

ROBERT BOSCH GmbH




1 928 A00 01T-E


Technical customer documentation

- Specification sheet / Test data sheet -

4-7 pole plug connector 1

BOSCH 	4-7 pole plug connector 1 2,8 mm JPT - contact with single seal	Issue/Number 1 928 A00 01T-E	Page 2 / 7	Date 22.07.2002
	GS/EVT	Technical customer documentation - Specification sheet / Test data sheet -	Prepared Sellmer	Phone 20979

Date	C H A N G E	Responsible	Approved GS/EVT2
13.07.95	New edition	Spengler	i.A. Langenhan
10.10.95	Change of acceleration	Spengler	Hofmeister
19.08.96	Additional information of contact Adjusting documentation to 2/3 pole	Sellmer	i.A. Langenhan
18.04.00	Summary of technical customer documentations: 4/5 pole Y 280 K/M02 054-E 6/7 pole Y 280 K/M02 058-E Additional drawing number Correction of extraction force of the crimp- connection (values Fa. AMP) Additional international standard	Sellmer	Schettler
22.07.02	Adjustment extraction force Additional degree of protection IPX 6K, IPX 7	signed Sellmer	signed Schönfeld

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Specification sheet:


Connector housing 4-7 pole with single seal for vehicel electronic assemblies

: order number → offer drawing

A 928 000 452 (offer drawing)
Y 280 A62 566A (interface drawing, closed to new application)
C 928 000 83A (interface drawing, closed to new application)
D 928 002 26A (interface drawing, closed to new application)
D 928 002 93A (interface drawing, closed to new application)
D 928 002 69A (interface drawing)

- Number of poles : 4 to 7 pole
- Temperature range** : -40°C...+130°C Sn-surface temporarily: +140°C / 20 h
-40°C...+150°C Au-surface temporarily: +160°C / 20 h
- Type of contact : 2,8 mm flat spring contact with single seal, JPT-contact
- Method of connection : grip connection
- Connection cross-section : 0,35 ... 2,5 mm²
- Wire seal : Single seal, Silicon, resistant to engine compartment conditions
Note: When using shielded wires, special measures are necessary.
Soldering of the cable outlet is not admissible.
- Plug seal (radial) : Silicon
Plugged connector is resistant to engine compartement conditions.
- Locking : Plastic-locking-clip
- Insertion force : 4 pole: ≤ 90 N 6 pole: ≤ 110 N
5 pole: ≤ 100 N 7 pole: ≤ 120 N
- Extraction force (connector unlocked) : 4/5 pole: ≤ 70 N
6/7 pole: ≤ 90 N
- Extraction force (connector locked) : 4 pole: ≥ 80 N (destruction of the connector)
5-7 pole: ≥ 100 N (destruction of the connector)

**Application at higher or other loads should be tested in each individual case.

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- Extraction force of the individual line out of the crimp connection (values Fa. AMP) :

0,35 mm ² : ≥ 50 N	1,0 mm ² : ≥ 100 N
0,50 mm ² : ≥ 60 N	1,5 mm ² : ≥ 150 N
0,75 mm ² : ≥ 90 N	2,5 mm ² : ≥ 200 N
- Extraction force of the contact spring out of the chamber housing : ≥ 70 N


• Matching contact (alternative):

type of cable	wire range size	order number Fa. AMP 2,8 mm JPT – contact (with additional steel spring)			
		contact		single seal	for isolation-Ø
		Sn-surface	Au-surface		
FLK	0,35mm ²	929 941-3	2-929 941-1	828 904-1	1,2 - 2,1 mm
	0,5 - 1,0 mm ²	929 939-3	2-929 939-1	828 905-1	2,2 - 3,0 mm
	1,5 - 2,5 mm ²	929 937-3	2-929 937-1	828 905-1	2,2 - 3,0 mm
FLKr ¹ FLX	0,35mm ²	929 941-3	2-929 941-1	828 904-1	1,2 - 2,1 mm
	0,5 - 1,0 mm ²	929 939-3	2-929 939-1	828 904-1	1,2 - 2,1 mm
	1,5 - 2,5 mm ²	929 937-3	2-929 937-1	828 905-1	2,2 - 3,0 mm
cavity plug				828 922-1	

¹ reduced in insulation thickness
Not used cavities must be sealed with cavity plugs.

- Contact material :

base material	→ tin bronze
surface	→ tin- or gold plated
additional steel spring	→ fine steel
- Insulation resistance (contact → contact) : ≥ 10⁷ Ω;
Note: Where wiring harness preparation or wiring harness laying is not carried out properly (not responsibility of RB), lower insulation resistances (R_{ins} ≥ 10⁶ Ω) are to be applied.
- current flow resistance : ≤ 10 mΩ (contact, without wire crimp)
- air - gap }
leakage distance } (contact → contact) : ≥ 1,2 mm
- Nominal voltage : 20 mV ... 40 V (DC)
- Test voltage (contact → contact) : 750 V (DC); break-down not permitted

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- Nominal current / contact** (I_{eff} , resistive load) depending on the ambient temperature (on the contact):

ambient temperature		
Sn-surface	Au-surface	contact current
-40 ... +90°C	-40 ... +110°C	max. 10 A *
-40 ... +110°C	-40 ... +130°C	max. 8 A *
-40 ... +130°C	-40 ... +150°C	mA-range

