

PRODUCT SPECIFICATION

ECONOSEAL 3. HIGH AND LOW CURRENT CONNECTORS

1. GENERAL REQUIREMENTS

Please note that this connector family must comply with the requirements of BLS.62.21.712, Issue 1, Draft 2.

This specification covers the requirements for a family of in-line connectors, which consist of the following types:

- (a) Sealed connector for low current applications.
- (b) Unsealed connectors for low current applications.
- (c) Sealed connectors for high current applications.
- (d) Unsealed connectors for high current applications.

(Please note that (a) and (b) and likewise (c) and (d) are the same connectors, but the unsealed versions will not have rubber seals).

The receptacle half of these "in-line" connectors will be used for mating with components such as switches and relays, etc.

If component design prohibits this, then special connectors will have to be manufactured to suit.

Connectors with a mixture of low current and high current contacts are possible, but will be considered "special".

The tab and receptacle contacts for the low current applications are .070" Series, and for the high current .250" Series. (Both sizes are based on the AMP - Econoseal "J", Mark II Contacts).

Low current is defined as up to 10 amps.
High current is defined as up to 19 amps.

The connectors consist of contacts encapsulated in insulating housings.

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The connectors have a smooth exterior, and are easily mated and unmated. The contacts can be inserted into the housings with a low force.

The connectors are generally of a square configuration.

2. PRODUCT DESCRIPTION

2.1 The general term "ECONOSEAL 3" is used to describe this family of connectors.

2.2 The .070" Series tabs and receptacles are made in two wire ranges, 0.2 to 0.5mm² and 0.75 to 2.0mm². Only thin walled cable shall be used.

(a) For unsealed connectors, the insulation crimp, for single wire applications, is of the overlap type.

(b) For unsealed connectors, the insulation crimp, for double wire applications, is the normal 'F' type. (2 x 0.5mm² Only consult AMP).

(c) For sealed connectors, the insulation crimp is "Special" - in order to crimp both wire and seal. ("O" crimp to be used).

The .250" Series tabs and receptacles are made in two wire ranges, 0.50mm² to 1,50mm² and 2,00mm² to 3,00mm².

(a) For unsealed connectors, the insulation crimp, for single wire applications, is of the overlap type.

(b) For unsealed connectors, the insulation crimp, for double wire applications, is of the normal 'F' type.

(c) For sealed connectors, the insulation crimp is "Special" - in order to crimp both wire and seal. ("O" crimp to be used).

2.3 The tabs and receptacles are made in pre-tinned brass.

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2.4 The .070" Series receptacles are designed to give low insertion and withdrawal forces when mated, or unmated, with appropriate tabs.

The .250" Series receptacles are designed to give the appropriate insertion and withdrawal forces to achieve the required current rating.

2.5 The 070" Series and the .250" Series tabs and receptacles are latched into the housing by means of a "resin" lance within each cavity. After the housings are fully loaded, the lances are secured by a front loaded wedge (anti-backout). Anti-backouts shall be used for sealed or unsealed applications.


The physical dimensions of the contacts are specified on the following drawings:

- .070" Series Rec (0.2 to 0.5mm²) - C345808-1 (C171630-1)
- .070" Series Tab (0.2 to 0.5mm²) - C345809-1 (C171631-1)
- .070" Series Rec (0.75 to 2.0mm²) - C345806-1 (C171662-1)
- .070" Series Tab (0.75 to 2.0mm²) - C345807-1 (C171661-1)

NOTE: The above contacts are supplied by AMP Japan, and are suitable for single cables of 0,5 to 2,0mm² (Thin walled), double cables of 2 x 0,5mm² only (Thin walled) and single cables of 0,5 to 2,0mm² with seals.

