

## Installation and Operating Instructions

# AMATRON



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**AMAZONEN-WERKE** **H.DREYER**  
GmbH & Co. KG



**D-4507 Hasbergen-Gaste**

Tel.: Hasbergen (0 54 05) \*5 01-0

Telex: 9 44 895

**D-2872 Hude/Oldbg.**

Tel.: Hude (0 44 08) \*801-0

Telex: 2 51 010

**AMAZONE-Machines Agricoles S.A.**

**F-57602 Forbach/France** · rue de la Verrerie

Tel.: (8) \*787 63 08 · Telex: 86 04 92

Factories for: Fertilizer-spreaders, -storage halls, -handling systems. Seed drills. Soil cultivation machines. Field sprayers. Potato-graders, -sorters.

The AMATRON is a product from the AMAZONE-range of farm machinery.

The engineering technology in connection with the correct operation ensures optimum use and longevity.

To ensure that you will get the best possible results from your "AMAZONE" we would ask you to read and observe these instructions carefully. You will, of course, appreciate that we will not be able to accept claims under the guarantee if any damage is caused due to incorrect operation.

Please enter the serial number of your AMATRON here. You will find this number on the numberplate.

Please always quote the serial number when ordering spares or asking technical questions:

**AMATRON**

Serial-No. \_\_\_\_\_



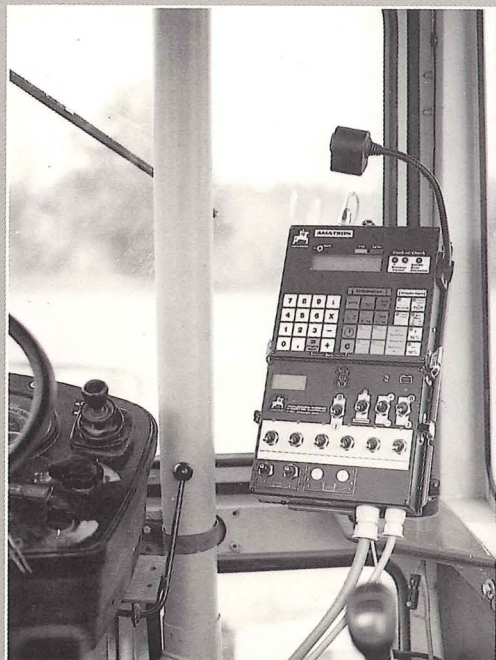
# AMATRON

The electronic control- and checking system from

# AMAZONE

enables effectful control of AMAZONE-Machinery from the tractor seat and optimum metering of mineral fertilizer, microgranules and spray liquids. That means saving on expensive materials and avoiding ecological damage. The same AMATRON is useable for both, the AMAZONE Jet pneumatic spreaders and the AMAZONE US-sprayers (additional savings!). The desired application rate is entered into the memo of the AMATRON's computer which then automatically controls the application rate continuously in relation to the ground speed of the tractor.

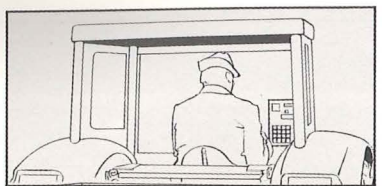
The AMATRON computes and displays on demand such important data as consumed quantity, total worked area, hours of operation etc.





# AMATRON

- checks
- controls
- readjusts
- memorizes
- informs



Input data      Informations

Schematic illustration of the computer assisted operation control by AMATRON



actual data

actual data

ACTORS  
i.e. setting motor

SENSORS  
i.e. for ground related speed

SENSORS  
i.e. flow check device

OPERATION

fertilizing      spraying

Description of the function keys

Available Information		Display of the stretch covered after releasing of the start function.
		Display of the worked area after start and determination of the total area (i.e. of a season)
		Display of the application rate
		Display of the applied quantity until the next start function and the total applied quantity (i.e. of a season)
		Display of the operating hours after releasing of the start function
Start		Releasing of the start function

Input		Input and checking of the working width
		Determination and checking of the figure for the ground speed (Impulses / 100 m stretch)
		Input of the desired application rate
		Input of the specific impulse figure/kg (fertilizer) resp. impulse figure/l (spray liquid)
		For instant brief increasing or reducing of the application rate
Memorizer		Memory for the specific figure Impulse/kg, 1-3 (fertilizer) and Impulse/l (spray liquid)

