



















































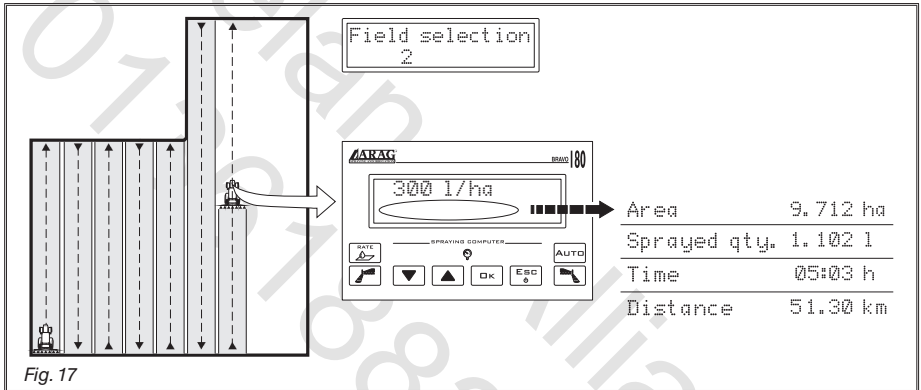
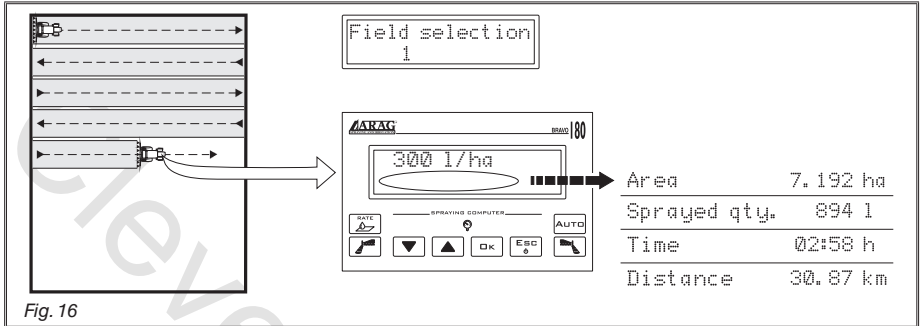






## 13.2 Field selection

When treating a field, the BRAVO 18x collects the data for the current job (treated surface, liquid delivered, treatment time, distance traveled) and stores up to 4 different treatments. These data can be called up with the "FIELD" function.



**Select the field before starting a new treatment: if this is not done, the data will be added to those for the last selected field.**

## 13.3 Setting calibrated returns (control units with three-way valves)

Calibrated returns, fitted onto control units with three-way valves, ensure there are no pressure variations when closing one or more section valves.



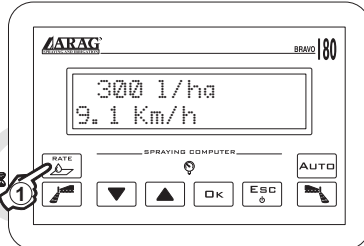
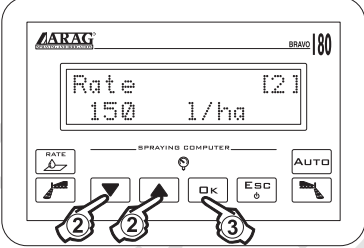
**Set EACH TIME nozzle type is changed.**

**Please refer to user's guide supplied with purchased control unit for details on adjusting procedure.**

If nozzle type is not changed, adjustments made ensure a steady spray even in case of jobs at different operating pressure.

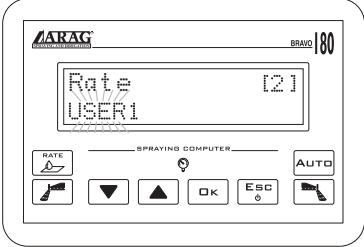
### 13.4 Job/spray rate program selection (for automatic control ONLY)

Before starting treatment, select the right dosage from those provided in the Menu User (par. 12.1).

