IP DES System Lift Controller Protocol

375010

Protocol management

RA00213AA-04/22-PC

IP DES System Lift Controller Protocol

User and installation manual

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Fundamental concepts

Lift call

The lift call generated by the IP DES system provides Central Unit Lift with certain data such as:

- who made the call
- where the call is addressed
- call generation type.

Based on this information, Central Unit Lift decides how to operate the lift.

The lift call can be generated in two modes:

- with Lift Control icon on the Indoor Unit
- with door lock release control.

In turn, the lock release command can be activated by:

- door lock icon on the Indoor Unit
- door lock icon on the Guard station
- face recognition from Entrance panel
- finger print from Entrance panel
- badge reader from Entrance panel
- local access code from Entrance panel
- personal access code from Entrance panel.

Protocol

This protocol is applicable to point-to-point communication between IP DES system Entrance Panel and lift access control system of 3rd party company. This document is open to use for the access control company or lift company that wants to be compatible with IP DES system.
They should modify their protocol management according to this document to realize the control function of the lift.
If the lift access control system is not natively compatible with the protocol presented in this document, 375010 must be added to realize protocol conversion.
375010 has two serial RS485 interfaces, RS485-1 connected with IP DES EP and the RS485-2 connected to the lift access control system. It's only required to create a new firmware to be uploaded in 375010 lift controller SW, there's no need to apply any changes in IP DES Entrance Panel.

In this manual, for easy reading, the abbreviated device name is used as in the list.

- IU: Indoor Unit
- EP: Entrance Panel
- CLC: Central Unit Lift control
- APT: apartment

Interface definition

- Hardware interface: RS-485
- Baud rate: 9600BPS
- Start:1 Bit
  End: 1 Bit
  Data: 8 Bit ASCII
- Error correction method: CheckSum

Communication protocol

Data format (STX - Data length - Data - ETX -SUM)

STX (starting frame)	0 x 02
Data length	2 Bytes, indicating the data length. For example: if the data length is 18 Bytes, it is marked as "18" as 0x 31 0 x 38.
ETX:	0 x 03
SUM (checksum)	The accumulated value after the character STX (excluding STX), ignoring arithmetic carry.

Data composition

Command		Event / Riser No.		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor		
Byte 2	Byte 1	Byte 2	Byte 1	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0

Data description
In the starting floor of data lift, if B2= A (HEX) --> 41 (ASCII) , it means underground floor.
For example: B2B1B0= A02 (HEX) -->413032 (ASCII) , it means 2nd floor underground.

Note: the field values in this description are hexadecimal (HEX) values.
During the transmission of the protocols, they are decoded into ASCII.

Communication direction:

- EP > CLC: it means that the frames originated by the EP for the 375010, and should be translated to the CLC.
- EP > 375010: it means that the frames originated by the EP for the 375010, but not to be translated to the CLC.
- 375010 > EP: it means that the frames originated by the 375010, not from the lift riser.

Command list

Note: for the correct operation of the protocol, the parameters "Floor" and "Apartment" in the "Community information configuration" of the Address book must have value "99". See Server DES software manual.

Note: In this table, '000' and '0000' indicate that the field cannot be used, while 'xxxx' indicates that a value must be entered.

