Operating instructions

RABE Drill control system
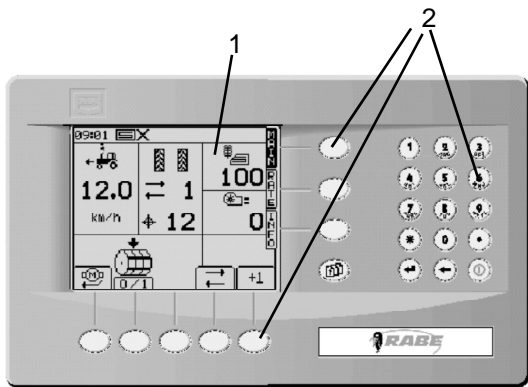
RDS „Artemis" *for*

Turbodrill Front Hopper T ...F
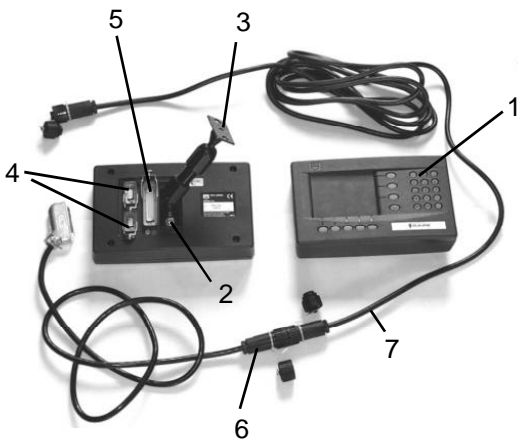*Turbodrill Combi-Speed T 602C*

RABE

Contents   Page

1. Introduction

1.1 Brief Description

The **RABE** drill control system RDS "**ARTEMIS**" allows you to variably adapt your RABE seed drill to match the seed and seeding conditions and to control the seeding rate precisely and flexibly.

ARTEMIS is a fully programmable control with a job computer (**4/3**) and power unit (**4/4**) on the machine and a removable operating terminal (**2/1**) with a graphic, clearly legible display (**1/1**) and integrated keyboard (**1/2**) on the tractor.

Data transfer takes place using an integrated, flexible and upgradeable CAN-Bus.

ARTEMIS features self-explanatory, fault tolerant screen controls (menu control).

This means the system can be mastered quickly and without reference to the manual.

Please read the following information and explanations carefully before use to avoid control and configuration errors.

The operating terminal (**2/1**) features two stay bolts M8 (**2/2**) on the rear which are used to fasten the control to an adjustable support (**2/3**) in the tractor cab.

Also on the rear of the unit are two 9-pin RS-232 interfaces (**2/4**) to allow the connection of additional devices such as GPS receivers, external disk drives, data transfer cables etc.

The 50-pin connection (**2/5**) on the operating terminal features a short cable end with a CA6 plug (**2/6**). This is used in conjunction with the enclosed CA6 cable (**2/7**) to establish the connection to the computer in the seed drill.

This cable also supplies the terminal with power from the machine.

1.2 Technical Data

Operating Voltage	+10 V ..... +15 V
Power Consumption (max.)	30 A
Operating Temperature	-5 °C ... 60 °C
Storage Temperature	-25 °C ... 60 °C
Level of Protection	IP54

3
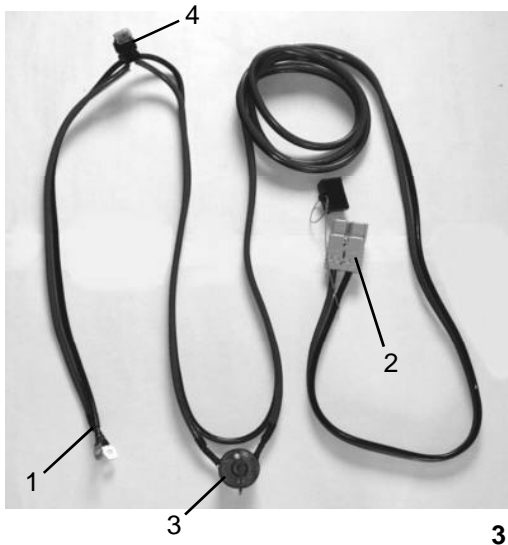
2. Commissioning:

2.1 Technical Requirements

Power Supply

A special 12V connection (RABE-No.: 9012.51.03) must be fitted to the tractor using the appropriate supply cable tree (**3/1**) directly at the vehicle battery.
(see Appendix "**Commissioning**" the seed drill).

The entire drill machine receives all of its power via the connection plug (**3/2**).

The supply cable tree contains the main switch (**3/3**) and two fuses (**3/4**).

In the event of a fault, **both** fuses must always be replaced.
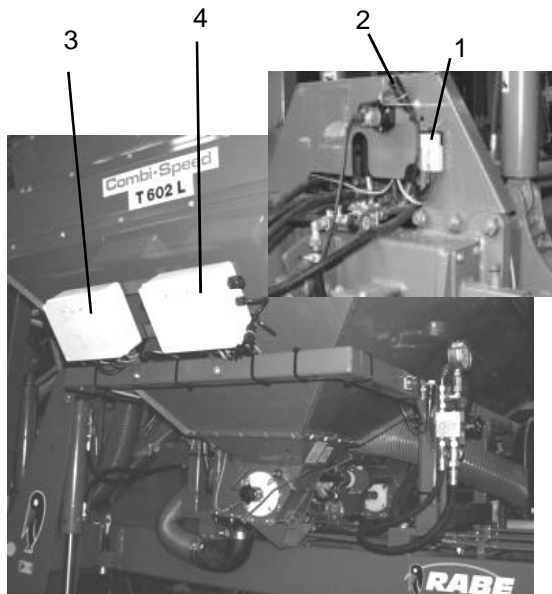
Fuses:
Flat Pin Terminal 12 V - 30 A (2x) **(3/4)**
Flat Pin Terminal 12 V - 10 A (1x) **(4/4)**

3

2.2 Switching on the Control

a) Connect the 12V supply for the seed drill

b) Connect the CA6 cable to the operating terminal

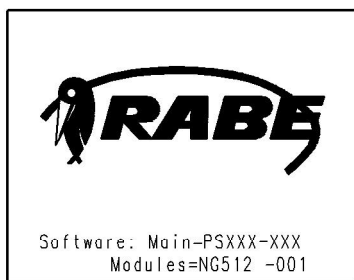**c)** Switch on the main switch

4

When the control terminal is connected to the machine's job computer (**4/4**), the <**On/Off**> lights up on the terminal. Briefly pressing this button switches the computer on.

Make sure that the machine is in a raised position otherwise an audible warning is immediately given to alert to incorrect work parameters.
(The control gives a periodic warning tone once the machine is in the working position and the minimum travel speed of 0.5 km/h is not being met.
Furthermore, the fan in use must be rotating at a minimum RPM!)

Software: Main-PSXXX-XXX
Modules=NG512 -001

5

6

When switched on, the screen is almost entirely blank – the software version and detected CAN module are displayed. (**Fig. 5**)
After approximately 5 seconds, the display changes to the main function screen **"MAIN"**: (**Fig. 6**)

The machine is now ready in principle for operation.
It is initially set with factory set default parameters which can also be restored at a later date by means of a software reset.
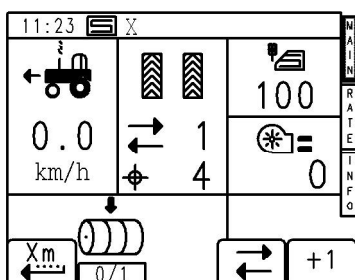
Changes which can be made to the standard values to suit the working conditions are described in **Chapter 4**.

