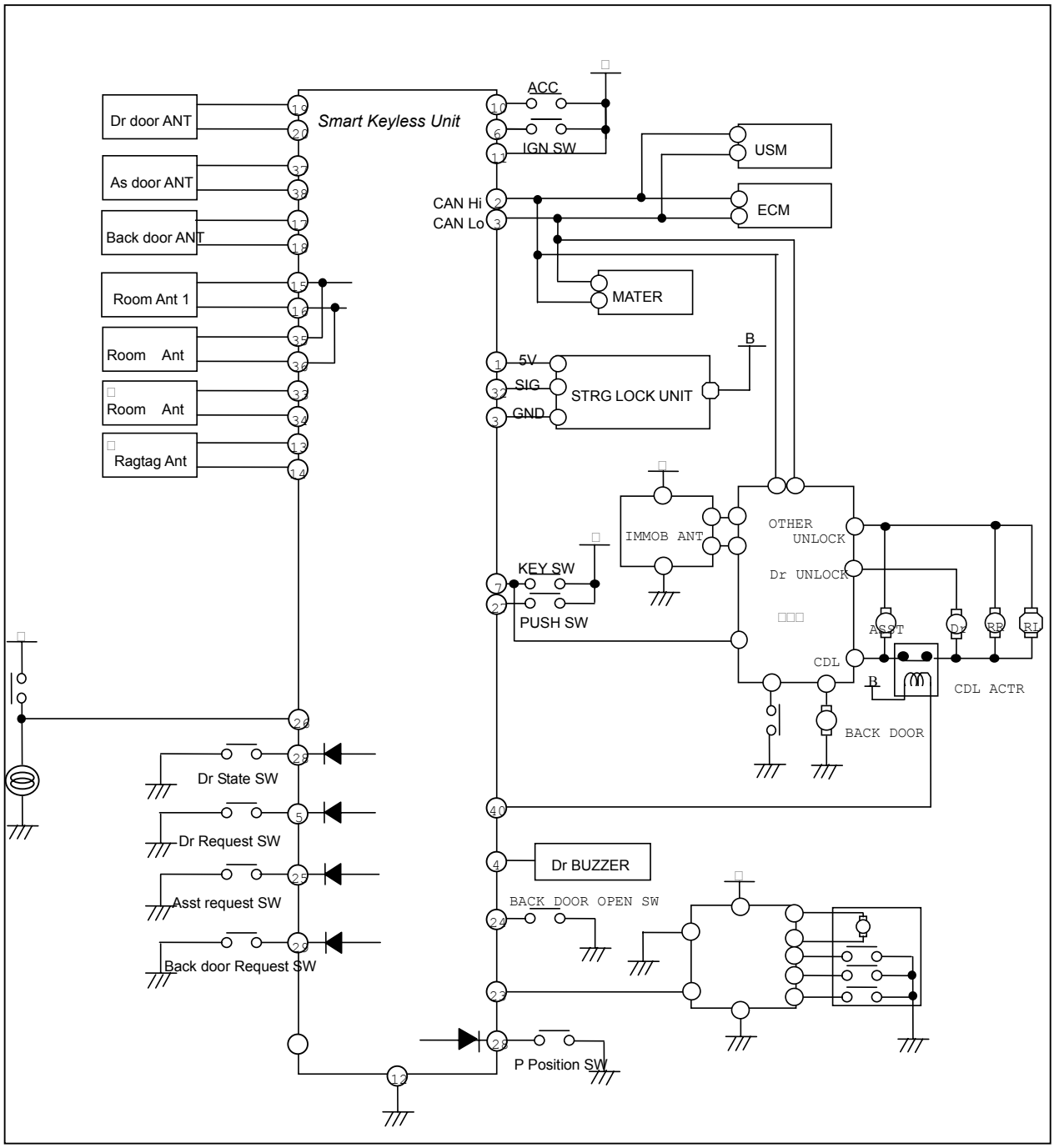
1.System block diagram



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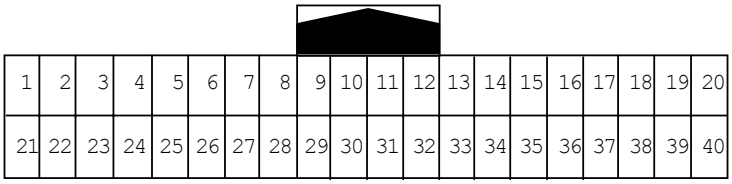
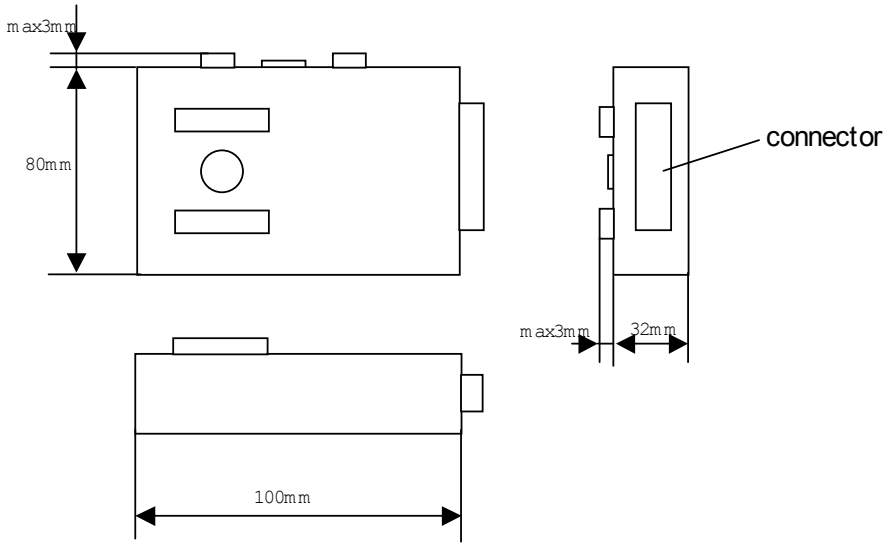
2. Connector & Terminal No.



TH40HW

Terminal No.	Terminal Name	Terminal No.	Terminal Name
1	STRG LOCK 5V OUTPUT	21	DONGLE K-LINE
2	CAN Hi	22	KEY LOCK SOL for MT
3	CAN Lo	23	(BACK DOOR OPEN OUTPUT OPT)
4	Dr BUZZER OUTPUT	24	(BACK DOOR OPEN SW OPT)
5	Dr request SW	25	ASST request SW
6	IGN SW	26	(STOP LAMP SW OPT)
7	KEY SW	27	PUSH SW
8	Immobilizer ANT SIG IN	28	(Dr LOCK STATE SW OPT)
9	Immobilizer ANT SIG OUT	29	BACK DOOR request SW
10	ACC SW	30	SECURITY IND
11	BAT	31	STRG LOCK UNIT GND
12	GND	32	STRG LOCK UNIT SIG
13	LUGGAGE ANT +	33	(ROOM ANT2+ OPT)
14	LUGGAGE ANT -	34	(ROOM ANT2- OPT)
15	ROOM ANT1+	35	(ROOM ANT3+ OPT)
16	ROOM ANT1-	36	(ROOM ANT3- OPT)
17	BACK DOOR ANT+	37	ASST DOOR ANT+
18	BACK DOOR ANT-	38	ASST DOOR ANT-
19	Dr DOOR ANT+	39	(P Range SW OPT)
20	Dr DOOR ANT-	40	ASST SELECT UNLOCK OUTPUT

