

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>1 af 8</b>

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## Serial protocol

for

Project 40230

BOGBALLE CALIBRATOR 2003 / 2003W  
V1.1

Edited 20/05 1998.

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Ver- sion	Date	Text
V1.0	28-07-1997	Original version.
V1.1	04-10-2000	Checksum changed so that it corresponds to the communication to SW ver. 3,01

Description			T&O ref.
BOGBALLE CALIBRATOR 2003 / 2003W			40230
Document type	Editor	Printed d.	Page
Serial protocol	PP	24/3 2004	2 af 8

## Contents

1. Hardware .....	3
1.1 Plug .....	3
2. Protocol. ....	4
2.1 Baudrate. ....	4
2.2 BC2002 Protocol.....	4
2.3 BC2003 Protocol.....	4
<b>2.3.1 Checksum.</b> .....	<b>5</b>
<b>2.3.2 Telegram to BC2003.</b> .....	<b>6</b>
<b>2.3.3 Return telegram.</b> .....	<b>6</b>

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>3 af 8</b>

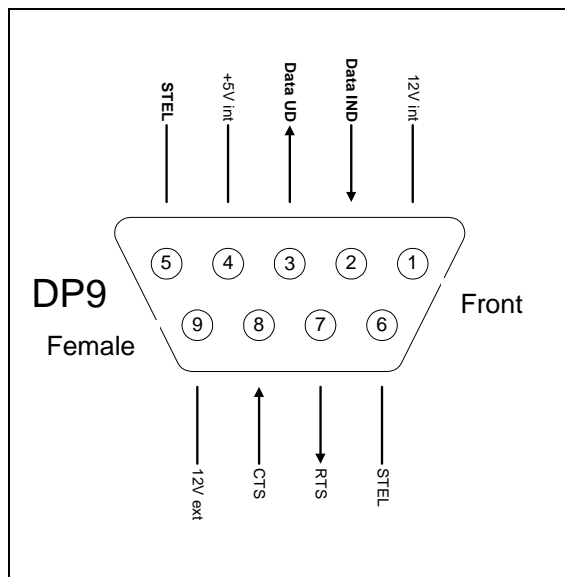
## 1. Hardware

### 1.1 Plug

BC2003 must be connected to the computer via the DP9 FEMALE plug.

The following pins in the plug are used (see fig. 1):

Pin 2 : Receive (Data into BC2003)  
Pin 3 : Transmit (Data out of BC2003)  
Pin 5 : Frame



**Fig. Pin connexions**

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>4 af 8</b>

## **2. Protocol.**

### **2.1 Baudrate.**

The communication must take place as follows

RS232  
9600 bit/s  
8 data bit  
No paritets bit  
1 stop bit

### **2.2 BC2002 Protocol**

BC2003 er compatible with the BC2002 serial protocol, where the computer sends 3 byte.

For instance.

HEX           **4F    02    23**

Make change of application rate to Hex 0223 = 547 kg/ha

BC2003 does not correspond to any telegram.

### **2.3 BC2003 Protocol**

The 2 last pages show an overview of the telegrams that can be sent to BC2003 and the structure of the return telegram.

The computer is ALWAYS master, and BC2003 is ALWAYS slave.  
BC2003 only sends a telegram if it was asked to by the computeren.

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>5 af 8</b>

### 2.3.1 Checksum.

The check sum C in the overview is calculated in the following way:



The start-/end characters and the checksum itself is NOT included in the check sum. All others are included in the calculation.

$$S \text{ XOR } B \text{ XOR } 2 \text{ XOR } 8 \text{ XOR } 7 = h53 \text{ XOR } h42 \text{ XOR } h32 \text{ XOR } h38 \text{ XOR } h37 = h2C$$

Say the check sum character must in this example be h2C.

The following modification of the check sum is only valid for software version 3,XX

If the checksum character is h00, h7B (}) or h7D (}) the checksum character is h55 (U).

In order to be sure that all software versions of Calibrator 2003 understand the communication it is recommended to send 2 telegrams in case the check sum is h00, h7B (}) or h7D (}) The one is as the telegram is, and the other is with a modified check sum.

