ES4602 Breakout Panel

User's Guide

Copyright

R1.0.4 EN - 11.2002 TTN F 00K 700 206

Contents

1 Introduction

So-called breakout boxes are used to divide the signals between the control unit and the LabCar allowing the user to simulate a cable break simply by pulling a jumper. The center tabs of the jumpers make it possible to access the individual control unit signals externally.

The chassis of the ES4602 is a backplane type breakout box. All connectors of the ES4602 are printed versions. Standard connectors have been selected to ensure compatibility with other products within the ES46xx series and the coupling boards of the ES4500 component rack.

Using a project-specific front panel, the labels of the individual signal channels can be customized, and it is possible to mask certain jumpers to avoid faulty or erroneous connections.

The ES4602 breakout panel is designed as a standard 19" rack-mount type thus allowing its use both as a stand-alone unit in its own housing and rack-mounted as part of a LabCar system.

2 Definitions

ES4500 Component Rack	Designates a 19" assembly rack system consisting of the assembly rack, power-supply unit, and a 20-slot backplane (component rack backplane) with 340 loop-through signal lines. It serves as the mounting rack for related test plug-in cards.
Coupling board	Designates a plug-in board of the ES4500 Component Rack. It allows coupling the component rack backplane with external devices such as control unit, breakout box, or signal box.
Lab jack system	Designates the combination of lab jacks and the associated jumpers and connectors.
Signal channel	Designates a specific signal that is uniquely identified by its current specification and name (channel number or label).

3 Technical Description

3.1 Overview

The ES4602 breakout panel is mechanically and signal-logically divided into three areas. The connectors to the control unit ("ECU") are mounted on the right-hand side (see Figure "Front view of the ES4602 Breakout Panel" on page 9). The connectors to the ES4500 Component Rack ("LOADBOX") or signal box are located on the left.

The jumpers are arranged in the center section. The jumpers are designed based on the current specification of each signal channel. Some signals in the range of higher currents are protected specially (see Chapter "Safety Measures" on page 13).

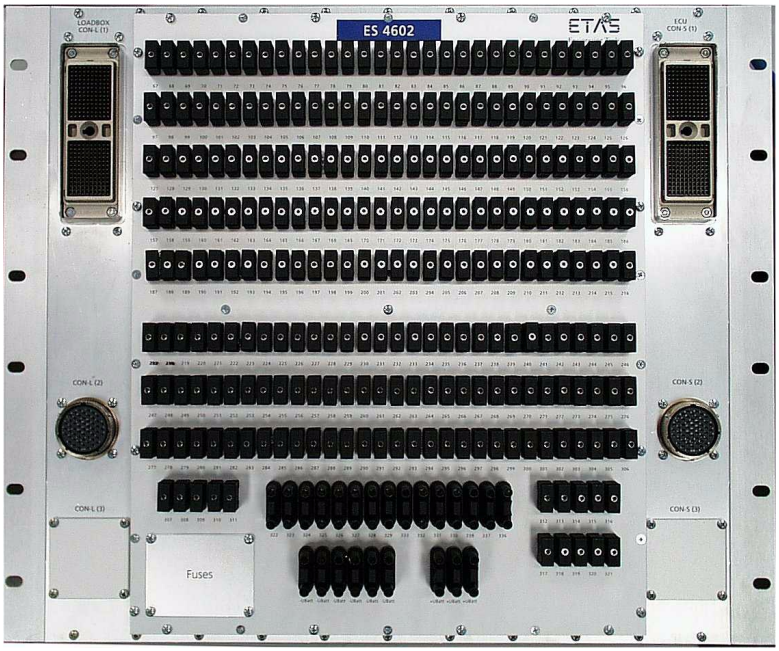
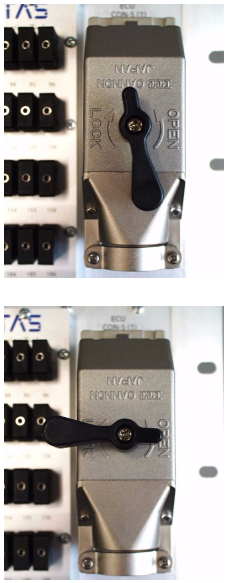


Fig. 3-1 Front view of the ES4602 Breakout Panel

Although the connectors CON-L (3) and CON-S (3) are included in the backplane layout, they are not required at this stage and therefore hidden under a cover.

