Installation and Operating Guide

UNI Control-S

on

Multi-purpose spreaders

July 1997

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Contents

1 Overview 3

1.1 Operating mode "multi-purpose sprayer" 3

1.2 System description 4

1.2.1 UNI Control S with switch box 4

1.2.2 Signal distributor – multi-purpose sprayer with sensors 5

2 Installation instructions 7

2.1 Console and computer 7

2.2 Sprayer equipment 7

2.3 Safety 10

2.4 Specified implementation 10

2.5 Safety instructions 10

3 Operation 11

3.1 Operating scheme 11

3.2 Operation procedure 12

3.3 Description of the order, machine and operation data of and the memory 13

1 Overview

This operating guide supplements the UNI Control S operating guide. The application on the multi-purpose sprayer is described here.

1.1 Operating mode "multi-purpose sprayer"

Used on multi-purpose sprayers with hydraulic driven scraper floors, the UNI Control S controls the spread rate fully automatically. The speed of the hydraulic motor and consequently the spread rate are controlled by a motor-adjustable current control valve.

The UNI Control S ensures exact dosage of the spraying liquid. Wrong dosage when conditions are difficult is impossible due to slip-free speed recording. Accurately spread sludge replaces commercial fertilizer and protects the environment.

1.2 System description

The system consits of the UNI Control S computer with switch box, and the multi-purpose sprayer signal distributor with sensors and current control valve.

1.2.1 UNI Control S with switch box

The multi-purpose sprayer program is included in every UNI Control S. The program is activated by coding in the machine plug of the switchbox.

The system is switched on and off at the switch box. Automatic or manual operation can be selected using the manual/auto switch. During manual operation the +/- keys can be used to adjust the scraper floor speed. The UNI Control S recognises the working position when the scraper floor drive is running and the working position switch is on. The recording of the area and the spread rate is interrupted when the scraper floor drive is switched off or when the working position switch is at off.

The dosage position and dosage position + lamps show the required slide valve position.

The LCD display in the switch box shows a value analogue to the scraper floor speed (= oil engine's rpm).

Before initial operation the following table should be filled out. .

Position of the current control valve	Switch box display
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

The display shows the valve position at any given time. This is absolutely essential for manual operation. In addition the display is used to monitor the fully automatic regulation.

1.2.2 Signal distributor – multi-purpose sprayer with sensors

Following sensors are connected in the switch box

- "Dosage" sensor (inductive sensor)
  The drive's rpm is recorded at the gear wheel of the oil engine. The UNI Control S uses this to calculate the current spread rate in m^3/min.

- "Speed" sensor (Hall element)
  The sensor takes the actual rate from the wheel of the sprayer.

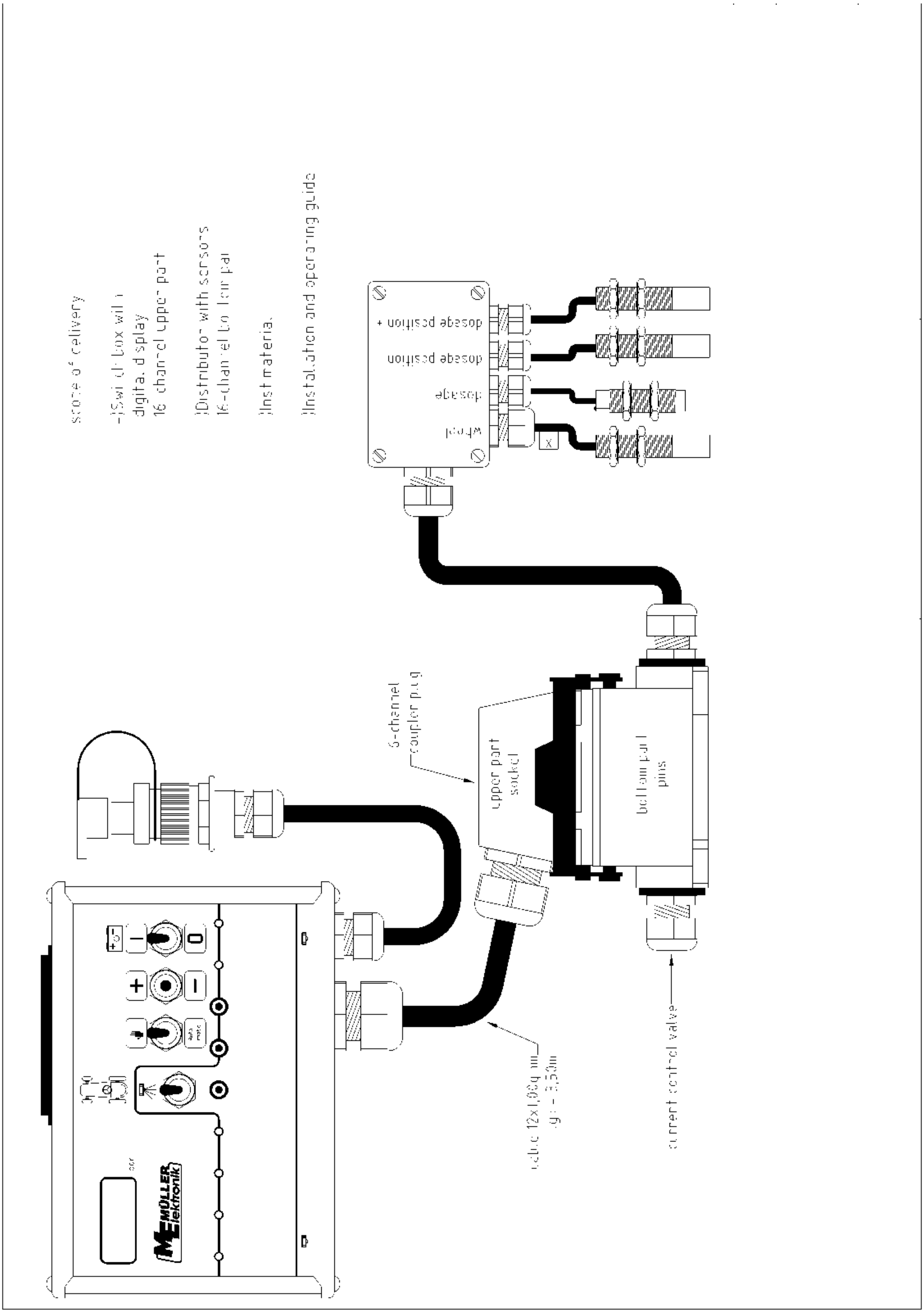
- "Dosage position" sensor and " Dosage position +" sensor (Hall element)
  The slide valve position must be adhered to exactly for accurate dosage. The "dosage position " sensor displays the selected position during operation via a lamp in the switch box

  The "dosage position +" sensor displays the wider opened slide valve via a further lamp. A wider opening is required at the beginning of operation when the sludge has a low TS content

  Varying slide valve positions are necessary depending on the spread rate and the spray liquid. This can be done by moving the magnets.

- Motor controlled current control valve.
  The UNI Control S regulates the speed of the oil-motor propelled scraper floor by means of the valve.

  The current control valve is connencted to the bottom part of the 16-channel coupler plug.


scope of delivery
-)Switch box with
digital display
16 channel upper part
)Distributor with sensors
)Inst material
)Installation and operating guide
6-channel
coupler plug
upper part
socket
bottom part
pins
current control valve
wheel
dosage
dosage position
dosage position +

2 Installation instructions

2.1 Console and computer

Please refer to the UNI Control S Operation and Installation Guide.