For instance if the tractor computer must send a stop order it is recommended to send

{SS♦} ( h7B h53 h53 h00 h7D )

and

{SSU} ( h7B h53 h53 h55 h7D )

It is the same thing on receipt of a telegram from the Calibrator. That means that the tractor programme should accept both types of telegrams where the check sum is calculated to h00, h7B (}) or h7D (})

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>6 af 8</b>

### 2.3.2 Telegram to BC2003.

A telegram must be sent without space between the single characters. Max pause between 2 characters is 2 sec. If there is a space of more than 2 sec. The telegram is lost, and it is necessary to start again.

### 2.3.3 Return telegram.

The Accept from BC2003 is no guarantee for change in BC2003, but only for receipt of the telegram.

CHANGE OF VALUE IN BC2003			
	COMPUTER SENDS	BC2003 ANSWERS	EXPLANATION
Application rate with application rate returned	{SDxxxC}	{ADxxxC}	xxx kg/ha
Spread width	{SBxxxC}	{ABxxxC}	xx,x m (Job computer / Flow computer) 0xx m (Fertiliser spreader)
Distance	{SLxxxxxC}	{ALxxxxxC}	xxxxx m
HA[y]	{SHyxxxxC}	{AHyxxxxC}	y: 1-5 is Area no. 1-5. 6 er Total counter xx,xx ha
Hopper contents	{SIxxxxxC}	{AIxxxxxC}	xxxxx kg
Time	{SCddmmaat tmmC}	{ACddmmaa t tmmC}	dd:Date mm:Month aa:Year(in relation to 1900) tt:Hours mm:Minute
Active Area	{SAxC}	{AAxC}	x 1-5 6=total
Open	{SOC}	{AOC}	Shutter opens. Must be closed by the "STOP" command

Description <b>BOGBALLE CALIBRATOR 2003 / 2003W</b>			T&O ref. <b>40230</b>
Document type <b>Serial protocol</b>	Editor <b>PP</b>	Printed d. <b>24/3 2004</b>	Page <b>7 af 8</b>

---

Plot	{SPC}	{APC}	Toggles the Plot function (Half of Ha etc. No Trend guide)
Zero set Tara	{STC}	{ATC}	
Start	{SGC}	{AGC}	
Stop	{SSC}	{ASC}	

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### READING OF VALUE IN BC2003

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	COMPUTER SENDS	BC2003 ANSWERS	EXPLANATION
Set value, application rate	{RDC}	{WDxxxxC}	xxx kg/ha
Present value, application rate	{RAC}	{WAxxxxC}	xxx kg
Spread width	{RBC}	{WBxxxxC}	xx,x m
Distance	{RLC}	{WLxxxxxC}	xxxxx m
HA[y]	{RhyC}	{WHyxxxxxC}	xx,xx ha
Hopper contents	{RIC}	{WIxxxxxC}	xxxxx kg
Tara	{RTC}	{WTxxxxxC}	xxxxx kg
Speed	{RVC}	{WVxxxxC}	xx,x km/t
Time	{RCC}	{WCddmmaa tmmC}	dd:Date mm:Month aa:Year (in relation to 1900) tt:Hours mm:Minute

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Description			T&O ref.
BOGBALLE CALIBRATOR 2003 / 2003W			40230
Document type	Editor	Printed d.	Page
Serial protocol	PP	24/3 2004	8 af 8

---

PTO	{RPC}	{WPxxxC}	xxx rpm
Status	{RSC}	{WSopsatl hfmC}	o:Open p:Plot s:Start/Stop a:Active area t:Type l:Language prog h:Wheel sensor f:Tank sensor m:Mode o 0=Open inactive 1=Open active p 0=Plot function inactive 1=Plot fonction active s 0=Stop 1=Start a 1-5=Area No. 1-5 6=Total counter t 0=E 1=EX 2=EX2 3=EW 4=EXW 5=EX2W 6=D 7=DZ l 0=DK 1=GB 2=F 3=D 4=NL 5=S h 0=Fix speed 1=wheel sensor 2=Radar 3=Transmission f 0=Tank sensor not available 1=Tank sensor available m 0=Fertiliser spreader 1=Job computer 2=Flow computer

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