The adjusted values are retained even when the unit is switched off or in the event of a power failure.

When implementing any changes, you should make a written note of the original values because they will need to be re-entered manually if you have to reset the software.

Standard Values: (Tab. 1)

|	
Working Width	6 m
Tramline Rhythm	4, symmetric
Seed Rate in	kg/ha
Speed Sense Factor	0,00611 m/Impulse
Warning Delay	8 sec.
Over/Under Quantity Steps	5%
Calibration	8 km/h
Calibration Area	0.03 ha (~1/40 ha)
Prestart X	4 sec.
Prestart Y	3 sec.
Using Fan min.	2500 RPM
Using Fan max.	3800 RPM
Using Fan absolute max.	4500 RPM
Drive motor ratio	50
Imp/Rev. Using Fan	1
Imp/Rev.Drive Motor	100
Normal Seeds	0.430 kg/m.wheel rev.
Small Seeds	0.016 kg/m.wheel rev.
Nudge Calibration Factor (nudge)	0%
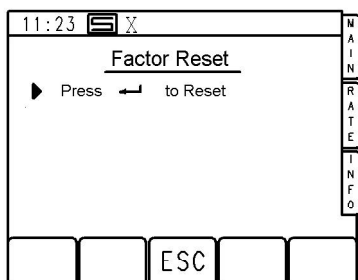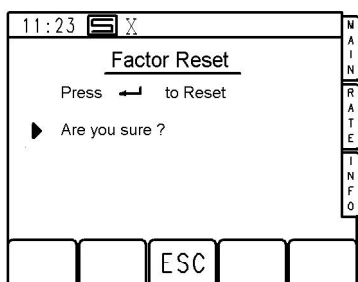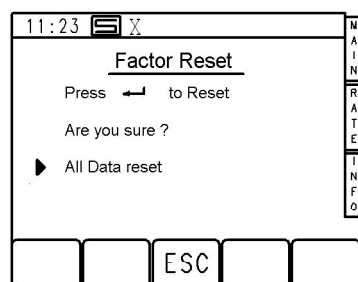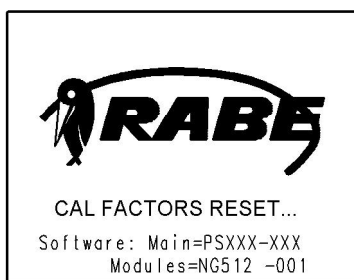
Reset and PIN Codes

To restore the original factory settings (standard values), you can reset the unit. (**Fig. 7a-d**)

The above parameters are reapplied.

The control has two PIN codes:

Factory Setting:	9375
Reset and CAN configuration for Rabe:	7223

Instructions for RESETting the control:

- After switching on the unit, press the bottom left softkey <**S1**> immediately   (**Fig. 8**):

- Then press <**Enter**>to confirm.(**Fig. 7a-d**)

- After a few moments, switch off the electronics using the <**On/Off**> button.

- **When the unit restarts, the factory settings will have been restored.**

7a

7b

7c

7d

Fig. 8

On/Off

Back

Enter

a b c d   M   R   I   P

S1   S2   S3   S4
              S5
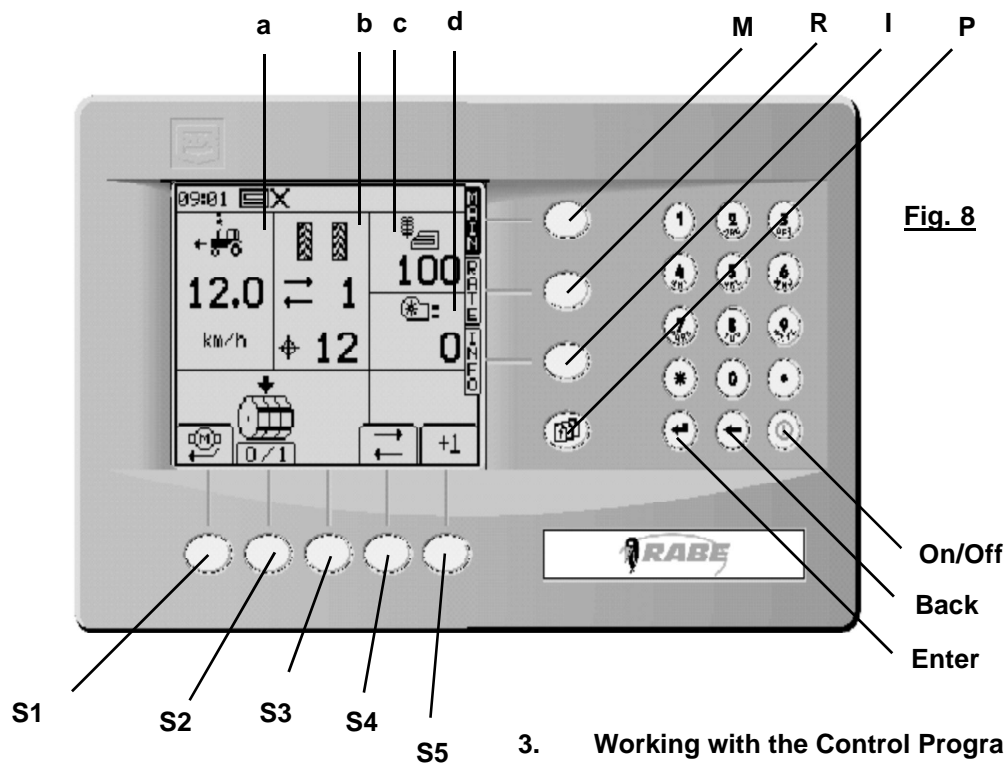
3. Working with the Control Program

3.1 Main Screen "Main" , <M>

The screen which appears after switching on the unit displays all the main operating data for the drill machine at a glance. For this purpose, the display interface is divided into several separate areas.

At the very top is an internal information bar featuring the time.
Below this is a block display indicating the travel speed (**a**), tramline rate and rhythm (**b**), seed quantity (**c**) and using fan RPM (**d**).
The symbols below this indicate the meaning of the lower software controlled keys (softkeys).
These are on the main function screen <**M**>:
<**S1**> : Pre Start
<**S2**> : Metering Wheel Stop
<**S3**> : Vacant
<**S4**> : Tramline Counting Stop
<**S5**> : Manual tramline correction

a) Speed Display and Warning Messages:

The current speed is displayed in large digits.
The machine operates at a speed ranging from 0.5 km/h to 18 km/h. If this speed is not achieved while in the working position, a warning symbol and 'km/h' flash alternately with an arrow pointing downwards. (**Fig. 9a**)

If the maximum speed is exceeded, the arrow points upwards.

This may be lower than 18 km/h depending on the seed rate and the seed type.
An audible warning is also given.

