



Harwin Test Report Summary

HT06404

Comparison Report with Competitor
product for Archer Kontrol (M55 Series)



1. Introduction.

1.1. Description and Purpose.

The following data has been taken from Harwin Test Report 1695 and from comparison of applicable technical drawings, datasheets and component specifications of competitor product. As these comparisons were carried out on competitor-published data in Q3 2017 (Male Vertical SMT) Q1 2021 (Female IDC Cable Assemblies), and with competitor product purchased during Q3 2017 (Board Mount), the reports are only valid for the information gathered at that time, the items tested, and on the day of the test/for the batch tested.

This report summarises this data to compare with equivalent connectors available from other manufacturers, namely:

- ERNI – SMC series
- EPT – One27 series (performance level 1)
- Harting – Har-Flex series (performance level 1)

1.2. Conclusion.

For all tested comparisons, the results suggest that Archer Kontrol (M55 Series) was comparable to these three competitor products, subject to the customer's own application, connector choices and environment.

However, certain results lead us to recommend that, in all cases, customers mate Harwin with Harwin product. Harwin plc and subsidiaries cannot be held liable for any changes to any competitor product, nor any issues that may arise from mating Harwin product to a non-Harwin product.

2. Test Method, Requirements and Results.

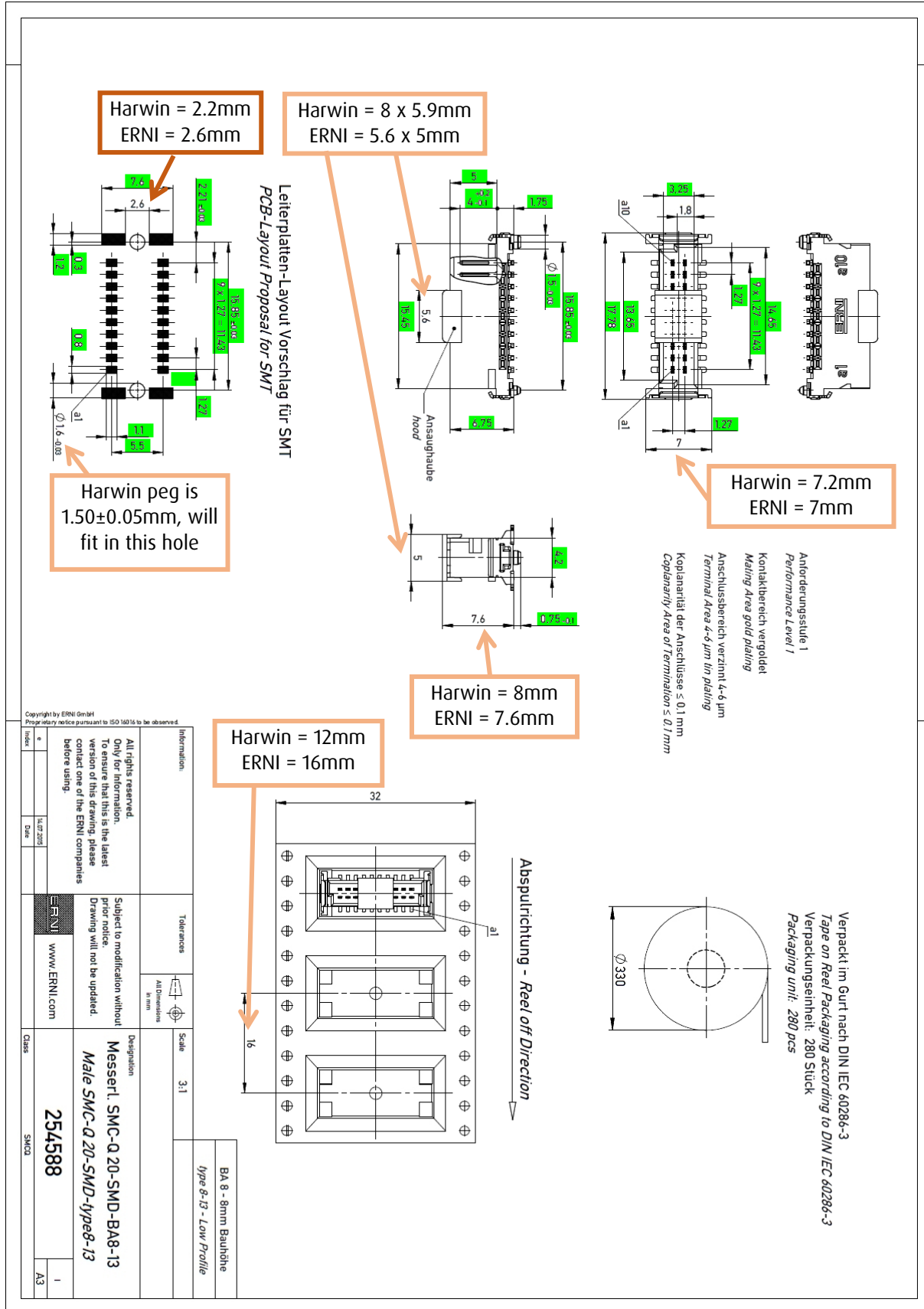
2.1. Dimensional Comparison.

