

# User Manual

## Connection to Allen Bradley DF1

Part Number: 80 860.674  
Version: 2  
Date: 31.05.2006  
Valid for: TSwin .net 4.1x

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<b>Version</b>	<b>Date</b>	<b>Modifications</b>
1	14.11.2005	First edition
2	31.05.2006	New layout, Protocol name modified

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# 1 Important Notes

## 1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.



### **Danger**

This symbol is used to refer to instructions which, if ignored or not carefully followed could result in personal injury.



### **Note**

This symbol indicates application tips or supplementary notes.



### **Reference to source of information**

This symbol refers to detailed sources of information on the current topic.

## 1.2 Safety Notes

- Read this manual carefully before using the software. Keep this manual in a place where it is always accessible to all users.
- Proper handling of this product is a prerequisite for its subsequent flawless and safe operation.
- The user manual, in particular the safety notes, must be observed by all personnel working with the software and the programmed device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

## 1.3 Intended Use

- The software has to be used for programming operating devices exclusively. Every other use is not permitted.

## 1.4 Target Group

All configuration and programming work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.



## 2 Allen Bradley DF1

The Allen Bradley DF1 protocol provides you

- random read and write access to all data of the controller
- bit and word access to all data of an **integer file** in read and write mode.



Before individual bits of a word can be accessed for a write operation, a read access to the entire word is performed. After the bit changes, the write access to the entire word is carried out. For this type of access, you must therefore ensure that the operating device and the controller do not simultaneously modify individual bits of the same word.

The size of the address area depends on the controller being used.

The protocol supports a connection to all controllers which are supported by the DF1 protocol such as the following controller types.

- MicroLogix 1000 family,
- SLC500 with SLC5/03,
- SLC500 with SLC4/04,
- PLC5 and
- PLC5/250.

### 2.1 Data Types

Direct access is possible to the following data types.

You can specify a data file number for each variable in the variable list.

#### Configurable Values

9 to 254

A corresponding integer data file must be created in the PLC5 controller for each data file number you entered.

Table 2-1 Allen Bradley data types

Type	Mnemonic	Access
Bit	B	Bit Access to Word Address
Word	W	Word Access to Word Address
Double Word	DW	Double-Word Access to Word Address

### 2.2 Programming

#### 2.2.1 Protocol Parameters

With the protocol parameters, you can adapt the communication of the controller used.

**2.2.1.1 Baud Rate**

This parameter specifies the communication rate.

Table 2-2 Baud rate

Configurable Values (Baud)	Default value
300	
600	
1200	
2400	
4800	
9600	X
19200	
38400	
57600	
76800	
115200	

**2.2.1.2 Parity**

This parameter specifies the parity used to control the communication.

Table 2-3 Parity

Configurable Values	Default Value
None	
Even	X
Odd	

**2.2.1.3 Handshake**

This parameter specifies the method used to control the communication.

Table 2-4 Handshake

Configurable values	Default Value
No Handshake	X
Hardware	
Software	

**2.2.1.4 Data Bits**

This parameter specifies the number of data bits.

Table 2-5 Data bits

Configurable Values	Default Value
5	
6	
7	
8	X

**2.2.1.5 Stop Bits**

This parameter specifies the number of stop bits.

Table 2-6 Stop bits

Configurable Values	Default Value
1	X
1.5	
2	

**2.2.1.6 Type of PLC**

This parameter specifies which controller is used.

Table 2-7 Type of PLC

Configurable Values	Default Value
SLC500-5/03	X
PLC5	

**2.2.1.7 Block Check**

This parameter specifies the block check to be performed for the communication.

Table 2-8 Block check

Configurable Values	Default Value
CRC16	X
LRC8	

### 2.2.2 Input Syntax

The following image illustrates the structure of the input syntax for variables in the programming software.

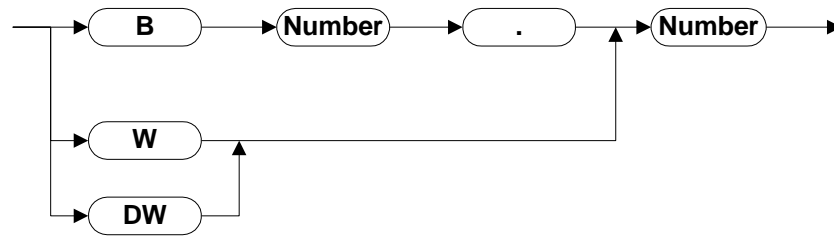


Figure 2-1 Syntax diagram

## 2.2.3 Physical Connection

Plug-in connectors on the operating device for connection to the controller.

