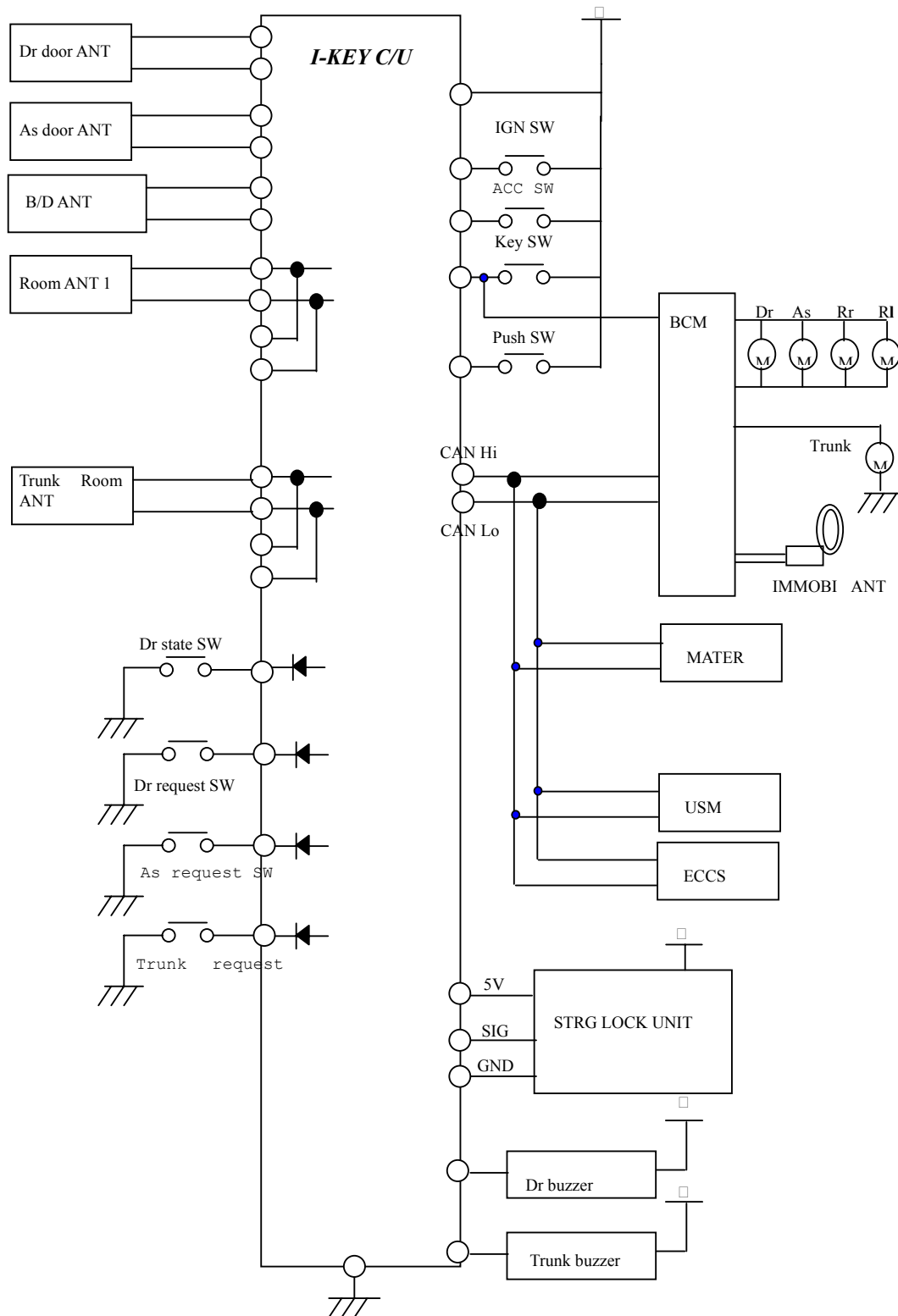



1. System block diagram



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2. Connector & Terminal No.