3.2 Connectors CON-L (1) and CON-S (1)

ITT Cannon DLM5-260 connectors are used for signals carrying a maximum current of 3 A. This connector type is a so-called zero-insertion force connector with 260 pins. Plugging this connector requires no insertion force for connecting the female and male contacts. A tight connection is ensured by simply pressing the related contacts against each other. The female and male connectors are locked by turning the lever on the cable plug (see Figure "Fixing the DLM5-260 Connector (Example)" on page 10).



DLM5-260
position "open"

DLM5-260
position "closed"

Fig. 3-2 Fixing the DLM5-260 Connector (Example)

note

The connectors CON-L (load/signal box side connectors) and CON-S (ECU side connectors) are not protected against erroneous insertion (wrong side, etc.). The user has to take care to insert the connectors on the correct sides.

3.3 Connectors CON-L (2) and CON-S (2)

KPTC22-55 type connectors from ITT Cannon are used for signals up to 15 A. The mating connector has a bayonet catch. Safe contact is only ensured after the bayonet has been locked.

note

The connectors CON-L (load/signal box side connectors) and CON-S (ECU side connectors) are not protected against erroneous insertion (wrong side, etc.). The user has to take care to insert the connectors on the correct sides.

3.4 Jumpers

Different jumpers – 2 mm and 4 mm contacts – are employed depending on the current specification of the signals. The 2 mm system is used for signals up to 3 A while the 4 mm system is used for signals exceeding 3 A.

In both systems, the jumpers include center tabs that enable the user to short-circuit signals via cable jumpers or to connect external measuring systems.

3.4.1 Signal Channel Labels

As the ES4602 Breakout panel is designed for use in combination with the ES4500 Component Rack, the standard labels of the individual signal channels are based on the layout of the ES4500 backplane. The signal channels relevant to the control unit start at channel #67. The labels of the individual signal channels are located below the associated jumper (see Figure "Location of the Channel Label" on page 11).

jumper

channel label

Fig. 3-3 Location of the Channel Label

A customized front panel can be mounted if the user prefers different labels. Depending on the particular type, lab jacks that are not in use can be masked. The panel is made of 1 mm thick anodized aluminum. The labels are printed. The panel is mounted using the existing screws.

The customized front panel is available as an option.

3.4.2 Layout of the Lab Jacks

Two lab jacks are used for each signal channel and jumper. The upper lab jack connects the control unit (ECU) while the lower lab jack connects the component rack (LOADBOX) / signal box (see Figure "Layout of the Lab Jacks" on page 12).

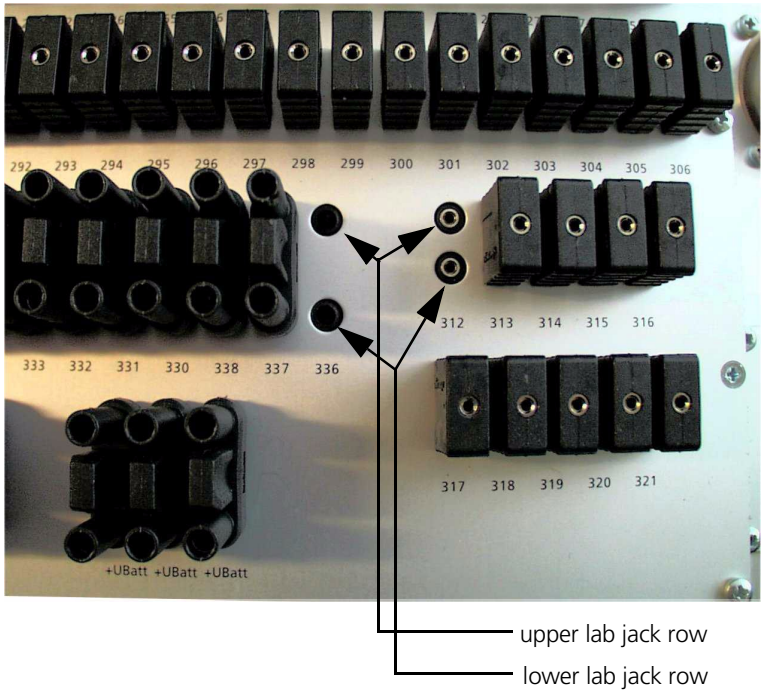


Fig. 3-4 Layout of the Lab Jacks

3.5 Safety Measures

Certain signal channels reserved for the battery node circuit and $\pm U_{bat}$, are protected by fuses on the control unit side. The fuses are "Minifuse" types manufactured by Littlefuse.