9a

9b1

9b2

9b3

9c,d
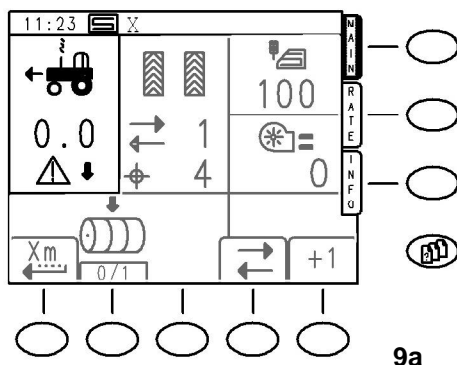
b) Tramline Rhythm and Current Tramline Status Display (Fig. 9b)
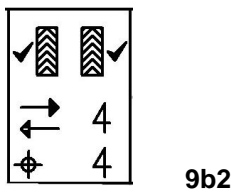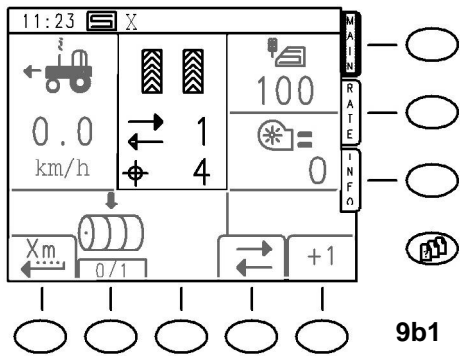
The upper number represents the tramline rate (counter). If relaying is suppressed (tramline stop) the symbol has a line through it. **(Fig. 9b3)**

The lower number indicates the tramline rhythm setting. In the case of an active tramline, a checkmark appears beside the switched row. **(Fig. 9b2)**

This diagram displays a symmetrical tramline. In the case of asymmetric tramlines, a checkmark is only displayed on the left or right.

The magnetic flaps on the distribution head outlets are switched individually on together accordingly.

The tramline rate is relayed by means of an external button by pressing the track marker until it reaches the stop.

Note that only **one** switching operation can be counted within a period of 5 seconds using the external button. This prevents multiple switching e.g. in the event of hydraulic pressure impacts.
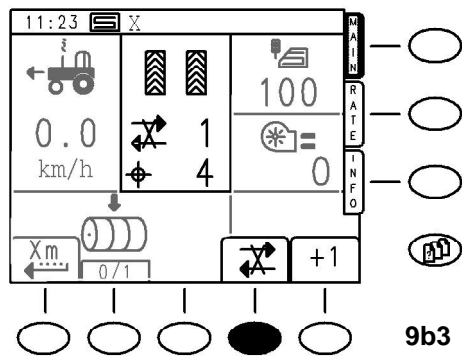
c) Current Seed Rate / ha Display (Fig. 9c)

The area of the screen labelled **c** displays the current seed rate in kg/ha.

d) Using Fan RPM Display (Fig. 9d)

The area of the screen labelled **d** displays the current RPM of the using fan.
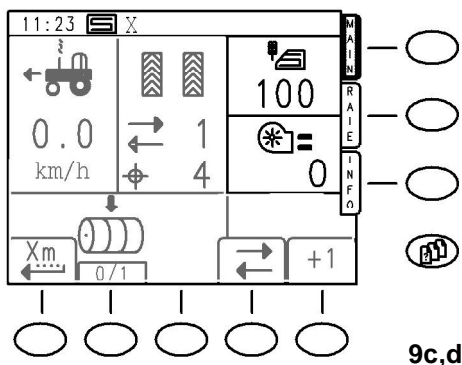
3.1.2 Functions of Software Keys (Softkeys)

<S1> Pre Start

Using Pre Start

Pre Start is a useful function in order to avoid, for example, fault locations when driving or a reset after a stop.

The function is easy to use – the machine is brought into the working position with the nominal RPM of the using fan. Press the softkey <**S1**> to start the machine seeding at calibration speed.

During the waiting period X, the softkey display flashes. Once the waiting period has finished, there are two short audible signals.

The sowing machine must now be brought up to working speed in a short period of time.

Pre Start Y is provided for this purpose – it runs after the audible signal has sounded.

Once it has run, the machine is once more controlled using the speed sensor.

To avoid the formation of gaps or heaps when driving, both time values should be carefully selected.

See Section 4.2.3 for information on settings

<S2> Metering Wheel Stop

A useful function is the ability to stop the metering wheel manually, for example when lifting the machine at the end of a field.

In this way, by pressing <**S2**>- before lifting the machine you can stop the metering so that no more seeds are on the surface.

The metering wheel stop function is cancelled by pressing <**S2**> again when the machine is lowered.

9
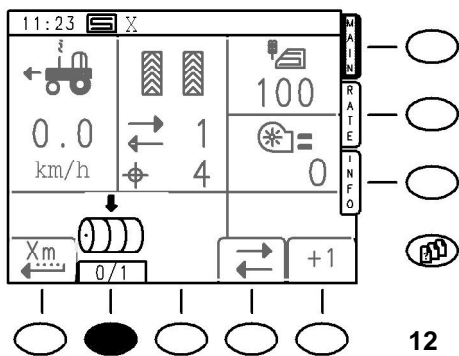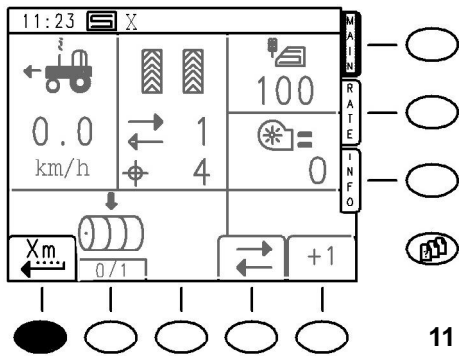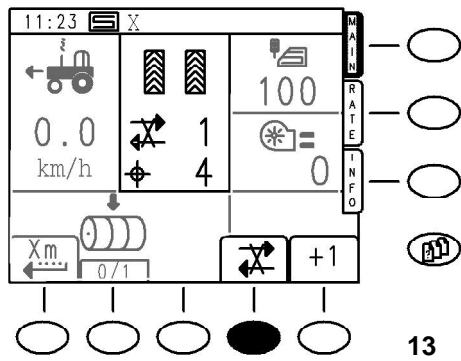
<S4> Tramline - Stop

When you use the tramline-stop function <**S4**> relaying is suppressed, regardless of whether the terminal button <**S5**> or the external button are pressed.

Pressing the terminal button <**S4**> again, releases relaying again.

The switch position is indicated by the symbol which may or may not have a line through it.

Note that only **one** switching operation can be counted within a period of 5 seconds using the external button. This prevents multiple switching e.g. in the event of hydraulic pressure impacts.
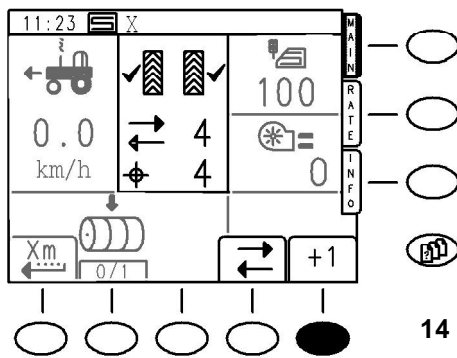
<S5> Change Tramline Rate

The tramlines are relayed via the external hydraulic pressure switch by pressing the track writer until is reaches the end or manually using the correction button <**S5**> on the terminal.