Command description	Command 2 Byte	*Event 2 Byte*	*Start APT ID 4 Byte*	*Arrival APT ID 4 Byte*	*Lift start floor 3 Byte*	*Lift arrival floor 3 Byte*	*Communic. direction*
IU calls lift	11	00	0000	xxxx (IU APT ID)	000	xxx (IU location of the floor)	EP → CLC
		01 (indoor to indoor)	xxxx (IU 1 APT ID)	xxxx (IU 2 APT ID)	xxx (IU 1 location of the floor)	xxx (IU 2 location of the floor)	
EP unlock	12	01 IU unlocking (EP calls IU, IU unlocking)	xxxx (EP No.)	xxxx (IU APT ID)	xxx (EP location of the floor)	xxx (IU location of the floor)	
		02 local password unlocking	xxxx (EP No.)	0000	xxx (EP location of the floor)	000	
		02 personal access code unlocking	xxxx (EP No.)	xxxx (IU APT ID)	xxx (EP location of the floor)	xxx (IU location of the floor)	
		03 fingerprint unlocking	xxxx (EP No.)	0000	xxx (EP location of the floor)	000	
		03 GS unlocking	xxxx (EP No.)	0000	xxx (EP location of the floor)	000	
		03 face	xxxx (EP No.)	xxxx (IU APT ID)	xxx (EP location of the floor)	xxx (IU location of the floor)	
		04 Bticino access control card unlocking	xxxx (EP No.)	xxxx (IU APT ID)	xxx (EP location of the floor)	000	
Building EP call lift ***Note 4***	13	Riser (01-99) A building contains many Risers, there is no Riser EP, multiple Risers share a Building EP and call lift	xxxx Start APT No. If there is no specific APT number, use 0000 instead	xxxx Arrival APT No. If there is no specific APT number, use 0000 instead	xxx Start floor No If there is no specific floor number, use 000 instead	xxx Arrival floor No. If there is no specific floor number, use 000 instead	EP → CLC CLC calls the lift according to the riser number
Lift query and feedback	21	01 Lift quantity, number and protocol type of the lift riser query	Reserve 14 Byte				EP → 375010
		02 Lift quantity, number and the lowest floor of the riser query	Lift qty 1Byte	Lift 1 1Byte (1 – 8)	Lift 2 1 Byte (1~8)	Lift 3 1 Byte (1~8) / Lift 4 1 Byte (1~8) / Reserved 7 Byte / Local riser the lowest floor 1 Byte ***Note 3*** / Protocol Type 1 Byte	375010 → EP
Lift status query and feedback	22	01 lift status query	Lift No. 1 Byte ***Note 1***	Reserve 13 Byte			EP → 375010
		02 lift response to the status ***Note 2***	Lift 1# status / Lift 1# physical layer	Lift 2# status / Lift 2# physical layer / Lift 3# status / Lift 3# physical layer / Lift 4# status / Lift 4# physical layer		Reserve 6 Byte	375010 → EP

Note 1

Lift No. = 1 query the status of lift 1 # ;

Lift No. = 2 query the status of lift 2 #, and so on.

This protocol limits the max number of Lifts to 4 in a riser.

Lift = FF it means to query the status of all lifts.

Note 2

The answer is 1Byte, the specific as below:

Lift status =	*1*	*Up*
Lift status =	*2*	*Down*
Lift status =	*3*	*Current waiting floor*
Lift status =	*4*	*Lift stop working*
Lift status =	*5*	*Up direction from waiting floorr*
Lift status =	*6*	*Down direction from waiting floor*

The IU can judge whether the lift has arrived according to the lift status 5, 6 and the current floor of lift location.

For example, when the indoor unit of 9th floor calls the lift, if the lift is on the 9th floor and the lift status is 6 (Down direction from waiting floor), that means the lift has arrived on the current floor; If visitors need to arrive the 8th floor, when the lift is on the 8th floor and the lift status is 5 (Up direction from waiting floor), that means the lift has arrived on the current floor.

Note 3

0 x 30 – 0 x 39 corresponds to underground layer 5 to layer 5 respectively.
For example, if the value is 0 x 34, that means the lift has arrived the lowest floor - 1 .
Hex is used in the parts of physical layer of the lift, and ASCII code is used for the rest.

Note 4

The Building Unit EP manages multiple Risers, the Building EP to call lift when there is no Riser EP.

Communication examples

Note: In these examples, the data shown are already decoded into ASCII.

Lift request generated by an EP Riser following a call to IU 0801.

The lift goes to the EP floor and then to the IU 0801 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	31	30	30	30	30	30	30	30	38	30	31	30	30	30	30	30	38	03	DF

Lift request generated by EP 01 on basement floor 1 by pressing the lock icon on IU 0605.

The lift goes to the EP 01 floor and then to the IU 0605 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	32	30	31	30	30	30	31	30	36	30	35	41	30	31	30	30	36	03	F4

Lift request generated by EP 02 on floor 1 using a local password.

The lift goes to the EP 02 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	32	30	32	30	30	30	32	30	30	30	30	30	30	31	30	30	30	03	D4

Lift request generated by EP 01 on floor 1 using a personal access code linked to IU 0301.

