tape        |

## REEL DIMENSIONS

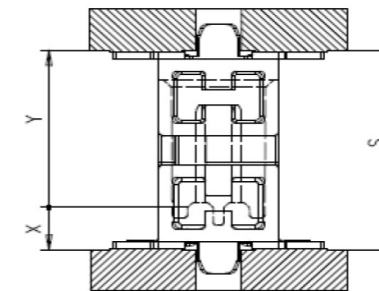


| Reel dimensions: | E    |
|------------------|------|
| Poles 06 to 12   | 24,4 |
| Poles 14 to 20   | 32,4 |
| Poles 22 to 40   | 44,4 |
| Poles 42 to 56   | 56,4 |
| Poles 58 to 80   | 72,4 |
| Poles 82 to 100  | 88,4 |

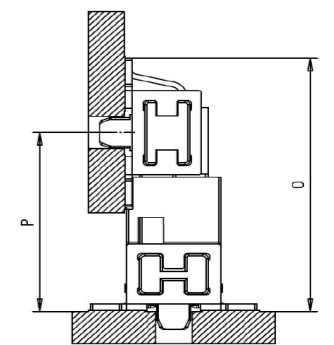
## APPLICATION INFORMATION

|       |                  |                              |                              |                              |                              |
|-------|------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| S     | 14mm             |                              |                              |                              |                              |
|       | 13mm             |                              |                              |                              |                              |
|       | 12mm             |                              |                              |                              |                              |
|       | 11mm             |                              |                              |                              |                              |
|       | 10mm             |                              |                              |                              |                              |
|       | 9mm              |                              |                              |                              |                              |
|       | 8mm              |                              |                              |                              |                              |
| X & Y | stacking heights | male 1.75mm<br>female 6.25mm | male 3.25mm<br>female 6.25mm | male 1.75mm<br>female 9.05mm | male 3.25mm<br>female 9.05mm |
| S     | PCB distance     | 8mm - 9.5mm                  | 9.5mm - 11mm                 | 10.8mm - 12.3mm              | 12.3mm - 13.8mm              |
|       | part numbers     | 15 11 ...<br>15 21 ...       | 15 12 ...<br>15 21 ...       | 15 11 ...<br>15 22 ...       | 15 12 ...<br>15 22 ...       |

straight female



angled female



straight male

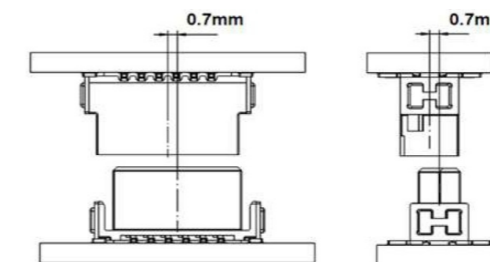
|      |      |      |        |
|------|------|------|--------|
| 3,25 | 9,05 | 12,3 | 13,8   |
| 1,75 | 9,05 | 10,8 | 12,3   |
| 3,25 | 6,5  | 9,5  | 11     |
| 1,75 | 6,25 | 8    | 9,5    |
| X    | Y    | Smin | * Smax |

straight male

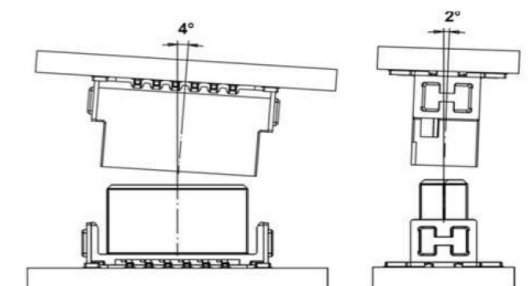
|      |        |       |
|------|--------|-------|
| 3,25 | 10,25  | 14,08 |
| 1,75 | 8,75   | 12,58 |
| X    | P min. | 0     |

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

Admissible inclination



Admissible mismatching



All Dimensions in mm  
Original Size DIN A3

Scale  
1:1

Free size tol.

Ref.

Sub.



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Department EC PD - CN

Created by  
ZHUANGJ

Inspected by  
LUOK

Standardisation  
HOFFMANN

Date  
2018-05-21

State  
Final Release

Title  
har flex male stacking height 1.75 and 3.25

Doc-Key / ECM-Nr.  
100577896/UGD/001/B  
500000135280

HARTING Electronics GmbH  
D-32339 Espelkamp

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