Male Vertical SMT

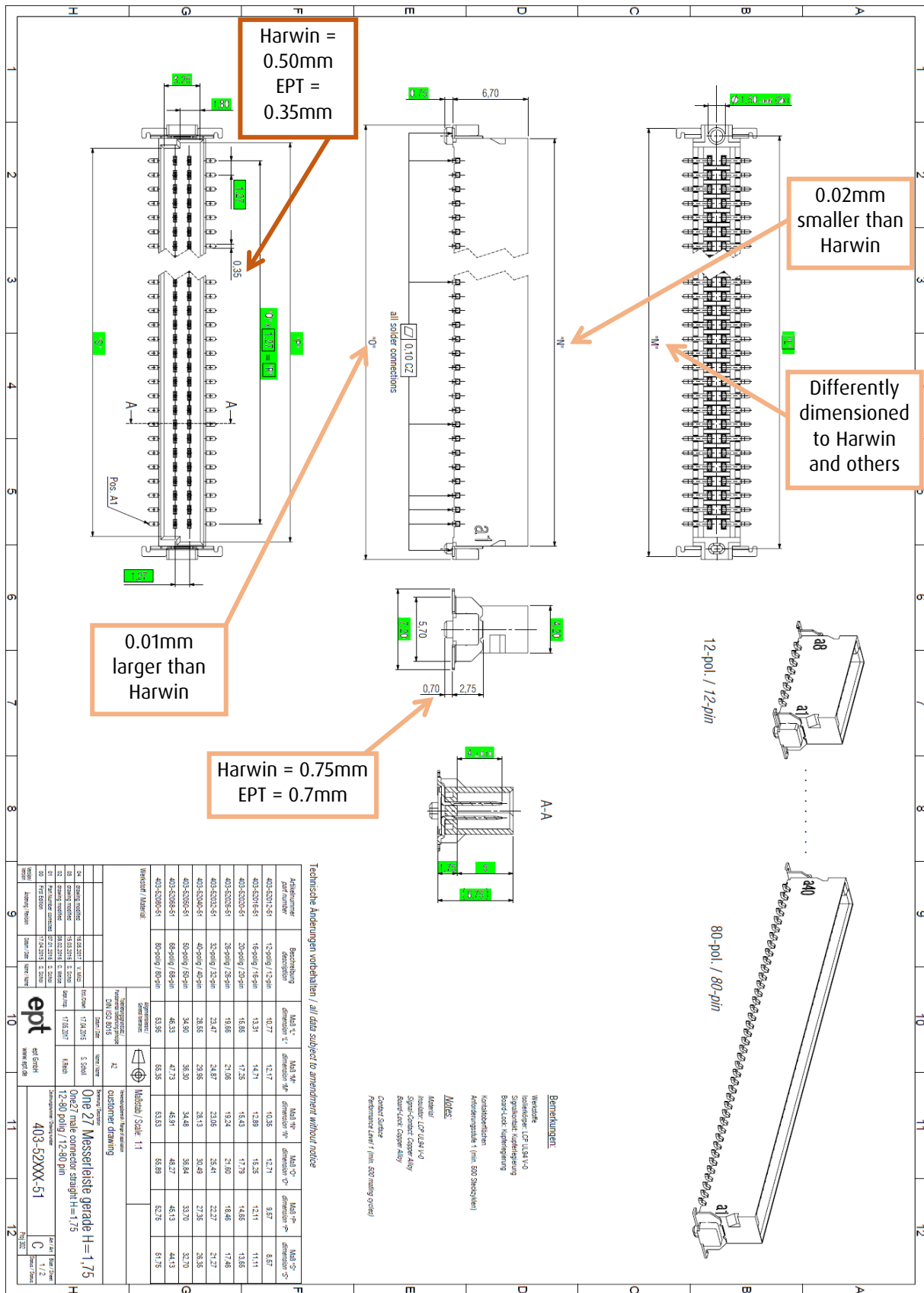
On the following pages, the drawings for the three competitor's ranges of Male Vertical SMT connectors are compared to equivalent dimensions from the Archer Kontrol range (specifically, the M55-700 connectors). Each drawing has been marked up with notations where differences were located.

None of the differences were felt to cause any major impact on equivalence for fit, form or function (subject to the customer's application and environment).