*largest wire cross section

- Operating current : possibly lower, dependent upon application (dependent upon the contact ambient temperature, the conductor cross-section, number of contacts with max. current)
- Limiting temperature (on the contact) : Sn-surface: +130°C
Au-surface: +150°C
- Mating cycles : Sn-surface: ≤ 20 cycles
Au-surface: ≤ 100 cycles
- Gap dimension of contact spring : ≤ 0,1mm (after 10 insertions)

- Approximate value of permissible acceleration** (no quality and reliability feature) : **SineOnRandom** (Sn- and Au-surface) with


sine part of acceleration	$a_{sine} \leq 250 \text{ m/s}^2$
part of wide-band-vibration	$a_{eff} \leq 113 \text{ m/s}^2$
sine-wave-test (50 h, 3x16 h)	$a_{sine} \leq 300 \text{ m/s}^2$
random vibration test (50 h) peak value level of acceleration	
Sn-surface:	$a_{peak} \leq 200 \text{ m/s}^2$
Au-surface:	$a_{peak} \leq 300 \text{ m/s}^2$

With reservations on measurement at frequencies specific to the point of attachment and agreement by Bosch.

Measuring point: On the product, as near as possible to the plug (dependent on component).

- Degree of Protection : IPX 4K (splash test with elevated pressure)
IPX 9K (steam jet test with elevated pressure)
IPX 6K (heavy water jet test, elevated pressure)
(IPX 6K only with seal protection wall)
IPX 7 (submersion test)
- Installation position : arbitrary, preferably cable outlet pointing downwards
strain relief after ≤ 150 mm

**Application at higher or other loads should be tested in each individual case.

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Test data sheet:

1. Functional test (IEC 512, part 7)

Assemble the connector housing with all parts, connect it to a related component and then disconnect it. The following tolerance limits must be observed in respect of measured insertion and extraction forces.

- Insertion force : 4 pole: ≤ 90 N
5 pole: ≤ 100 N
6 pole: ≤ 110 N
7 pole: ≤ 120 N
- Extraction force : 4/5 pole: ≤ 70 N
(connector unlocked) 6/7 pole: ≤ 90 N
- Extraction force : 4 pole: ≥ 80 N (destruction of the connector)
(connector locked) 5-7 pole: ≥ 100 N (destruction of the connector)

2. Endurance test

2.1 Actuating cycles (number of insertion / removal cycles when currentless)

- Sn-surface: min. 20 cycles
- Au-surface: min. 100 cycles

2.2 Temperature cycling test (IEC 68-2-14)

300 temperature cycles -40° ... +120°C


2.3 Vibration test (no quality and reliability feature)

2.3.1 SineOnRandom-test (IEC 68-2-6, IEC 60068-2-64)

basis: Measurements on various components, which are fixed at the engine, with several collectives of rotational speeds.

short-time test:

- testing time : 50 h (per each direction new parts)
- conditions : $T_{amb} = +85^{\circ}\text{C}$
- sine-part : frequency range f = 50 - 500 Hz (1 oct./min)
f = 50 - 160 Hz x = ±0,25 mm
f = 160 - 500 Hz a = 250 m/s²
- noise-part : frequency range f = 15 - 2000 Hz
 $a_{eff} = 113 \text{ m/s}^2$
(effective value of acceleration)

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long-time test:

test-program	:	8 several noise-parts are combined with 2 various sine-parts.
testing time	:	373 h
conditions	:	$T_{amb} = +70^{\circ}\text{C} \dots +110^{\circ}\text{C}$
sine-part	:	frequency range $f = 50 \dots 700 \text{ Hz}$ (1 oct./min.) 2 several test-degrees with max. acceleration $a_{max} = 210 \text{ m/s}^2$
noise-part	:	frequency range $f = 15 \dots 2000 \text{ Hz}$ 8 several test-degrees with max. effect. value of acceleration $a_{eff} = 246 \text{ m/s}^2$

2.3.2 Sine vibration test

in accordance with DIN 40046, sheet 8, Fc (customer specifications)

- testing time	:	50 h (per each direction new parts)
conditions	:	sine-acceleration $a_{sine} = 300 \text{ m/s}^2$ $f = 50 \dots 250 \text{ Hz}$ (1 oct./min.) $T_{amb} = +85^{\circ}\text{C}$
- testing time	:	3 x 16 h (each part tested in 3 directions)
conditions	:	sine-acceleration $a_{sine} = 300 \text{ m/s}^2$ $f = 65 \dots 500 \text{ Hz}$ (1 oct./min.) $T_{amb} = +85^{\circ}\text{C}$

2.3.3 Random vibration test

testing time	:	50 h
conditions	:	random vibration (stochastic oscillation acceleration) with a maximum value level of acceleration (Bosch-Peak-level 0,5%) Sn-surface: $a_{peak} = 200 \text{ m/s}^2$ Au-surface: $a_{peak} = 300 \text{ m/s}^2$ $T_{amb} = +85^{\circ}\text{C}$

2.4 Corrosion test

96 h	salt spray test SS	(DIN 50021)
3 cycles	industrial climat SFW 2,0S	(DIN 50018)
21 days	damp alternating atmosphere FW 24	(DIN 50016)

(Includes the corrosion resistance class K04 in accordance with DIN 70 040.)

2.5 Degree of protection (in accordance with DIN 40050, part 9)

protection against	
- heavy splashing (elevated pressure)	IPX 4K
- steam jet-cleaning (elevated pressure)	IPX 9K
- heavy water jet test (elevated pressure)	IPX 6K
(IPX 6K only with seal protection wall)	
- submersion test	IPX 7