The fuses have sockets and can be replaced easily. The fuse compartment has a 1 mm aluminum cover (see Fig. 3-5).

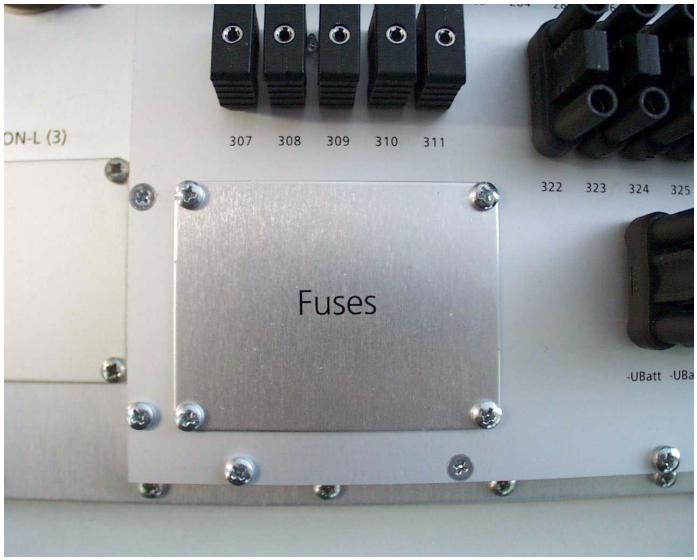


Fig. 3-5 Fuse Compartment Cover

To replace a fuse, remove the cover using a Phillips screwdriver (see figure). Remove the defective fuse using a pair of flat-nose pliers and replace it with a new one (see Fig. 3-6 on page 14).

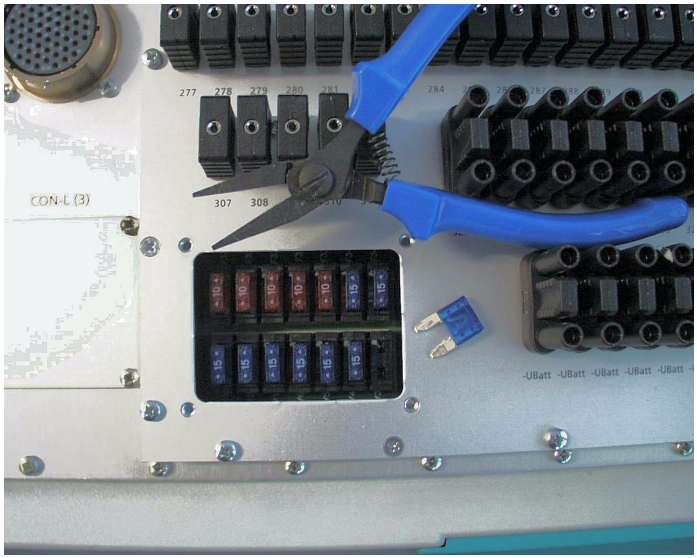


Fig. 3-6 Fuse Replacement

note

Be sure to use 10 A and 15 A rated fuses only. Using fuses with higher ratings will void the warranty.

The location of the fuses is described in Figure "Fuses for Each Signal Channel and Corresponding Pin on CON-S(2) (Top View)" on page 15.

Table "Allocation of Signal Fuses to the Corresponding Connector Pins" on page 14 shows the fuse allocation for each signal channel to the corresponding connector pins (see also Chapter "Connector Pin Allocations" on page 21).

Fuse	Pin # [CON-L(2) / (CON-L(3)]	Pin # [CON-S(2) / CON-S(3)]
330	(i,N) / (H,S)	(i,N) / (H,S)
331	(x,EE) / (J,T)	(x,EE) / (J,T)
332	(t,F) / (K,U)	(t,F) / (K,U)
333	(b,u) / (L,M)	(b,u) / (L,M)

Tab. 3-1 Allocation of Signal Fuses to the Corresponding Connector Pins

Fuse	Pin # [CON-L(2) / (CON-L(3)]	Pin # [CON-S(2) / CON-S(3)]
338	(c,g,v) / (F,G)	(c,g,v) / (F,G)
339/1	(d,G,H) / (D,E,R)	(d) / (R)
339/2	(d,G,H) / (D,E,R)	(G) / (E)
339/3	(d,G,H) / (D,E,R)	(H) / (D)
340/1	(e,f,J,K,L,M) / (A,B,N)	(J) / (A)
340/2	(e,f,J,K,L,M) / (A,B,N)	(e) / (N)
340/3	(e,f,J,K,L,M) / (A,B,N)	(f) / (B)
340/4	(e,f,J,K,L,M) / (A,B,N)	(L) / n.c.
340/5	(e,f,J,K,L,M) / (A,B,N)	(M) / n.c.
340/6	(e,f,J,K,L,M) / (A,B,N)	(K) / n.c.