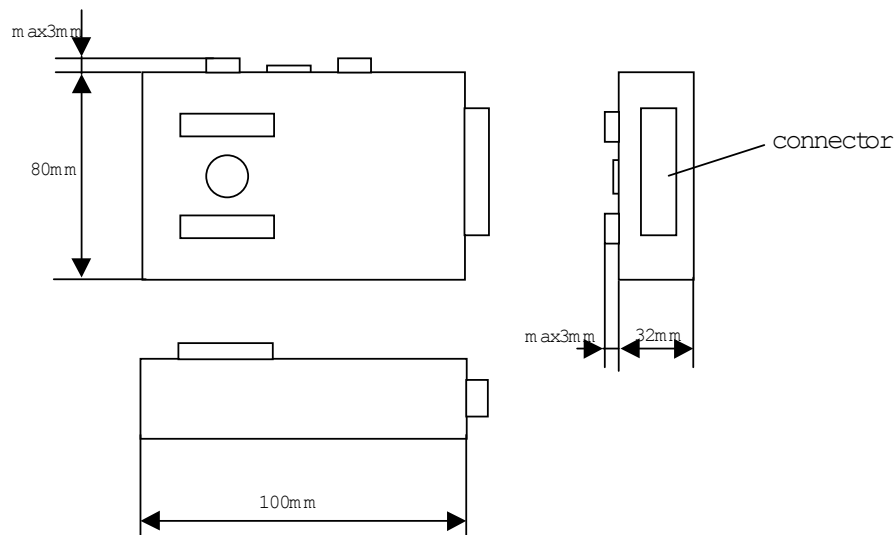


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

TH40HW

TerminalNo	TerminalName	TerminalNo	TerminalName
1	STRG LOCK 5V OUTPUT	21	NC
2	CAN Hi	22	(KEY LOCK SOL forMT)
3	CAN Lo	23	Trunk BUZZER OUTPUT
4	DrBUZZER OUTPUT	24	(BCM)
5	Dr request SW	25	ASST request SW
6	IGN SW	26	(STOP LAMP SW OPT)
7	KEY SW	27	PUSH SW
8	(Key rotate SW)	28	DrLOCK STATE SW
9	(Low Input SW (OPT))	29	BACK DOOR request SW
10	ACC SW	30	(BAT)
11	BAT	31	STRG GND
12	GND	32	STRG LOCK UNIT SG
13	LUGGAGE ANT +	33	(LUGGAGE ANT + OPT))
14	LUGGAGE ANT -	34	(LUGGAGE ANT - OPT))
15	ROOM ANT1+	35	ROOM ANT2+
16	ROOM ANT1-	36	ROOM ANT2-
17	BACK DOOR ANT+	37	ASST DOOR ANT+
18	BACK DOOR ANT-	38	ASST DOOR ANT-
19	DrDOOR ANT+	39	(Hi Input SW (OPT))
20	DrDOOR ANT-	40	NC

3. CASE SIZE



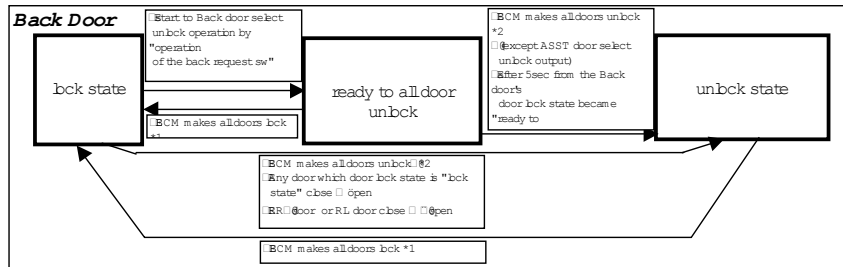
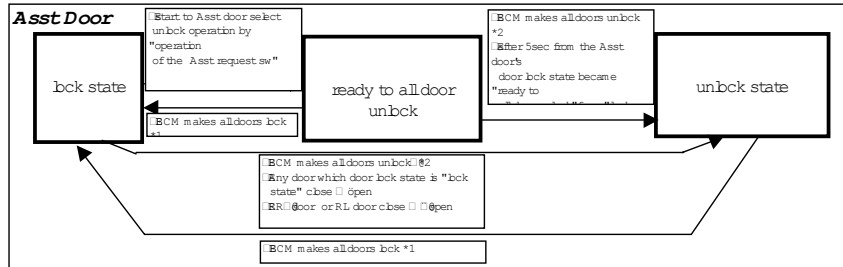
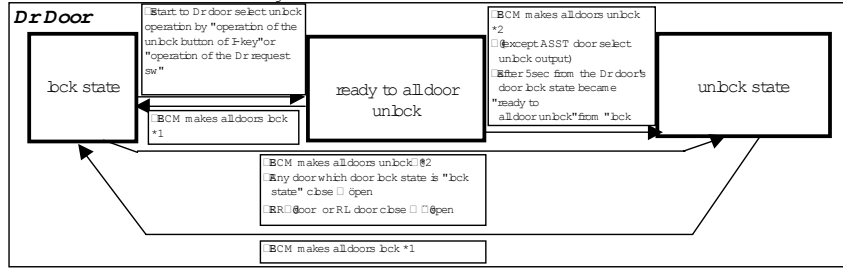
4.Function