Comparison 1 – ERNI 254588 (drawing downloaded June 2018):



Comparison 2 - EPT 403-52xxx-51 (drawing downloaded June 2018)



Technische Änderungen vorbehalten / all data subject to amendment without notice

Arzturmnummer Part number	Bezeichnung description	M55-C dimensions in mm	M55-M dimensions in mm	M55-Q dimensions in mm	M55-P dimensions in mm	M55-S dimensions in mm
403-5207-51	12-polig / 12-pin	10,17	12,17	10,38	12,17	9,87
403-5208-51	18-polig / 18-pin	13,31	14,71	12,89	15,33	12,11
403-5209-51	20-polig / 20-pin	15,85	17,25	15,43	17,79	14,65
403-5208-51	25-polig / 25-pin	19,65	21,05	19,24	21,80	18,45
403-5203-51	35-polig / 35-pin	23,47	24,87	23,05	25,41	22,27
403-5204-51	40-polig / 40-pin	28,53	29,93	28,11	30,46	27,35
403-5205-51	50-polig / 50-pin	34,90	36,30	34,48	36,94	33,70
403-5206-51	60-polig / 60-pin	40,33	41,73	40,91	42,27	40,13
403-5200-51	80-polig / 80-pin	53,35	54,75	53,33	55,89	52,75

Material: Insulator: LCP UL94 V-0
Spring/Contact: Copper Alloy
Burr/Lock: Copper Alloy

Notes: Performance Level 1 (max. 500 mating cycles)

Conical Contact

Benennung:

Werkstoffe: Material: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Kontaktkeramik: Keramikkeramik (max. 500 Steckzyklen)

Material:

Insulator: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Conical Contact

Performance Level 1 (max. 500 mating cycles)

Benennung:

Werkstoffe: Material: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Kontaktkeramik: Keramikkeramik (max. 500 Steckzyklen)

Material:

Insulator: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Conical Contact

Performance Level 1 (max. 500 mating cycles)

Benennung:

Werkstoffe: Material: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Kontaktkeramik: Keramikkeramik (max. 500 Steckzyklen)

Material:

Insulator: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Conical Contact

Performance Level 1 (max. 500 mating cycles)

Benennung:

Werkstoffe: Material: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Kontaktkeramik: Keramikkeramik (max. 500 Steckzyklen)

Material:

Insulator: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Burr/Lock: Kupfer-Legierung

Conical Contact

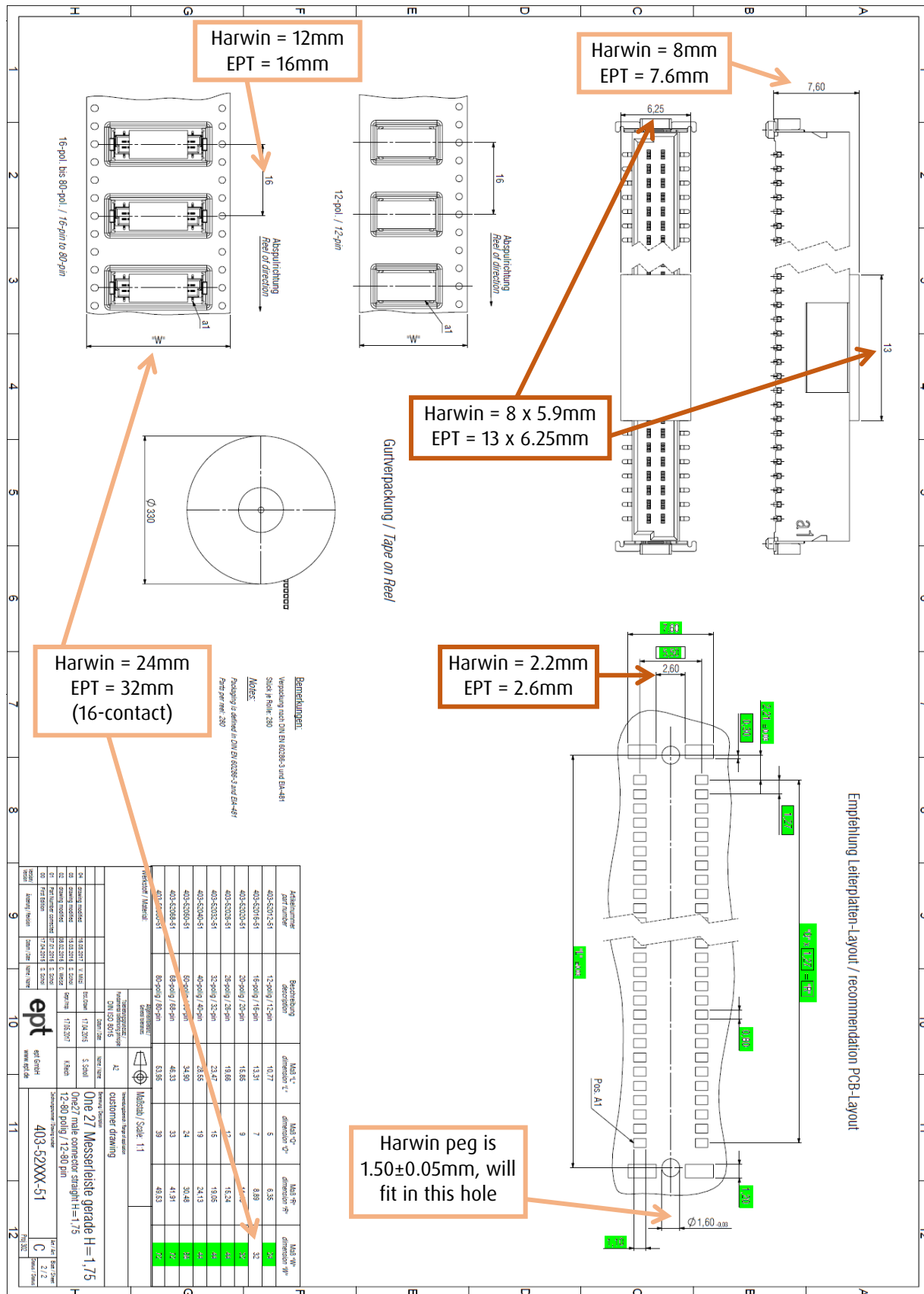
Performance Level 1 (max. 500 mating cycles)