	<p>1) Hold down the key for 1 second to enter the dosage selection menu.</p>
	<p>2) Press to scroll through the dosage settings. 3) Confirm the selection.</p>



If pressure reckoning is **ENABLED** on spray rate selection, pressure reckoning value and selected nozzle will alternately flash on the display.

	
--	--

### 13.5 Automatic treatment control



Refer to Chapter 10 - Computer controls and display - for information on operating the keys and switches.

	<ol style="list-style-type: none"> <li>1) Press to enable automatic mode: the letter "A" (automatic) displays.</li> <li>2) Open the section valves by setting the control panel switches to the up position: their leds will turn on*.</li> <li>3) Drive to the start of the field.</li> <li>4) Set the main control switch up: its led will turn on.</li> <li>6) Run the treatment.</li> </ol> <p>*: the leds only turn on for computers configured to operate in P mode. If the computer is configured for M mode, the section leds will only turn on when the main control switch is set to ON.</p>
	<p>When treatment is run in automatic mode, the computer keeps delivery to the set value: press the pressure control valve switch to temporarily change the distribution value: the value can be modified in 10% steps (in the range -50% - +50%).</p> <p><b>This temporarily changes the distribution value: to set a new permanent distribution value, refer to par. 12.1 - Setting the dosage.</b></p> <p>A) Press to increase the distribution value. B) Press to decrease the distribution value.</p> <p><b>Attention: when the distribution value is being changed, the display alternately flashes the variation percentage and the current distribution value.</b></p> <p>To return to the set distribution value, press the RATE key.</p>

### 13.6 Manual treatment control



Refer to Chapter 10 - Computer controls and display - for information on operating the keys and switches.

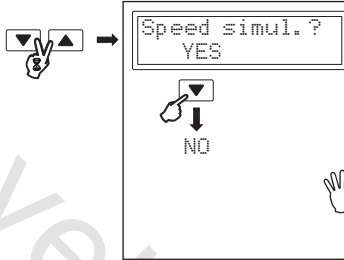
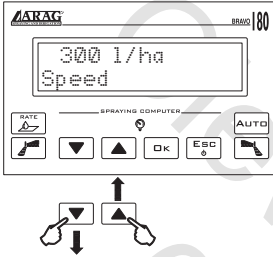
	<ol style="list-style-type: none"> <li>1) Press to enable manual mode: the letter "M" (manual) displays.</li> <li>2) Open the section valves by setting the control panel switches to the up position: their leds will turn on*.</li> <li>3) Drive to the start of the field.</li> <li>4) Set the main control switch up: its led will turn on.</li> <li>5) Operate the switch to set the desired dosage.</li> <li>6) Run the treatment.</li> </ol> <p>*: the leds only turn on for computers configured to operate in P mode. If the computer is configured for M mode, the section leds will only turn on when the main control switch is set to ON.</p>
--	--

## 13.7 Distribution menu

This menu provides the treatment options. Almost all parameters have a submenu which can be accessed by holding down the UP and DOWN keys together for 1 second; this opens the function associated with the selected menu.

In all submenus, pressing OK confirms entry or modification of a parameter, while pressing ESC cancels the operation or quits the menu option.

### Measuring the current speed

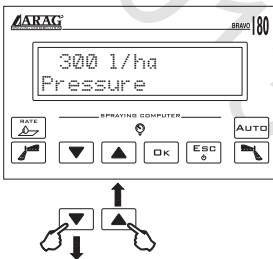


Simulating the tractor's speed enables product distribution even without a speed sensor mounted to the wheels. The default simulation setting is 6 kph; this can be changed by holding down OK and pressing the UP and DOWN keys.