- .250" Series tab (0,5 to 1,5mm² - Overlap Ins. Crimp) - C344071
- .250" Series rec (0,5 to 1,5mm² - Overlap Ins. Crimp) - C344072
- .250" Series tab (2,0 to 3,0mm² - Overlap Ins. Crimp) - C344067
- .250" Series rec (2,0 to 3,0mm² - Overlap Ins. Crimp) - C344068
- .250" Series rec (2 X 0,5 & 2 X 0,75mm² - 'F' Ins. Crimp) - C344071
- .250" Series rec (2 X 0,5 & 2 X 0,75mm² - 'F' Ins. Crimp) - C344072
- .250" Series tab (2 X 1,0 & 2 X 1,5mm² - 'F' Ins. Crimp) - C344067
- .250" Series rec (2 X 1,0 & 2 X 1,5mm² - 'F' Ins. Crimp) - C344068
- .250" Series tab (0,5 to 1,5mm² - Special for Seal) - C344069
- .250" Series rec (0,5 to 1,5mm² - Special for Seal) - C344070
- .250" Series tab (2,0 to 3,0mm² - Special for Seal) - C344008
- .250" Series rec (2,0 to 3,0mm² - Special for Seal) - C344009

2.6 The sealed connectors require discrete wire seals that are automatically crimped to the wire in the insulation barrel area of the contacts. Also, a seal ring is required to seal between the receptacle half and tab half of the housings.

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2.7 The housings for the low and high current connectors are made in heat stabilised Nylon 6.6. The front loading wedge (anti-backout) is also made in heat stabilised Nylon 6.6 but will be a different colour to the housings.

The seal rings and the discrete wire seals are made in a suitably rated material for the temperature requirements (Seals to blank off unused cavities, are to be made in the same material).

Harness design should obviate the need for similar connectors to be adjacent to each other. The physical dimensions, for the various numbers of ways, of the housings are specified on the following drawings.

LOW CURRENT CONNECTORS

NUMBER OF WAYS	UNSEALED CONNECTORS (SEE NOTE BELOW)	SEALED CONNECTORS (ASSEMBLY OF HOUSING PLUS SEAL RING RECEPTACLE HALF ONLY)
2 Way Tab Housing	C344274	
2 Way Rec. Housing	C344275	C344276
3 Way Tab Housing	C344271	
3 Way Rec. Housing	C344272	C344273
4 Way Tab Housing	C344268	
4 Way Rec. Housing	C344269	C344270
6 Way Tab Housing	C344265	
6 Way Rec. Housing	C344266	C344267
13 Way Tab Housing	C344260	
13 Way Rec. Housing	C344262	C344263

SPECIAL REQUIREMENTS:

- 6 way tab housing, C344325, for sealed application only. Mates with standard 6 way rec. hsg, C344267.
- 6 way tab housing, C346030 (includes gasket seal for panel mounting), for sealed application only. Mates with standard 6 way rec. housing., C344267.

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HIGH CURRENT CONNECTORS

NUMBER OF WAYS	UNSEALED CONNECTORS (SEE NOTE BELOW)	SEALED CONNECTORS (ASSEMBLY OF HOUSING PLUS SEAL RING RECEPTACLE HALF ONLY)
2 Way Tab Housing	C344075	
2 Way Rec. Housing	C344078	C344081
4 Way Tab Housing	C344074	
4 Way Rec. Housing	C344077	C344080
8 Way Tab Housing	C344073	
8 Way Rec. Housing	C344076	C344079

Please Note: The TAB and the RECEPTACLE housings are used for both the sealed connectors and the unsealed connectors, but for the sealed connectors the RECEPTACLE halves will be supplied with the seal ring in position.


The physical dimensions for the wedge (anti-backout), seal rings, discrete wire seals and blank cavity seals are specified on the following drawings.

LOW CURRENT CONNECTORS

NUMBER OF WAYS	WEDGE PART NUMBER	SEAL RING PART NUMBER
2 Way Tab Housing	C345253-1	
2 Way Rec. Housing	C345254-1	C344785-1 (C173072-1)
3 Way Tab Housing	C345255-1	
3 Way Rec. Housing	C345256-1	C345008-1 (C173073-1)
4 Way Tab Housing	C345257-1	
4 Way Rec. Housing	C345258-1	C345009-1 (C173917-1)
6 Way Tab Housing	C345259-1	
6 Way Rec. Housing	C345260-1	C345010-1 (C173922-1)
13 Way Tab Housing	C344261-1	
13 Way Rec. Housing	C344264-1	C345011-1 (C173893-1)

SPECIAL REQUIREMENTS:

1. 6 way tab housing, C344325, uses standard wedge (Anti-Backout) C345259-1.
2. 6 way tab housing, C346030, uses standard wedge (Anti-Backout) C345259-1.