Benennung:

Werkstoffe: Material: LCP UL94 V-0

Spring/Contact: Kupfer-Legierung

Comparison 2 - EPT 403-52xxx-51 (drawing downloaded June 2018) (sheet 2)

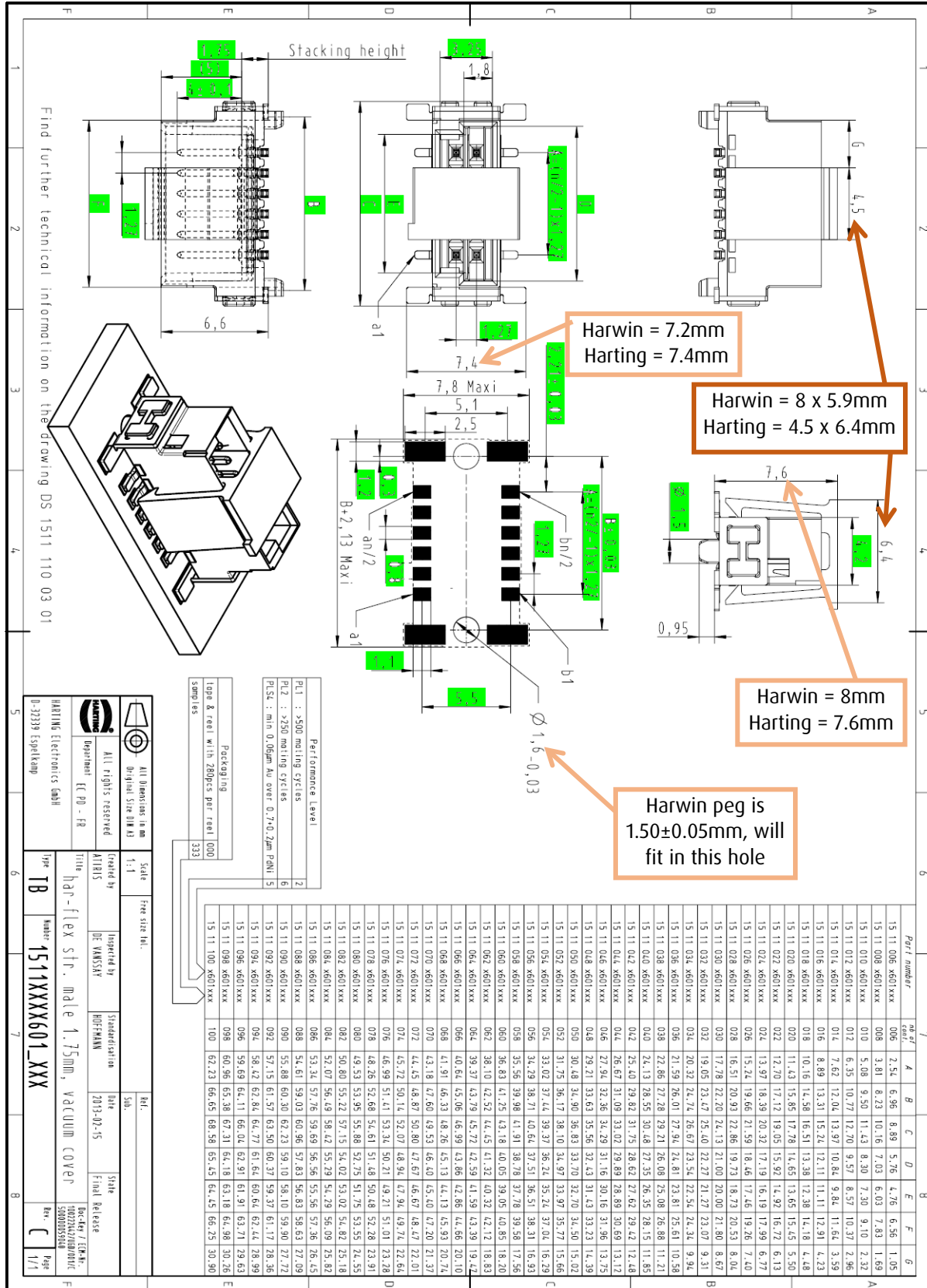


Bemerkungen:
Verpackung nach DIN EN 60295-3 und EN 60481
Stück in Rolle: 250
Mo/Es:
Packaging is defined in DIN EN 60295-3 and EN 60481
Part per reel: 250

