

ALPS ELECTRIC Co., LTD

2. Connector & TerminalNo.

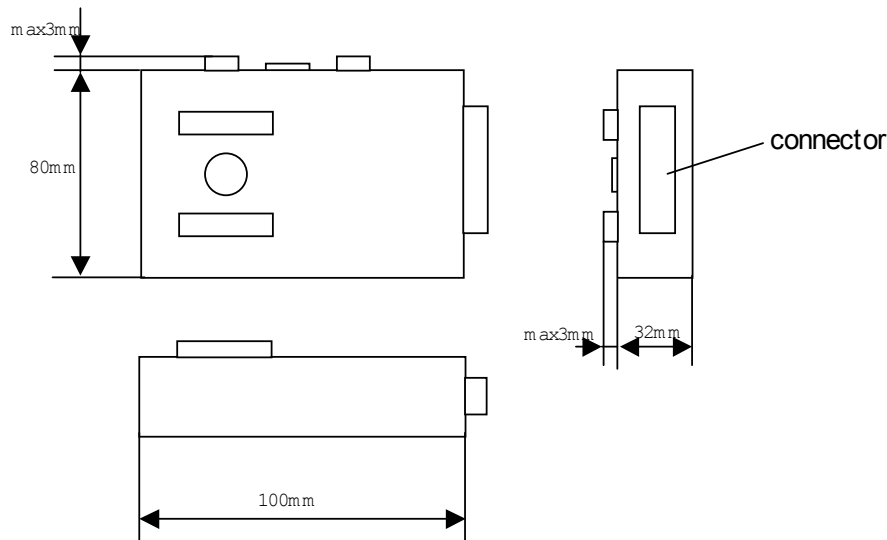


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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 SIG N	28	(DrLOCK STATE SW OPT)
9	Immobilizer ANT SIG 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 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	DrDOOR ANT+	39	(P Range SW OPT)
20	DrDOOR ANT-	40	ASST SELECT UNLOCK OUTPUT

3. CASE SIZE



ALPS ELECTRIC Co., LTD

4.Function

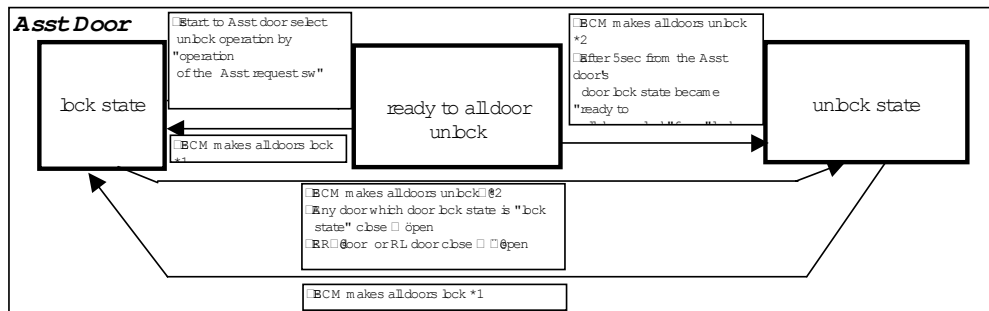
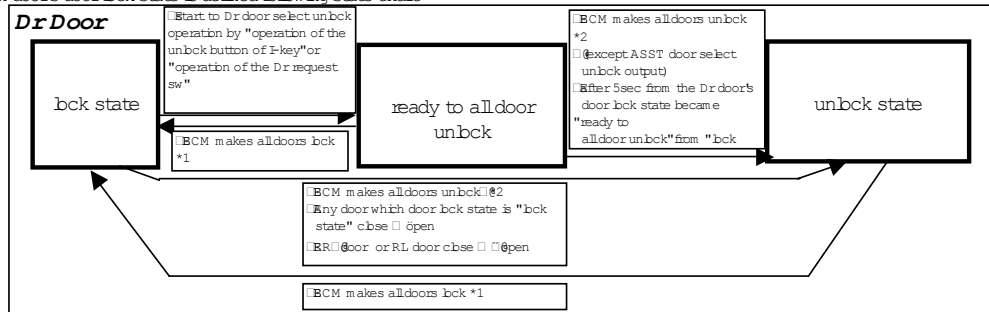
1.Entry Function

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

(1)Door bck state of each door

I-key unit has 3 state of door bck state,"bck state"or"ready to alldoor unbck"or"unbck state" for Each door independently

Each door's door bck state is defined following state chart



*1 When I-key unit received can comm and "dr door actr inf"="10" or "other door actr inf"="10" from BCM,

I-key unit recognize BCM makes alldoors bck

*2 When I-key unit received can comm and "other door actr inf"="01" from BCM, I-key unit recognize BCM makes alldoors 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 alldoor unbck	alldoor unbck output
unbck state	bck output

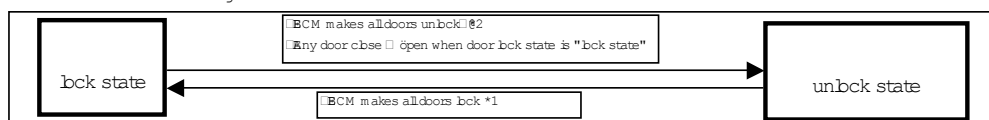
*3 "door bck state" of which that request SW operated

1-2 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 alldoor

door bck state is defined following state chart



*1 When I-key unit received can comm and "dr door actr inf"="10" or "other door actr inf"="10" from BCM,