1.Entry Function

1-1 Operation by request SW When the customer setting state is "SELECTIVE UNLOCK"="0")

(1)Door lock state of each door

I-key unit has 3 state of door lock state,"lock state"or"ready to all door unlock"or"unlock state" for Each door independently
Each door's door lock state is defined following state chart.



*1 When I-key unit received can command "dr door act info"="10" or "other door act info"="10" from BCM, I-key unit recognize BCM makes alldoors lock

*2 When I-key unit received can command "other door act info"="01" from BCM, I-key unit recognize BCM makes alldoors unlock □

(2) Operation by request SW

door lock state*3	Output when the request SW is operated
lock state	operated door's select unlock output
ready to all door unlock	all door unlock output
unlock state	lock output

*3 "door lock state" of which that request SW operated

1-2 Operation by request SW When the customer setting state is "SELECTIVE UNLOCK"="1")

(1)Door lock state of each door

I-key unit has 2 state of door lock state,"lock state"or"unlock" for all door
door lock state is defined following state chart.



*1 When I-key unit received can command "dr door act info"="10" or "other door act info"="10" from BCM, I-key unit recognize BCM makes alldoors lock

*2 When I-key unit received can command "other door act info"="01" from BCM, I-key unit recognize BCM makes alldoors unlock □

(2) Operation by request SW

door lock state	Output when the request SW is operated
lock state	all door unlock output
unlock state	lock output

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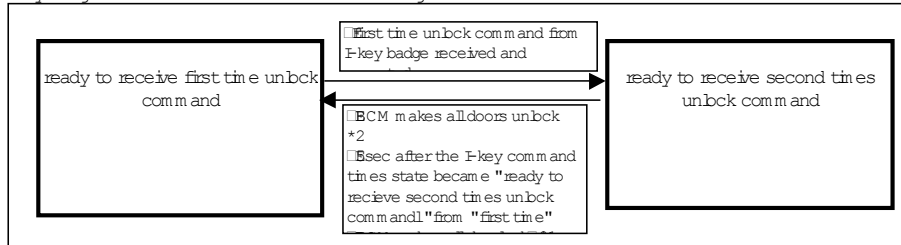
1-3 Operation by i-key badge button (When the customer setting state is "SELECTIVE UNLOCK"="0")

(1) Operation by F-key badge button

operated button	Dr's door bck state	output
lock button	□@	bck output
unlock button	first	bck state
		Dr door select unbck output
	second	ready to all door unbck
		all door unbck output
		unbck state
		Dr door select unbck output
		all door unbck output

(2) Judgement condition first time or second time operation of unlock button of F-key badge

F-key badge command times state defined following state chart



ready to receive first time unlock command When F-key unit received unlock command from F-key badge during this state F-key unit judge first time unlock command

ready to receive second time unlock command When F-key unit received unlock command from F-key badge during this : F-key unit judge second times unlock command

*1 When i-key unit received can command "dr door actr info"="10" or "other door actr info"="10" from BCM, F-key unit recognize BCM makes all doors lock

*2 When F-key unit received can command "other door actr info"="01" from BCM, F-key unit recognize BCM makes all doors unlock

1-4 Operation by i-key badge button (When the customer setting state is "SELECTIVE UNLOCK"="1")