Artikelnummer / part number	Bestellung / description	MAS °C / dimension °C	MAS °C' / dimension °C'	MAS °F / dimension °F	MAS °F' / dimension °F'
403-5207-2-81	12-Pin / 12-pin	10,77	5	5,26	2,6
403-5207-5-81	15-Pin / 15-pin	13,31	7	6,39	3,2
403-5207-8-81	20-Pin / 20-pin	16,86	9	8,18	4,1
403-5208-5-81	25-Pin / 25-pin	19,66	11	9,74	4,8
403-5208-8-81	32-Pin / 32-pin	23,47	15	11,85	5,9
403-5209-5-81	40-Pin / 40-pin	29,53	19	14,85	7,4
403-5209-8-81	50-Pin / 50-pin	34,90	24	17,28	8,6
403-5210-8-81	80-Pin / 80-pin	46,33	33	23,01	11,5
403-5210-9-81	80-Pin / 80-pin	46,33	39	23,01	12,2

Hersteller / Manufacturer: Harwin
Produktionsort / Production site: China
DIN ISO 9015
Mittelmaß / Scale: 1:1
customer drawing
OneZ / Messerleite gerade H = 1,75
OneZ / male connector straight H = 1,75
12-80 pin / 12-80 pin
403-52xxx-51
Harwin
www.harwin.de
ept GmbH
www.ept.de
Harwin
www.harwin.de
ept GmbH
www.ept.de

Comparison 3 - Harting har-flex 1511xxxx601 (drawing downloaded June 2018)



Performance Level

PL1 : >500 mating cycles	2
PL2 : >250 mating cycles	5
PL3 : min 0.106mm Au over 0.7±0.2µm PdNi 5	6