3. CASE SIZE



4.Function

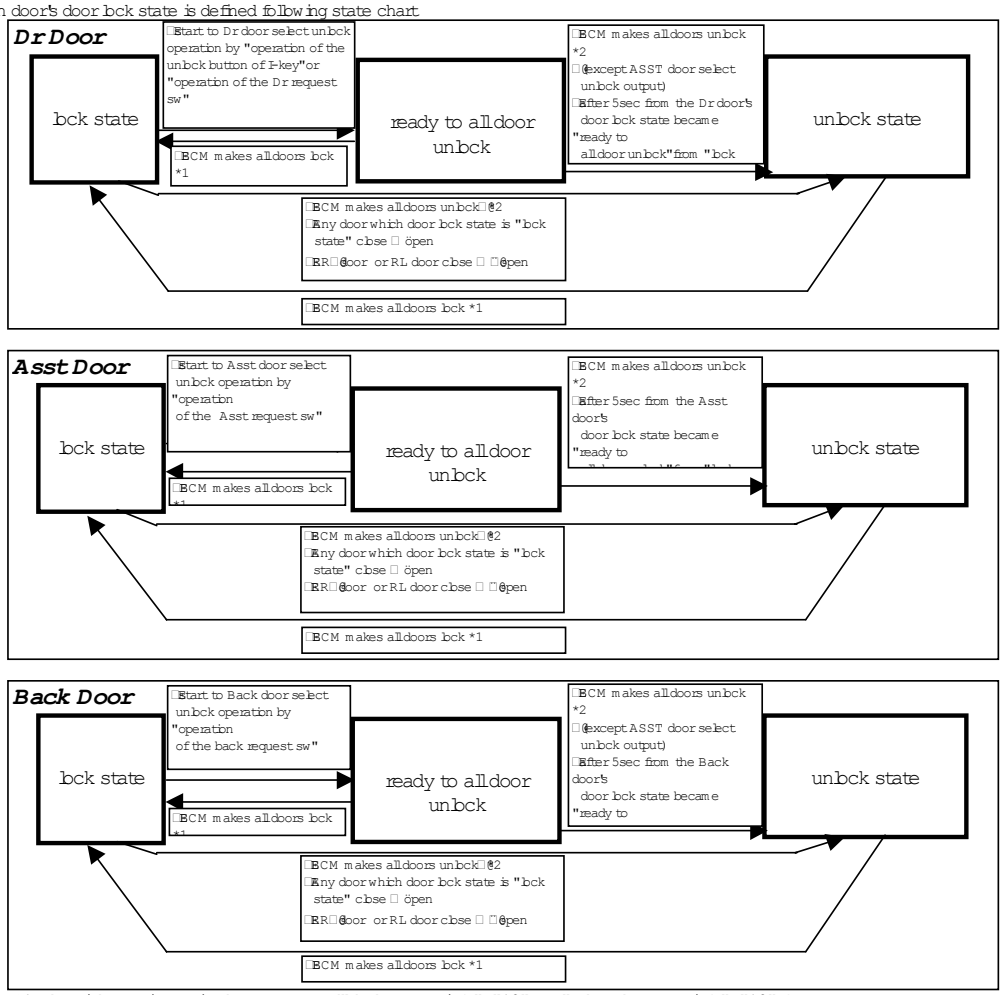
1 Entry Function

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 alldoor 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"drdooractrinfo"="10" or "otherdooractrinfo"="10" from BCM, I-key unit recognize BCM makes alldoors lock

*2 When I-key unit received can command"otherdooractrinfo"="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 alldoor unlock	alldoor unlock output
unlock state	lock output

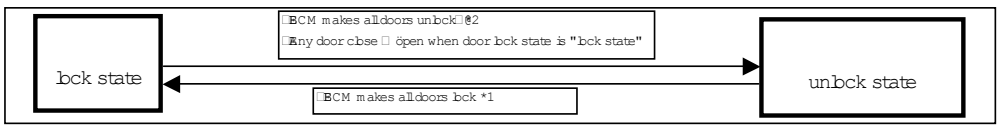
*3 "door lock state" of which that request SW operated

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 alldoor

door lock state is defined following state chart



*1 When i-key unit received can command"drdooractrinfo"="10" or "otherdooractrinfo"="10" from BCM, I-key unit recognize BCM makes alldoors lock

*2 When I-key unit received can command"otherdooractrinfo"="01" from BCM, I-key recognize BCM makes alldoors unlock