(1) Operation by F-key badge button

operated button	Dr's door bck state	output
lock button	□@	bck output
unlock button	□@	all door unbck output

1-5 Auto relock operation (When the customer setting state is "AUTO RELOCK TIMER T_{re}"="00" or "10")

(1) When F-key unit output all door unlock output or any door select unlock output by request SW operation or F-key badge of F-key unit clear the auto relock timer and restart to count auto relock timer

When the auto relock timer become to T_{re}, F-key unit output all door unlock output

(2) Auto relock timer clear condition

F-key unit clear the auto relock timer when at least one of following condition exist

□ Any door close / open

□ F-key unit receive can command "dr door actr info"="10" or "other door actr info"="10" from BCM

□ Push sw on or key sw on

(3) Auto relock operation cancel

When the customer setting state is "AUTO RELOCK TIMER T_{re}"="01" auto relock function doesn't work

1-6 Antikey lock in operation (When customer setting state "ANTIKEY LOCK N"="0")

(1) When F-key unit receive can command "other door actr info"="10" from BCM while any door is opened,

F-key unit search the F-key badge that registered by room ANT and Luggage ANT.

When F-key unit find the F-key badge that registered to own above search, F-key unit output all door unlock output

(2) Antikey lock in operation cancel

When the customer setting state is "ANTIKEY LOCK N"="1" antikey lock in function doesn't work

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2. Operational condition

2-1 Operational condition of Request SW

(1) F-key unit accept the request sw operation (off/on), when all of following condition are satisfied, and then F-key output according to door lock state condition

- F-key unit search the F-key badge by out of vehicle ANT of which the door that request sw operated, and by room ANT and luggage ANT
- And then F-key unit recognize different F-key badge that found by out of vehicle ANT from F-key badge that found
- By room ANT and luggage ANT (include F-key find no F-key badge by room ANT and luggage ANT)
- KEY SW, PUSH SW, ACC SW, IGN SW and door SW, and customer setting state "LOCK/UNLOCK by F-KEY" condition are following

			"LOCK/UNLOCK by FKEY"="0"		"LOCK/UNLOCK by FKEY"="1"
			ANY DOOR SW		
			OFF	ON	
KEY SW	OFF		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
	ON		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
PUSH SW	OFF		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
	ON	OFF position warning is not operated	<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
		OFF position warning is operated	<input type="checkbox"/> ~	<input type="checkbox"/> ~	
ACC SW	OFF		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
	ON		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
IGN SW	OFF		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~
	ON		<input type="checkbox"/> >	<input type="checkbox"/> ~	<input type="checkbox"/> ~

- Operation of request sw is accepted
- Operation of request sw is not accepted

2-2 Operational condition of F-key badge button

2-2-1 Operational condition of F-key badge lock button

(1) F-key unit accept the F-key badge lock operation (off/on), when all of following condition are satisfied, and then F-key output door lock output

- KEY SW, PUSH SW, ACC SW, IGN SW and door SW condition are following

			ANY DOOR SW	
			OFF	ON
KEY SW	OFF		□ >	□ ~
	ON		□ >	□ ~
PUSH SW	OFF		□ >	□ ~
	ON	OFF position warning is not operated	□ >	□ ~
		OFF position warning is operated	□ ~	□ ~
ACC SW	OFF		□ >	□ ~
	ON		□ >	□ ~
IGN SW	OFF		□ >	□ ~
	ON		□ >	□ ~

- Operation of request sw is accepted
- Operation of request sw is not accepted

2-2-2 Operational condition of F-key badge unlock button

(1) F-key unit accept the F-key badge lock operation (off/on), when all of following condition are satisfied, and then F-key output according to F-key badge command times state

- KEY SW, PUSH SW, ACC SW, IGN SW and door SW condition are following

			DOOR SW	
			OFF	ON
KEY SW	OFF		□ >	□ >
	ON		□ >	□ >
PUSH SW	OFF		□ >	□ >
	ON		□ >	□ >
ACC SW	OFF		□ >	□ >
	ON		□ >	□ >
IGN SW	OFF		□ >	□ >
	ON		□ >	□ >