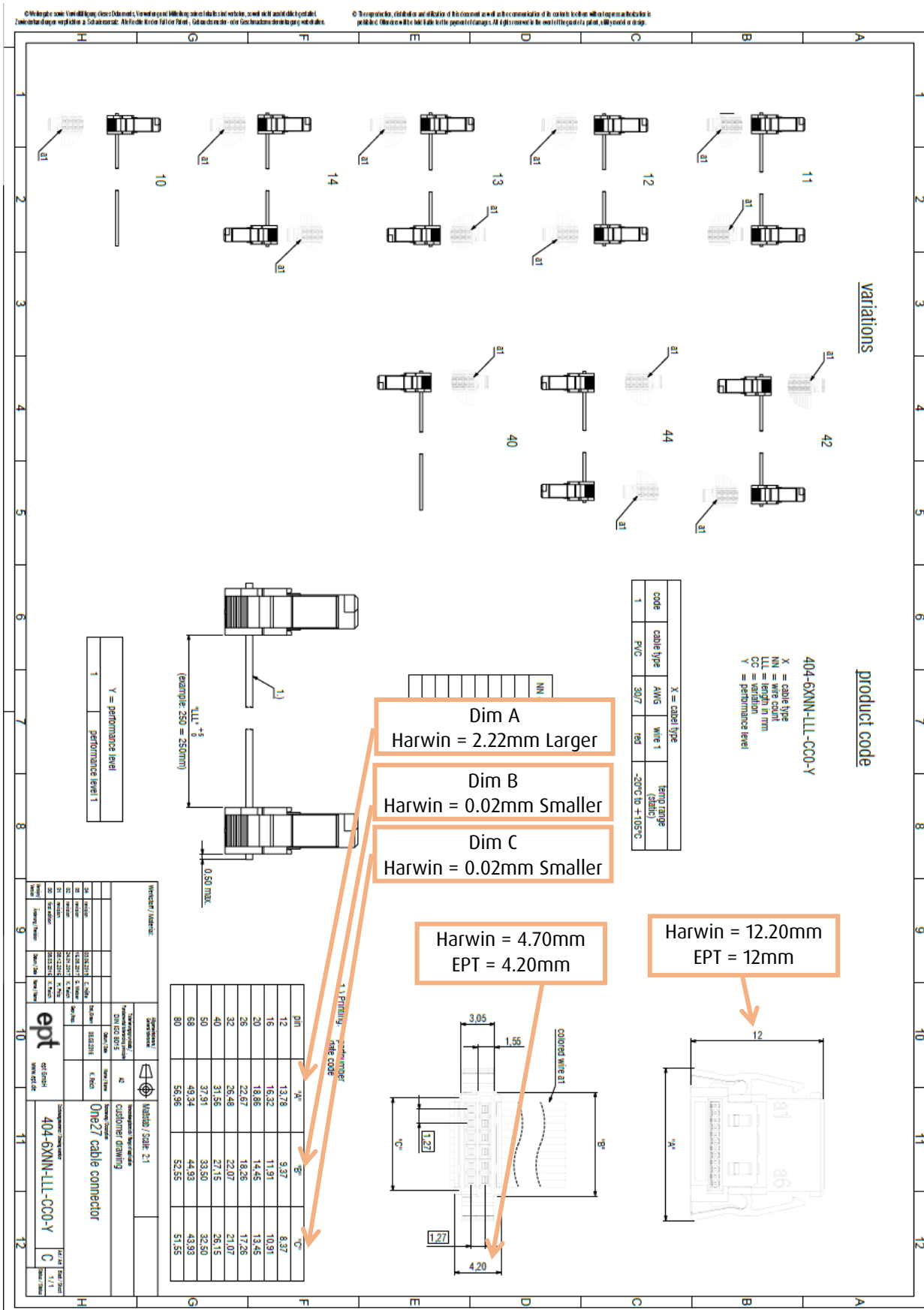
Packaging

tape & reel with 280pcs per reel 000

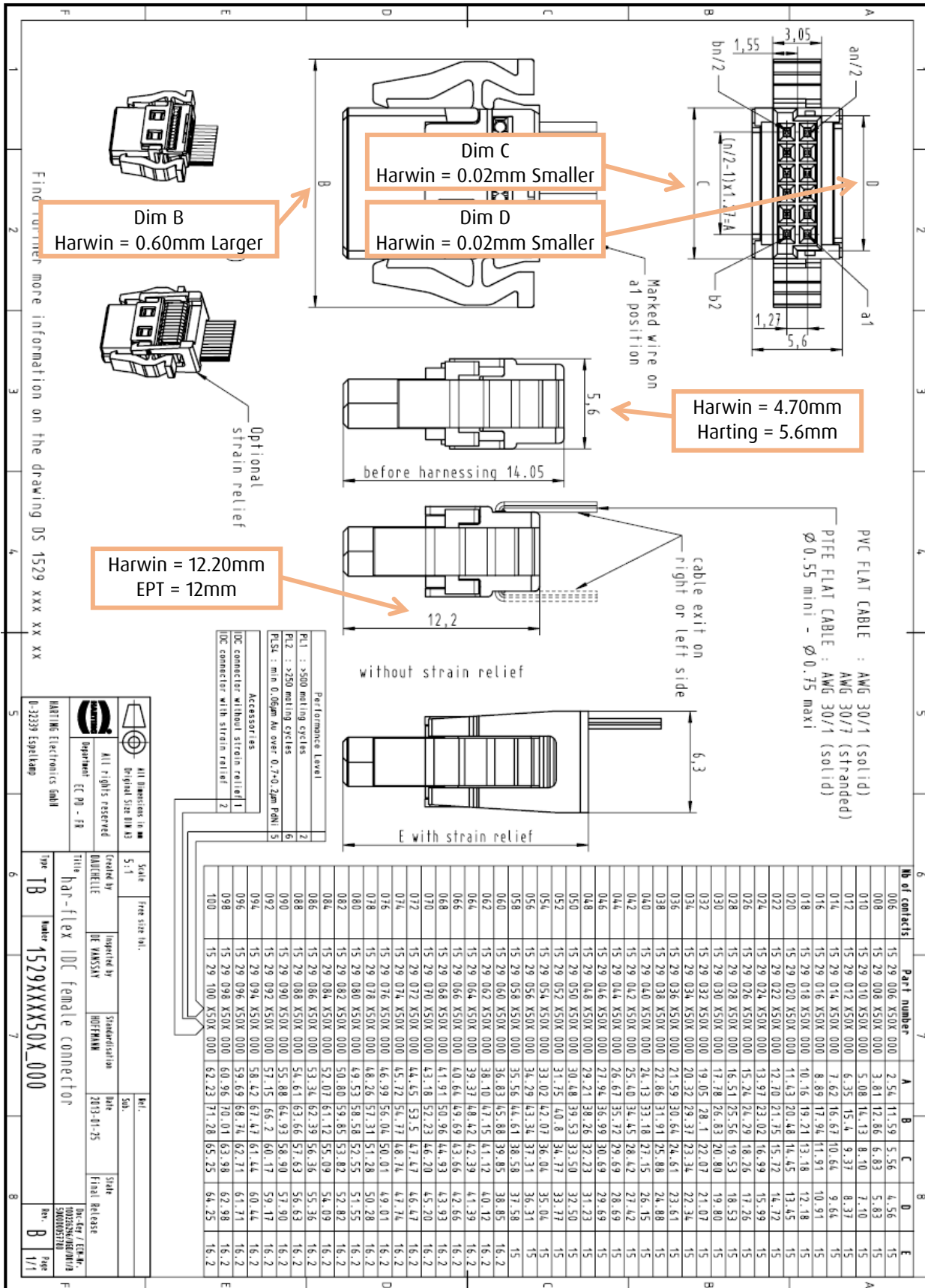
samples 333

Part number	mm of	A	B	C	D	E	F	G
15 11 006 x601xxx	006	2.51	6.96	8.89	5.76	4.76	6.56	1.05
15 11 008 x601xxx	008	3.81	8.23	10.16	7.03	6.03	7.83	1.69
15 11 010 x601xxx	010	5.08	9.50	11.43	8.30	7.30	9.10	2.32
15 11 012 x601xxx	012	6.35	10.77	12.70	9.57	8.57	10.37	2.96
15 11 014 x601xxx	014	7.62	12.04	13.97	10.84	9.84	11.64	3.59
15 11 016 x601xxx	016	8.89	13.31	15.24	12.11	11.11	12.91	4.23
15 11 018 x601xxx	018	10.16	14.58	16.51	13.38	12.38	14.18	4.88
15 11 020 x601xxx	020	11.43	15.85	17.78	14.65	13.65	15.45	5.50
15 11 022 x601xxx	022	12.70	17.12	19.05	15.92	14.92	16.72	6.13
15 11 024 x601xxx	024	13.97	18.39	20.32	17.19	16.19	17.99	6.77
15 11 026 x601xxx	026	15.24	19.66	21.59	18.46	17.46	19.26	7.40
15 11 028 x601xxx	028	16.51	20.93	22.86	19.73	18.73	20.53	8.04
15 11 030 x601xxx	030	17.78	22.20	24.13	21.00	20.00	21.80	8.67
15 11 032 x601xxx	032	19.05	23.47	25.40	22.27	21.27	23.07	9.31
15 11 034 x601xxx	034	20.32	24.74	26.67	23.54	22.54	24.34	9.94
15 11 036 x601xxx	036	21.59	26.01	27.94	24.81	23.81	25.61	10.58
15 11 038 x601xxx	038	22.86	27.28	29.21	26.08	25.08	26.88	11.21
15 11 040 x601xxx	040	24.13	28.55	30.48	27.35	26.35	28.15	11.85
15 11 042 x601xxx	042	25.40	29.82	31.75	28.62	27.62	29.42	12.48
15 11 044 x601xxx	044	26.67	31.09	33.02	29.89	28.89	30.69	13.12
15 11 046 x601xxx	046	27.94	32.36	34.29	31.16	30.16	31.96	13.75
15 11 048 x601xxx	048	29.21	33.63	35.56	32.43	31.43	33.23	14.39
15 11 050 x601xxx	050	30.48	34.90	36.83	33.70	32.70	34.50	15.02
15 11 052 x601xxx	052	31.75	36.17	38.10	34.97	33.97	35.77	15.66
15 11 054 x601xxx	054	33.02	37.44	39.37	36.24	35.24	37.04	16.29
15 11 056 x601xxx	056	34.29	38.71	40.64	37.51	36.51	38.31	16.93
15 11 058 x601xxx	058	35.56	39.98	41.91	38.78	37.78	39.58	17.56
15 11 060 x601xxx	060	36.83	41.25	43.18	40.05	39.05	40.85	18.20