Descriptions and illustrations are not binding and are subject to change without notice



**AMAZONEN-WERKE** H.DREYER GmbH & Co. KG  
D-4507 Hasbergen-Gaste · D-2872 Hude (Oldenburg) · AMAZONE-Machines Agricoles S.A., F-57602 Forbach/France

fold over for close-up on AMATRON

# Contents

<b>1. Description of systems</b>	2
1.1 Switch box SK/SKJ/SKS	2
<b>2. Installation instructions</b>	3
2.1 Computer	3
2.2 Drive transducer for the distance covered	3
2.3 Control of discharge	4
<b>3. Operating instructions</b>	5
3.1 Description of the input	5
3.2 Description of the function keys	8
3.3 Operation procedure	9
<b>4. Maintenance</b>	9
4.1 Computer	9
4.2 Special hints	9
<b>5. Trouble shooting</b>	10
<b>6. Determined implement-data</b>	11

# 1. Description of systems

The AMATRON monitor is intended to control the AMAZONE Jet fertiliser spreader and electrically or pneumatically controlled field AMAZONE sprayers fully automatically.

It is plugged into the standard existing switchbox. Please see para. 1.1.

This description relates to the use of the above-mentioned implements.

The AMATRON monitor consists mainly of:

- the computer (installed in the driver's cab of the tractor)

It is intended to: – determine the area and the total worked area

- determine the operating time
  - display the continuous speed and discharge of fertiliser in kg/ha or of in litre/ha.
  - compute automatically the spread rate/area worked when varying boom working width.
  - determine the amount of fertiliser or liquids discharged
  - automatic control of the preset discharge.
- The magnetic drive transducer (cable X)  
fitted to the holder provided on the chassis of the tractor. The distance travelled and hence also the speed is determined by this transducer.
  - The rugged operating conditions in agriculture have been taken into consideration in the design. The front panel therefore consists of a very robust, but also very serviceable foil keyboard, so that the equipment can be operated rapidly. All the data fed in and detected will remain stored even when the equipment has been switched off. The lithium battery has an effective life of approximately 10 years.

## 1.1 Switchboxes SK/SKJ/SKS

Depending on the type of implement and on the working width the right switchbox must be attached.

The AMATRON receives its power supply by the switchbox. Implement-specific functions such as "on/off" at the headlands or boom section control are controlled by the switchbox and the informations of it are passed to the AMATRON's computer.

We distinguish:

- SK... = Switchbox for AMAZONE pneumatic spreader SUPER JET
- SKJ... = Switchbox for AMAZONE pneumatic spreader JET
- SKS... = Switchbox for AMAZONE field sprayers

## 2. Installation instructions

### 2.1 Computer

The console of the computer with the switchbox must be installed in the field of view of the driver. The distance to any possible radial and aerial must be at least 1 metre.

#### **WARNING!**

The power supply must be taken directly from the battery or starter (brown = +, blue = -).

### 2.2 Drive transducer for the distance covered (cable X)

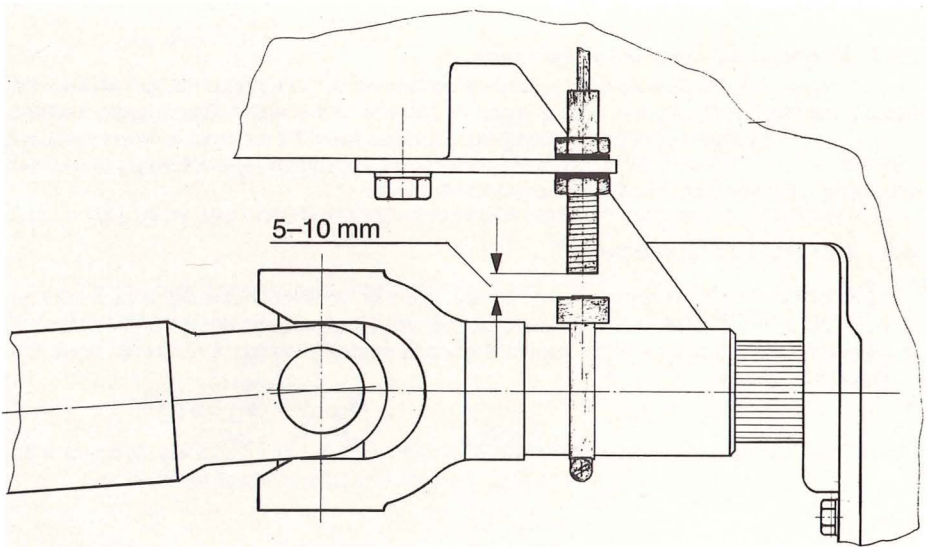
The distance travelled between impulses should in maximum be 0.60 m. The response time of the control will be longer, if the distance becomes greater.