### 2.2.3.1 Pin Assignment for Operating Devices with an Universal Interface

Table 2-9 Pin assignment RS232

Pin	Designation	Function
6	TD	Transmitted Data
15	CTS	Clear to send
17	RTS	Request to send
18	RD	Received data
25	SGND	Signal Ground

Table 2-10 Pin assignment RS485

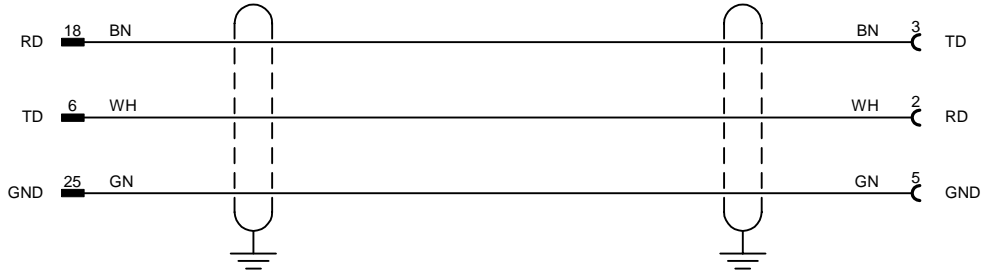
Pin	Designation	Function
8	T(A)	Transmitted Data (-)
9	T(B)	Transmitted Data (+)
11	SGND	Signal Ground
22	R(A)	Received Data (-)
23	R(B)	Received Data (+)

**2.2.3.2 Cable SER1 RS232 - Allen Bradley SLC 500-5/03**

The following cabling diagram applies to operating devices with an universal interface **only**.

Operating Device

Allen Bradley  
SLC 500-5/03



D-SUB  
Male Connector  
25 Pin

D-SUB  
Male Connector  
9 Pin

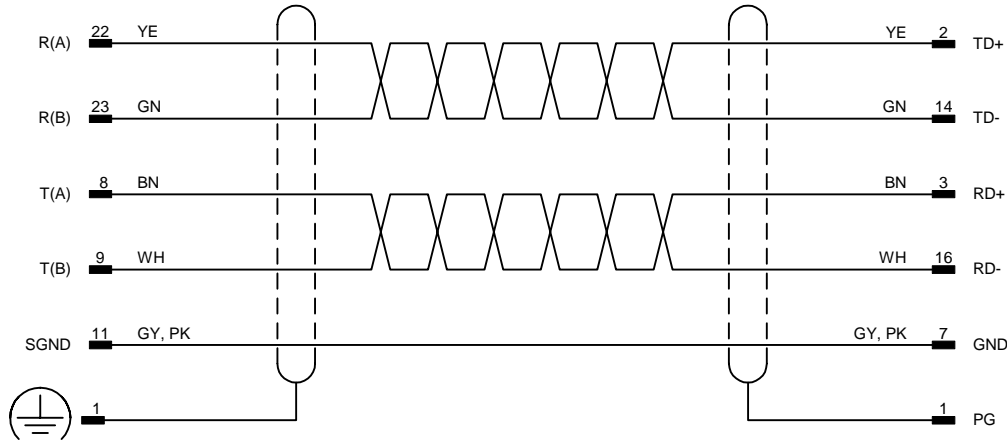
Both ends of the shield are connected to the metallic housing.

**2.2.3.3 Cable SER1 RS485 - Allen Bradley PLC 5**

The following cabling diagram applies to operating devices with an universal interface **only**.

Operating Device

Allen Bradley  
PLC 5 Channel 0



D-SUB  
Male Connector  
25 Pin

D-SUB  
Male Connector  
25 Pin

Both ends of the shield are connected to the metallic housing.

## 2.3 Error Messages

Error messages are displayed on the operating device along with a code and sub-code. Error messages are composed as follows:

Communication Error  
 Code            XXXXX  
 Subcode        XXXXX  
 Retries         XXXXX

Table 2-11 Allen Bradley DF1 error messages

Code	Subcode	Error Type	Possible Cause
1	1	Slave not ready	
	2	Packets out of sequence	
	3	Error in protocol frame	
	4	Waiting time elapsed (Timeout)	Connection broken.
	6	Wrong parity	
	7	Send process aborted	
	8	Receive process aborted	
	9	Cyclic buffer overrun	Cyclic buffer too small
	10	No cyclic data defined	
	12	Cyclic data already defined	
	15	Protocol error	The selected protocol is not supported.
	16	Receive buffer overrun	
	17	NAK from controller despite repetitions	
	40	System variable error	Undefined system variable
	50	No acknowledgment for order telegram	
	51	Acknowledgment for order telegram is NAK	
	52	Wrong character for acknowledgment	
	53	Non-interpretable reply	
	55	Timeout - No response telegram	
	56	Timeout - No response telegram	
240	Access to PLC is not possible (locked)	This error occurs when a PLC program is downloaded. Afterwards the operating device shows code 1, subcode 56. In the protocol parameters of channel 0 for the PLC, deselect the parameter "Duplicate Packet Detect".	

Table 2-11 Allen Bradley DF1 error messages

<b>Code</b>	<b>Subcode</b>	<b>Error Type</b>	<b>Possible Cause</b>
2	58	Incorrect number of data received	Check if the screen, in which the error occurred, contains a variable with an odd number of bytes which accesses a word address or a double-word address.
Error from the controller			
3	10	Error in the command message	
	50	Access to invalid address in controller	

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