I-key unit recognize BCM makes alldoors bck

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

(2)Operation by request SW

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

ALPS ELECTRIC Co., LTD

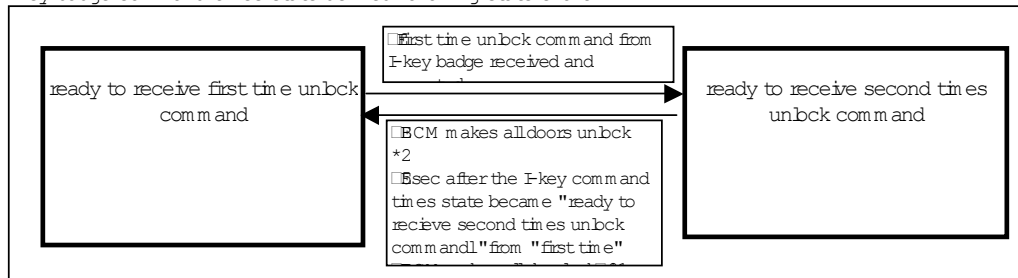
1-3 Operation by i-key badge button (When the customer setting state is "SELECTIVE UNLOCK"="0")

(1) Operation by F-key badge button

operated button		Dr's door 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 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 "drdooractinfo"="10" or "otherdooractinfo"="10" from BCM,

F-key unit recognize BCM makes all doors lock

*2 When F-key unit received can command "otherdooractinfo"="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 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 Tr"="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 Tr, 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 "drdooractinfo"="10" or "otherdooractinfo"="10" from BCM

□ Push SW on or key SW on

(3) Auto relock operation cancel

When the customer setting state is "AUTO RELOCK TIMER Tr"="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 "otherdooractinfo"="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

ALPS ELECTRIC Co., LTD

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 doorSW, 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		☐ >	☐ ~	☐ ~
	ON		☐ >	☐ ~	☐ ~
PUSH SW	OFF		☐ >	☐ ~	☐ ~
	ON	OFF position waming is not operated	☐ >	☐ ~	☐ ~
		OFF position waming 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 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 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 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

ALPS ELECTRIC Co., LTD

3 Output definition

3-1. Door bck /unbck output

door bck output	I-key unit send can command "bck/unbck/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 "bck/unbck/trunk open request"="01", I-key unit finish output after send "bck/unbck/trunk open request"="01" three times
Dr door select unbck output	I-key unit send can command "bck/unbck/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 "bck/unbck/trunk open request"="01", I-key unit finish output after send "bck/unbck/trunk open request"="01" three times
Asst door select unbck output	When condition to output exist, I-key unit do under operation + turn Asst select unbck RLY on + After 50ms from + I-key unit send can command "alldoor unbck request"="1" three times (event) + I-key unit turn Asst select unbck RLY off after 1200ms from can command "alldoor unbck request" set to 1 or when can command from BCM "operation actr from smart" become "1" to "0" + I-key unit finish output procedure after 10ms from turn Asst select unbck RLY off
Back door select unbck 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 unbck output	I-key unit send can command "alldoor unbck 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 unbck request"="1", I-key unit finish output after send "alldoor unbck 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 unbck output

□ I-key unit receive can command "other door actr operate info"="01"

(except Asst door select unbck 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"

ALPS ELECTRIC Co., LTD

4 Answer back

according under table F-ley unit set can comm and "answerback request" three times or turn on Drbuzz
same tin ing as door bck output start

		command "answerback request"	Dr buzzer
request SW operation	Dr door select unbck output	when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	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□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	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□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	alldoor unbck output	when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	when Anser Back with F-Key unbck=0 2times when Anser Back with F-Key unbck=1 OFF
	door bck output	when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	when Anser Back with F-Key bck=00or10 when Anser Back with F-Key bck=01 1time
	F-key badge button operation	select unbck output	when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10
alldoor unbck output		when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	OFF
door bck output		when FLASH□□□□□□ REMOTE□□□□□□□-Key=01or11 when FLASH□□□□□□ REMOTE□□□□□□□-Key=00or10	OFF
other			
	auto rebck output	"000"	OFF
	anti key bck in output	"000"	OFF

FLASH@inREMOTE@E-Key : custom er setting param eter

Answer Back with F-Key unblock customer setting parameter

Answer Back with I-Key back customer setting parameter

☐ Er buzzer

time:125ms ON

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

ALPS ELECTRIC Co., LTD

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 TRIGGER"="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

‡ 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 TRIGGER"="0")

	KEY	flick	BUZZER	
	red		buzzer1	drbuzzer
search# 0	□ >	□ >	□ ~	□ 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 TRIGGER"="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

‡ 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 TRIGGER"="1")

	KEY	flick	BUZZER	
	red		buzzer1	drbuzzer
search# 0	□ >	□ >	□ ~	□ 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

ALPS ELECTRIC Co., LTD

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 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 t % O	BUZZER	
start warning	☐ >	☐ >	☐ > 800ms	☐ ~
Dr door open ☐ Dr door cbse, 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

☐ ID OK FLAG RESET

11-3 IGN knob not bck position warning

(1) IGN knob not bck position warning start condition

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

☐ ID OK FLAG SET

☐ Dr door open

☐ IGN sw off

(2) how to warning

F-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, F-key unit stop warning

☐ ID OK FLAG RESET

☐ Dr door cbse

☐ IGN sw on

11-4 door bck operation is not done warning

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

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

☐ During off position warning on

☐ F-key unit receive bck comm and from F-key badge

(2) how to warning

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

ALPS ELECTRIC Co., LTD

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 5 times 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 on 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 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, I-key unit turn key red indicator off (event)

After 2sec from IGN off on (except stig bck unit is not registered 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 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, I-key unit turn knob indicator off (event)

After 2sec from IGN off on (except stig bck unit is not registered 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)

EFF 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)

EFF position warning off

KNOB IND lighting condition exist

ALPS ELECTRIC Co., LTD

12-4 output definition

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