Tab. 3-1 Allocation of Signal Fuses to the Corresponding Connector Pins

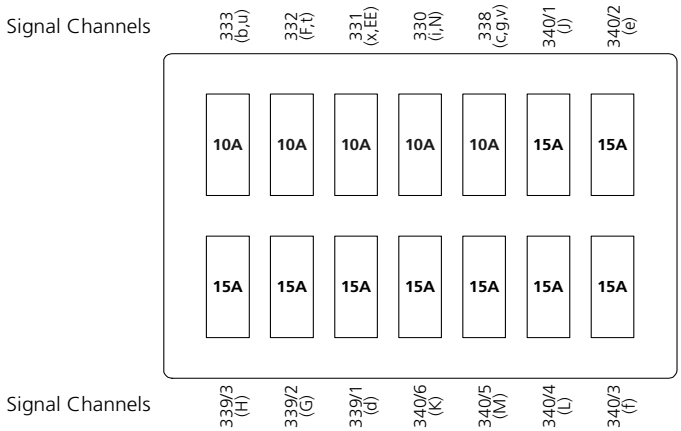


Fig. 3-7 Fuses for Each Signal Channel and Corresponding Pin on CON-S(2) (Top View)

3.6 Signal Routing

In general, all connections between the CON-L(1),(2),(3) and CON-S(1),(2),(3) connections are point-to-point links that can be opened with the use of jumpers.

Exceptions are the $+U_{bat}$ and $-U_{bat}$ signals. For some control units, the $+U_{bat}$ and $-U_{bat}$ voltages are applied to separate inputs of the control unit. These voltages must therefore exist on the breakout panel individually.