15 11 062 x601xxx	062	38.10	42.52	44.45	41.32	40.32	42.12	18.83
15 11 064 x601xxx	064	39.37	43.79	45.72	42.59	41.59	43.39	19.47
15 11 066 x601xxx	066	40.64	45.06	46.99	43.86	42.86	44.66	20.10
15 11 068 x601xxx	068	41.91	46.33	48.26	45.13	44.13	45.93	20.74
15 11 070 x601xxx	070	43.18	47.60	49.53	46.40	45.40	47.20	21.37
15 11 072 x601xxx	072	44.45	48.87	50.80	47.67	46.67	48.47	22.01
15 11 074 x601xxx	074	45.72	50.14	52.07	48.94	47.94	49.74	22.64
15 11 076 x601xxx	076	46.99	51.41	53.34	50.21	49.21	51.01	23.28
15 11 078 x601xxx	078	48.26	52.68	54.61	51.48	50.48	52.28	23.91
15 11 080 x601xxx	080	49.53	53.95	55.88	52.75	51.75	53.55	24.55
15 11 082 x601xxx	082	50.80	55.22	57.15	54.02	53.02	54.82	25.18
15 11 084 x601xxx	084	52.07	56.49	58.42	55.29	54.29	56.09	25.82
15 11 086 x601xxx	086	53.34	57.76	59.69	56.56	55.56	57.36	26.45
15 11 088 x601xxx	088	54.61	59.03	60.96	57.83	56.83	58.63	27.09
15 11 090 x601xxx	090	55.88	60.30	62.23	59.10	58.10	59.90	27.72
15 11 092 x601xxx	092	57.15	61.57	63.50	60.37	59.37	61.17	28.36
15 11 094 x601xxx	094	58.42	62.84	64.77	61.64	60.64	62.44	28.99
15 11 096 x601xxx	096	59.69	64.11	66.04	62.91	61.91	63.71	29.63
15 11 098 x601xxx	098	60.96	65.38	67.31	64.18	63.18	64.98	30.26
15 11 100 x601xxx	100	62.23	66.65	68.58	65.45	64.45	66.25	30.90

Comparison 2 – EPT 404-6XNN-LLL-CC0-Y (drawing downloaded JANUARY 2021) (sheet 1)



Comparison 3 - Harting 1529xxxx50x_000 (drawing downloaded JANUARY 2021) (sheet 1)



2.2. Electrical and Mechanical Specification Comparison.

Male Vertical SMT

The following table is a comparison of the component specification performance levels between Archer Kontrol and the three other product ranges. The table is incomplete in some cases where information proved difficult to find publicly. The information was gathered in Q3 2017.

The table shows that the ranges show only minor differences, none of which are expected to cause issues in fit, form function, or mating compatibility.

