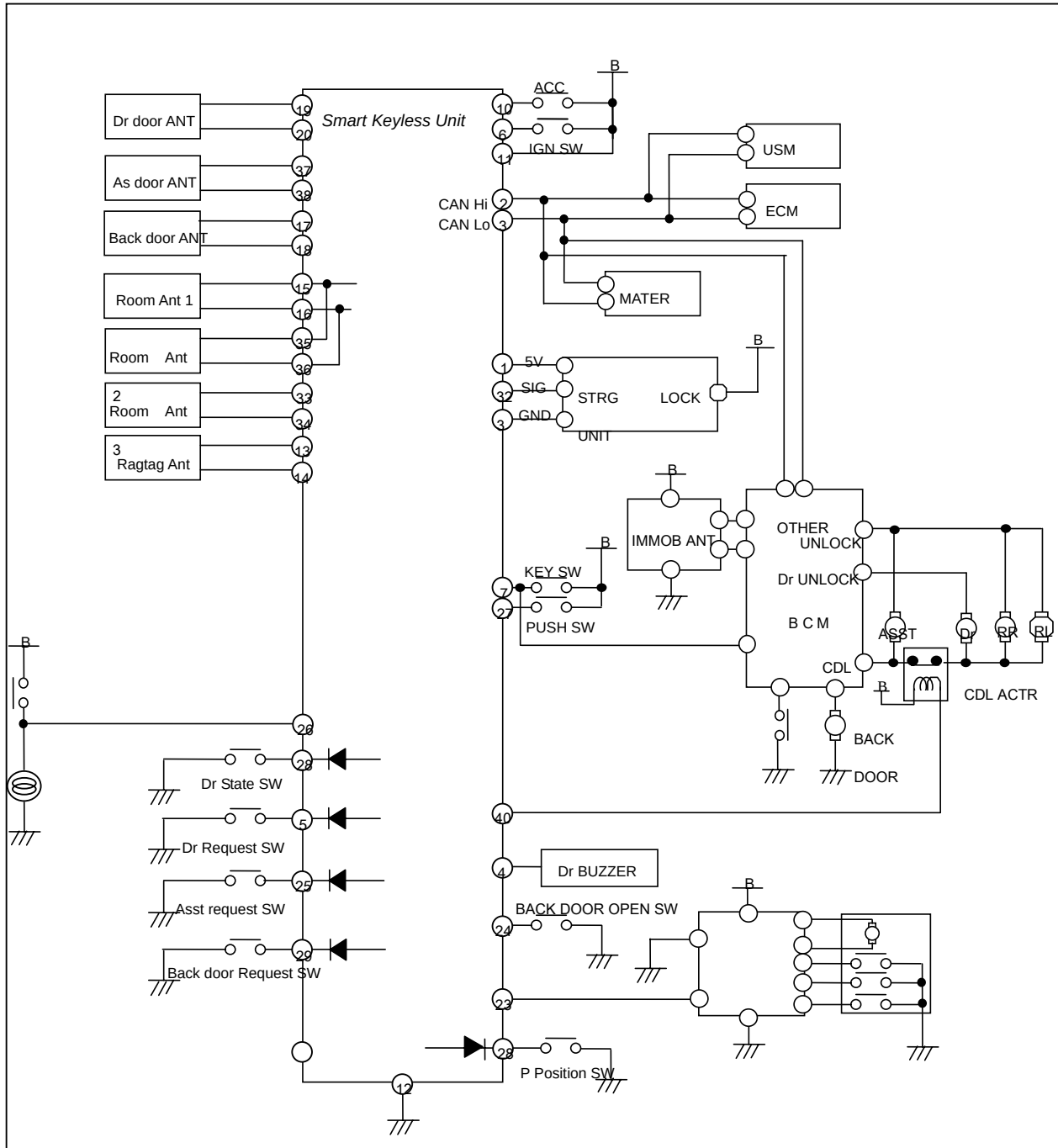


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1. System block diagram



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2. Connector & TerminalNo.