**When this function is used, the dosage cannot be the real value inasmuch as the speed of the tractor is not detected in real time.**

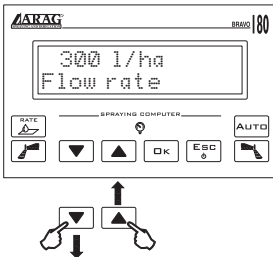
### Instantaneous pressure indication



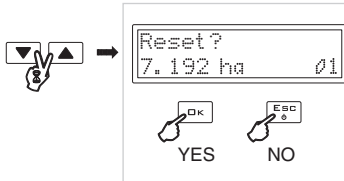
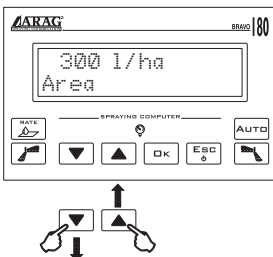
**THIS ITEM WILL SHOW ONLY IF PRESSURE RECKONING IS ENABLED**

This function allows the user to read pressure value proportional to flow rate and selected nozzle.

### Instantaneous flow rate indication



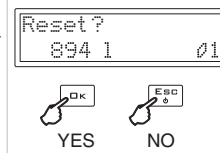
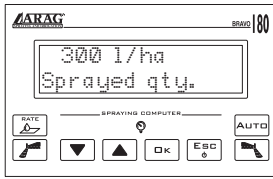
### Treated surface count



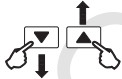
This function resets the treated surface count for the field indicated at the right corner of the display.

CONTINUES

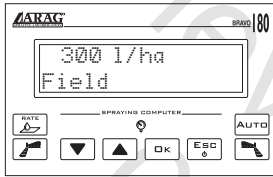
## Liquid distributed count



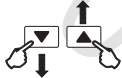
This function resets the liquid distributed count for the field indicated at the right corner of the display.



## Field treated



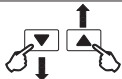
Press to select the field to be treated. After the field selection has been confirmed, the computer will prompt for the operator to reset the parameters for the selected field.



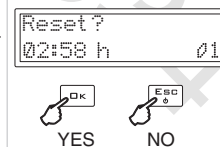
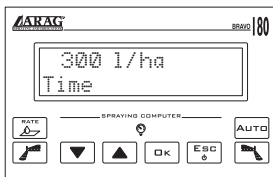
## Tank level\*



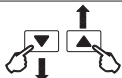
This function fills the tank. The computer displays the maximum filling value, which can be changed with the UP and DOWN keys. Confirm by pressing OK.



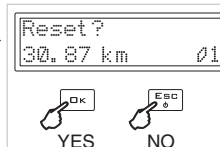
## Treatment time\*



Press to reset the treatment time counter for the field at the right corner of the display. Confirm with OK, cancel with ESC.



## Distance traveled count\*




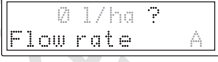

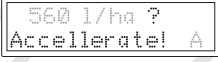

Press to reset the distance traveled count for the displayed field. Confirm with OK, cancel with ESC.

To return to the speed display, hold down the UP key for three seconds at any time.

\* this menu option is only displayed if EXTENDED menu mode is selected.

### 13.8 Fault warnings (for automatic control ONLY)

If distribution errors occur during treatment, the computer warns the operator by sounding a buzzer and displaying a message describing the problem.

	<p><b>Speed alarm</b> The computer does not detect the tractor speed and the control unit is supplied (control valve open or drain valve closed). Set the main control switch to OFF or start the tractor. If the tractor is already in motion, there may be a problem with the speed sensor.</p>
<p>1</p>  <p>2</p> 	<p><b>Flow rate alarm</b> If there is insufficient flow to the flow meter and hence to the control unit, the computer notifies the user (1) by display 0 flow rate (2).</p>
 	<p><b>Distribution alarm</b> If the set distribution value cannot be reached, the computer indicates that the tractor should speed up or slow down.</p>

