

# **Multi-function lifting device communication and control protocol**

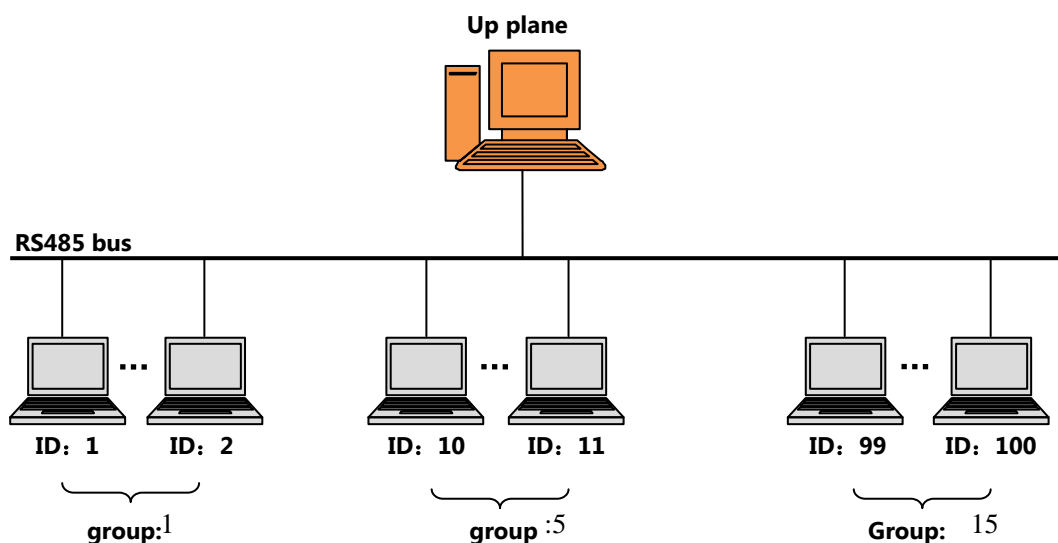
**Ver 2.0**

This protocol applies to our company's VB series of multi-lifting equipment, remote monitoring.

This Agreement defines the host computer control software (referred to below upper plane), and connected to the RS485 bus, all devices (below referred to as device) means of communication. This Agreement asymmetric means of communication, that is to take a question and answer approach to communications initiated by the host computer communication, front-end devices only respond to host computer commands, rather than take the initiative to send a message up plane.

### 1, Systems Network Structure:

The whole system network topology is as follows:



Note: This version of the protocol support the maximum number of terminal devices of 1,000 units, the most can be divided into 16 groups.

Serial port parameters: Baud Rate 4800bps, data bit 8, stop bit 1, no parity, no flow control.

### 2, the information code structure:

This version of the communication protocol of the information code in accordance with the direction of data transfer can be divided into descending order (the upper plane → devices), and upstream response (unit → Host machine) . Downstream or upstream, whether the data have roughly the same information structure, definition as follows: the definition of the information in the code all the data for 16 single-byte hexadecimal means of expressing, the same below.

FF (Synchronization header)
AC
E1
Group ID
ID, high byte
ID, low byte
Information Code
Information body (0 ~ 6Bytes)
Checksum high byte
Checksum low byte

Description:

- Every time when initiates communication one time with 3 bytes (FF AC E1) synchronous data began in the order and number of immutable.
- There are two means of expressing group number: Ex mode and FF mode. Ex mode, is defined as E0 ~ EF indicates that all devices, 16 divided group, the directives issued by this approach is only valid on the current group. FF mode is group number refers to the current directive ignored restrictions on all groups of the devices are valid.
- ID in the range of 00 00 ~ 03 E8, in the communication process, ID high byte I in the former, low byte in the post. When ID = 00 00, that shows ignored the instruction ID information, the whole group and effective device. When ID = 00 01 ~ 03 E8, it said that the directive only one specific to a particular device effective, if the group number or ID does not match, then the device does not respond.
- Information code can be divided into two kinds of commands and responses, specifically definition as follows:

Information Code	meaning
No response commands(no message body)	
1D	forward, so that the specified device moves forward.
2D	backward, so that the designated unit moves backward
CD	Stop, stop the specified device up, down, the forward or the h backward action.
DD	up, and that the specified device up.
ED	down to specify the device down.
No response commands (with message body, mainly set up commands)	
6D	set group number and ID
Commands need to answer (no message body, it is generally a single device to the specified effective)	
0D	query status, check the online status of a single device.
BD	query ID.
Return response code (with information on body)	
FD~FF	reply status, group number and ID, device, after receiving a search command to return online status and group number, ID.