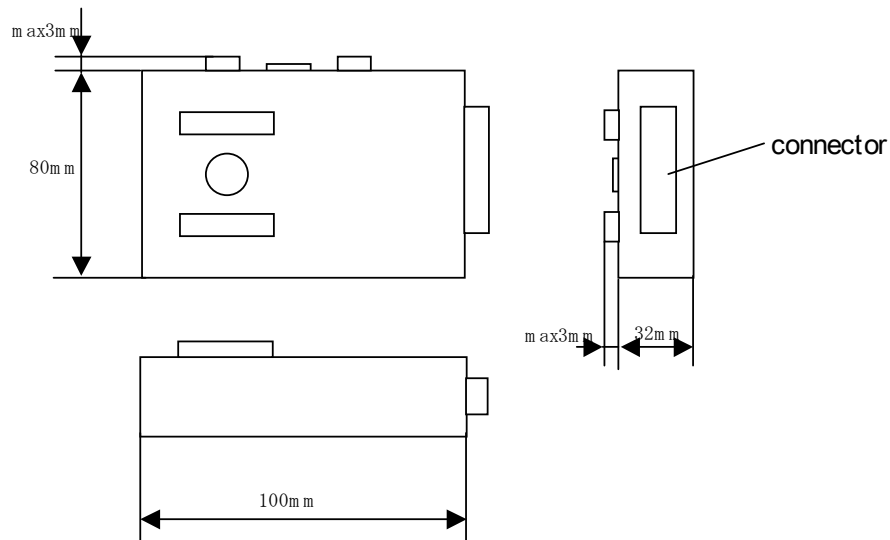


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

TH40HW

TerminalNo.	TerminalName	TerminalNo.	TerminalName
1	STRG LOCK 5V OUTPUT	21	DONGLE K-LNE
2	CAN Hi	22	KEY LOCK SOL forMT
3	CAN Lo	23	(BACK DOOR OPEN OUTPUT OPT)
4	DrBUZZER OUTPUT	24	(BACK DOOR OPEN SW OPT)
5	Drrequest SW	25	ASST request SW
6	IGN SW	26	(STOP LAMP SW OPT)
7	KEY SW	27	PUSH SW
8	Immobilizer ANT S G N	28	(DrLOCK STATE SW OPT)
9	Immobilizer ANT S G OUT	29	BACK DOOR request SW
10	ACC SW	30	SECURITY ND
11	BAT	31	STRG LOCK UNIT GND
12	GND	32	STRG LOCK UNIT S G
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	DrDOOR ANT+	39	(P Range SW OPT)
20	DrDOOR ANT-	40	ASST SELECT UNLOCK OUTPUT

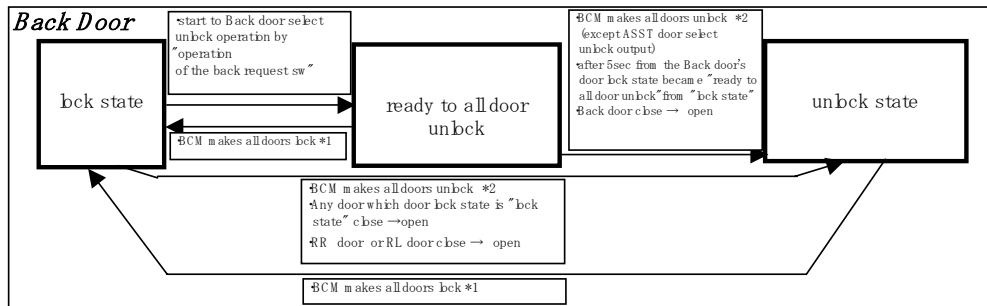
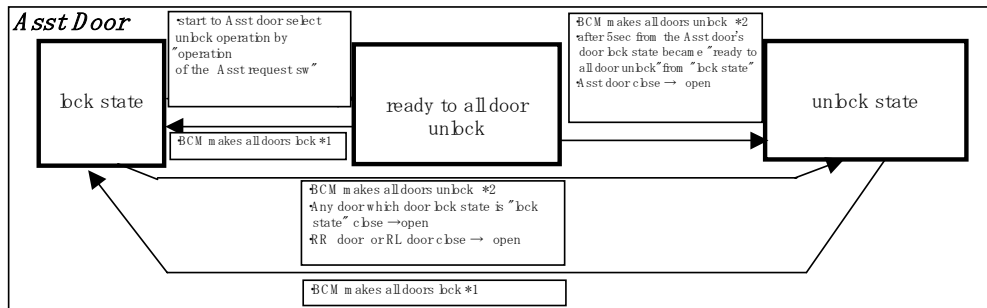
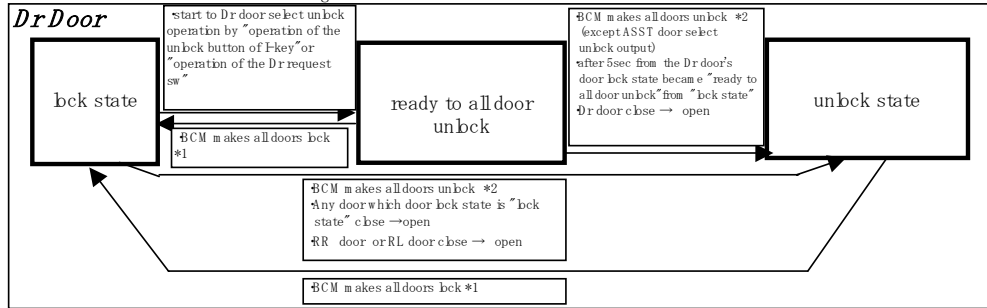
3. CASE SIZE