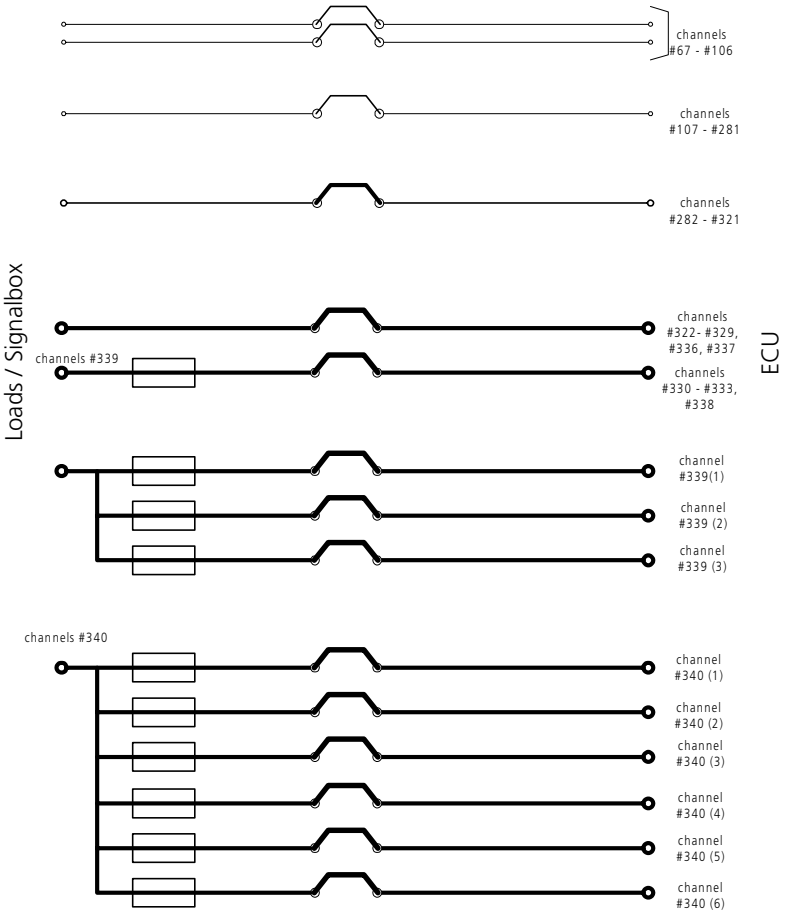


Fig. 3-8 Signal Channel Routing on the ES4602 Breakout Panel

For the ES4602 Breakout Panel, the $+U_{bat}$ and $-U_{bat}$ signals on the CON-L(2) side are routed to three ($+U_{bat}$) or six ($-U_{bat}$) lab jacks (see Figure "Signal Channel Routing on the ES4602 Breakout Panel" on page 16 "Channel #339" and "Channel #340"). After the jumper, the signals are then split into three ($+U_{bat}$) or six
($-U_{bat}$) individual signals (see Figure "Signal Channel Routing on the ES4602 Breakout Panel" on page 16 and Figure "Distribution of the Battery Nodes to the Plug-In Bridges" on page 17). This meets the requirement for supply voltages that can be split into individual voltages. The individual $+/-U_{bat}$ signals are protected towards the control unit side by means of a miniature car fuse (15 A) (see also Table "Current-Carrying Capacity of the Backplane" on page 19).

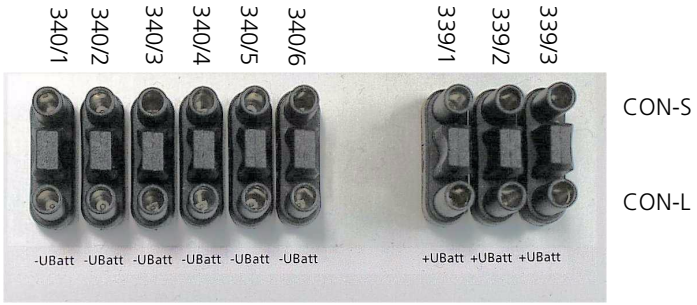


Fig. 3-9 Distribution of the Battery Nodes to the Plug-In Bridges

4 Appendix

4.1 ES4602 Specifications

4.1.1 Permissible Connector Load

Connector	Max. load [A]	Dielectric strength [V]
DLM5-260	4.0 A	1000 V
KPTC22-55	7.5 A	1500 V
lab jack system 2 mm	10.0 A	
lab jack system 4 mm	18.0 A	

Tab. 4-1 Maximum Load and Dielectric Strength of the Connectors

4.1.2 Permissible Backplane Load

Signal channel range	Current-carrying capacity [A] (signal box side)	Current-carrying capacity [A] (control unit side)
67 – 281	1.5 A	1.5 A
282 – 321	6.0 A	6.0 A
322 – 329	10.0 A	10.0 A
330 – 333, 338	25.0 A	25.0 A
336, 337	10.0 A	10.0 A
339, 340	40.0 A	15.0 A

Tab. 4-2 Current-Carrying Capacity of the Backplane

The backplane is designed for a dielectric strength between the individual connections of 300 V.

4.1.3 Fuses

The fuses to be employed are "Minifuse" types manufactured by Littlefuse. The following ratings are used:

- 10 A (red)
- 15 A (blue)

4.2 Accessories

Connection cable ES4602 to ES4510
Connection chord with 2 mm banana plug (black)
Plug-in bridge 2 mm
Plug-in bridge 4 mm
Fuse 10 A
Fuse 15 A
Customized front panel

English Manual:
ES4602 Breakout Panel User's Guide (TTN: F 00K 700 206)
German Manual:
ES4602 Breakout Panel Benutzerhandbuch (TTN: F 00K 700 205)

The accessories are available on request.