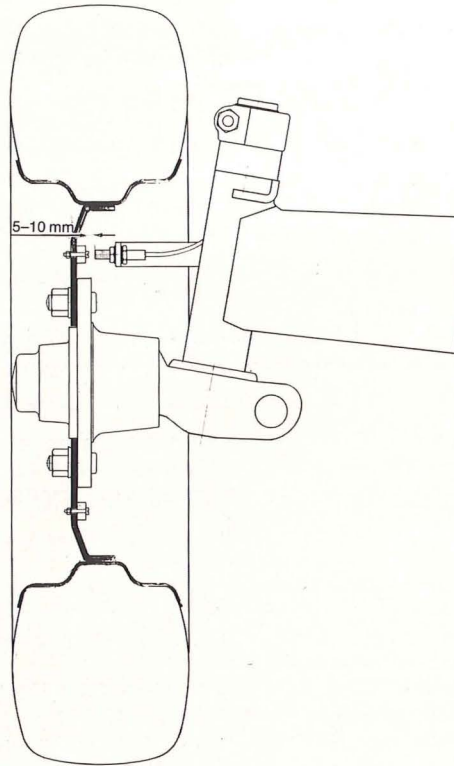
#### 2.2.1 Fitting to the Unimog

Unscrew the tachometer shaft from the gearbox and fit the adapter supplied (option). Apply multi-purpose grease to the shaft with the magnets and insert it with the yoke downwards. Screw the tachometer shaft to the adapter.

#### 2.2.2 Fitting to the MB trac and the 4-wheel drive tractor

Fit the magnet to the front axle propeller shaft using the clamp provided. Fit the drive transducer X with the holder supplied to a fixed part of the vehicle opposite the magnet at a distance of 5–10 mm.





### 2.2.3 Fitting to tractor without 4-wheel drive

Fit the magnets at equal distance apart around the circumference in the shell of the front wheel of the tractor. The number of magnets is determined by the size of the wheel. The distance travelled between impulses should be 0.18 m minimum to 0.60 m maximum. Fit the impulse drive transducer to a fixed component of the vehicle with the holder supplied, such that the end of the drive transducer is pointing to the magnets. The distance should be 5–10 mm.

## 2.3 Control of discharge

The Computer controls the speed of the metering rollers or the amount of liquid through the flow valve via the control box SK and the servo motor and hence the discharge. An "AMATRON/Manual" changeover switch decides whether control is effected manually via the "+/—" switch or via the AMATRONS' computer.

The discharge can also be varied on the AMATRON via the  or  key (see para. 3.3).



### 3. Operating instructions

#### 3.1 Description of the input

The values specific to the machine have to be fed in before the equipment is put to use:

##### 3.1.1 Key



This key feeds in the effective width:

– Press key



– Feed in the value via the decimal keyboard.

– Press key



– Check the figure fed in by pressing the key



##### 3.1.2 Key



There are two possible inputs:

##### 3.1.2.1 The figure (impulse/100 m) is not yet known.

– Measure out and mark a distance of 100 m in the field.

– Take the vehicle to the starting position/Switch main switch to "0".

– Press key



and



– Drive the vehicle forward slowly and bring to constant speed.

– Stop after 100 m.

– Press key



– Check the figure fed in by pressing key



##### 3.1.2.2 The figure (impulse/100 m) has already been determined once for the tractor.

In this case there can be a direct input. Press key



with the vehicle at standstill.

Feed in the number of impulses at 100 m for example 235 via the decimal keyboard.

– Press key



– Check the figure fed in by pressing key



### 3.1.3 Key



Apart from the number of impulses for a distance of 100 m travelled and the effective width, the monitor will also require the information of the rate of discharge of fertiliser or liquid so as to regulate the discharge. The required impulses/kg or impulses/litre are obtained from the drive of the metering rollers or flow valve with a transducer. A different number of impulses/kg or impulses/litre is supplied to the computer depending on the type of fertiliser or liquid.