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4.Function

i-key unit has 3 state of door bck state,"bck state"or"ready to all door unbck"or"unbck state" for Each door independently
Each door's door bck state is defined folbw ing state chart



*1 When i-key unit received can comm and "dr door actr info"="10" or "other door actr info"="10" from BCM, I-key unit recognize BCM makes all doors bck

*2 When I-key unit received can comm and "other door actr info"="01" from BCM, I-key unit recognize BCM makes all doors unbck

②)operation by request SW

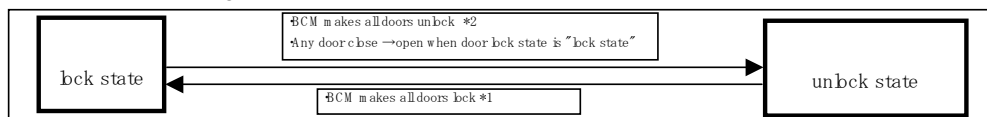
door bck state*3	Output when the request SW is operated
bck state	operated door's select unbck output
ready to all door unbck	all door unbck output
unbck state	bck output

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

1-2.0 operation by request SW (When the customer setting state is "SELECTIVE UNLOCK"="1")

(1)Door bck state of each door

i-key unit has 2 state of door bck state,"bck state"or"unbck" for all door
door bck state is defined folbw ing state chart



*1 When i-key unit received can comm and "dr door actr info"="10" or "other door actr info"="10" from BCM, I-key unit recognize BCM makes all doors bck

*2 When I-key unit received can comm and "other door actr info"="01" from BCM, I-key recognize BCM makes all doors unbck

②)operation by request SW

door bck state	Output when the request SW is operated
bck state	all door unbck output
unbck state	bck output

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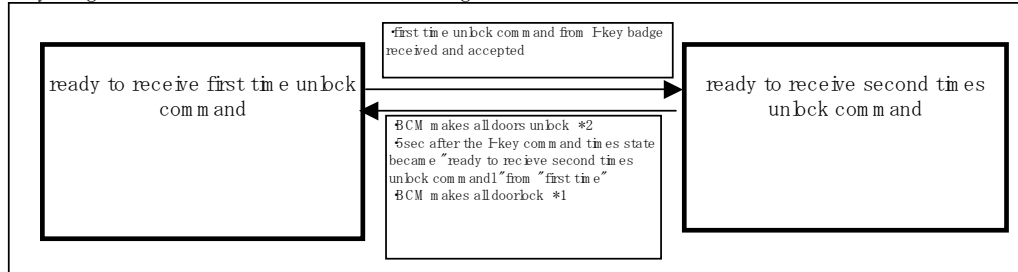
1-3.0 operation by i-key badge button (When the customer setting state is "SELECTIVE UNLOCK"="0")

(1) Operation by F-key badge button

operated button		Dr's door bck state	output
bck button		—	bck output
unlock button	first	bck state	Dr door select unlock output
		ready to all door unlock	all door unlock output
	second	—	Dr door select unlock output
			all door unlock 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 state F-key unit judge second times unlock command

*1 When i-key unit received can command and "dr door act info"="10" or "other door act info"="10" from BCM,

F-key unit recognize BCM makes all doors lock

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

1-4.0 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
bck button		—	bck 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 F-key unit output all door unlock output or any door select unlock output by request SW operation or F-key badge operation F-key unit clear the auto relock timer and restart to count auto relock timer

When the auto relock timer become to Tre, 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 and "dr door act info"="10" or "other door act 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. Antikey lock in operation (When customer setting state "ANTIKEY LOCK N"="0")

(1) When F-key unit receive can command and "other door act 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

2-1.0 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 doorSW, and customer setting state "LOCK/UNLOCK by F-KEY" condition are following

			"LOCK/UNLOCK by F-KEY"="0"		"LOCK/UNLOCK by F-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

2-2.0 Operational condition of F-key badge button

2-2-1.0 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 doorSW 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

2-2-2.0 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 doorSW 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 bck /unbck output