4.3 Connector Pin Allocations

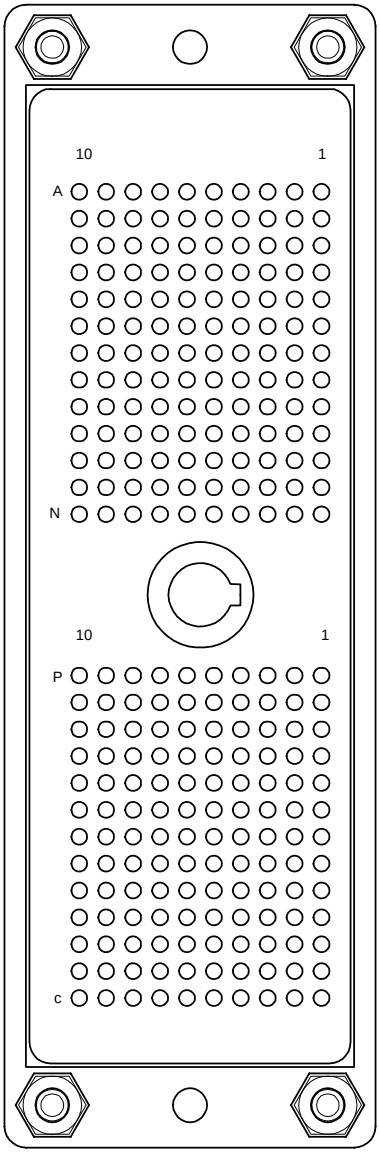


Fig. 4-1 260-pin ITT Cannon DLM5-260 Connector

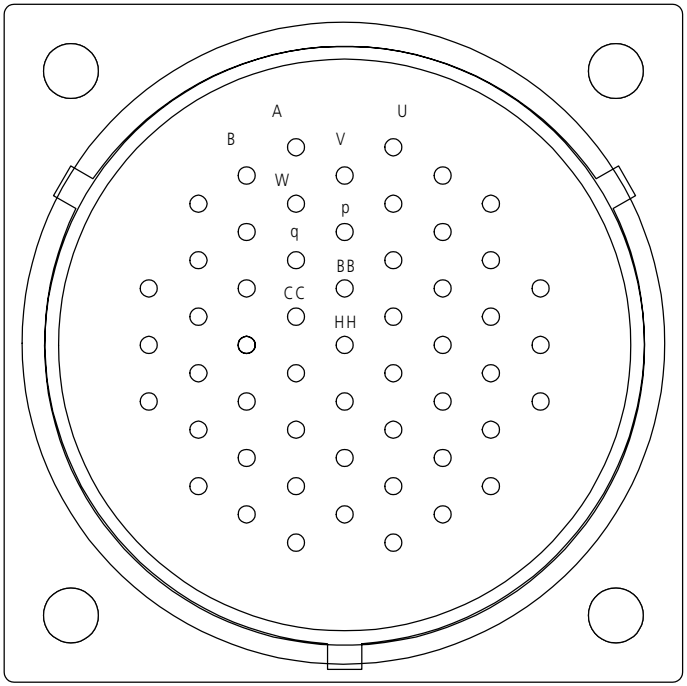


Fig. 4-2 ITT Cannon KPTC22-55 Connector

The following table shows the allocation of the signal channels to the corresponding connector pins:

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
67	1	1.5	C10
68	1	1.5	C9
69	1	1.5	C8
70	1	1.5	C7
71	1	1.5	C6
72	1	1.5	C5
73	1	1.5	C4
74	1	1.5	C3

Tab. 4-3 Table of the Shielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
75	1	1.5	C2
76	1	1.5	C1
77	1	1.5	D10
78	1	1.5	D9
79	1	1.5	D8
80	1	1.5	D7
81	1	1.5	D6
82	1	1.5	D5
83	1	1.5	D4
84	1	1.5	D3
85	1	1.5	D2
86	1	1.5	D1
87	1	1.5	E10
88	1	1.5	E9
89	1	1.5	E8
90	1	1.5	E7
91	1	1.5	E6
92	1	1.5	E5
93	1	1.5	E4
94	1	1.5	E3
95	1	1.5	E2
96	1	1.5	E1
97	1	1.5	F10
98	1	1.5	F9
99	1	1.5	F8
100	1	1.5	F7
101	1	1.5	F6
102	1	1.5	F5
103	1	1.5	F4

Tab. 4-3 Table of the Shielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
104	1	1.5	F3
105	1	1.5	F2
106	1	1.5	F1

Tab. 4-3 Table of the Shielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
107	1	1.5	G10
108	1	1.5	G9
109	1	1.5	G8
110	1	1.5	G7
111	1	1.5	G6
112	1	1.5	G5
113	1	1.5	G4
114	1	1.5	G3
115	1	1.5	G2
116	1	1.5	G1
117	1	1.5	H10
118	1	1.5	H9
119	1	1.5	H8
120	1	1.5	H7
121	1	1.5	H6
122	1	1.5	H5
123	1	1.5	H4
124	1	1.5	H3
125	1	1.5	H2
126	1	1.5	H1
127	1	1.5	J10
128	1	1.5	J9
129	1	1.5	J8