There is a key for each of the three different types of fertiliser. This means that the driver will set the monitor at the appropriate time by pressing a key, if it is required to spread different fertilisers







in one day. The fourth key  is required for the use of a plant protection sprayer.

Feeding in the values

There are two types of inputs possible.


#### 3.1.3.1 The figure (impulse/kg or impulse/litre) is not known

- Fill the fertiliser spreader with fertiliser or the sprayer with liquid
- Place a bucket under one metering roller or sprayer boom.
- Switch off the other metering roller or boom section via the section width circuit.
- Switch on the fertiliser spreader for a short period via the main switch and switch it off again (metering rollers must fill up).
- Empty the tray.

- Press one of the keys    or the sprayer 

- Press key 

- Switch on the fertiliser spreader or sprayer via the main switch.
- Switch off the fertiliser spreader or sprayer via the main switch when the buckets are full.
- Weigh the fertiliser or measure the liquid.
- Feed in the quantity (e.g. 12 kg/l) via the decimal keyboard.



- Press key 

The computer will convert the recorded values into impulse/kg when pressing the key



The specific figure (impulse/kg) for the fertiliser just calibrated will be stored by memory key



or  or  as selected by the driver. (The indicator lamp of the selected key will light.)





The indicator lamp to which the material has been allocated must light while the material is being discharged.

It will now also be possible to store the figures (impulse/kg) of two other types of fertiliser. The 4<sup>th</sup> storing place is reserved for spray liquid.

By pressing the corresponding key select the figure (impulse/kg) of the other fertiliser, if the fertiliser has to be changed between the three types memorized or if a liquid shall be sprayed at a particular rate select key "imp./l".








Record the fertiliser/liquid with the assigned memory key any and the figure (impulse/kg or imp.) for reasons of safety.

Example:

Key	Type of fertiliser/liquid	Related figure
	Fertiliser type X	322 Imp./kg
	Fertiliser type Y	485 Imp./kg
	Fertiliser type Z	291 Imp./kg
	Liquid	346 Imp./l

The figure indicated should be compared with the figure memorized for the required fertiliser when a different key is selected.

### 3.1.3.2 The figure impulse/kg or litre for the fertiliser or liquid is known

- Press one of the three keys   , or the sprayer 
- Press key 
- Feed in the figure via the decimal keyboard.
- Press key 
- Check the figure fed in by pressing the selected key 

The figure (impulse/kg or litre) for the special fertiliser will now be stored under the selected memorized key.



### 3.1.4 Key input as at 3.1.1

This is used to instruct the computer of the desired discharge. The electronic circuit will control the speed of the metering rollers or the flow valve and hence the discharge automatically, if the switch is in the automatic position. The control process should be observed via the indicator lamps “+” and “–”. The buzzer will sound and both the lamps “+” and “–” will light, if the preset figure is not achieved within 5 seconds as a result of a fault (e.g. drive speed too high).

### 3.1.5 Red key: “Speicher – Memory – Memoire”

When pressing this key the display shows the control-constant. It influences the calculation process and is for:



AMAZONE JET = 1  
AMAZONE Fieldsprayers = 2.5

The entering of a control-constant is done by use of the decimal keys and by pressing of the “Input” key.

## 3.2 Description of the function keys

The rate of discharge and the forward speed can be read on the display during operation. The computer will automatically display the discharge volume and the speed after 5 seconds, if a different function is selected via a key.

### 3.2.1 "Start function" of the AMATRON

The start function is triggered by pressing the keys  and  simultaneously.

This means the store for the    and  will be switched to "0".

Pressing this key will start the clock automatically.

This function will be carried out before starting operation.

The implement-specific functions are controlled by the controlbox "SK" (see p. 11 or para 3.3).

### 3.2.2 Key



This key is used to indicate what distance has been completed after performing the "start function" (3.2.1).

### 3.2.3 Key





This key is used to indicate the area which was worked after triggering the start function (3.2.1). The widths of sections covered will be considered automatically when switched off. The measurement of the area will be interrupted when the fertiliser spreader is switched off via the main switch.

### 3.2.4 Key



This can be used to determine the total area, e.g. over a season.

The memory will be switched to "0" by pressing the keys  and  simultaneously before the start of the season.

### 3.2.5 Key




The discharge will be displayed in kg/min. when this key is pressed.

### 3.2.6 Key




This counter will be set to zero by the start function (3.2.1). This also applies to the counter for the

. The worked area and the quantity of fertilizer or liquid applied to this area can therefore be read off when the operation has been completed.