In the case of an active tramline, a checkmark appears beside the switched row (track)
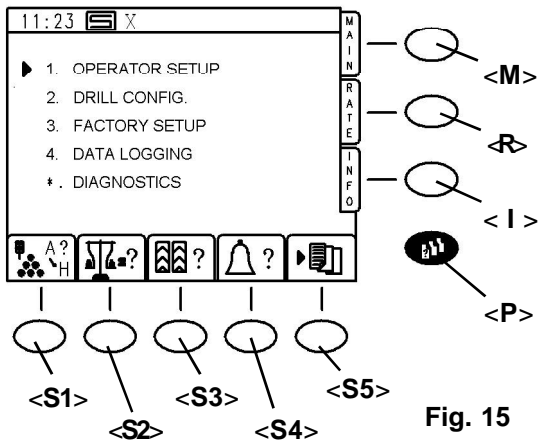
Fig. 15

3.2 Setting Operating Parameters

3.2.1 Opening the Parameter Menus <P>

Press the button <**P**> to open the parameter menu on the screen **Fig. 15**.

This is the start screen for setting all machine values. Direct access to select and change operating parameters is also possible using the lower softkeys.

3.2.2 Softkey Functions

<S1> Select Seed

Eight seed entries are available. The relevant names and other parameters can be set and changed in a menu under "**CUSTOMISE**".

As standard, three seed types with standard values are available after a reset.
A-Winter wheat, **B**-Winter barley, **C**-Oilseed rape.

When you select one, the parameters contained in the seed table are automatically applied.

16
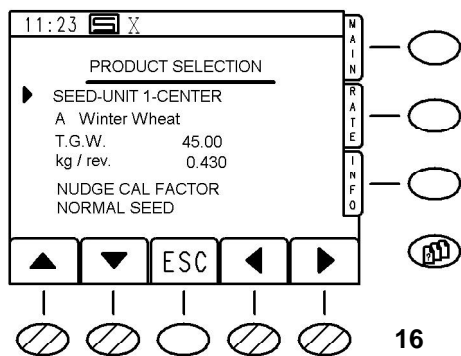
When you press <**S1**> seed selection, the following screen appears **Fig. 16**.

Use the up/down arrow keys (<**S1**>,<**S2**>) to move the arrow to the seed name. (e.g. **A**-Winter-Wheat)

The arrow disappears.

Use the right/left buttons (<**S4**>,<**S5**>) to select an available seed.

Press <**Enter**> to accept the selection and load the standard parameters.

Do not make any more changes here.
Additional options are described later.

Use the <**S3**> "**ESC**" to return to the parameter menu <**P**>.

<S2> Calibration:

Note: For the purposes of calibration, the operating terminal can be removed from the C6 plug in the tractor cab and fitted to the C6 plug on the machine. **(17/1)** ***Switch off the terminal before removing***.

The motor can be hand-controlled with button **(17/2)**.

Press <**S2**> 'Calibrate' in operator set-up to display a selection menu containing the selected seed.

If tramline switching is currently active, the tramline is temporarily deactivated for the duration of the calibration routine. The tramline is reactivated approximately 5 seconds after you exit the calibration routine. The counter status of the tramline is not changed as a result.

In the same way as selecting the seed, you can now move the arrow to the lines T.G.W. (thousand grain weight) and seed rate.

You do not need to change the T.G.W. value.

Specify the desired seed rate in kg/ha, when the arrow is on the appropriate line and press <**Enter**>.

Move the arrow to '**START CALIBRATION**' and press <**Enter**>again.

You can now select the calibration area from the display. The standard value is 0.03 ha.
This corresponds to the standard familiar measurement of 1/40ha.

However, because the computer calculates during calibration, it does not matter which calibration area is selected.

Use the arrow buttons (<**S4**>,<**S5**>) to adjust the value upwards and downwards in increments of 1/100 ha.
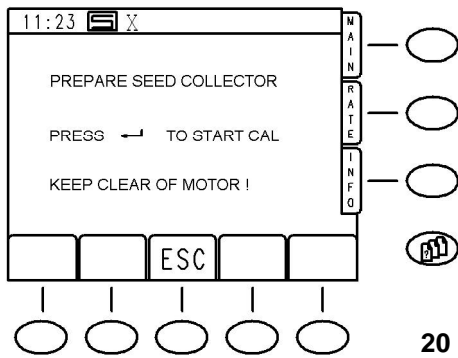
It is also easy to specify for example, '0.1' directly for 1/10ha on the numeric pad.

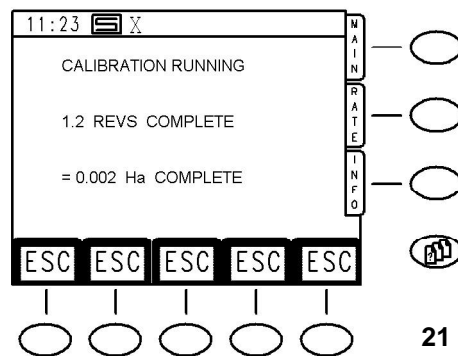***Rule: The larger the calibration area, the smaller the amount of errors.***
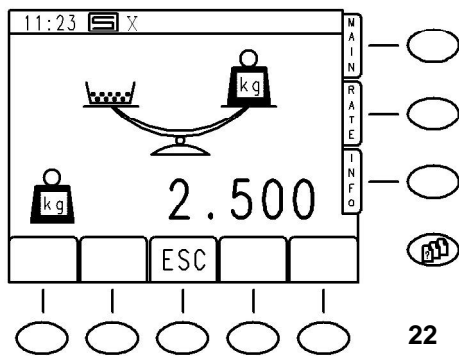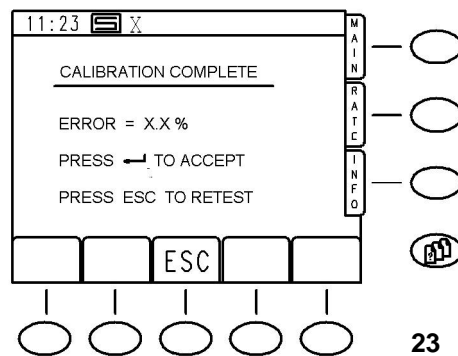
The maximum value is 0.5 ha.

17

19
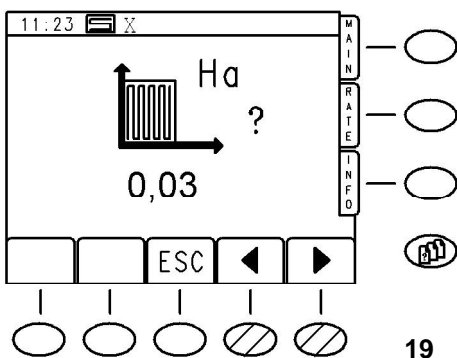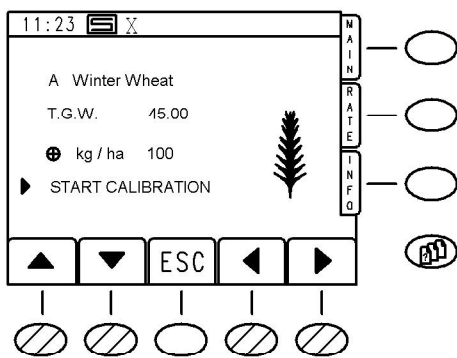
When you press <**Enter**> again the following message appears. (**Fig. 20**)

The metering wheel should now be filled and the correct dosing wheel setting should be selected.