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
130	1	1.5	J7
131	1	1.5	J6
132	1	1.5	J5
133	1	1.5	J4
134	1	1.5	J3
135	1	1.5	J2
136	1	1.5	J1
137	1	1.5	K10
138	1	1.5	K9
139	1	1.5	K8
140	1	1.5	K7
141	1	1.5	K6
142	1	1.5	K5
143	1	1.5	K4
144	1	1.5	K3
145	1	1.5	K2
146	1	1.5	K1
147	1	1.5	L10
148	1	1.5	L9
149	1	1.5	L8
150	1	1.5	L7
151	1	1.5	L6
152	1	1.5	L5
153	1	1.5	L4
154	1	1.5	L3
155	1	1.5	L2
156	1	1.5	L1
157	1	1.5	M10
158	1	1.5	M9
159	1	1.5	M8

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
160	1	1.5	M7
161	1	1.5	M6
162	1	1.5	M5
163	1	1.5	M4
164	1	1.5	M3
165	1	1.5	M2
166	1	1.5	M1
167	1	1.5	N10
168	1	1.5	N9
169	1	1.5	N8
170	1	1.5	N7
171	1	1.5	N6
172	1	1.5	N5
173	1	1.5	N4
174	1	1.5	N3
175	1	1.5	N2
176	1	1.5	N1
177	1	1.5	P10
178	1	1.5	P9
179	1	1.5	P8
180	1	1.5	P7
181	1	1.5	P6
182	1	1.5	P5
183	1	1.5	P4
184	1	1.5	P3
185	1	1.5	P2
186	1	1.5	P1
187	1	1.5	R10
188	1	1.5	R9
189	1	1.5	R8

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
190	1	1.5	R7
191	1	1.5	R6
192	1	1.5	R5
193	1	1.5	R4
194	1	1.5	R3
195	1	1.5	R2
196	1	1.5	R1
197	1	1.5	S10
198	1	1.5	S9
199	1	1.5	S8
200	1	1.5	S7
201	1	1.5	S6
202	1	1.5	S5
203	1	1.5	S4
204	1	1.5	S3
205	1	1.5	S2
206	1	1.5	S1
207	1	1.5	T10
208	1	1.5	T9
209	1	1.5	T8
210	1	1.5	T7
211	1	1.5	T6
212	1	1.5	T5
213	1	1.5	T4
214	1	1.5	T3
215	1	1.5	T2
216	1	1.5	T1
217	1	1.5	U10
218	1	1.5	U9
219	1	1.5	U8

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
220	1	1.5	U7
221	1	1.5	U6
222	1	1.5	U5
223	1	1.5	U4
224	1	1.5	U3
225	1	1.5	U2
226	1	1.5	U1
227	1	1.5	V10
228	1	1.5	V9
229	1	1.5	V8
230	1	1.5	V7
231	1	1.5	V6
232	1	1.5	V5
233	1	1.5	V4
234	1	1.5	V3
235	1	1.5	V2
236	1	1.5	V1
237	1	1.5	W10
238	1	1.5	W9
239	1	1.5	W8
240	1	1.5	W7
241	1	1.5	W6
242	1	1.5	W5
243	1	1.5	W4
244	1	1.5	W3
245	1	1.5	W2
246	1	1.5	W1
247	1	1.5	X10
248	1	1.5	X9
249	1	1.5	X8

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
250	1	1.5	X7
251	1	1.5	X6
252	1	1.5	X5
253	1	1.5	X4
254	1	1.5	X3
255	1	1.5	X2
256	1	1.5	X1
257	1	1.5	Y10
258	1	1.5	Y9
259	1	1.5	Y8
260	1	1.5	Y7
261	1	1.5	Y6
262	1	1.5	Y5
263	1	1.5	Y4
264	1	1.5	Y3
265	1	1.5	Y2
266	1	1.5	Y1
267	1	1.5	Z10
268	1	1.5	Z9
269	1	1.5	Z8
270	1	1.5	Z7
271	1	1.5	Z6
272	1	1.5	Z5
273	1	1.5	Z4
274	1	1.5	Z3
275	1	1.5	Z2
276	1	1.5	Z1
277	1	1.5	a8
278	1	1.5	a7

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. Current Slot [A]	Max. Current Backplane [A]	ITT Cannon DLM5-260
279	1	1.5	a6
280	1	1.5	a5
281	1	1.5	a4