Tab. 17

## 14 MAINTENANCE / DIAGNOSTICS / REPAIRS

### 14.1 Troubleshooting

FAULT	CAUSE	REMEDY
The display does not turn on	No power	<ul style="list-style-type: none"> <li>• Turn the ignition key to "Ignition".</li> <li>• Check the power cable connections.</li> <li>• Press the power button.</li> </ul>
The valves do not respond to controls	The valves are not connected	<ul style="list-style-type: none"> <li>• Connect the connectors.</li> </ul>
A valve refuses to open	No power to valve	<ul style="list-style-type: none"> <li>• Check the electrical connection and functionality of the valve.</li> </ul>
The displayed speed is incorrect even at constant speed	Incorrect programming	<ul style="list-style-type: none"> <li>• Check the wheel constant setting (par. 12.2).</li> </ul>
	Speed sensor signal not received	<ul style="list-style-type: none"> <li>• Check the speed sensor connection.</li> </ul>
	Incorrect speed sensor installation	<ul style="list-style-type: none"> <li>• Check the speed sensor installation.</li> </ul>
The delivery volume display is incorrect	Incorrect programming	<ul style="list-style-type: none"> <li>• Check the boom width setting (par. 11.8).</li> <li>• Check the flow meter constant setting (par. 11.11).</li> </ul>
		<ul style="list-style-type: none"> <li>• Check the speed sensor installation.</li> </ul>
		<ul style="list-style-type: none"> <li>• Check the wheel constant setting (par. 12.2).</li> </ul>
		<ul style="list-style-type: none"> <li>• Check the section valve type setting (par. 11.10).</li> </ul>
The treated surface count displayed on the computer differs from the actual amount of terrain covered	Incorrect programming	<ul style="list-style-type: none"> <li>• Check the boom width setting (par. 11.8).</li> <li>• Check the speed sensor installation.</li> </ul>
	The counter has not been reset	<ul style="list-style-type: none"> <li>• Check the wheel constant setting (par. 12.2).</li> <li>• Reset the counter.</li> </ul>
The traveled distance count displayed on the computer differs from the actual distance traveled	Incorrect programming	<ul style="list-style-type: none"> <li>• Check the speed sensor installation.</li> <li>• Check the wheel constant setting (par. 12.2).</li> </ul>
	The counter has not been reset	<ul style="list-style-type: none"> <li>• Reset the counter.</li> </ul>
The delivered liquid display differs from the actual amount of liquid delivered	Incorrect programming	<ul style="list-style-type: none"> <li>• Check the flow meter constant setting (par. 11.11).</li> <li>• Check the section valve type setting (par. 11.10).</li> </ul>
	You are using 3 way section valves and the calibrated returns have not been calibrated	<ul style="list-style-type: none"> <li>• Calibrate the returns.</li> </ul>
	The counter has not been reset	<ul style="list-style-type: none"> <li>• Reset the counter.</li> </ul>
The set distribution value cannot be obtained during automatic operation	Incorrect programming	<ul style="list-style-type: none"> <li>• Correct the distribution value.</li> <li>• Correct the boom width.</li> </ul>
	The system cannot deliver the requested flow rate	<ul style="list-style-type: none"> <li>• Check the setting of the maximum pressure valve.</li> <li>• Check that the installed control valve is correct for the system in use.</li> </ul>
	Control valve malfunction	<ul style="list-style-type: none"> <li>• Check the functionality of the control valve.</li> </ul>
The time count display differs from the actual treatment time	The counter has not been reset	<ul style="list-style-type: none"> <li>• Reset the counter.</li> </ul>

Tab. 18

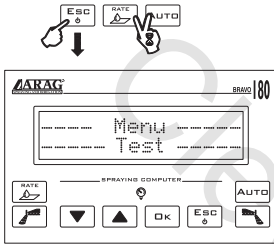
## 14.2 Test menu

This menu tests that the computer is operating correctly.

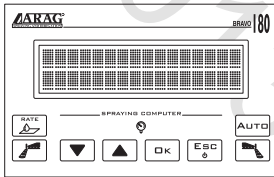
To access the menu, turn the computer on with the AUTO and RATE keys held down.



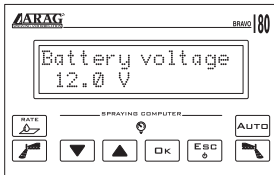
**All tests are READ ONLY; the parameters cannot be modified.**



  
**Display test**



  
**Tractor battery voltage test**



  
**Switches test**



Operate the switches to test that they are working correctly.