In machines with 2 metering devices make sure that calibration is carried out using both devices.
Open the calibration flaps and lower the basket.

When everything has been completed, press <**Enter**>.

The progress as well as the number of metering wheel revolutions are displayed on the screen during the calibration process.(**Fig. 21**)

The calibration sample can be stopped while running at any time by pressing the '**ESC**' button <**S1-S5**>.

The display changes to the previous screen for a new calibration sample.

When the calibration process is complete, the control system requests the calibrated quantity via the screen (**Fig. 22**).

The display displays the rough **prognosis** value for the calibrated seed.

Note: The more precise the seed parameters are in the seed table, the lower the deviation of the prognosis value from the actual calibration sample!

The **weighed** weight of the calibration sample is now displayed on the terminal in kg. Use the numeric keypad on the control unit and press <**Enter**> to confirm the value.

Do not forget the decimal point!

The software only accepts values ranging between 33%-300% of the prognosis value.
Otherwise an error message is generated and a new calibration process is required! If the value you entered has been accepted, the screen in **Fig. 23** is displayed.

The deviation from the prognosis is displayed in %.

Press <**Enter**> to accept the value – the display changes back to the menu page selection screen.

The calibration process is now complete.

Remember to close the calibration flaps!

If the deviation is too large, you can start a new calibration process by pressing <**S3**> '**ESC**'.

The software automatically makes the necessary corrections.
The process can be repeated as often as necessary.

20

Screen display:
11:23
PREPARE SEED COLLECTOR
PRESS ↵ TO START CAL
KEEP CLEAR OF MOTOR !
ESC

21

Screen display:
11:23
CALIBRATION RUNNING
1.2 REVS COMPLETE
= 0.002 Ha COMPLETE
ESC ESC ESC ESC ESC

22

Screen display:
11:23
kg
2.500
kg
ESC

23

Screen display:
11:23
CALIBRATION COMPLETE
ERROR = X.X %
PRESS ↵ TO ACCEPT
PRESS ESC TO RETEST
ESC
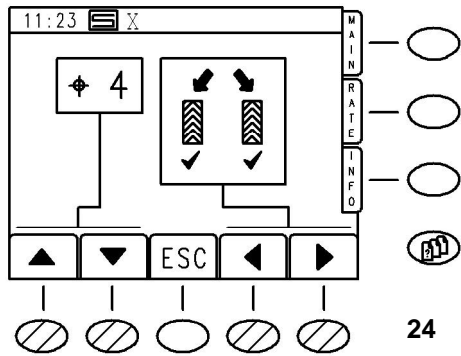
<S3> Tramline Settings (Fig. 24)

The tramline rhythm and implementation can be preselected in this display. Rhythms of 1 (continuous tramline) to 12 are possible as are symmetric and asymmetric, right or left settings. A special rhythm - 18 – is also available to allow the creation of correct tramlines for 18m injectors with a 4m working width.
Once the correct setting has been selected using the arrow keys, press '**ESC**' to exit the menu.
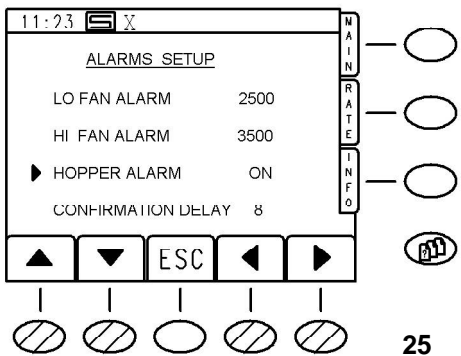
<S4> Warning Parameters (Fig. 25)

The monitored parameters which have been set for the drill machine are displayed here.

The standard values should not normally be changed. Other values can be displayed using the numeric keypad.

So, for instance, it may be useful to temporarily switch off a warning function.

If, for example, you want to switch off the using fan monitoring because the sensor is faulty, you can set the upper (HI) **and** lower (LO) RPM limits to 0.

Please note that the machine will not sow if it is running below the minimum RPM limit!
(To prevent blockage)

You can also switch off the alarm for the hopper fill level if you are using small seed quantities.

To do this, move the arrow to the relevant line (Hopper Alarm) and use the right/left arrow keys to switch between ON and OFF.

'**Confirmation Delay**' describes the delay time between metering shaft impulses. If no impulse is received during this time, the metering shaft monitor triggers.

Always confirm numeric entries using the <**Enter**>key.

Press the <**S3**> "**ESC**" button to change the display back to the "Menu" function screen.
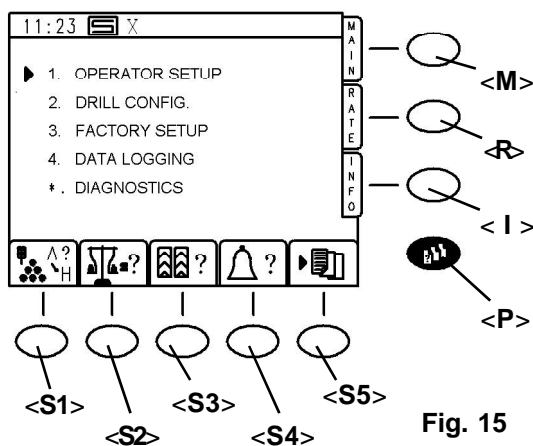
<S5> Job Management:

Working with predefined jobs requires additional hardware components such as an external disk drive and/or a GPS receiver etc.

If the button <**S5**> is accidentally pressed, you can only exit the page which appears by pressing the button <**M**> on the top right of the panel for the "Menu" function page.

26
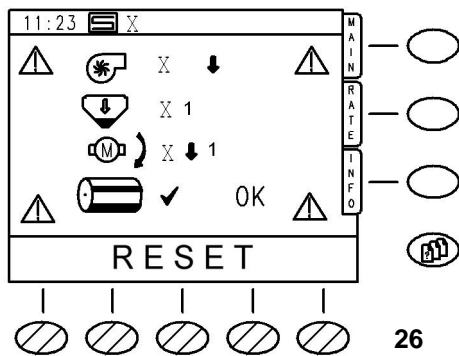
3.3 Alarm Screen

Warning Messages

This alarm display (**Fig. 26**) appears if any warning messages are generated until the cause of the error has been resolved or the warning message has been cancelled using the "**RESET**" button <**S1-S5**>.

If a warning message has been switched off, a small bell flashes on the main function page above the <S5> button.

For example, in the case of a machine which has only been switched on on one side, the warning message 'Metering Shaft' appears.
This can be cancelled by pressing a button.

If the machine is raised after this (e.g. when turning) the message is no longer cancelled for safety reasons!

When the warning screen appears, an audible signal is given at regular intervals.
The warning triangles in the corners flash.

The following warnings are currently active in the warning screen illustrated:
- Using Fan RPM Too Low (visible from the arrow pointing downwards beside the symbol)
- Hopper Level Warning. (The number '1' only indicates which of two possible systems the warning message affects – it is of no significance here as there is only one machine present)
- Metering Motor ROM Too Low in System '1' (arrow pointing downwards). The metering shaft monitoring does not respond because the inadequate RPM of the drive motor has a higher priority.