Specification	Hawin	ERNI	EPT	Harting
Current rating	1.2A per contact	1.7A per contact (12 pins)	1.4A max at 20°C (50 pins)	1.2A to 0.7A (as connector size increases)
Contact resistance	25mΩ max			
Insulation resistance	10GΩ min	10,000MΩ min	10GΩ max	10GΩ min
Operating voltage	100V AC			100V
Dielectric withstand voltage	500V AC			
Durability (Number of mating cycles)	500			
Insertion force	0.8N max	0.5N max	0.5N max	0.5N approx.
Withdrawal force	0.2N min	0.5N max	0.1N min (0.5N max)	0.5N approx.
Operating temperature	-55°C to +125°C			
Vibration Sensitivity	10Hz to 2000Hz, 1.52mm, 196m/s ² (20G), duration 12h	10Hz to 2000Hz, 20G	10Hz to 200Hz, 20G	
Vertical stacking heights (fully mated)	8.00 to 18.50mm	8.00 to 18.50mm	8.00 to 12.30mm	8.00 to 12.30mm

Female IDC Cable Assemblies

The following table is a comparison of the component specification performance levels between Archer Kontrol and the three other product ranges. The table is incomplete in some cases where information proved difficult to find publicly. The information was gathered in Q1 2021.

The table shows that the ranges show only minor differences, none of which are expected to cause issues in fit, form function, or mating compatibility.

Specification	Hawin	ERNI	EPT	Harting
Current rating	0.5A per contact	1.7A per contact (12 pins)	1.4A max at 20°C (50 pins)	-
Contact resistance	<25 mΩ	<10mΩ	<10mΩ	<25 mΩ
Insulation resistance	10GΩ min	<10 ⁴ MΩ	10GΩ max	<10GΩ
Operating voltage	100V AC	-	-	-
Dielectric withstand voltage	500V AC			
Durability (Number of mating cycles)	500			
Insertion force	0.8N max	0.5N max	0.5N max	0.5N approx.
Withdrawal force	0.2N min	0.5N max	0.1N min (0.5N max)	0.5N approx.
Operating temperature	-20°C to +105°C	-55°C to +125°C	-30°C to +105°C	-55°C to +125°C
Vibration Sensitivity	10Hz to 2000Hz, 1.52mm, 196m/s ² (20G), duration 12h	10Hz to 2000Hz, 20G	10Hz to 200Hz, 20G	-

2.3. Plating Finish Comparison.

The plating finishes are compared as follows:

- Harwin – 0.025µm Gold over 2.03µm Nickel on contact area, 2.54µm Tin over 1.27µm Nickel on SMT tails.
- ERNI – Gold over Nickel on contact area, 4-6µm Tin over Nickel on SMT tails. Thicknesses of Gold and Nickel not specified.
- EPT – Gold over Palladium Nickel over Nickel on contact area, Tin on tails. No thicknesses specified.
- Harting – Gold over Palladium Nickel on contact area, Tin on SMT tails. No thicknesses specified.

2.4. Mating Compatibility.

A small selection of Harwin connectors were mated to a selection of the competitor products. In each case, the following checks were carried out:

- Insertion and Withdrawal force - the following table shows figures for total connector, with per contact figure in brackets.
- Contact resistance at pin 1 (to meet 25mΩ max).

None of these figures exceed the specification limits that Harwin states in the Component Specification.

Harwin Part Number	Competitor	Competitor Part Number	Fit?	Insertion force (N)	Withdrawal force (N)	Contact resistance (mΩ)
M55-7001242R (Male)	ERNI	154805	Yes	3.9 (0.33)	2.75 (0.23)	9
	EPT	404-52012-51	Yes	3.5 (0.29)	2.9 (0.24)	13
	Harting	15210122601000	Yes	5.7 (0.48)	5.1 (0.43)	11
M55-7012642R (Male)	ERNI	154806	Yes	6.6 (0.25)	5.7 (0.22)	11
	EPT	404-52026-51	Yes	5.8 (0.22)	4.8 (0.18)	15
	Harting	15210262601000	Yes	6.65 (0.26)	5.6 (0.22)	12
M55-6001242R (Female)	ERNI	244836	Yes	8.4 (0.7)	3.7 (0.31)	13
	EPT	403-52012-51	Yes	5.3 (0.44)	4.9 (0.41)	12
	Harting	15110122601000	Yes	5.6 (0.47)	8.3 (0.69)	10
M55-6022642R (Female)	ERNI	244837	Yes	7.7 (0.3)	7.8 (0.3)	9
	EPT	403-52026-51	Yes	8.75 (0.34)	9.2 (0.35)	15
	Harting	15110262601000	Yes	8.3 (0.32)	6.2 (0.24)	11
M55-6108042R (Female)	ERNI	244840	Yes	58.7 (0.73)	25.2 (0.32)	13
	EPT	403-52080-51	Yes	33.9 (0.42)	32 (0.4)	16
	Harting	15110802601000	Yes	41.5 (0.52)	36 (0.45)	15

These results lead us to conclude that to ensure full performance to the required specification, customers should preferably mate Harwin to Harwin connectors.