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Discrete wire seal, for low current connectors using wires of 0,5 to 1,5mm², is Part No. C172746-1, but for wire of 2.0mm² the wire seal Part No. C172888-2 shall be used. Cavity blanking plug, for all low current connectors is Part No. C172748-2.

HIGH CURRENT CONNECTORS		
NUMBER OF WAYS	WEDGE PART NUMBERS	SEAL RING PART NUMBER
2 Way Tab Housing	C344090-1	
2 Way Rec. Housing	C344089-1	C344084-1
4 Way Tab Housing	C344088-1	
4 Way Rec. Housing	C344087-1	C344083-1
8 Way Tab Housing	C344086-1	
8 Way Rec. Housing	C344085-1	C344082-1

Discrete wire seal, for high current connectors using wires of 0,5 to 1,5mm², is Part No. C344095-1.

Discrete wire seal, for high current connectors using wires of 2,0 to 3,0mm², is Part No. C172747-1.

Cavity blanking plug, for all high current connectors, is Part No. C172749-1.


2.8 SUMMARY OF REQUIREMENTS

This family of connectors are to be user friendly. The housing colours are to be BLACK, and the wedge (anti-backout) to be a contrasting colour. Other housing colours now available.

The tab half of the connectors must have a bracket mount feature, which will latch positively onto a bracket (on the vehicle) and which can also be released.

PLEASE NOTE:

The 6 way tab housing assembly, C346030-1, snaps into a headlamp moulding and complies with Honda Spec. SA5 for water ingress and vibration.

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Both halves of the connector must latch together by means of an inertia latch (Go-No-Go), which has an audible "click" feature. The thumb release bar must not be depressed when mating.

The tabs of this connector must be adequately shrouded to prevent damage during mating.

Connectors of different numbers of ways must not mate or partially mate with each other.

Those connectors that should mate with each other, must only do so for the correct configuration.

Contact orientation must be in the same plane (for automatic assembly).

One of the most important features of this family of connectors is that they are suitable for AUTOMATIC HARNESS MANUFACTURE.

Housings will be supplied in loose piece form, to enable them to be bowl fed.

3. MECHANICAL REQUIREMENTS

3.1 The initial engagement force between tab and receptacle (.070" Series) shall be between 2,9 and 7,8 Newtons, steadily applied load.

The initial engagement force between tab and receptacle (.250" Series) shall be between 4 and 25 Newtons, steadily applied load.

3.2 The initial withdrawal force between tab and receptacle (.070" Series) shall be 2,9 Newtons minimum, steadily applied load.

The initial withdrawal force between tab and receptacle (.250" Series) shall be 4 Newtons minimum, steadily applied load.

3.3 After eleven more engagements, the 12th disengagement (withdrawal) force between tab and receptacle shall be 2,9 Newtons minimum for the .070" Series; and 4 Newtons minimum for the .250" Series, steadily applied load.

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- 3.4 Insertion force of tab or receptacle (.070" Series and .250" Series) into housing - with or without discrete wire seal shall be 12 Newtons maximum.
- 3.5 The force to pull the tab or the receptacle out of the housing on the first extraction shall be 80 Newtons minimum for either the .070" Series or the .250" Series (wedge anti-backout feature not fitted).
- 3.6 The force to pull the tab or receptacle out of the housing, with the wedge anti-backout feature fitted, shall be 100 Newtons minimum for either the .070" or the .250" Series.
- 3.7 The minimum unintentional disengagement force of the tab housing from the receptacle housing, with latches operative is to be as follows:

For .070" Series:

2 Way	90 Newtons
3 Way	100 Newtons
4 Way	110 Newtons
6 Way	120 Newtons
13 Way	200 Newtons

For .250" Series:

2 Way	150 Newtons
4 Way	175 Newtons
8 Way	200 Newtons

- 3.8 All housings are polarised, and it must not be possible to mate, or even temporarily complete circuits in any but the design configuration.
- 3.9 All cables referred to in this specification are of the thin walled, non-irradiated type and in accordance with BLS. 62.21. 688 Issue No. 2.