27

<S2> <S3> <S4>
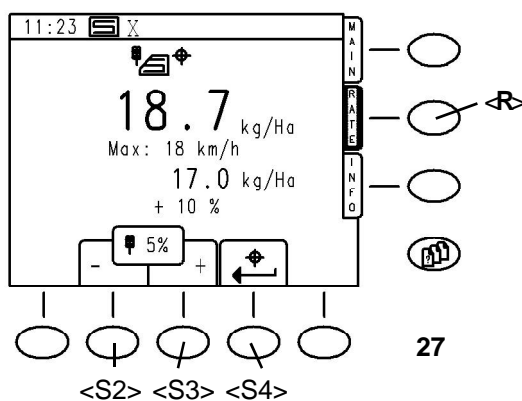
3.4 Function Page "RATE" <R>

3.4.1 Display Seed Rate

The "**RATE**" function page provides information relating to the current seed quantity as well as changes to it. To open the screen, simply press <**R**>.

The following screen appears: (**Fig. 27**)

The current seed quantity is displayed in large digits.

The second value is the maximum possible travel speed. This can be significantly below 18 km/h where large seed quantities are used.

Below this is the calibrated seed quantity in kg/ha. (reference value)

The last value is the deviation of the current seed quantity from the calibrated seed quantity in %.

15
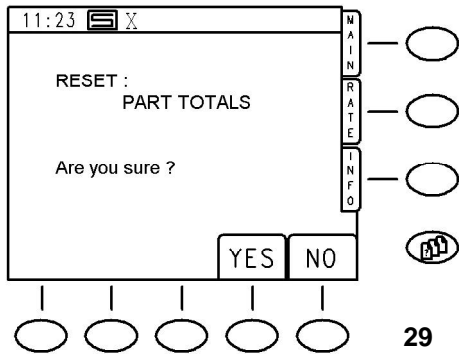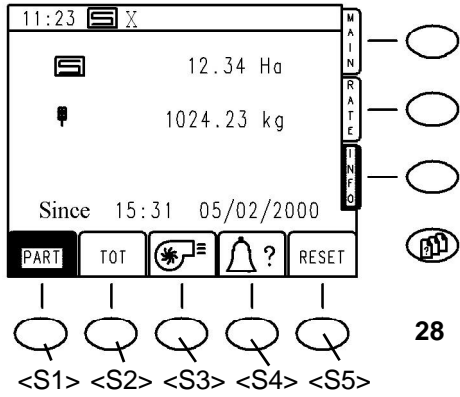
3.4.2 Changing the Quantity While Moving:

Use the buttons -/+ (**<S2>,<S3>**) to increase or decrease the seed quantity using the set and displayed increments (e.g. 5%).

The range is from -50% to +50% of the calibrated quantity.

Use the <**S4**> button to return directly to the calibrated quantity.

3.5 INFO Page <I >

3.5.1 Display Value

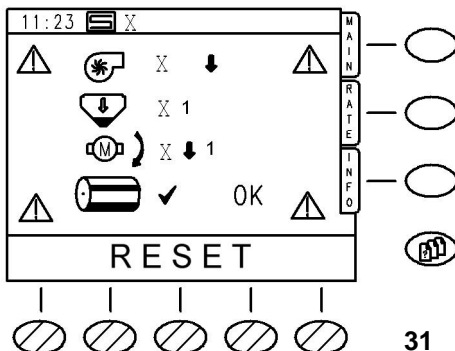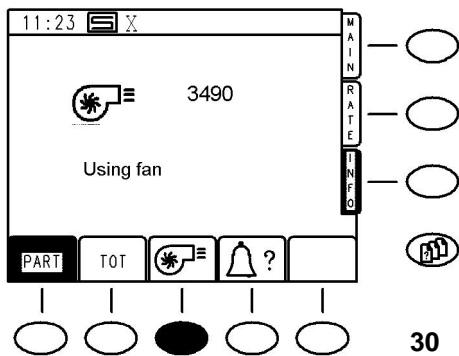To open the INFO page, press the < **I** > '**INFO**' button on the right edge of the screen. The following screen appears: (**Fig. 28**)

The display includes the area, the quantity of seeds used on this area and the date and time these values were selected.

3.5.2 Hectare Metre, Total and Partial Area

Two independent hectare counters work in the background during the sowing process.

The relevant current display – partial or total area – is displayed in black in the softkey symbol.

You can switch between the two using <**S1**> or <**S2**>. (**Fig. 28**)

To reset a counter to zero, press '**RESET**' <**S5**>. The following question appears, for example for **PART**: (**Fig. 29**)

Press <**S4**> '**YES**' to reset the area and quantity to 0 – the date and time are updated.

Press <**S5**> '**NO**' to leave the values unchanged. The display changes automatically to the previous information page.

3.5.3 Using Fan Operating Status

You can query the precise using fan operating status using the fan symbol button <**S3**>. (**Fig. 30**)

3.5.4 Warning Message Status

Similarly you can display the warning message status using <**S4**> and have it reset if desired. (**RESET**) (**Fig. 31**)

4. Entering and Adjusting the Operating Parameters

4.1 Operator - Set-up

In the 'OPERATOR SET-UP' (Fig. 32) you can adjust the brightness and contrast of the display by accessing point '1. DISPLAY'. (Fig. 33)

By accessing point '6. TIME/DATE' you can change the date and time. (Fig. 34)

```
11:23 ▤ X                    M
                             A
  ▶ 1. DISPLAY               I
    2. TRAMLINES             N
    3. SEED / FERT SELECT    R
    4. SPEED SENSOR FACTOR   A
    5. ALARMS SETUP          T
    6. TIME / DATE           E
    7. CUSTOMISE             I
    8. CAL' SPEED            N
                             F
                             O
   ▲    ▼   ESC
```
32

```
11:23 ▤ X                    M
                             A
                             I
  ◐ ▬▬▬▬▬▬                  N
                             R
  ▶☼ ▬▬▬▬▬▬▬▬               A
                             T
                             E
                             I
                             N
                             F
                             O
   ▲    ▼   ESC   ◀    ▶
```
33

```
11:23 ▤ X                    M
          TIME SET           A
                             I
  ▶ Hours      11            N
    Minutes    25            R
    Day        19            A
    Month       6            T
    Year     2000            E
                             I
                             N
                             F
                             O
   ▲    ▼   ESC
```
34
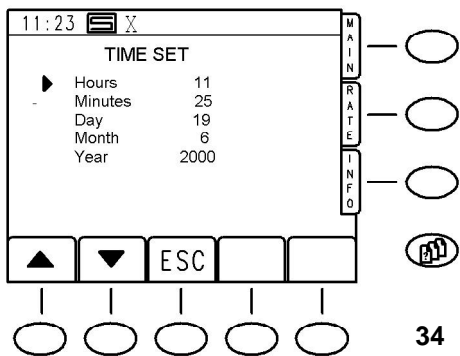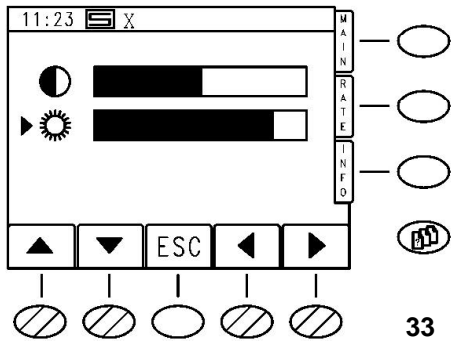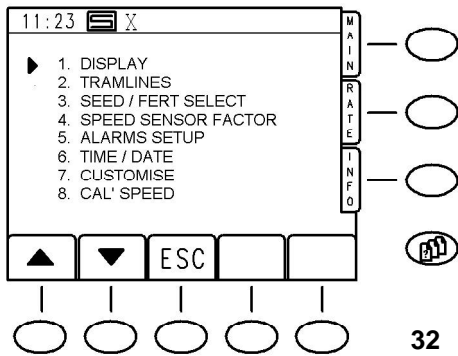
Instructions for Advanced Users

The functions described above allow users to control the machine easily and securely use the ARTEMIS drill control system by RABE.