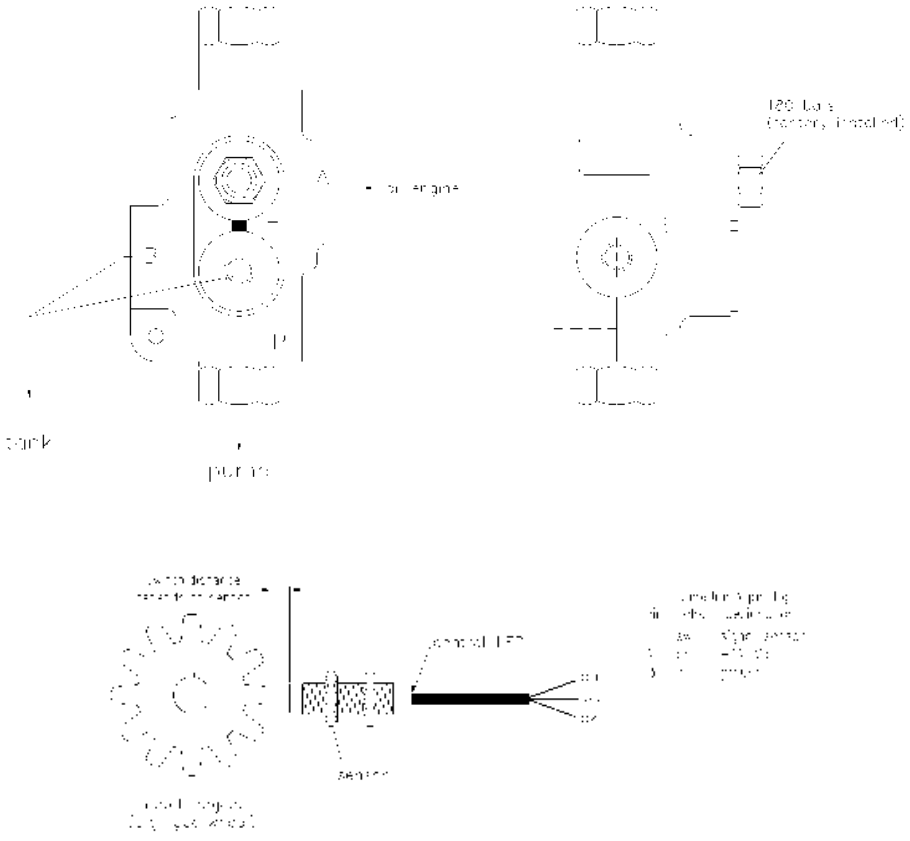
2.2 Sprayer equipment

- 16-channel coupler plug
The 16-channel coupler plug is mounted on the sprayer's drawbar using the enclosed screws

- Multi-purpose sprayer switch box
The signal distributor is mounted in a protected position on the rear part of the sprayer (e.g. on the bar underneath the floor.

- Current control valve
The current control valve is mounted near the 16-channel coupler plug and is connected directly to the coupler plug. Refer to the current control valve graphic to connect the hydraulics.

- **Dosage sensor (inductive sensor)**
The rpm is recorded at the gear wheel of the oil engine by means of this sensor. The distance between the tooth and the sensor should be approximately 2mm. A fully enclosed inductive sensor with the same electrical functions is supplied for oil bath drives. The sensor is screwed directly into the casing of the oil bath drive.
The switch distance in this case should also be 2mm.
The sensor has a screw thread of M12 x 1. The gear wheel with the highest rpm is best suited for impulse recording.



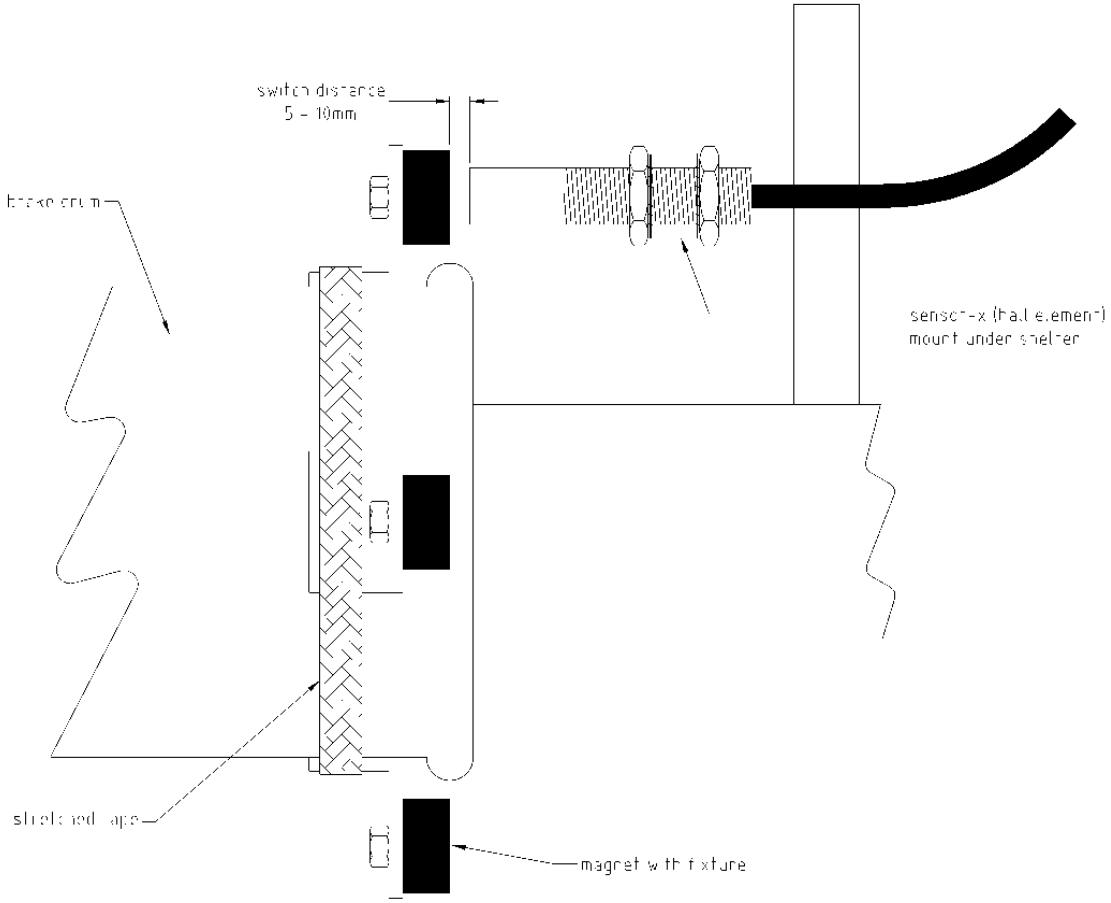
- Wheel sensor

The magnets are attached to a tape stretched round the brake drum. A Hall sensor is mounted opposite the magnets at a distance of 5 - 10 mm.

The number of magnets depends on the wheel circumference. An impulse should be delivered for every 60 cm distance covered.

Example: Wheel circumference 3.40 m
= 340 cm ÷ 60 cm = 5.66
= this means that 6 magnets are required.

Slip-free speed recording can also be carried out by a radar device on the tractor. In this case the wheel sensor on the sprayer is not required.



- Dosage position sensor and dosage position + sensor

As already described under section 1.2.1 and 1.2.2. the dosage position and dosage position + sensors are necessary in order to locate the dosage position easily.

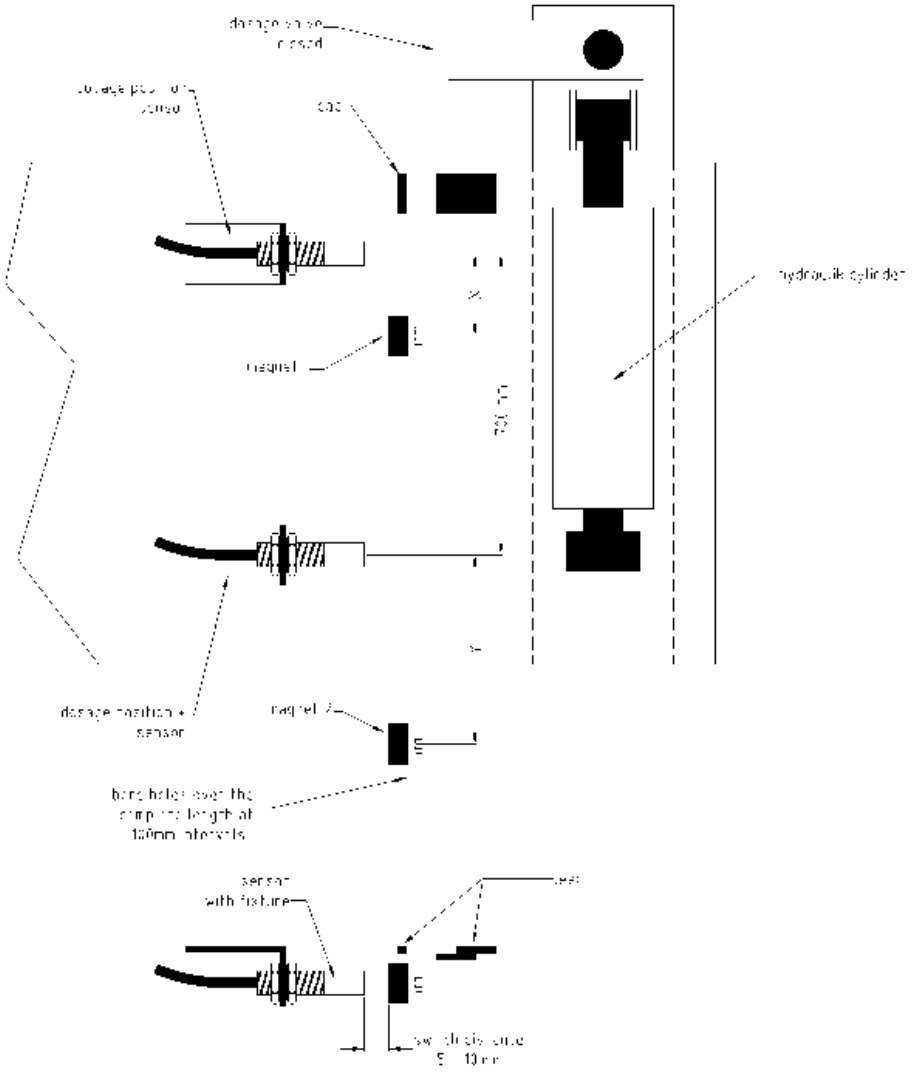
A corner bracket is mounted to the dosage slide valve.