(2)Operation by request SW

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

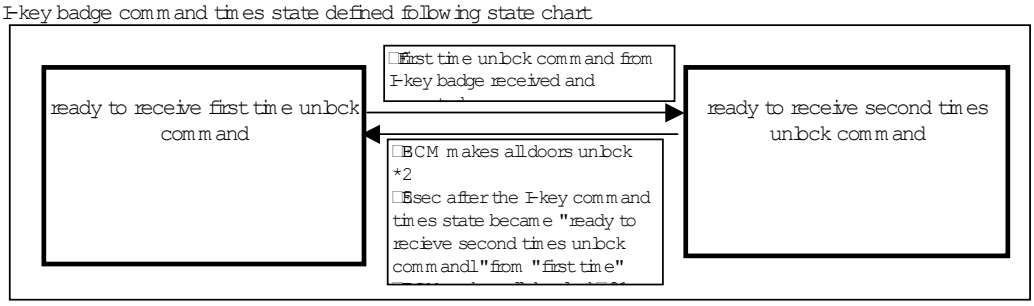
1-3.Operation by i-key badge button (When the customer setting state is "SELECTIVE UNLOCK"="0")

(1)Operation by I-key badge button

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

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

I-key badge command times state defined following state chart



ready to receive first time unlock command□When I-key unit received unlock command from I-key badge during this sta

I-key unit judge first time unlock command

ready to receive second time unlock command□When I-key unit received unlock command from I-key badge during this

I-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,
I-key unit recognize BCM makes all doors lock

*2 When I-key unit received can command"other door actr info"="01" from BCM,I-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 I-key badge button

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

1-5.Auto relock operation (When the customer setting state is "AUTO RELOCK TIMER Tre"="00"or"10")

(1)When I-key unit output all door unlock output or any door select unlock output by request SW operation or I-key badge op

I-key unit clear the auto relock timer and restart to count auto relock timer

When the auto relock timer become to Tre, I-key unit output all door unlock output

(2)Auto relock timer crear condition

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

□Any door close□ open

□I-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 Tre"="01",auto relock function doesn□t work

1-7.Anti key lock in operation (When customer setting stete "ANTIKEY LOCK IN"="0")

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

I-key unit serch the I-key badge that registrated by room ANT and Luggage ANT.

When I-key unit find the I-key badge that registrated to own above serch , I-key unit output all door unlock output

(2)Anti key lock in operation cancel

When the customer setting state is "ANTIKEY LOCK IN"="1",anti key lock in function doesn□t work

2. Operational condition

2-1 Operational condition of Request SW

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

- I-key unit search the I-key badge by out of vehicle ANT of which the door that request sw operated, and by room ANT and 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)
- KEY SW, PUSH SW, ACC SW, IGN SW and door SW, and customer setting state "LOCK/UNLOCK by I-KEY" condition are following

			"LOCK/UNLOCK by I-KEY"="0"		"LOCK/UNLOCK by I-KEY"="1"
			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 Operational condition of I-key badge button

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

(1) I-key unit accept the I-key badge lock operation (off → on), when all of following condition are satisfied, and then I-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 I-key badge unlock button

(1) I-key unit accept the I-key badge lock operation (off → on), when all of following condition are satisfied, and then I-key output according to I-key badge comm and 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

3.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 1200msec 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 1200msec 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 ‡ @turn Asst select unlock RLY on ‡ After 50ms from ‡ @I-key unit send can command "alldoor unlock request"="1" three times (event) ‡ B-key unit turn Asst select unlock RLY off after 1200ms from can command "alldoor unlock request" set to 1 or when @can command from BCM "operation actr from smart" become "1"to"0" ‡ C-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)
alldoor unlock output	I-key unit send can command "alldoor unlock request"="1" three times (event) when condition to output exist. This output procedure is finished after 1200msec 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 "alldoor unlock request" ="1", I-key unit finish output after send "alldoor unlock 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"