There is, however, a range of other useful functions which make using the control even more flexible and allow for optimum seeding by making adjustments to the seed and sowing conditions.

Note: In the parameter menus you can access the menu items using the softkeys and <Enter> as well as directly by using the number for the menu item you require.

4.1 Operator - Set-up

4.1.1 Speed-sensor-factor

a) Enter the calculated speed sensor factor

b) Calibrate the machine while working:

The speed sensor factor is the actual route covered between two impulses from the shaft encoder.

The factory default setting for all machines is 0.00611 m/impulse.

Due to varying ground conditions, it may be useful to change this value.

The value can be entered directly, in which case the effective radius of the speed sensor must be known, or the machine can be calibrated directly on the land.

Calibration is the most precise way in all cases.

Both procedures are described below.

Using the MENU button <**P**> and menu item <**1**>, change to the **OPERATOR SETUP** menu.

Now, press <**4**> to call up the **SPEED SENSOR FACTOR** setting.
The following screen appears.(**Fig. 52**)

a) If known, enter the value directly using the keyboard and confirm with <**Enter**>.

The value is a calculated value and states how many metres the machine travels between each impulse from the speed sensor shaft encoder. The speed sensor shaft encoder transmits 360 impulses per revolution.

If the effective radius of the speed sensor is known, it can be calculated as a circular arc length.

This is not recommended, however!
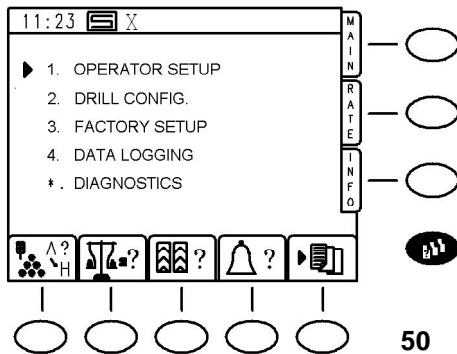
50

51

52

The methods described below are recommended:

b) Using a tape measure, measure a stretch of land 100 m long and mark the distance using two pegs.

Bring the machine into working position at the first peg where visibility is good.

On the display, move the arrow to the line **'ENT' FOR AUTOCAL** and press <**ENTER**>.

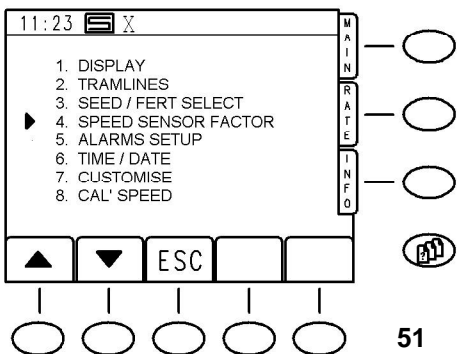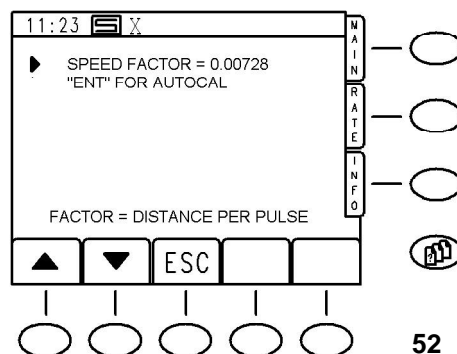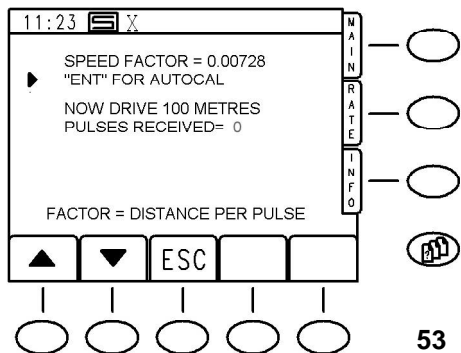The following display appears: (**Fig. 53**)

```
11:23  [icon] X
       SPEED FACTOR = 0.00728
   ►   "ENT" FOR AUTOCAL
       NOW DRIVE 100 METRES
       PULSES RECEIVED=  0

       FACTOR = DISTANCE PER PULSE
   ▲   ▼   ESC
```
53

Proceed with the machine as normal.

Sowing does **not** take place during measurement, this means that the using fan does not have to be running at nominal RPM!
As soon as the control obtains the first impulse, the display changes as follows: (**Fig. 54**)
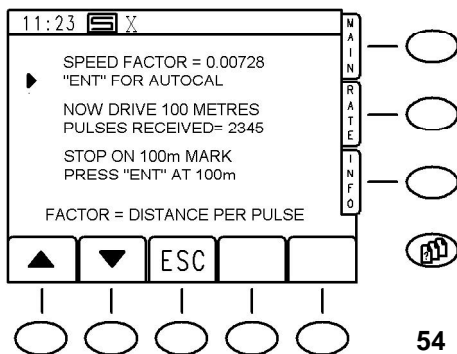
The control counts each impulse received.

At the end of the stretch of ground, stop the machine as close as possible to the second peg and press <**ENTER**>.

The display changes back to **SPEED SENSOR FACTOR**, the value is automatically calculated and displayed. (**Fig. 52**)

```
11:23  [icon] X
       SPEED FACTOR = 0.00728
   ►   "ENT" FOR AUTOCAL
       NOW DRIVE 100 METRES
       PULSES RECEIVED= 2345
       STOP ON 100m MARK
       PRESS "ENT" AT 100m
       FACTOR = DISTANCE PER PULSE
   ▲   ▼   ESC
```
54

Press <**ESC**> to exit the function.

The **OPERATOR SETUP** screen is displayed again.
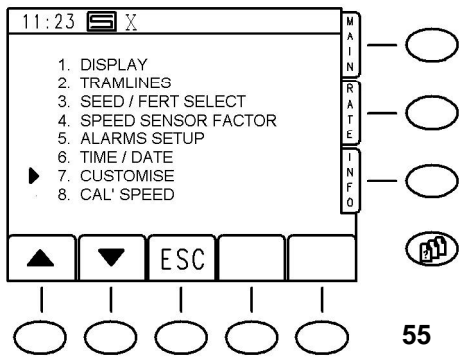
4.1.2 Customising Work Parameters (CUSTOMISE)

The options contained under "**CUSTOMISE**" are accessed as follows:

Press the button for accessing menus (**see above**).

Select item **1. "OPERATOR SETUP"** and press <**ENTER**>. (The arrow is in the correct position when you call up the menu)

Now select item **7. CUSTOMISE**.
(e.g. move the signal arrow to the line and press <**ENTER**>)

The following screen appears: (**Fig. 56**)

a) Seed Quantity in kg/ha or SEED/m2

The seed quantity display can be set in **kg/ha** or in **SEED/m²**.