The dosage slide valve position and the dosage slide valve position + sensors are installed opposite the corner bracket. The distance should be 70 cm. Over the complete length of the corner bracket at 100mm intervals, holes (5mm) are to be bored to secure the magnets. The distance x when the slide valve is closed is equal to the opening during operation (in the diagram 30cm). The distance y is the slide valve position + (in the diagram 50cm).

2-3 positions are necessary for varying spread rates, e.g. sludge.

e.g. small opening (20 cm) 5 - 15 m^3/ha
medium-sized opening (30 cm) 15 - 30 m^3/ha
large opening (40 cm) over 30 m^3/ha

With the altered scraper floor speed the required interim rates are achieved.



2.3 Safety

2.4 Specified implementation

Der UNI Control S is specified exclusively for use in agriculture. Any application outwith this area is regarded as unspecified.

The manufacturer does not accept liability for damage to persons or property resulting from unspecified use. In such cases all risks are the responsibility of the user.

Specified implementation also includes adhering to the operation and maintenance conditions stipulated by the manufacturer in the operating instructions.

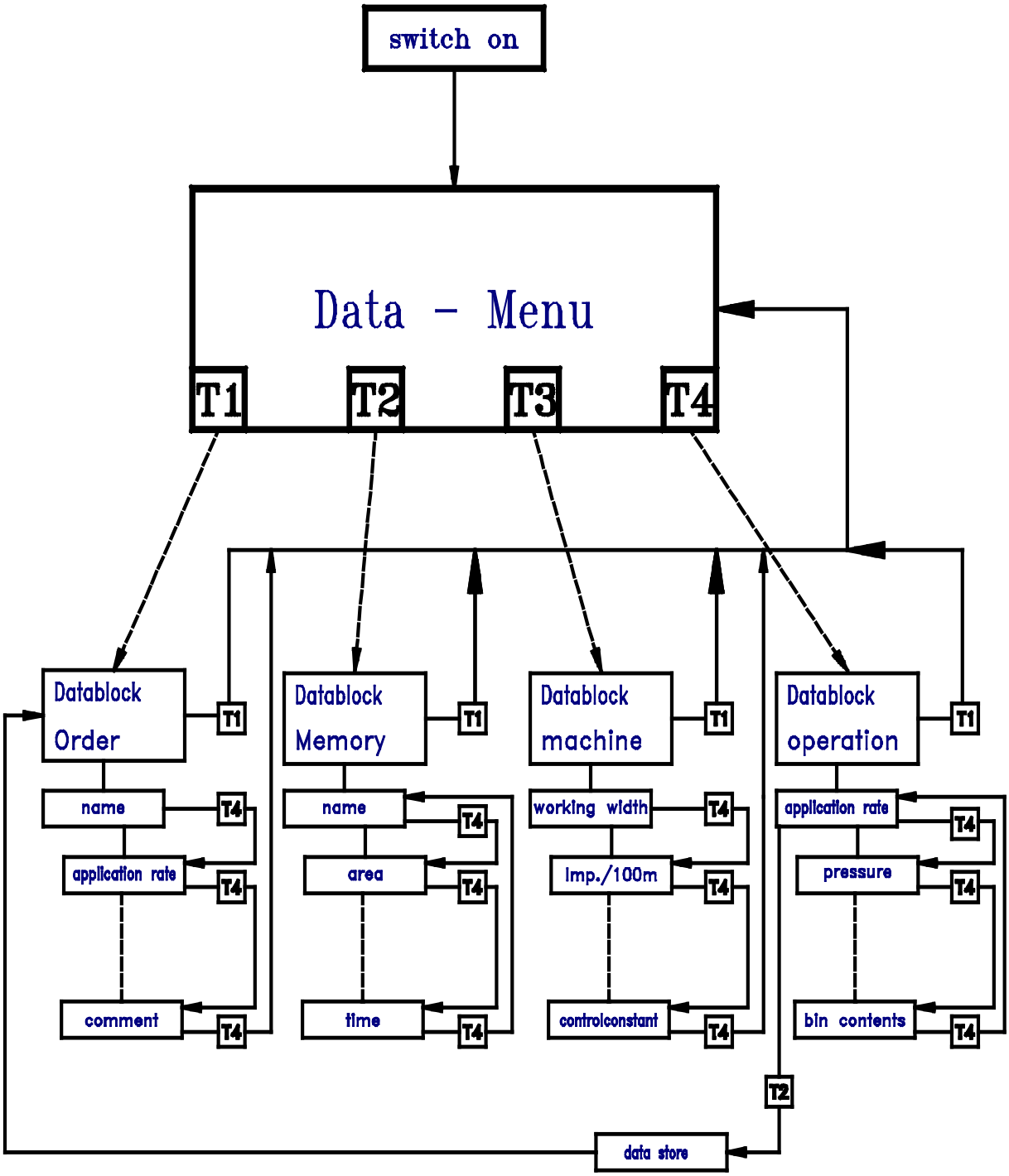
Relevant accident prevention regulations as well as other generally recognized safety, industrial-medical and road traffic rules are to be adhered to. In addition the manufacturer accepts no liability in cases where arbitrary modifications have been made to the UNI Control.

2.5 Safety instructions

Before working on the electrical system or carrying out any welding operations on the tractor or on an attached implement, the battery connection must be interrupted.

3 Operation

3.1 Operating scheme



3.2 Operation procedure

After the UNI Control S has been installed and the machine specific data entered it is ready for operation.

The operation procedure is as follows:

* Connect the sprayer to the tractor and the switch box to the UNI Control S, which must be switched off.
* Switch on the UNI Control S; the type of machine is automatically detected via the machine plug and the corresponding program with the machine data entered is automatically selected.
* Select data block "order" (Press the T1 key)
  – Enter the name (field name; customer name)
  – Enter or check the set rate
  – Enter comments
  Name and comments are not compulsory.
  The set rate should always be checked.
  – Start the order (T2)
* Check magnets 1 and 2 on the dosage position and dosage position + sensors and if necessary reposition the required spread rate accordingly.
* Check the impulses/m3 rate and if necessary adjust to the new slide valve position.
* Operation can begin
  - All functions, including calculator functions, can be selected during operation. The spread rate can be altered in 10% degrees in relation to the set rate using the +/- keys.
  - If the hydraulic valve is switched off at the end of the field (scraper floor at standstill) the UNI Control S automatically recognises the working position "off". The working position switch on the switch box can remain switched on. The area will not be measured and not monitored.
  - If a small rest on the sprayer is to be spread in a high gear, the working position switch on the switch box is to be set at "off". The area and the spread rate will not be recorded. Monitoring is switched off.
  - By pressing the T2 key (end), the order and the following confirmation is concluded.
    The recorded data: area operation time, amount spread etc. are now stored.
    After this the counters of these data are automatically set to 0 .
    New numbers are automatically allocated and the operation procedure can begin again.