- Operation of request sw is accepted
- Operation of request sw is not accepted

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3.0 Output definition

3-1. Door lock /unlock output

door lock output	I-key unit send can command "lock/unlock/trunk open request"="01" three times (event) when condition to output exist. This output procedure is finished after 1200m sec from output start or when can command from BCM "operation actr from smart" become "1" to "0" If I-key unit receive can command "operation actr from smart" become "1" to "0" during send "lock/unlock/trunk open request"="01", I-key unit finish output after send "lock/unlock/trunk open request"="01" three times
Dr door select unlock output	I-key unit send can command "lock/unlock/trunk open request"="01" three times (event) when condition to output exist. This output procedure is finished after 1200m sec from output start or when can command from BCM "operation actr from smart" become "1" to "0" If I-key unit receive can command "operation actr from smart" become "1" to "0" during send "lock/unlock/trunk open request"="01", I-key unit finish output after send "lock/unlock/trunk open request"="01" three times
Asst door select unlock output	When condition to output exist, I-key unit do under operation + ① turn Asst select unlock RLY on + ② After 50ms from + ① I-key unit send can command "alldoorunlock request"="1" three times (event) + ③ I-key unit turn Asst select unlock RLY off after 1200ms from can command "alldoorunlock request" set to 1 or when can command from BCM "operation actr from smart" become "1" to "0" + ④ I-key unit finish output procedure after 10ms from turn Asst select unlock RLY off
Back door select unlock output	I-key unit set can command "accept back door open sw" to "1" (event) and after 300ms from set can command "accept back door open sw" to "1", this output procedure is finished "accept back door open sw" is set to "0" when I-key unit receive can command "Dr door actr operate info"="10" or "other door actr operate info"="10" (event)
alldoorunlock output	I-key unit send can command "alldoorunlock request"="1" three times (event) when condition to output exist. This output procedure is finished after 1200m sec from output start or when can command from BCM "operation actr from smart" become "1" to "0" If I-key unit receive can command "operation actr from smart" become "1" to "0" during send "alldoorunlock request"="1", I-key unit finish output after send "alldoorunlock request"="1" three times

3-2. Back door operation

(1) I-key unit set the can command "accept back door open sw" to "1" (event) when at least one of following condition exist

□ Back door select unlock output

□ I-key unit receive can command "other door actr operate info"="01" (except Asst door select unlock output)

(2) I-key unit set the can command "accept back door open sw" to "0" (event) when receive can command "Dr door actr operate info"="10" or "other door actr operate info"="10"

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4 Answer back

according under table Fly unit set can command "answerback request" three times or turn on Drbuzz
same thing as door lock output start

		command "answer back request"	Dr buzzer
request SW operation	Dr door select unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	when Answer Back with F-Key unbk=0 2times when Answer Back with F-Key unbk=1 OFF
	Asst door select unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	when Answer Back with F-Key unbk=0 2times when Answer Back with F-Key unbk=1 OFF
	Back door select unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	when Answer Back with F-Key unbk=0 2times when Answer Back with F-Key unbk=1 OFF
	all door unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	when Answer Back with F-Key unbk=0 2times when Answer Back with F-Key unbk=1 OFF
	door bck output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	when Answer Back with F-Key bck=00or10 when Answer Back with F-Key bck=01 1time
F-key badge button operation	select unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	OFF
	all door unbk output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	OFF
	door bck output	when FLASH□@th□EMOTE□@□Key=01or1 when FLASH□@th□EMOTE□@□Key=00or10	OFF
other	auto rebck output	"000"	OFF
	antikey bck in output	"000"	OFF

```
FLASH@ with REMOTE@ @Key : customer setting parameter
```

Answer Back with F-Key unlock customer setting parameter

Answer Back with F-Key back customer setting parameter

☐ Er buzzer

time:125ms ON

2 times: 125ms on □ 125ms off □ 125ms on

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5 warning

5-1 Take out I-key badge warning

(1) take out I-key badge warning can work while following condition
ID OK FLAG SET

(2) take out I-key badge warning never work while following condition
ID OK FLAG RESET

(3)-1 take out I-key badge warning start condition

When customer setting parameter "FOB TAKE OUT WAN TRIGER"="0")