The lift goes to the EP 01 floor and then to the IU 0301 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	32	30	32	30	30	30	31	30	33	30	31	30	30	31	30	30	33	03	DC

Lift request generated by a GS by pressing the lock icon during a conversation with EP 03 on floor 1.

The lift goes to the EP 03 floor and then to the GS floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	32	30	33	30	30	30	33	30	30	30	30	30	30	31	30	30	30	03	D6

Lift request generated by EP 01 on basement floor 2 through face recognition linked to IU 0101.

The lift goes to the EP 01 floor and then to the UI 0101 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	32	30	33	30	30	30	31	30	31	30	31	41	30	32	30	30	31	03	E9

Lift request generated by IU 0801 by pressing the Lift control icon during a conversation with IU 0301.

IU 0801 and IU 0301 are installed on the same Riser. The lift goes to the IU 0301 floor and then to the IU 0801 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	31	30	31	30	33	30	31	30	38	30	31	30	30	33	30	30	38	03	E7

Here are some examples of calls directed to several riser columns sharing the same entrance (the EP is located at the entrance of the building, not on the riser).
Note that the call configuration must specify the riser to which the call is addressed. This function does not support a local password to call the lift.

Lift request generated by IU 0605 of riser 03 by pressing the lock icon during a conversation with the building EP of basement floor 2.

The lift goes to the building EP floor and then to the IU 0605 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	33	30	33	30	30	30	30	30	36	30	35	41	30	32	30	30	36	03	F7

Lift request generated by an EP of basement floor 4 using a personal access code linked to IU 0605.

The lift goes to the EP floor of basement 4 and then to the UI 0605 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	33	30	38	30	30	30	30	30	36	30	35	41	30	34	30	30	36	03	FE

Lift request generated by IU 0301 by pressing the Lift control icon, during a conversation with IU 0801.

IU 0801 and IU 0301 installed on the same Riser 2. The lift goes to the UI 0801 floor and then to the UI 0301 floor.

STX	Data length		Command		Event		Lift call sender address				Lift call receiver address				Lift start floor			Lift arrival floor			ETX	SUM
	high	low	high	low	high	low	D3	D2	D1	D0	A3	A2	A1	A0	B2	B1	B0	C2	C1	C0		
02	31	38	31	33	30	32	30	30	30	31	30	33	30	31	30	30	38	30	30	33	03	EA

Communication process

Control code definition

Name	Code (HEX)
STX	0X02
ACX	0X06
ENQ	0X05
0X05	0X03
NAK	0X15

Querying the status of lift

For the items that need to display the lift status in real time, the riser EP must query 375010; 375010 collects the lift status and responds to the query of the riser EP.

Lift qty query

When EP is power on, it should send a message "Lift quantity, number and the lowest floor of the riser query" to lift to get the lift quantity and the lowest floor of this riser.

In order to avoid the situation that EP is poweron first and 375010 is power on later so it cannot get the query information the following beharior is implemented. After 375010 is power on, it will return the same response message "Lift quantity, number and the lowest floor of the riser query" when it received any lift's command for the first time, inform EP the lift quantity and the lowest floor of this riser.

Note: 375010 receives the "lift quantity inquiry" command, and shall feedback the lift quantity information within 50 ms.

Lift status query

After getting the lift quantity information, the EP will query the lift status every 200 ms (if it does not receive the lift quantity information, it will not query for status). After the EP sends the command to query the lift quantity or status, it must wait for 375010 to reply to the lift status. The next instruction cannot be sent until the number of lifts (or status) of 375010 is returned or the waiting time of 50 ms is expired.

When the EP receives the lift status information and finds that the lift status has changed, it sends the status to the IU in the form of UDP broadcast.

The IU displays the status as required.

EP		695863
|		|
|	STX + DATA query lift qty or status + ETX + SUM	-> |
| <-	STX + DATA lift qty and status feedback + ETX + SUM	|

EP sends the other lift control requests

The EP send one frame of lift control request at a time, and the other side does Not need to respond.

EP		CLC
|		|
|	STX + DATA + ETX + SUM	|
|	---------->	|

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