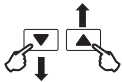
**M** Control valve / drain valve switch (depending on system)

**1 ÷ 5** Section valve switches

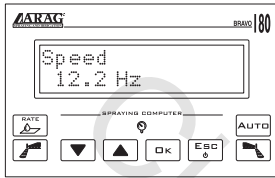
(the computer will display the actual number of sections installed)

**+ / -** Control valve switch

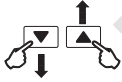
CONTINUES



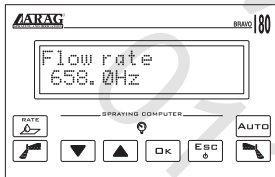
### Speed sensor input test



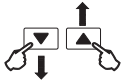
The frequency reading in Hz of the speed sensor displays.



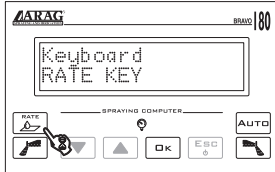
### Flow meter input test



The frequency reading in Hz of the flow meter displays.



### Keyboard test



Press the keys to display the respective text.

Key texts:

RATE:RATE KEY

LH foam marker:TFSX KEY

OK:OK KEY

RH foam marker:TFDX KEY

AUTO:AUTO KEY

The UP, DOWN and ESC keys cannot be tested.

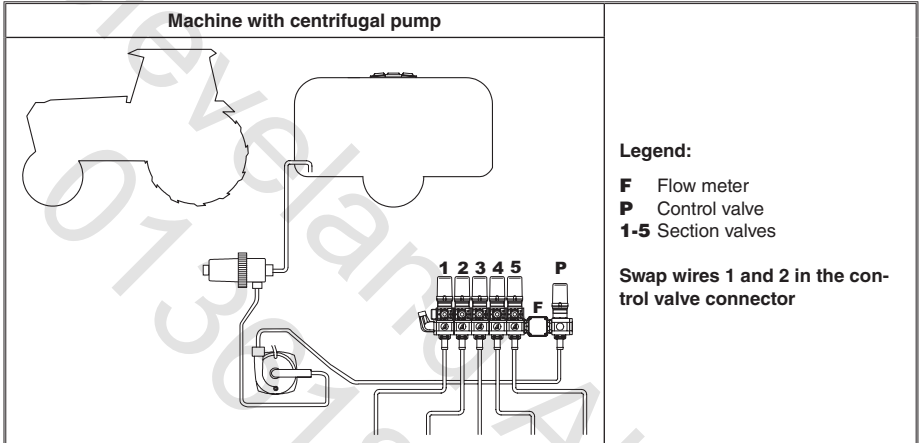
### 14.3 Problems due to the type of system and computer's mode of operation



All work intended to partially or completely modify the operation of the computer or any components connected thereto is done at the user's full and exclusive liability. If there is any doubt regarding alternative computer cable hookups, please contact your nearest service center for further information.

**IMPORTANT: FOLLOW INSTRUCTIONS BELOW ONLY IF PERFECTLY SURE THEY WILL GRANT CORRECT SYSTEM OPERATION.**

Inverse operation of the pressure regulation may be caused by the type of control unit and system to which it is connected. Resolve the problem as described in the following table; if the problem persists, contact your local service center.



Tab. 19

### 14.4 Opening the connector and swapping the wires:



Fig. 18



Fig. 19



Fig. 20

- Unscrew the cable clamp with a small pair of pliers (Fig. 18).
- Prize the connector open with a screwdriver in the provided slot (Fig. 19).
- Slacken off the screws and swap the wires (Fig. 20).