When following condition is satisfied, I-key unit start warning

□ PERMIT TO ENG START FLAG is set to reset caused following search result, while ID OK FLAG S

‡ Any door open □ all door close search

‡ Push sw on and any door open search

‡ Detect take out I-key badge from window search

(only when customer setting parameter "DETECT FOB TAKEOUT FROM WINDOW"="0")

(4)-1 how to warning (When customer setting parameter "FOB TAKE OUT WAN TRIGER"="0")

	KEY	flick	BUZZER	
	red		buzzer1	drbuzzer
search# @	□ >	□ >	□ ~	□ 3sec
search# A	□ >	□ >	□ ~	□ ~
search# B	□ >	□ >	□ 3sec	□ ~

Dr buzzer 10Hz 30% Duty

(3)-2 take out I-key badge warning start condition

When customer setting parameter "FOB TAKE OUT WAN TRIGER"="1")

When following condition is satisfied, I-key unit start warning

□ PERMIT TO ENG START FLAG is set to reset caused following search result, while ID OK FLAG S

‡ Any door open □ all door close search, while shift position is not P

‡ Push sw on and any door open search

‡ Detect take out I-key badge from window search

(only when customer setting parameter "DETECT FOB TAKEOUT FROM WINDOW"="0")

‡ Shift position is out of "p" search

‡ Dr door open □ Dr door close search, while shift position is P

(4)-2 how to warning (When customer setting parameter "FOB TAKE OUT WAN TRIGER"="1")

	KEY	flick	BUZZER	
	red		buzzer1	drbuzzer
search# @	□ >	□ >	□ ~	□ 3sec
search# A	□ >	□ >	□ ~	□ ~
search# B	□ >	□ >	□ 3sec	□ ~
search# C	□ >	□ >	□ 3sec	□ ~
search# D	□ >	□ >	□ ~	□ 3sec

Dr buzzer 10Hz 30% Duty

(5) take out I-key badge warning stop condition

When at least one following condition is satisfied, I-key unit stop warning

□ PERMIT TO ENG START FLAG is set

□ ID OK FLAG is reset

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5-2 OFF position warning

(1) OFF position warning start condition

When following condition is satisfied, I-key unit start warning

- After 1sec from ACC sw on off, while ID OK FLAG SET and IGN sw off

	without mechanical key					with mechanical key				
IGN knob	LOCK	OFF	ACC	IGN	ST	LOCK	OFF	ACC	IGN	ST
PUSH SW	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	ON
KEY SW	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
warning	□ ~	□ ~	□ ~	□ ~	□ ~	□ ~	□ ~	□ ~	□ ~	□ ~

(2) how to warning

	KNOB	" - Å f f % O	BUZZER	buzzer2	drbuzzer
start warning	□ >	□ >	□ >	□ ~	□ ~
Dr door open	□ >	□ >	□ ~	□ ~	□ ~
□ Dr door close, during off position warning on					

Drbuzzer 10Hz 30% Duty

(3) OFF position warning stop condition

When at least one of following condition is satisfied, I-key unit stop warning

- ACC sw on
- IGN sw on
- ID OK FLAG RESET

5-3 IGN knob not bck position warning

(1) IGN knob not bck position warning start condition

When all of following condition is satisfied, I-key unit start warning

- ID OK FLAG SET
- Dr door open
- IGN sw off

(2) how to warning

I-key send can comm and "key warning buzzer"="1" to METER

(3) IGN knob not bck position warning stop condition

When at least one of following condition is satisfied, I-key unit stop warning

- ID OK FLAG RESET
- Dr door close
- IGN sw on

5-4 door bck operation is not done warning

(1) door bck operation is not done warning start condition

When all of following conditions are satisfied, I-key unit make warning

- I-key unit search the I-key badge by out of vehicle ANT of which the door that request sw operated, and search by room ANT
- Luggage ANT, and then I-key unit recognize different I-key badge that found by out of vehicle ANT from I-key badge that
- found by room ANT and luggage ANT (include I-key find no I-key badge by room ANT and luggage ANT)
- Door bck state of the door that request sw operated is "unbck state"
- Any door open or off position warning on