3.3 Description of the order, machine and operation data of and the memory

The operation procedure for initial operation is described here. The display together with the adjacent soft keys are depicted:
Left : User guidance and information display
Right : Description of the soft keys

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Data block abbreviations

Me = Menu selection
Au = Order data block
Sp = Memory data block
Ma = Machine data block
Ar = Operation data block
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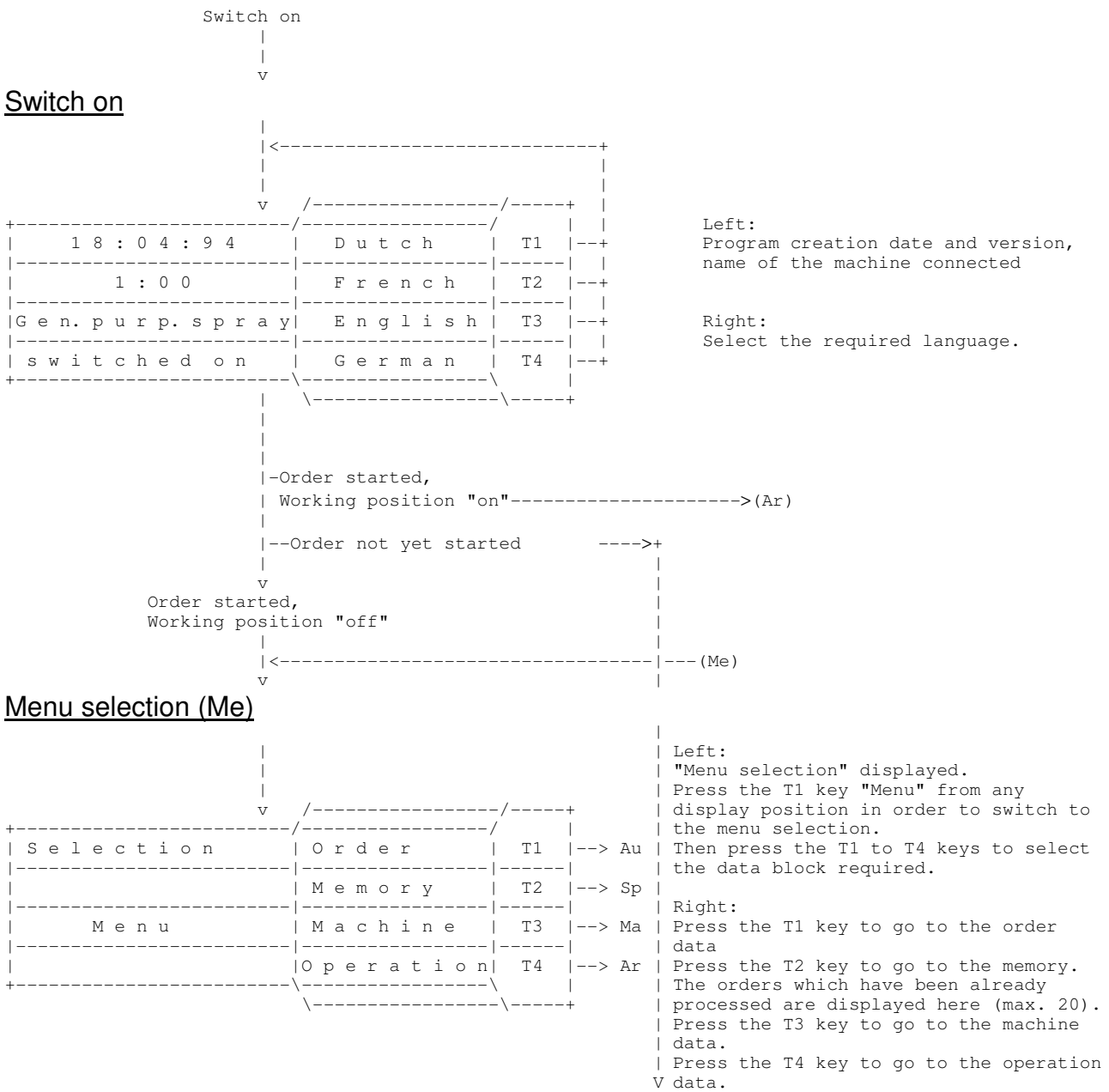
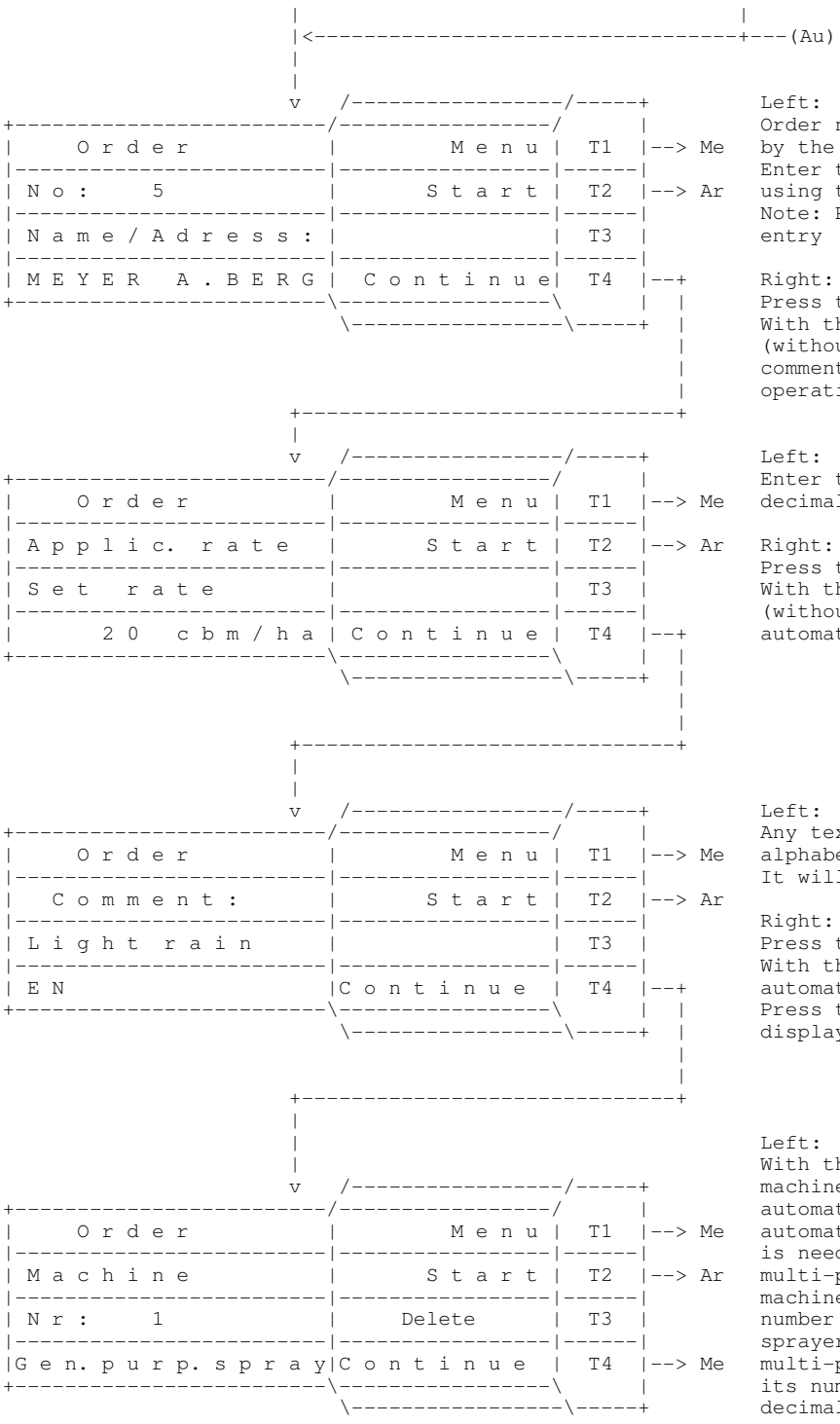
Multi-purpose sprayer program



Order data block (Au)



Left:
Order number, automatically allocated by the board computer, is displayed.
Enter the customer's name or the field using the alphabetical keyboard.
Note: Press the enter key to end the entry

Right:
Press the T1 to go to menu selection.
With the T2 key the order is started (without entry of the set rate and comment), automatic move to the operation data.

Left:
Enter the required set rate using the decimal keyboard.

Right:
Press the T1 key for menu selection.
With the T2 key the order is started (without entry of the comment), automatic move to the operation data.