### 3.2.7 Key



This counter is available for optional use. The counter will be erased, if this key and the key  are pressed at the same time.

This counter can be used for example to monitor the contents of the tank. Set the counter to zero after filling up. The quantity of fertilizer or liquid spread can be read off.



### 3.2.8 Key



The working time, which has elapsed after performing the "start function" (3.2.1) is indicated by pressing this key. The recording of the time will cease when there is no electricity applied to the computer.

It is started again when the machine is switched on. It will also be possible to stop the clock during the cultivation process.

The clock can be stopped by pressing the "time" key a second time. It will be restarted if the "time" key is pressed yet again.

## 3.3 Operation procedure

Perform the start function (3.2.1) before starting the operation after the data of the machine has been fed in (3.1.1–3.1.6).

Switch the AMATRON/Manual switch to the position "AMATRON"!

Before beginning the operation the p.t.o. or the hydraulic resp. must be engaged. The actual spreading or spraying operation is triggered off only after switching the main switch for the boom section control. This should also be switched from "1" to "0" at the headland or vice versa (see para. 1.1).

It will be possible to display any value during the operation. It will also be possible to perform the 4 basic calculator functions during operation.

The AMATRON automatic system will ensure precise metering.

The same speed should if possible be maintained at the time when the fertiliser spreader or sprayer is switched off and on, in order to avoid under- or over-metering for a short period. Press the key



or



respectively, if it is required to increase or reduce the amount of material for a short period.

The new reference value will be displayed for 5 seconds. It will be possible to increase or even reduce the desired deviation again in sets of 10% by pressing several times, if the deviation from the reference value fed in is required to be more than 10%.



Key should be pressed, if it is then required to return to the amount programmed into the system with this key to be discharged. All the figures can be recalled after the operation has been completed. A new operating programme will start with the "start function".

## 4. Maintenance

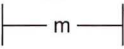
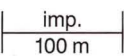
### 4.1 Computer

The computer requires no maintenance. It has an internal electronic safety system. It should be stored in a heated space during the winter lay-off.

### 4.2 Special hints

When performing any welding on the tractor the electricity supply to the AMATRON computer should be disconnected.

## 5. Trouble shooting

	Problem	Cause	Remedy
5.1	All lamps are shining and the horn sounds constantly	Voltage too low	Take electricity directly from battery or starter
5.2	Area is not measured	Input of "working width"  and of "calibrat. input"  is missing	Put in figures (according to 3.1.1 and 3.1.2)
		No impulse from drive transducer for distance (green lamp does not flash during operation)	Check plug X and cable towards drive transducer for any damage, possibly drive transducer needs replacing
5.3	The spreadrate display kg/ha shows "0" during operation. (First check if 5.2 applies)	Input of "Impulses/kg" is missing	Put in the number of impulses/kg (see 3.1.1)
		No impulses from impulse transducer get to the computer	Check distance of impulse transducer from the sprocket (1–2 mm)
5.4	Display of spread rate kg/ha incorrect	The area covered is not correctly determined (The display "total-Ltr/kg" is correct	Check working width and correct if necessary (see 3.1.1) Check Imp./100 m and correct if necessary (see 3.1.2)
5.5	The required spread rate is not achieved. The actual rate lies below the value put in. The horn sounds (see also 5.4)	The electr. adjustment motor has been poled wrongly. The rev.'s of the metering rollers/flow valve are adjusted downwards instead of upwards	Change poling of the motor
		Spreader/sprayer cannot deliver the required quantity	Use next smaller fwd. gear
5.6	The spreadrate lies above the pre-set value. The horn sounds	The elect. adjustment motor is poled wrongly. The rev.'s of the metering rollers/flow valve are adjusted up- instead of downwards	Change poling of the motor
5.7	After switching on the Lc-display shows HALP 8888 or HALP 0000	The contents of the memory has been changed by a disturbing impulse	Switch AMATRON several times "on" and "off" until a "0" is displayed. Put in newly implement-related data (see 3.1.1–3.4.4). If "0" does not show up, please replace computer.

We do not assume any responsibility for damage to the crop due to misapplication

**6. Determined implement-data:**

– Impulses/100 m \_\_\_\_\_

– Working width \_\_\_\_\_

– Key	Kind of fertiliser/liquid	Impulses/kg or litres