When all of following conditions are satisfied, I-key unit make warning, too

- During off position warning on
- I-key unit receive bck comm and from I-key badge

(2) how to warning

I-key unit turn on Drbuzzer for 2sec (10Hz 30%Duty)

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6. Indicator lamp

6-1 KEY BLUE

(1) LIGHTING

□ Lighting condition

When all of following conditions are satisfied, F-key unit turn key blue indicator on. (event)

(if key blue ind. Turn off once, F-key unit never turn key blue indicator on without new ID OK FLAG RESET SET trigger)

□ ID OK FLAG RESET SET

□ KEY RED is not lighting and not blinking

□ KEY BLUE is not blinking

□ Turn off condition

When at least one of following condition exist, F-key unit turn key blue indicator off (event)

□ ID OK FLAG RESET

□ ACC sw on

□ KEY RED lighting or blinking condition exist

□ KEY BLUE blinking condition exist

(2) BLINKING

□ Blinking condition

When all of following conditions are satisfied, F-key unit makes key blue indicator blinking. (event)

□ When F-key unit judged F-key badge's BAT is low voltage

□ (When F-key unit received BAT low voltage signal 5 times continuously from same F-key badge,

□ F-key unit judged F-key badge's BAT is low voltage)

□ IGN ON

□ Turn off condition

When at least one of following condition exist, F-key unit turn key blue indicator off (event)

□ After 30sec from IGN sw on

□ IGN sw off

6-2 KEY RED

(1) LIGHTING-1 (search result NG)

□ Lighting condition

When all of following conditions are satisfied, F-key unit turn key red indicator on. (event)

□ PUSH SW ON

□ The result of search when PUSH sw off on is NG

□ KEY SW OFF

□ Turn off condition

When at least one of following condition exist, F-key unit turn key blue indicator off (event)

□ PUSH SW OFF

□ KEY SW ON

(2) LIGHTING-2 (bulb check) (it should be synchronized with knob indicator's bulb check)

□ Lighting condition

□ IGN off on

□ Turn off condition

When at least one of following condition exist, F-key unit turn key red indicator off (event)

□ After 2sec from IGN off on (except stay lock unit is not registered with F-key unit)

□ IGN OFF

(3) BLINKING

□ Blinking condition

When all of following conditions are satisfied, F-key unit makes key red indicator blinking. (event)

□ Take out F-key badge warning on

□ KEY RED is not lighting

□ Turn off condition

When at least one of following condition exist, F-key unit turn key blue indicator off (event)

□ Take out F-key badge warning off

□ KEY RED lighting condition exist

6-3. KNOB IND

(1) LIGHTING (bulb check) (it should be synchronized with key red indicator's bulb check)

□ Lighting condition

□ IGN off on

□ Turn off condition

When at least one of following condition exist, F-key unit turn knob indicator off (event)

□ After 2sec from IGN off on (except stay lock unit is not registered with F-key unit)

□ IGN OFF

(2) BLINKING

□ Blinking condition

When all of following conditions are satisfied, F-key unit makes knob indicator blinking. (event)

□ OFF position warning on

□ KNOB IND is not lighting

□ Turn off condition

When at least one of following condition exist, F-key unit turn key blue indicator off (event)

□ OFF position warning off

□ KNOB IND lighting condition exist

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6-4 output definition

KEY BLUE lighting	F-key unit set CAN command "KEY indicator blue" to "1"
KEY BLUE blinking	F-key unit set CAN command "KEY indicator blue" and "flick indicator key warning" to "1" same timing
KEY RED lighting	F-key unit set CAN command "KEY indicator red" to "1"
KEY RED blinking	F-key unit set CAN command "KEY indicator red" and "flick indicator key warning" to "1" same timing
KNOB IND lighting	F-key unit set CAN command "Knob indicator on" to "1"
KNOB IND blinking	F-key unit set CAN command "Knob indicator on" and "flick indicator knob warning" to "1" same timing
take out F-key badge warning room buzzer	F-key unit set CAN command "buzzer1 on request" to "1"
OFF position warning room buzzer	F-key unit set CAN command "buzzer2 on request" to "1"
IGN knob not back position warning room buzzer	F-key unit set CAN command "KEY warning buzzer" to "1"