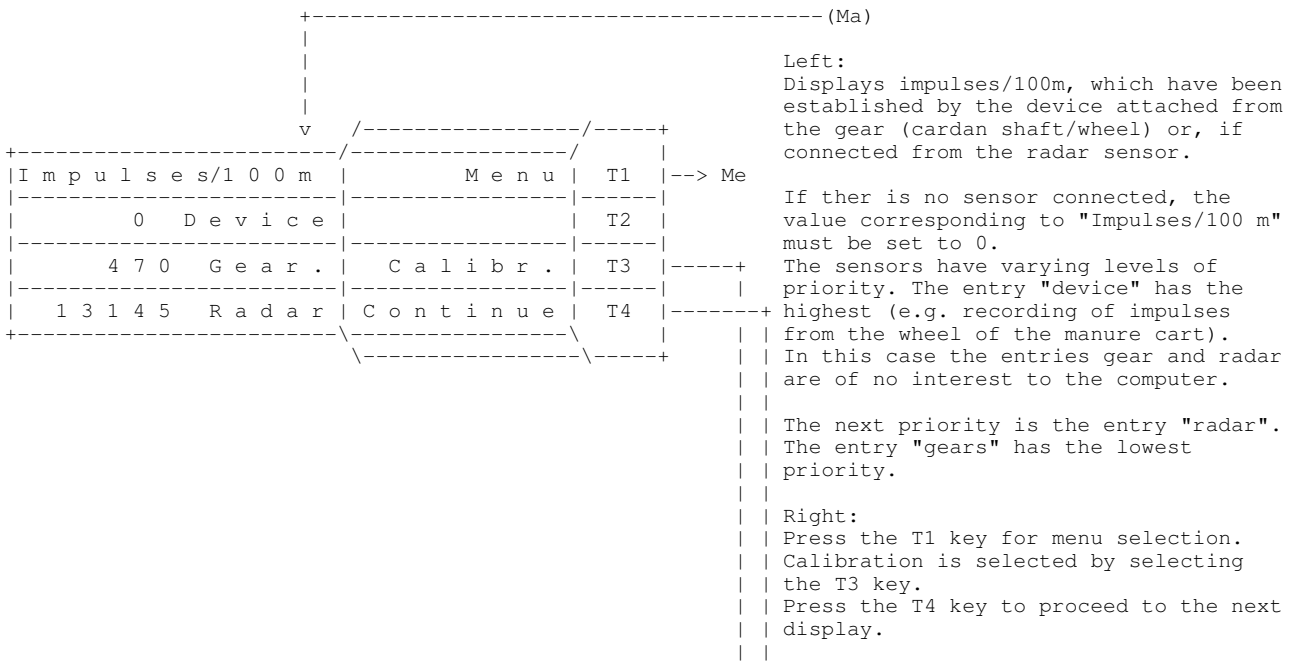
Left:
Any text can be entered using the alphabetical keyboard.
It will be stored as comment.

Right:
Press the T1 key for menu selection.
With the T2 key the order is started, automatic move to the operation data.
Press the T4 key to proceed to the next display.

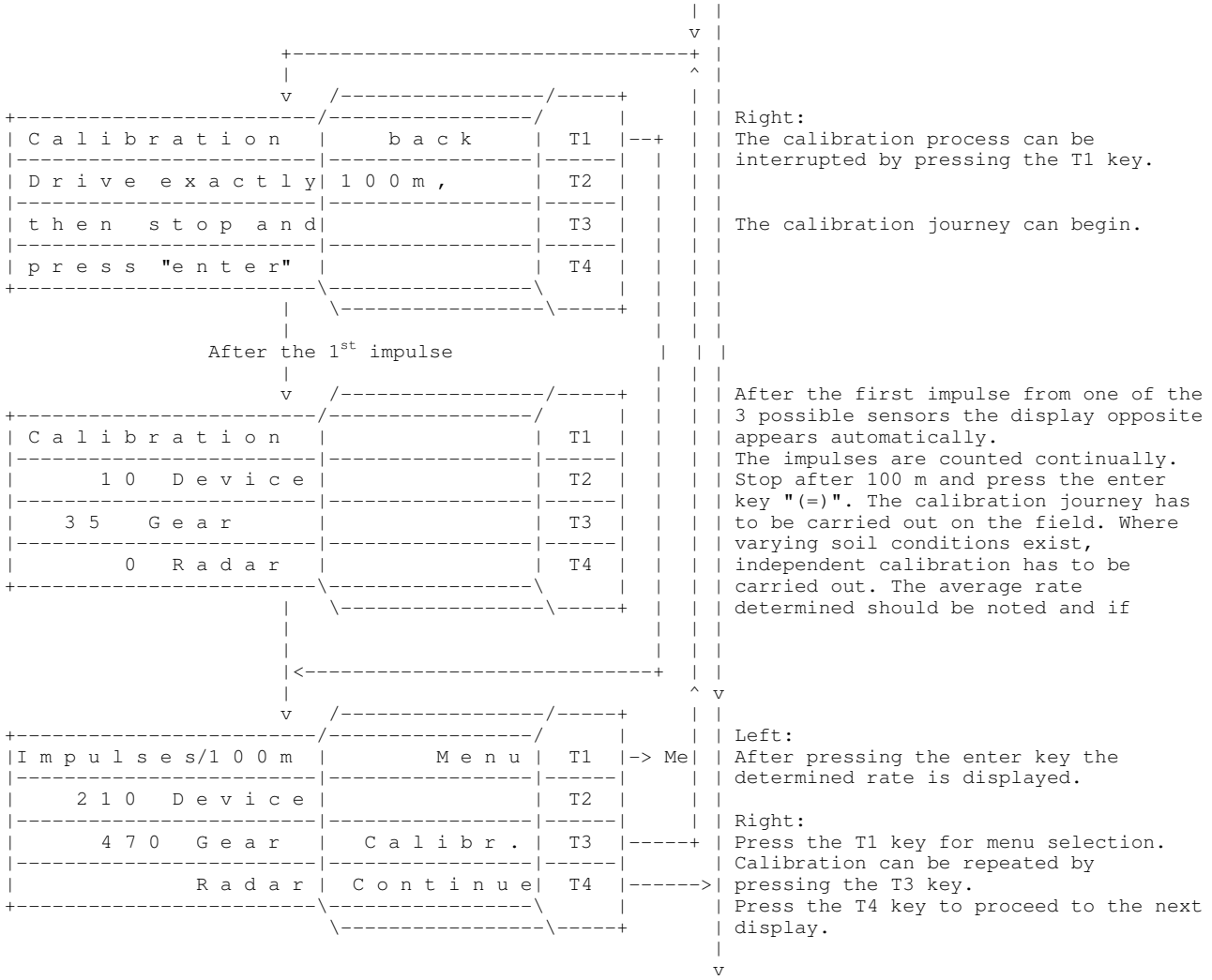
Left:
With the initial operation of each machine, the machine number is automatically allocated and also later automatically selected, i.e. no entry is needed! If however there is a 2nd multi-purpose sprayer with different machine data, the next free machine number is to be entered for the 2nd sprayer. In order to activate the 2nd multi-purpose sprayer's machine data, its number will be entered using the decimal keyboard after connecting.

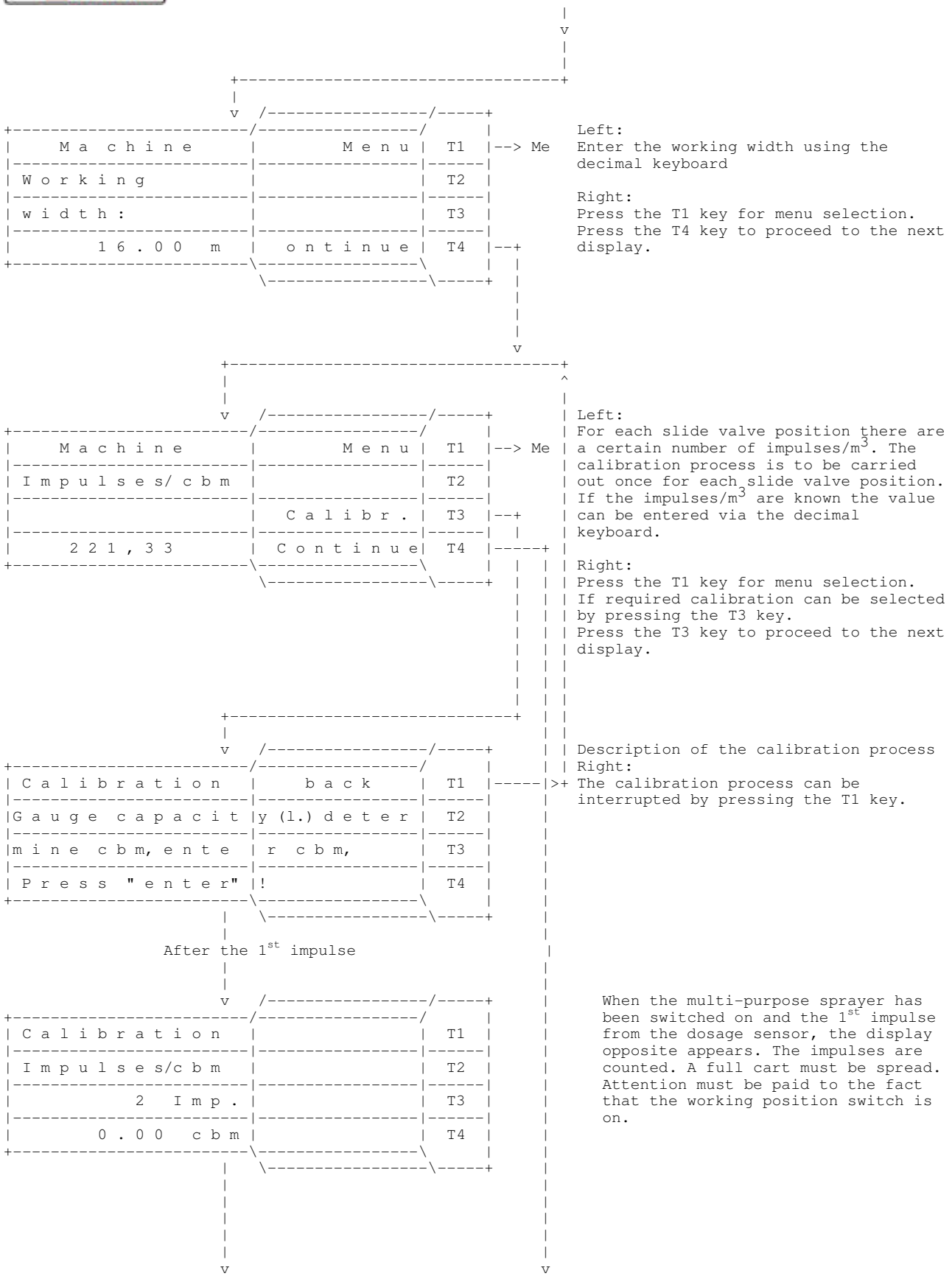
Right:
Press the T1 key for menu selection.
With the T2 key the order is started,
Automatic move to the operation data.
With the T3 key (delete) the machine data of the selecte machine can be deleted.
Press the T4 key to proceed to the next display.