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

3-2. Back door operation

- ① Fkey unit set the can comm and "accept back door open sw" to "1" (event), when at least one of following condition exist
 • back door select unbck output
 • Fkey unit receive can comm and "other door actr operate info"="01"
 (except Asst door select unbck output)
- ② Fkey unit set the can comm and "accept back door open sw" to "0" (event), when receive can comm and
 "Dr door actr operate info"="10" or "other door actr operate info"="10"

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4. Answer back

according under table F-key unit set can comm and "answer back request" three times or turn on Dr buzzer same timing as door bck output start

		comm and "answer back request"	Dr buzzer
request SW operation	Dr door select unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	Asst door select unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	Back door select unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	all door unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	door bck output	when FLASH with REMOTE & F-Key=01or11 "001" when FLASH with REMOTE & F-Key=00or10 "000"	when Anser Back with F-Key bck=00or10 OFF when Anser Back with F-Key bck=01 1time
F-key badge button operation	select unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	OFF
	all door unbck output	when FLASH with REMOTE & F-Key=01or11 "010" when FLASH with REMOTE & F-Key=00or10 "000"	OFF
	door bck output	when FLASH with REMOTE & F-Key=01or11 "001" when FLASH with REMOTE & F-Key=00or10 "000"	OFF
other	auto rebck output	"000"	OFF
	antikey bck in output	"000"	OFF

FLASH with REMOTE & F-Key :customer setting parameter

Anser Back with F-Key unbck :customer setting parameter

Anser Back with F-Key bck :customer setting parameter

Dr buzzer

1time:125ms ON

2 times:125ms on →125ms off →125ms on

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11.waming

11-1.Take out F-key badge waming

(1)take out F-key badge waming can work while follow ing condition

•D OK FLAG SET

(2)take out F-key badge waming never work while follow ing condition

•D OK FLAG RESET

(3)-1.take out F-key badge waming start condition

•When custom er setting param eter "FOB TAKE OUT WAN TRIGER"="0")

When follow ing condition is satisfied, F-key unit start waming

•PERM IT TO ENG START FLAG is set to reset caused follow ing search result, while D OK

①any door open→all door cbse search

②Push sw on and any door open search

③detect take out F-key badge from window search

(only when custom er setting param eter"DETECT FOB TAKEOUT FROM WINDOW"="0")

(4)-1.how to waming (When custom er setting param eter"FOB TAKE OUT WAN TRIGER"="0")

	KEY	flick	BUZZER	
	red		buzzer1	dr buzzer
search①	○	○	×	○3sec
search②	○	○	×	×
search③	○	○	○3sec	×

Dr buzzer 10Hz 30%duty

(3)-2.take out F-key badge waming start condition

•When custom er setting param eter "FOB TAKE OUT WAN TRIGER"="1")

When follow ing condition is satisfied, F-key unit start waming

•PERM IT TO ENG START FLAG is set to reset caused follow ing search result, while D OK

①any door open→all door cbse search, while shift position is not P

②Push sw on and any door open search

③detect take out F-key badge from window search

(only when custom er setting param eter"DETECT FOB TAKEOUT FROM WINDOW"="0")

④shift position is out of "p" search

⑤Dr door open → Dr door cbse search,while shift position is P

(4)-2.how to waming (When custom er setting param eter"FOB TAKE OUT WAN TRIGER"="1")

	KEY	flick	BUZZER	
	red		buzzer1	dr buzzer
search①	○	○	×	○3sec
search②	○	○	×	×
search③	○	○	○3sec	×
search④	○	○	○3sec	×
search⑤	○	○	×	○3sec

Dr buzzer 10Hz 30%duty

(5)take out F-key badge waming stop condition

When at least one follow ing condition is satisfied, F-key unit stop waming

•PERM IT TO ENG START FLAG is set

•D OK FLAG is reset

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11-2. OFF position warning

(1) OFF position warning start condition

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

• after 1sec from ACC sw on→off, while D 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	点滅 フラグ	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, F-key unit stop warning

• ACC sw on
• IGN sw on
• D 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, F-key unit start warning

• D OK FLAG SET
• Dr door open
• IGN sw off

(2) how to warning

F-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, F-key unit stop warning

• D 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, F-key unit make warning

• F-key unit search the F-key badge by out of vehicle ANT of which the door that request sw operated, and search by room ANT 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)
• 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, F-key unit make warning, too

• during off position warning on
• F-key unit receive lock command from F-key badge

(2) how to warning

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

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12. Indicator lamp

12-1. 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 DOK FLAG RESET→SET trigger)

- DOK 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)

- DOK 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

12-2. 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 strg bck 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

12-3. KNOB ND

(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 strg bck 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 ND 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 ND lighting condition exist

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12-4.output definition

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