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3.10 The crimp provides uniform attachment, adequate tensile strength, electrical conductivity and resists corrosion and vibration.

Typical cables terminated - the crimp will meet the following tensile requirements:

0,50mm ²	65 Newtons
0,75mm ²	85 Newtons
1,00mm ²	105 Newtons
1,50mm ²	160 Newtons
2,00mm ²	160 Newtons
2,50mm ²	220 Newtons
3,00mm ²	220 Newtons
2 x 0,50mm ²	65 Newtons) or 60% of any one
2 x 0,75mm ²	65 Newtons) of the cable tensile
2 x 1,00mm ²	65 Newtons) values, whichever is
2 x 1,50mm ²	65 Newtons) the greatest.

3.11 When a force of 35 Newtons is applied to the wire of a terminated tab or receptacle in a housing, with the wedge anti-backout fitted, the tab or receptacle should not fracture. The force is applied at 90° to the tab or receptacle.

3.12 Maximum initial engagement force of loaded connectors (tab to receptacle housing), latches operative, shall be as follows:

.070" Series

2 Way	70 Newtons
3 Way	70 Newtons
4 Way	70 Newtons
6 Way	70 Newtons
13 Way	150 Newtons

.250" Series

2 Way	80 Newtons
4 Way	140 Newtons
8 Way	200 Newtons

3.13 The assembled connectors shall be disengaged eleven times from the same mating part, with the latch(es) inoperative, and the twelfth intentional disengagement force shall be as follows:

.070" Series

2 Way	6 Newtons min. (30N max.)
3 Way	9 Newtons min. (50N max.)
4 Way	12 Newtons min. (50N max.)
6 Way	18 Newtons min. (70N max.)
13 Way	40 Newtons min. (140N max.)

.250" Series

2 Way	8 Newtons min. (40N max.)
4 Way	16 Newtons min. (80N max.)
8 Way	32 Newtons min. (140N max.)

4. ELECTRICAL REQUIREMENTS

4.1. The nominal current rating for the .070" Series contacts shall be 10 amps for a 20°C rise above ambient temperature, 20°C ± 5°C. This will be the average current of 10 samples crimped to the largest wire (cable) size of 1.5mm² in free air. (Note: 2mm² cable should only be used for the reduction of volt drop).

The nominal current rating for the .250" Series contacts shall be 19 amps for a 20°C rise above ambient temperature, 20°C ± 5 °C. This will be the average current of 10 samples crimped to the largest wire (cable) size of 3.0mm² in free air.

For multiway connectors, where high currents are passed through more than one circuit, a de-rating factor must be used - as defined on ARG specification drawings.

4.2 With tabs and receptacle terminated to 1.5mm² cable, and the nominal current of 10 amps flowing through one circuit only, the contact resistance should be measured at the first engagement (contacts fitted in suitable housings). This is for the .070" Series connectors.

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For .250" Series connectors the same test should be done, but contacts should be terminated to 3,00mm² cable and the nominal current of 19 amps should be flowing through one circuit only.

Refer to Section 8.2 of BLS. 62.21.712 specification.

- 4.3 High and low temperature tests, and vibration tests should be carried out in accordance with Sections 9, 10 and 19 respectively, of BLS. 62.21.712 specification.

For the above tests, monitor for electrical discontinuity greater than 1 microsecond.

5. ENVIRONMENTAL PERFORMANCE

- 5.1 Salt corrosion test should be carried out in accordance with Section 14 of BLS.62.21.712 specification on sealed connectors only.

- 5.2 Humidity test is to be carried out to BS 2001, Part 2.1 Z/AD. 1977. Then contact resistance is to be measured after exposure and after a further eleven engagements. Refer to Section 15 of BLS.62.21.712 specification.

- 5.3 Flammability test. Refer to Section 12.2 of BLS.62.21.712 specification.

6. RESISTANCE TO FLUIDS

- 6.1 Samples shall be tested for resistance to contaminants in accordance with Section 16 of BLS.62.21.712 specification.

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