**Tighten the screws to the correct amount when securing the cables.**

## 15 TECHNICAL DATA

### 15.1 Units of measurement

#### • Advanced menu

Datum	Min.	Max.	UM	Description	Notes
Language	--	--	--	Display language	Language options: Italian, English, French, German, Spanish, Portuguese, Polish, Russian, Croatian.
Units of measurement	--	--	--	Units of measurement used to display data	Available options: EU, US, US TURF
Number of sections	--	--	--	Number of section valves installed	Available options: 1 ÷ 5
Width of each individual section	0,00	29,99	EU: m	Boom width (each section)	To display this value set the width of each boom section
	0,0	299,9	US - US TURF: feet		
Section valves	--	--	--	Type of section valve	Available options: 2 way valve - without calibrated return 3 way valve - with calibrated return
Flow meter	1	29999	EU: imp/l US - US TURF: imp/gal	Flow meter constant	Used for calculating the flow rate
Tank capacity	1	19999	EU: l	Tank capacity	
			US - US TURF: gal		
Tank reserve	0	19999	EU: l	Tank reserve value	Below this value, the computer generates a visual and audible warning
			US - US TURF: gal		
Type of display of the distribution menu	--	--	--	Determines whether the counters are displayed or not	Available options: Large, Short
Pressure reckoning	YES	NO	--	Enable/disable pressure reckoning	
Nozzle number*	1	1000	--	Number of bar nozzles	

Tab. 20

\*= only if the previous item is set to "YES" (Pressure reckoning).

## Delivery values

Datum	Min.	Max.	UM	Description	Notes
Volume applied	0	1990	EU: l/ha	Liquid delivered per unit surface area	Displays on the first line of the display during treatment
	0,0	199,9	US: gpa		
	0,0	199,9	US TURF: gpk		
Speed	0	199,9	EU: km/h	Vehicle's speed of travel	
	0	199,9	US - US TURF: mph		
Pressure	0,0	999,9	EU - EU-l/100m: bar	Distribution pressure	Available only if "Pressure reckoning" in Advanced menu is set to YES.
	0	9999	US: psi		
Flow rate	0	999,9	EU: l/min	Liquid delivered per unit time	Liquid actually delivered by the nozzles
	0	999,9	US - US TURF: gal/min		
Tank level	0	19999	EU: l	Level of liquid remaining in the tank	Floating decimal point The counter decreases when the main control switch is set to ON
	0	19999	US - US TURF: gal		
Field	--	--	--	Number of the field being treated	Up to 4 values can be set

Tab. 21

## Delivery counters

Datum	Min.	Max.	UM	Description	Notes
Surface area	0,000	99999	EU: ha	Treated surface	Floating decimal point The counter increases when the main control switch is set to ON
	0,000	99999	US: acres		
	0,000	99999	US TURF: 1000 square ft		
Liquid delivered	0	99999	EU: l	Liquid delivered	The counter increases when the main control switch is set to ON
	0	99999	US - US TURF: gal		
Time	0:01	99999	EU - US US TURF: h	Time of operation	Floating decimal point The counter increases when the main control switch is set to ON From 00:01 to 99:59 in hh:mm format
Distance	0,001	99999	EU: km	Distance traveled	Floating decimal point The counter increases when the main control switch is set to OFF
	0,001	99999	US - US TURF: miles		

Tab. 22

## User menu

Datum	Min.	Max.	UM	Description	Notes
Dosage	0	600	EU: l/ha	Desired distribution rate	--
	0	600,0	US: gpa		
	0	60,00	US TURF: gpk		
Set dosages	1	5	--	Number of settable dosages	Up to 5 values can be set; zero settings are not displayed
Wheel constant	0	99,99	EU: cm/imp*	Wheel constant setting	Used to calculate the tractor speed; zero settings are not displayed
	0	99,99	US - US TURF: inch/imp*		
Wheel settings	1	3	--	Number of settable wheels	
Nozzle settings#	ISO11001	USER5	--	Selected nozzle type	17 available nozzles: 12 ISO steady nozzles and 5 customizable nozzles
Min. adjusting pressure#	Disabled	100.0 bar (1450 psi)		Min. pressure for disabling automatic adjusting function	

Tab. 23

\*imp= pulse

# = only if "Pressure reckoning" = YES

## 15.2 Computer technical data

Description	BRAVO 18x
Display:	Alphanumeric LCD display 2 lines x 16 characters, backlit
Power supply:	11 ÷ 14 Vdc
Consumption (only computer):	150 mA
Working temperature:	0°C ÷ 60 °C +32°F ÷ +140 °F
Digital inputs:	for open collector sensors: max. 2000 imp./s
Weight:	726 g (Bravo code 46718501 without cabling)
Protection against reversal of polarity:	•
Protection against short circuit:	•

Tab. 24

## 16 DISPOSAL AT THE END OF SERVICE

Dispose of the system in compliance with the established legislation in the country of use.

