

# Allen-Bradley DF1

## Allen-Bradley DF1 Full Duplex communication protocol

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### Supported device types and versions

The *Allen-Bradley DF1 Full Duplex* protocol supports communication with Allen-Bradley devices of the SLC-500 series. Communication supports (is verified for) for the following devices:

Table 1

| Device type                            | Meaning  | Protocol version |
|--|--|------------------|
| Allen-Bradley SLC 5/04                 | Communication with the SLC 5/04 CPU via RS232 port   | -                |
| <a href="#">Allen-Bradley 1770-KF3</a> | DH-485 bus concentrator supports communication with all the devices of the SLC-500 series (description of the setting is mentioned at the end of the chapter). | -                |

### Communication line configuration

- Communication line category: [Serial](#), [SerialOverUDP Device Redundant](#).
- Serial line parameters:
  - Baud rate (for 1770-KF3, 300, 600, 1200, 2400, 4800, 9600 or 19200 Baud can be used - parameter 3 of KF3 settings - *RS-232C Baud Rate*),
  - Parity (for 1770-KF3, None or Even parity can be used - parameter 4 of KF3 setting - *RS-232C Parity*),
  - Handshaking (for 1770-KF3, set the parameter 7 of KF3 setting - *Flow Control*, according to the setting of the RS-232 cable).

### Line protocol parameters

[Configuration dialog box](#) - tab **Parameters**, select the **Allen-Bradley DF1 Full Duplex** protocol. They influence some optional parameters of the protocol.

Table 2

| Parameter        | Meaning   | Unit       | Default value |
|------------------|---|------------|---------------|
| BCC/CRC Checksum | Type of checksum for securing of the payload.   | CRC<br>BCC | CRC           |
| Full Debug       | Activates detailed listings about sending and receiving values and further debug information. | YES/NO     | NO            |

### Communication station configuration

Communication protocol: **Allen-Bradley DF1**  
Station address: DH-485 Node Address of device in the range of 1 up to 31.

### Station protocol parameters

[Communication station - configuration dialog box](#) - the **Protocol parameter** input field. They influence some optional parameters of the protocol.

Table 3

| Parameter          | Meaning   | Unit    | Default value |
|--------------------|---|---------|---------------|
| Interface Node     | DH-485 Node Address of the communication interface (KF3), the address 0 is commonly used. (Warning, when you use the 1770-KF3 device, its setting is valid for all stations of the line). | -       | 0             |
| Wait First Timeout | First delay before reading the response after sending a request.  | ms      | 100           |
| Wait Timeout       | Delay between response readings until its finalization.   | ms      | 100           |
| Max Wait Retry     | The number of response readings till its finalization.  | -       | 40            |
| Max Read Retry     | The number of response readings, if the received response is not the response to the expected transaction. All received messages are to confirmed.  | -       | 10            |
| Retry Count        | A retry count of the request in case of a communication failure.  | -       | 3             |
| Block Read         | Enables block data reading. It is executed by non-documented functions - careful proceeding is asdvised.  | YES /NO | NO            |
| Max. Block Length  | Maximum block length for block reading (in bytes). The value must be an even number within the range of 2 up to 254.  | -       | 40            |

## I/O tag configuration

Possible I/O tag types: **Ai, Ao, Ci, Co, Di, Dout**.

I/O tag address is a text address in the SLC-500 format. The address format is:

[**\$**] X [**file**] : element [**.field**] [**/bit**]

in which

|                |   |
|----------------|---|
| <b>\$</b>      | optional character  |
| <b>X</b>       | file type identifier (required - see table No. 4)   |
| <b>file</b>    | file number (optional, if not defined, the default file number according to table No. 4 will be used) |
| <b>element</b> | the number of an element in the file (required),  |
| <b>.field</b>  | a sub-element number (optional, used for Output, Input files only),                                   |
| <b>/bit</b>    | a bit number (optional, must be within the range of 0..15).   |

**Table 4**

| <b>X</b> | <b>File Type</b> | <b>Default file number</b> |
|----------|------------------|----------------------------|
| O        | Output           | 0                          |
| I        | Input            | 1                          |
| S        | Status           | 2                          |
| B        | Binary           | 3                          |
| N        | Integer          | 7                          |
| F        | Float            | 8                          |

## Output type file

[**\$**]O[n]:e[.s][/b]

"n" the file number, if it is different from the default number 0,

"e" element number in the file,

"s" sub-element number (0..255),

"b" bit number (0..15).

For example:

O:2  
\$O0:2/0  
O:1.0/1

**Note:** You cannot write into Output files, only read data.

## Input type file

```
[ $\$$ ]I[n]:e[.s[/b]
```

"n" the file number, if it is different from the default number 1,  
"e" element number in the file,  
"s" sub-element number (0..255),  
"b" bit number (0..15).

For example:

```
I:1  
$I1:2/0  
I:2.0/15
```

**Note:** You cannot write into Input files, only read data.

## Status type file

```
[ $\$$ ]S[n]:e[/b]
```

"n" the file number, if it is different from the default number 2,  
"e" element number in the file,  
"b" bit number (0..15).

For example:

```
S:0  
$S2:40  
S:2/15
```

**Note:** You cannot write bit-by-bit into Status type files (output I/O tags with the parameter [/b]).

## Binary type file

```
[ $\$$ ]B[n]:e[/b]
```

"n" the file number, if it is different from the default number 3,  
"e" element number in the file,  
"b" bit number (0..15).

For example:

```
B:2  
$B3:0  
B3:2/1
```

## Integer type file

```
[ $\$$ ]N[n]:e[/b]
```

"n" the file number, if it is different from the default number 7,  
"e" element number in the file,  
"b" bit number (0..15).

For example:

```
N7:2  
$N:0  
N27:0/1
```

## Float type file

```
[ $\$$ ]F[n]:e
```

"n" file number - if there is used other than the default number of 8,  
"e" element number in the file.

For example:

F : 0  
\$F8 : 0  
F29 : 1

## The recommended settings of the 1770-KF3 device

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Further recommended parameters for the 1770-KF3 device:

- Set the Parameter *0 DH-485 Node Address* to 0. You can use other address, see „Communication station protocol parameters" - the parameter „IN".
- Set the parameter *5 DF1 Device Category* to *DF1 full-duplex*.
- The parameter *6 Error Detection* - both *BCC* and *CRC16* can be used, see „Communication station protocol parameters" - the [BCC/CRC Checksum](#) parameter.
- As for the other parameters, the suitable default settings are described in the document „1770-6.5.18, DH-485 Communication Interface User Manual (Cat. No. 1770-KF3)", Allen-Bradley April 1993.

## Literature

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- "1770-6.5.18, DH-485 Communication Interface User Manual (Cat. No. 1770-KF3)", Allen-Bradley - April 1993.
- "1770-6.5.16, DF1 Protocol and Command Set, Reference Manual", Allen-Bradley - October 1996.

## Changes and modifications

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## Document revisions

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- Ver. 1.0 - August 22nd, 2000 - document creation.
- Ver. 1.1 - April 27th, 2009 - update of the document.



### Related pages:

[Communication protocols](#)