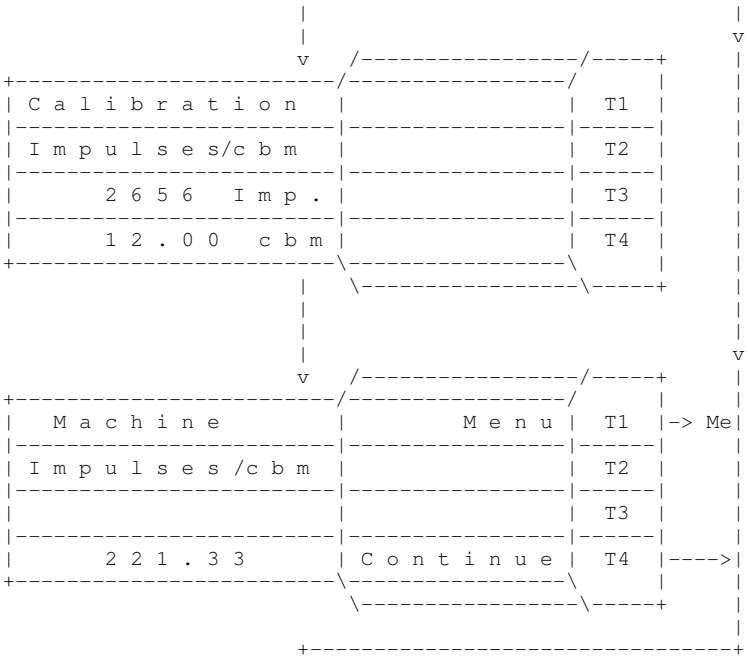
Machine data block (Ma)



Descriptionof the calibration process for impulses/100m



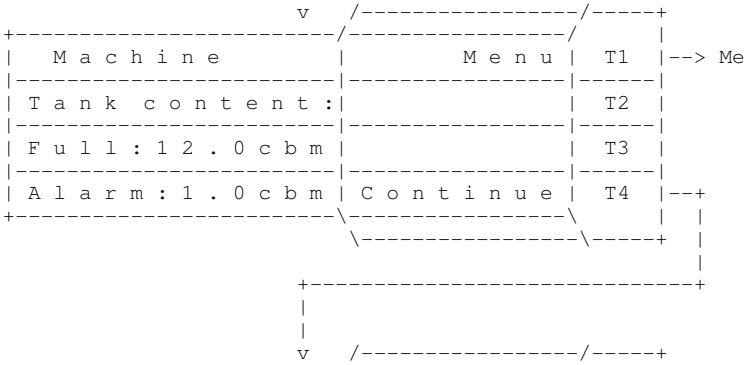

Machine
Menu
T1
--> Me
Working
width:
16.00 m
T2
T3
ontinue
T4
Left:
Enter the working width using the decimal keyboard
Right:
Press the T1 key for menu selection.
Press the T4 key to proceed to the next display.
Machine
Menu
T1
--> Me
Impulses/cbm
T2
Calibr.
T3
Continue
T4
221,33
Left:
For each slide valve position there are a certain number of impulses/m3. The calibration process is to be carried out once for each slide valve position. If the impulses/m3 are known the value can be entered via the decimal keyboard.
Right:
Press the T1 key for menu selection.
If required calibration can be selected by pressing the T3 key.
Press the T3 key to proceed to the next display.
Calibration
back
T1
Gauge capacit
y (l.) deter
T2
mine cbm, ente
r cbm,
T3
Press "enter"
!
T4
Description of the calibration process
Right:
The calibration process can be interrupted by pressing the T1 key.
After the 1st impulse
Calibration
T1
Impulses/cbm
T2
2 Imp.
T3
0.00 cbm
T4
When the multi-purpose sprayer has been switched on and the 1st impulse from the dosage sensor, the display opposite appears. The impulses are counted. A full cart must be spread. Attention must be paid to the fact that the working position switch is on.



Once the cart is empty the exact amount is determined and entered using the decimal keyboard.
The most exact calculation of the spread rate is acheived by weighing, taking the specific weight into account.

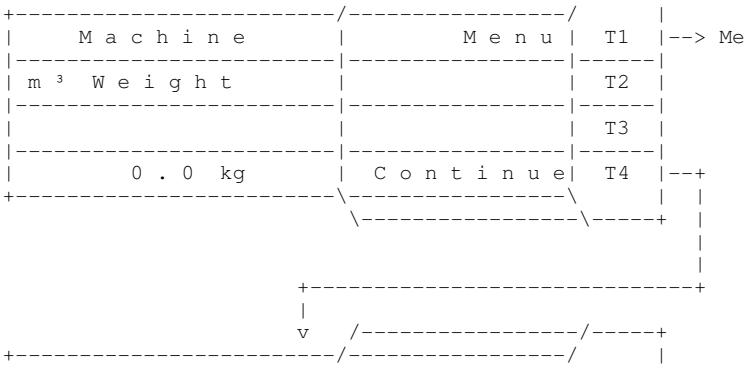
Left:
After pressing the enter key "(=)" the computer calculates the rate "impulses/cbm" and displays it.

Right:
Press the T1 key for menu selection.
Press the T4 key to proceed to the next display.



Left:
In order to determine the residue in the tank, the content and if required an alarm threshhold can be entered here.

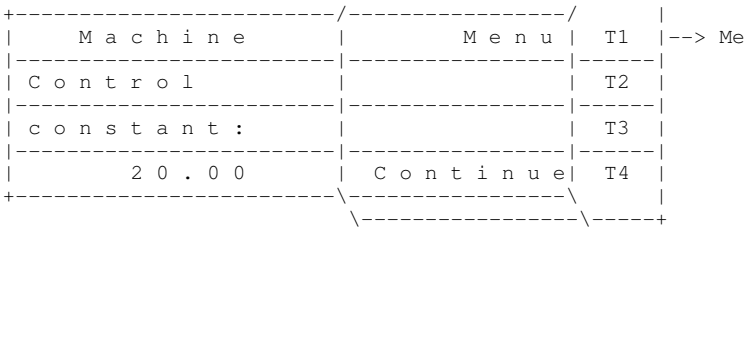
Right:
Press the T1 key for menu selection.
Press the T4 key to proceed to the next display.



Left:
The cubic meter weight can be entered in kg using the decimal keyboard, if the value is not 1000 kg.