1. ARAG s.r.l. guarantees this apparatus for a period of 360 day (1 year) from the date of sale to the client user (date of the goods delivery note). The components of the apparatus, that in the unappealable opinion of ARAG are faulty due to an original defect in the material or production process, will be repaired or replaced free of charge at the nearest Assistance Centre operating at the moment the request for intervention is made.  
The following costs are excluded:
  - disassembly and reassembly of the apparatus from the original system;
  - transport of the apparatus to the Assistance Centre.
2. The following are not covered by the guarantee:
  - damage caused by transport (scratches, dints and similar);
  - damage due to incorrect installation or to faults originating from insufficient or inadequate characteristics of the electrical system, or to alterations resulting from environmental, climatic or other conditions;
  - damage due to the use of unsuitable chemical products, for spraying, watering, weedkilling or any other crop treatment, that may damage the apparatus;
  - malfunctioning caused by negligence, mishandling, lack of know how, repairs or modifications carried out by unauthorised personnel;
  - incorrect installation and regulation;
  - damage or malfunction caused by the lack of ordinary maintenance, such as cleaning of filters, nozzles, etc.;
  - anything that can be considered to be normal wear and tear.
3. Repairing the apparatus will be carried out within time limits compatible with the organisational needs of the Assistance Centre.  
No guarantee conditions will be recognised for those units or components that have not been previously washed and cleaned to remove residue of the products used;
4. Repairs carried out under guarantee are guaranteed for one year (360 days) from the replacement or repair date.
5. ARAG will not recognise any further expressed or intended guarantees, apart from those listed here.  
No representative or retailer is authorised to take on any other responsibility relative to ARAG products.  
The period of the guarantees recognised by law, including the commercial guarantees and allowances for special purposes are limited, in length of time, to the validities given here. In no case will ARAG recognise loss of profits, either direct, indirect, special or subsequent to any damage.
6. The parts replaced under guarantee remain the property of ARAG.
7. All safety information present in the sales documents regarding limits in use, performance and product characteristics must be transferred to the end user as a responsibility of the purchaser.
8. Any controversy must be presented to the Reggio Emilia Law Court.

# Conformity Declaration **CE**



ARAG s.r.l.  
Via Palladio, 5/A  
42048 Rubiera (RE) - Italy  
P.IVA 01801480359

Dichiara

che il prodotto

descrizione: **Computer**

modello: **Bravo 180**

serie: **46718xxx e 467110W**

risponde ai requisiti di conformità contemplati nelle seguenti Direttive Europee:

**2004/108/CE** e successive modificazioni  
(Compatibilità Elettromagnetica)

Riferimento alla Norma Applicata:

**EN ISO 14982:1998**

(Macchine agricole e forestali – Compatibilità elettromagnetica  
Metodi di prova e criteri di accettazione)

Rubiera, 21 Dicembre 2007

*Giovanni Montorsi*

A handwritten signature in black ink, appearing to read "G. Montorsi", written over a horizontal line.

(Presidente)

*Only use original ARAG accessories and spare parts, to maintain safety conditions foreseen by the constructor.  
Always refer to the ARAG spare parts catalogue.*

Cleveland Alliances  
01361883418

12/2010

D20127\_GB-m04



42048 RUBIERA (Reggio Emilia) ITALY

Via Palladio, 5/A

Tel. 0522.622011

Fax 0522.628944

[info@aragnet.com](mailto:info@aragnet.com)

<http://www.aragnet.com>