Tab. 4-4 Table of the Unshielded Low Current Signals

Channel	Max. current Slot [A]	Max. current BP [A]	ITT Cannon DLM5-260	ITT Cannon KPTxx 55pol. (contact arrange-ments 22-55)	ITT CA20COM 19pol. (contact arrange-ments 22-14)
282	3	6	a1		
283	3	6		A	
284	3	6	a10		
285	3	6		U	
286	3	6	b1		
287	3	6		B	
288	3	6	b9		
289	3	6		V	
290	3	6	b10		
291	3	6		T	
292	3	6	c1		
293	3	6		C	
294	3	6	c2		
295	3	6		W	
296	3	6	c3		
297	3	6		n	
298	3	6	c4		
299	3	6		S	
300	3	6	c5		

Tab. 4-5 Table of the High Current Signals

Channel	Max. current Slot [A]	Max. current BP [A]	ITT Cannon DLM5-260	ITT Cannon KPTxx 55pol. (contact arrange-ments 22-55)	ITT CA20COM 19pol. (contact arrange-ments 22-14)
301	3	6		X	
302	3	6	c6		
303	3	6		p	
304	3	6	c7		
305	3	6		m	
306	3	6		Y	
307	3	6		q	
308	3	6		AA	
309	3	6		k	
310	3	6		D	
311	3	6		r	
312	3	6		BB	
313	3	6	c8		
314	3	6		z	
315	3	6		R	
316	3	6	c9		
317	3	6		Z	
318	3	6		CC	
319	3	6	c10		
320	3	6		GG	
321	3	6		i	C
322	5	10		E	
323	5	10		s	
324	5	10		HH	
325	5	10		y	
326	5	10		P	

Tab. 4-5 Table of the High Current Signals

Channel	Max. current Slot [A]	Max. current BP [A]	ITT Cannon DLM5-260	ITT Cannon KPTxx 55pol. (contact arrange-ments 22-55)	ITT CA20COM 19pol. (contact arrange-ments 22-14)
327	5	10		a	
328	5	10		DD	
329	5	10		FF	
330	5	25		i ; N	H ; S
331	5	25		x ; EE	J ; T
332	5	25		t ; F	K ; U
333	5	25		b ; u	L ; M
334	5	10			
335	5	10			
336	5	10		w	
337	5	10		h	
338	5	25		c ; v ; g	F ; G
339	10	40		G ; d ; H	D ; E ; R
340	10	40		J ; e ; f ; K ; L ; M	A ; B : N

Tab. 4-5 Table of the High Current Signals

note

The pins P and V have to be connected between the two connectors ITT CA20COM ratio 1:1.

5 ETAS Contact Addresses

ETAS HQ

ETAS GmbH

Borsigstr. 14	Phone:	+49 (711) 8 96 61-0
70469 Stuttgart	Fax:	+49 (711) 8 96 61-105
Germany	E-mail:	sales@etas.de
	WWW:	www.etasgroup.com

France

ETAS SAS

1, place des Etats-Unis	Phone:	+33 (1) 56 70 00 50
SILIC 307	Fax:	+33 (1) 56 70 00 51
94588 Rungis Cedex	E-mail:	sales@etas.fr
France	WWW:	www.etasgroup.com

Great Britain

ETAS Ltd.

Studio 3, Waterside Court	Phone:	+44 (0) 1283 - 546512
Third Avenue, Centrum 100	Fax:	+44 (0) 1283 - 548767
Burton-upon-Trent	E-mail:	sales@etas-uk.net
Staffordshire DE14 2WQ	WWW:	www.etasgroup.com
England		

Japan

ETAS K.K.

Queen's Tower C-17F 2-3-5, Minatomirai,	Phone:	+81 (45) 222-0900
Nishi-ku	Fax:	+81 (45) 222-0956
Yokohama 220-6217	E-mail:	sales@etas.co.jp
Japan	WWW:	www.etasgroup.com

Korea

ETAS Korea Co. Ltd.

3F, Samseung Bldg.	Phone:	+82 (2) 5747 016
61-1, Yangjae-dong	Fax:	+82 (2) 5747 120
Seocho-gu	E-mail:	sales@etas.co.kr
Seoul	WWW:	www.etasgroup.com
Republic of Korea		

North America

ETAS Inc.

3021 Miller Road	Phone:	+1 (888) ETAS INC
Ann Arbor, MI 48103	Fax:	+1 (734) 997-9449
USA	E-mail:	sales@etas.us
	WWW:	www.etasgroup.com

Figures

List of Tables