- checksum is the addition to synchronize the first communication data bytes other than the simple accumulation of all, and. Checksum is 2 bytes of data, in the communication process, the high section of the former, low byte in the post.

**3, the information code definition:**

**1) No response commands (no message body):**

FF (Synchronization header)
AC
E1
Group ID
ID, high byte
ID, low byte
Information Code
Checksum high byte
Checksum low byte

For example: For group 1 on the 2nd ID, device operation:

FF AC E1 E1 00 02 DD 01 C0 // up  
 FF AC E1 E1 00 02 ED 01 D0 // down  
 FF AC E1 E1 00 02 1D 01 00 // forward  
 FF AC E1 E1 00 02 2D 01 10 // backward  
 FF AC E1 E1 00 02 CD 01 B0 // Stop

Similarly, one of the group to operate all the equipment:

FF AC E1 E1 00 00 DD 01 BE // up  
 FF AC E1 E1 00 00 ED 01 CE // down  
 FF AC E1 E1 00 00 1D 00 FE // forward  
 FF AC E1 E1 00 00 2D 01 0E // backward  
 FF AC E1 E1 00 00 CD 01 AE // Stop

**2) No response commands (with message body, mainly to set command):**

- set group number and ID:

FF (Synchronization header)
AC
E1
Of the original group number
Of the original ID, high byte
Of the original ID, low byte
6D: Information Code
New Group Number
The new ID, high byte
The new ID, low byte
Checksum high byte
Checksum low byte

For example:

FF AC E1 E1 00 02 6D 02 00 03 01 55 // will be group 1 on the 2nd ID of the device changes the group 2, No. 3.  
 FF AC E1 FF 00 00 6D 02 00 03 01 71 // the group number and ID an unknown device was revised to group 2, No. 3.

Note: When an unknown group number and ID of the device to operate, they should ensure the RS485 bus, only to be modified only a single device, other devices should be disconnected bus connection or power, or else make all online device group number and the ID changes for the same group 2, No. 3. Known group number and ID are not required to modify the device or power off the bus.

**3) the need to respond to commands (no message body, it is generally a single device to the specified effective), and its response message code:**

● Query Status

Downlink commands:

FF (Synchronization header)
AC
E1
Group ID
ID, high byte
ID, low byte
0D: Information Code
Checksum high byte
Checksum low byte

Uplink Response:

FF (Synchronization header)
AC
E1
Group ID
ID, high byte
ID, low byte
FD / FE / FF: status information code
Checksum high byte
Checksum low byte

Note:

When the group number is FF, it said that no group number query,. At this time, it returns the current status when all online devices as long as the ID with the instructions specified are the same. The directive to search for all online devices, the host computer reconstruction of an existing device group kinds of information.

When the group number is E0 ~ EF, it said that the online status query a specific device. It will return to the current status when the device group number and ID and instructions are specified are the same. The directive to refresh the current group of all the devices online.

On-line status information code meaning: FD - device has been locked

FE - device is trialing.

FF - device has been unlocked

For example:

Command: FF AC E1 E1 00 02 0D 00 F0 // Inquiry Unit 1 on the 2nd ID device online status

Response: FF AC E1 E1 00 02 FD 01 E0 // group 1 on the 2nd ID unit is online, and has been locked

Command: FF AC E1 FF 00 02 0D 00 F0 // check 2 ID device online status

Response: FF AC E1 E1 00 02 FD 01 E0 // group 1 on the 2nd ID unit is online, and has been locked

- Query ID

Downlink commands:

FF (Synchronization header)
AC
E1
FF: group number
00: ID of the high byte
00: ID low byte
BD: Information Code
Checksum high byte
Checksum low byte

Uplink Response:

FF (Synchronization header)
AC
E1
Group ID
ID, high byte
ID, low byte
FD / FE / FF: status information code
Checksum high byte
Checksum low byte

Note:

Down directive command is fixed at FF, ID is fixed at 00 00. Therefore, all devices can be response this command, and return the current status information.

The commands currently mainly used for debugging, or check the unknown group number and ID of the online equipment.

Application of the command should ensure that only one device and to b e connected with RS485 bus, otherwise the host computer will receive the invalid and unpredicted information.