4 Answer back

according under teble I-key unit set can command "answer back request" three times or turn on Dr buzze same timing as door lock output start

		command "answer back request"	Dr buzzer
request SW operation	Dr door select unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	when Anser Back with I-Key unlock=0 2times when Anser Back with I-Key unlock=1 OFF
	Asst door select unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	when Anser Back with I-Key unlock=0 2times when Anser Back with I-Key unlock=1 OFF
	Back door select unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	when Anser Back with I-Key unlock=0 2times when Anser Back with I-Key unlock=1 OFF
	all door unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	when Anser Back with I-Key unlock=0 2times when Anser Back with I-Key unlock=1 OFF
	door lock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	when Anser Back with I-Key lock=00or10 when Anser Back with I-Key lock=01 1time
I-key badge button operation	select unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	OFF
	all door unlock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	OFF
	door lock output	when FLASH□With□REMOTE□Code□I-Key=01or11 when FLASH□With□REMOTE□Code□I-Key=00or10	OFF
other	auto relock output	"000"	OFF
	anti key lock in output	"000"	OFF

FLASH□With□REMOTE□Code□I-Key : customer setting parameter
Anser Back with I-Key unlock : customer setting parameter
Anser Back with I-Key lock : customer setting parameter

□Dr buzzer
1time: 125ms ON
2 times: 125ms on□ 125ms off□ 125ms on

11 warning

11-1 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

‡ @any door open all door close search

‡ A Push sw on and any door open search

‡ B 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 red	flick	BUZZER	
			buzzer1	drbuzzer
search‡ @	›	›	~	3sec
search‡ A	›	›	~	~
search‡ B	›	›	3sec	~

Drbuzzer 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

‡ @any door open all door close search, while shift position is not P

‡ A Push sw on and any door open search

‡ B 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 or 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 red	flick	BUZZER	
			buzzer1	drbuzzer
search‡ @	›	›	~	3sec
search‡ A	›	›	~	~
search‡ B	›	›	3sec	~
search‡ C	›	›	3sec	~
search‡ D	›	›	~	3sec

Drbuzzer 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

11-2 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□ öff, 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 ƒ ‡ ‰ O	BUZZER buzzer2	dr buzzer	
start warning	□ ›	□ ›	□ › 800ms	□ ~	
Dr door open □ Dr door close, during off position warning on	□ ›	□ ›	□ ~	□ 3sec	Dr buzzer 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

11-3 IGN knob not lock position warning

(1)IGN knob not lock 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 command "key warning buzzer"="1" to METER

(3)IGN knob not lock 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

11-4 door lock operation is not done warning

(1)door lock 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 lock state of the door that request sw operated is "unlock 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 lock command from I-key badge

(2)how to warning

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

12. Indicator lamp

12-1 KEY BLUE

(1) LIGHTING

□ Lighting condition

When all of following conditions are satisfied, I-key unit turn key blue indicator on. (event)
(if key blue ind. Turn off once, I-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, I-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, I-key unit makes key blue indicator blinking. (event)

- ¥when I-key unit judged I-key badge's BAT is low voltage
  (When I-key unit received BAT low voltage signal 5times continuously from same I-key badge, I-key unit judged I-key badge's BAT is low voltage)
- IGN ON

□ Turn off condition

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

- After 30sec from IGN sw on
- ¥IGN□ sw off

12-2 KEY RED

(1) LIGHTING-1 (search result NG)

□ Lighting condition

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

- ¥PUSH SW□ ON
- The result of search when PUSH sw off□ ön is NG
- KEY SW OFF

□ Turn off condition

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

- PUSH SW OFF
- KEY□ SW□ ON

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

□ Lighting condition

IGN□ off□ □ ön

□ Turn off condition

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

- After 2sec from IGN off□ ön (except strg lock unit is not registrated with I-key unit)
- IGN□ OFF

(3) BLINKING

□ Blinking condition

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

- Take out I-key badge warning on
- KEY RED is not lighting

□ Turn off condition

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

- Take out I-key badge warning off
- KEY RED lighting condition exist

12-3. KNOB IND

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

□ Lighting condition

IGN□ off□ □ ön

□ Turn off condition

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

- After 2sec from IGN off□ ön (except strg lock unit is not registrated with I-key unit)
- IGN□ OFF

(2) BLINKING

□ Blinking condition

When all of following conditions are satisfied, I-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, I-key unit turn key blue indicator off (event)

- OFF position warning off
- KNOB IND lighting condition exist

12-4 output definition

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