When entering a value, the spread rate is not displayed in kg/ha but in t/ha (tons/ha)

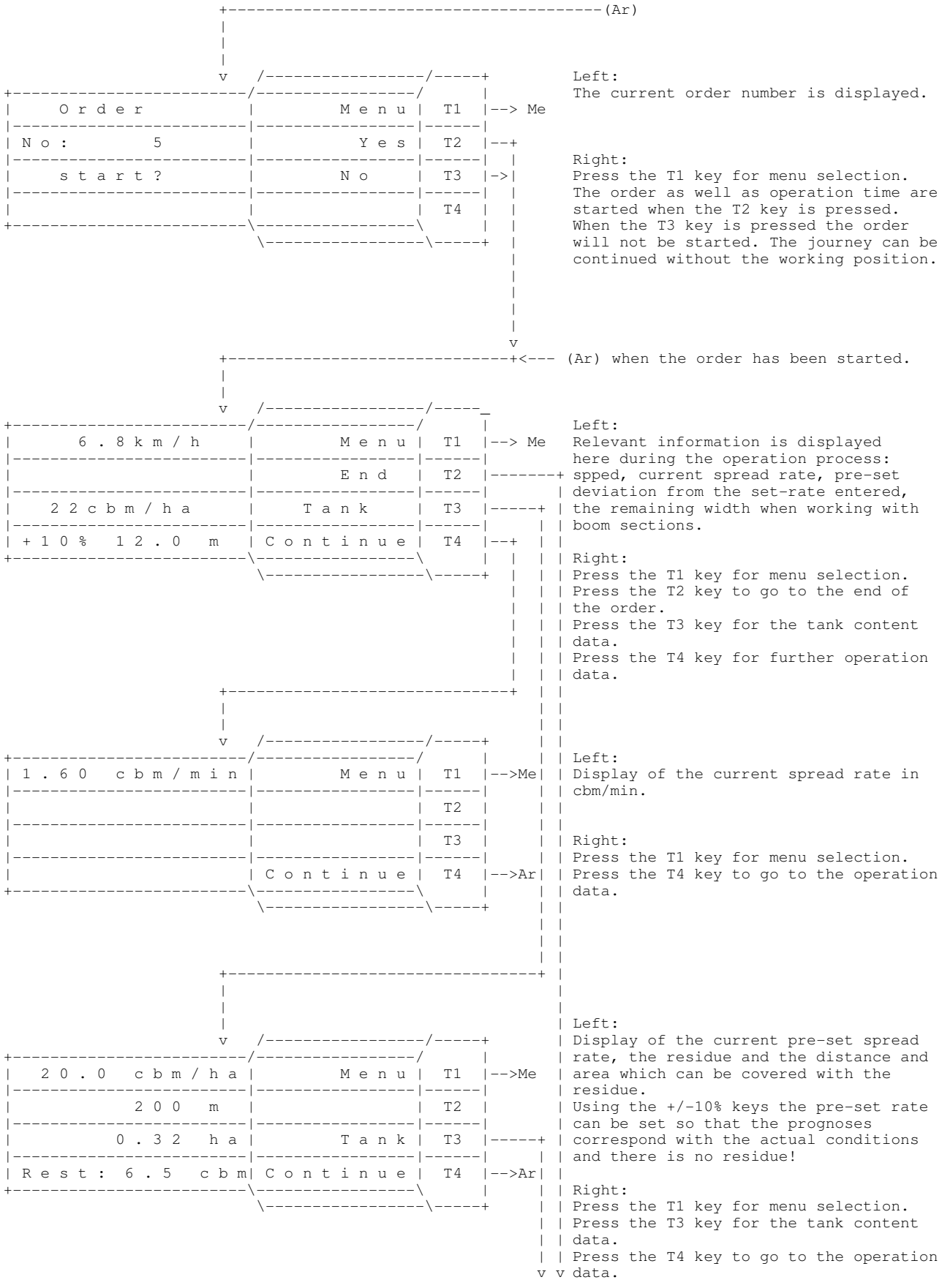
Right:
Press the T1 and T4 keys for menu selection.

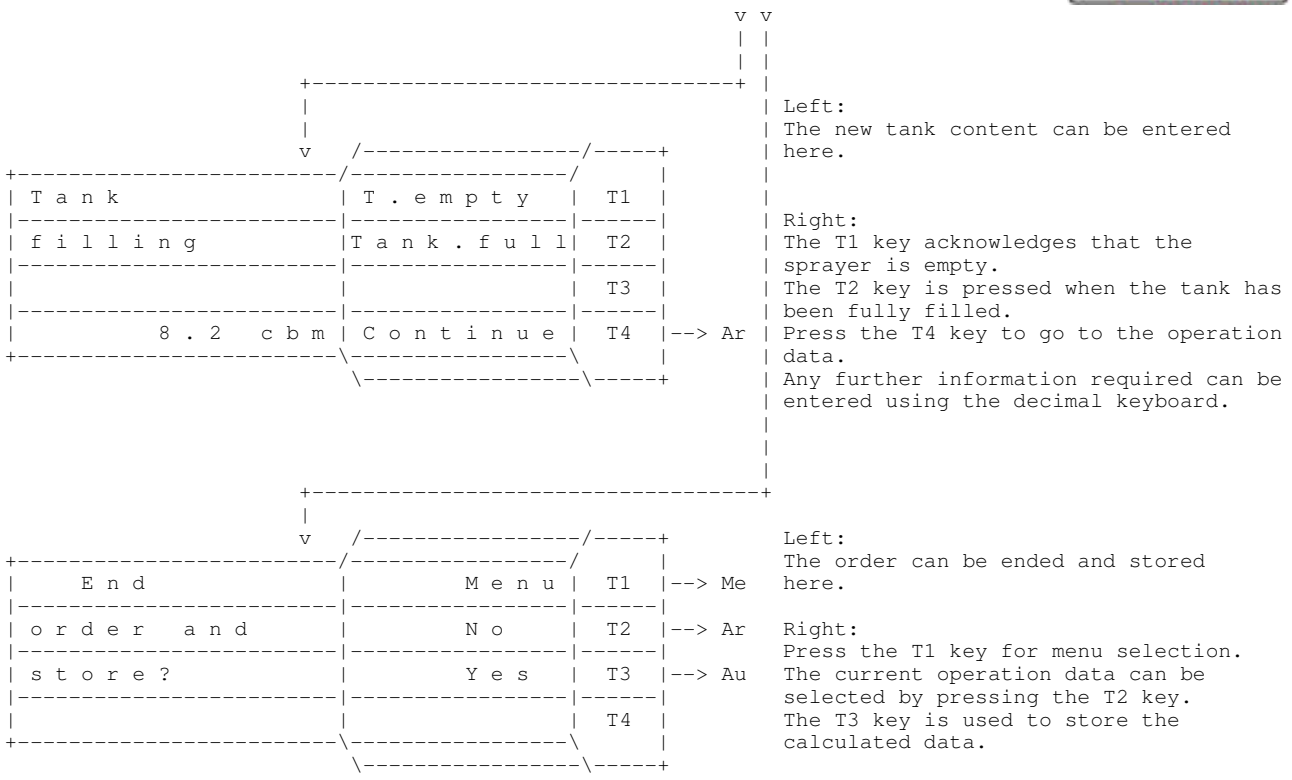


Left:
The control constant is entered using the decimal keyboard. If regulation is too sluggish, the rate has to be increased. In the case of saturation, i.e with a set-rate of 20cbm/ha there is regulation from 16cnbm/ha to 23cbm/ha then 18cbm/ha etc. then the control constant must be reduced. Depending on the multi-purpose sprayer, values varying from 10 to 40 are possible.

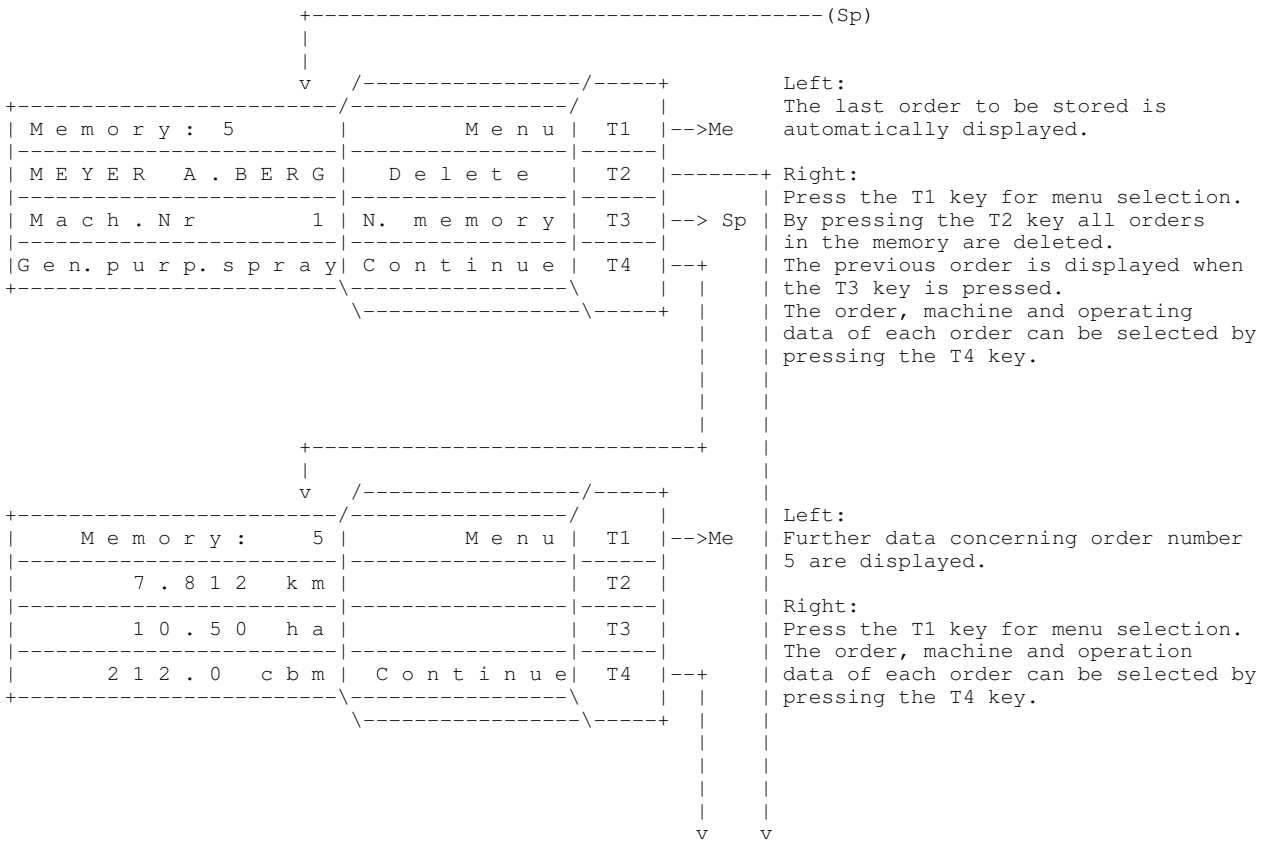
Right:
Press the T1 and T4 keys for menu selection.

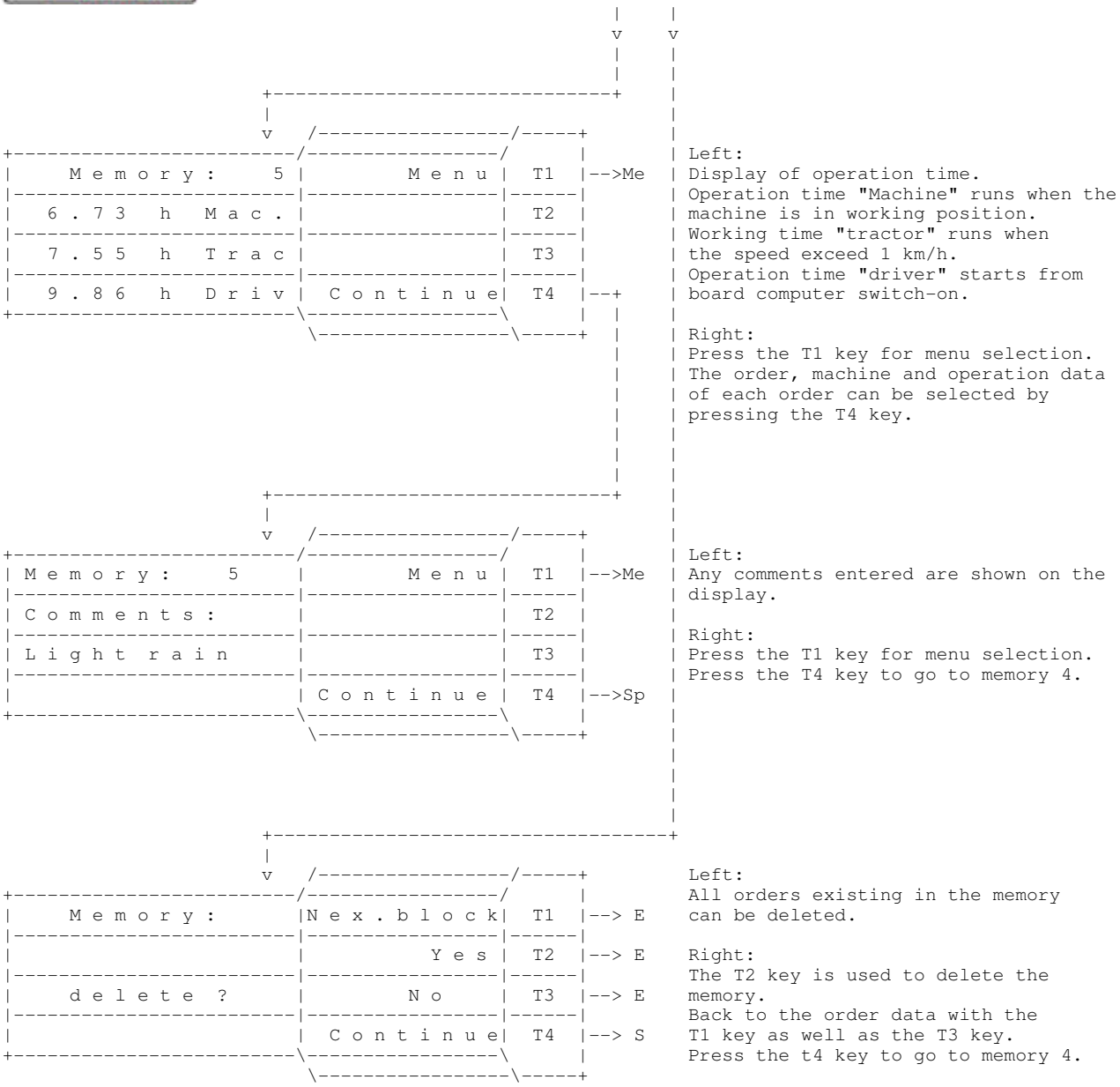
Operation data block (Ar)



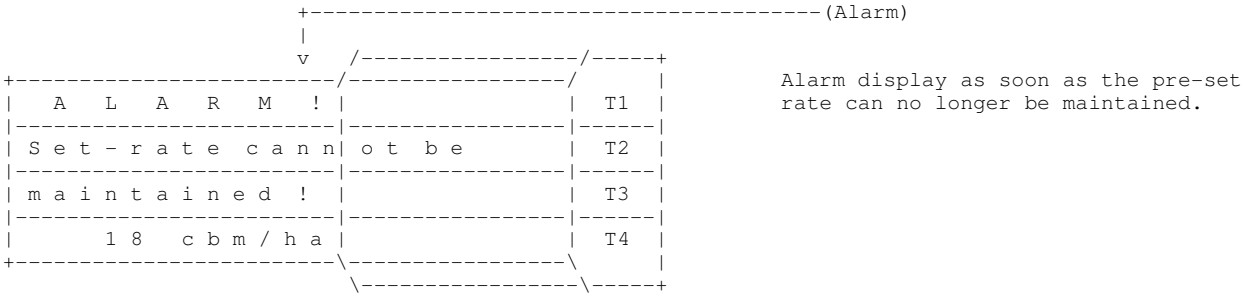


Memory data block

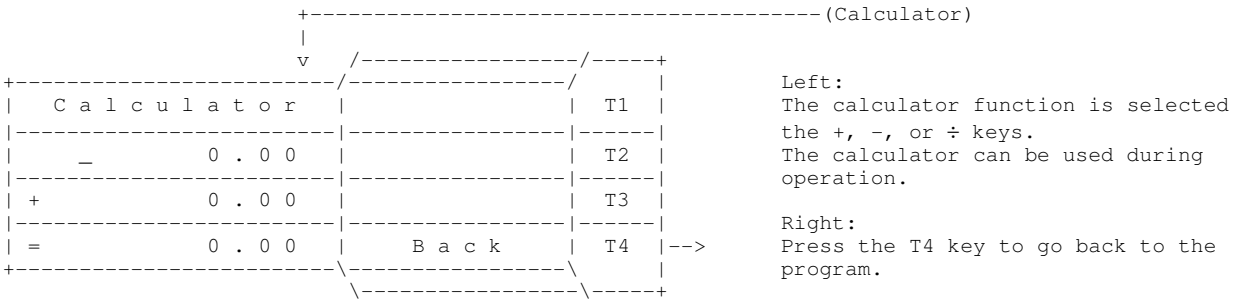



Memory: 5
6.73 h Mac.
7.55 h Trac
9.86 h Driv
Menu
Continue
T1
T2
T3
T4
Left:
Display of operation time.
Operation time "Machine" runs when the machine is in working position.
Working time "tractor" runs when the speed exceed 1 km/h.
Operation time "driver" starts from board computer switch-on.
Right:
Press the T1 key for menu selection.
The order, machine and operation data of each order can be selected by pressing the T4 key.
Memory: 5
Comments:
Light rain
Menu
Continue
T1
T2
T3
T4
Left:
Any comments entered are shown on the display.
Right:
Press the T1 key for menu selection.
Press the T4 key to go to memory 4.
Memory:
delete ?
Nex.block
Yes
No
Continue
T1
T2
T3
T4
Left:
All orders existing in the memory can be deleted.
Right:
The T2 key is used to delete the memory.
Back to the order data with the T1 key as well as the T3 key.
Press the t4 key to go to memory 4.

Alarm display



Calculator function



Functional data

The 3 function keys beside the decimal keyboard enable required rates to be displayed at any time simply by pressing a key.