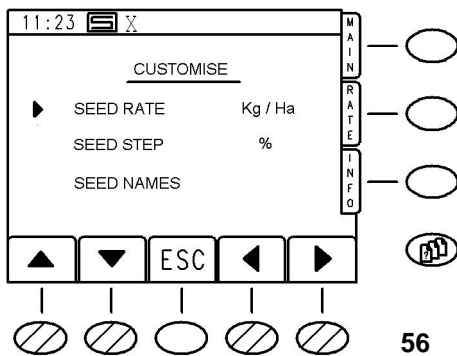If the option **SEED/m2** (grains per square metre) is used, you must enter the correct TGW value (thousand grain Weight) for each seed type!

If you use kg/ha the TGW value does not have to be correct because the calculation program ignores the TGW and uses the fill weight of the metering wheel cells.

Here the existing standard values for small seeds and normal seeds can be left as they are.

To change the settings, do the following: On the display, move the arrow to the first line and using the right/left buttons <**S4**>,<**S5**>, select "**SEED/m2**".

If you exit the menu using the <**ESC**> button, all other quantity details in the control are in **SEED/m2**.
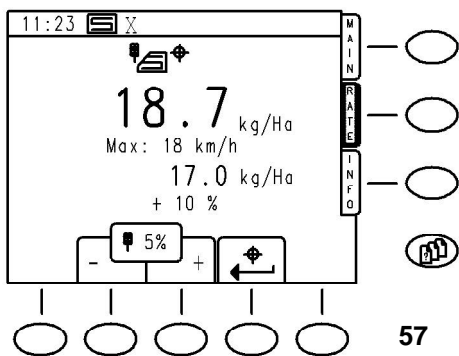
b) Quantity Step in the 'RATE' Menu <R>

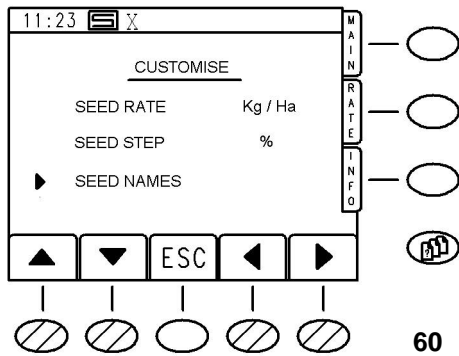You can change the seed quantity at any time during operation using the '**RATE**' function screen. (see below).

The quantity step can be preset. To do this, move the arrow to the line **SEED STEP** and select the desired percentage using the arrow buttons <**S4, S5**>.

(Values between 1% and 50% are possible)

If you exit the page using <**ESC**>, the selected values are applied in the program.
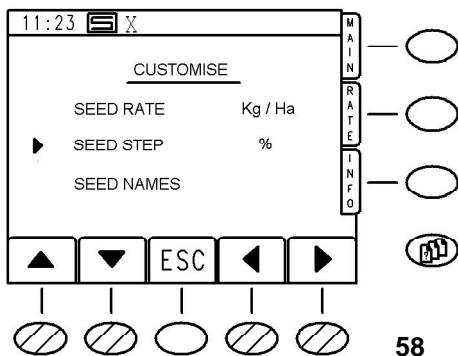
c) Seed Library

The key figures for each seed which are required for calculation and control of exact seed quantities are stored in a seed library in the job computer specific to each machine.

Note: Limited, careful work to maintain the seed library saves a lot of time when calibrating the machine as well as money as a result of precise and optimum sowing.

To call up the seed library, move the arrow to the line **SEED NAMES** and press <**ENTER**>.

In total, 8 seed entries are available. (**A-H**)

Three standard seeds are available as factory defaults, **A**-Winter wheat, **B**-Winter barley, **C**-Oilseed rape.

The entries for standard seeds can be changed if necessary.

(**Caution, if you reset the system all of these changes will be lost!**)

Using the <*> button you can switch between entries **A-D** and **E-H**.

IMPORTANT: This is only possible if no line has been selected for editing!
This takes place by pressing the left/right arrow buttons. A flashing underscore "_" appears in the line just below the active character location. While this is taking place, it is not possible to switch between pages using <*>. When you press <**ENTER**> the underscore disappears and you can switch between the pages using <*>.
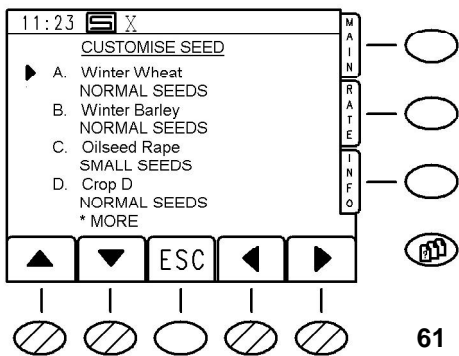
Seed Name

To name a new seed or to rename an existing seed, move the arrow to the relevant line and select the appropriate point using the left-right arrow buttons.
Use the numeric keys in the same way you would a mobile telephone to toggle through the letters of the alphabet and enter the name.
Use the <*> button to switch between upper case and lower case letters. When you have finished, press <**ENTER**>.

Normal or Small Seeds

You now need to specify whether the seed is a normal or small seed.
This is important because the appropriate standard values are assigned to the new seed first.
To do this, move the arrow to the line below the new seed and using the left/right arrow buttons select **NORMAL SEEDS** or **SMALL SEEDS** as appropriate.
When you have finished, press <**ESC**> three times to return to the parameter menu page.
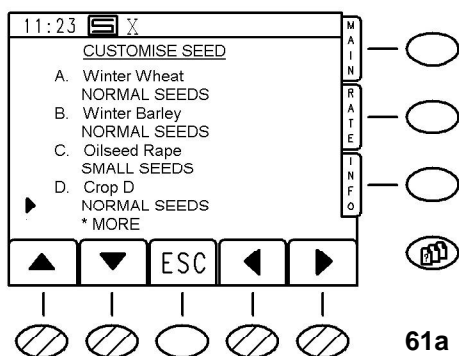
4.1.3 Seed Selection

a) Calculate and Enter Seed Key Values

The existing seeds in the seed library are assigned to standard values for TGW and kg/metering wheel revolution. The assignment takes place in the seed library by selecting small seeds or normal seeds.

These values allow problem-free calibration and sowing using the machine. For the purposes of calibration **only** the kg/metering wheel revolution value is important.

The more precise the value for a specific seed is, the more precise the calibration.

The value is best calculated as follows:

At the metering device, set the necessary mechanical parameters in accordance with the operating instructions (select dosing wheel, ground flap settings etc.).

Fill the hopper with seeds. Raise the machine and switch on the electronics.

Open the calibration flap and lower the container.

Press the motor button to fill the metering wheels. Then empty the container and lower it again.

Note the position of a screw, for example on the dosing shaft coupling and then press and hold the motor button until the metering wheel has completed 10 revolutions.

Weigh the seed from **both** dosing devices and divide by 10. This is the correct value.

When using small seeds it is recommended that that a '1' or '2' be included in the name depending on whether one or two small sowing wheels were measured for each metering unit.

The calculated values are entered as follows:

Press the menu button and then press the seed selection softkey (see above).

Select the appropriate seed and move the arrow to the line '**kg/rev**'.

Using the numeric keypad, enter the value and press <**ENTER**>.

Press <**ESC**> to return to the parameter menu page.

The TGW cannot be changed here! The TGW can only be changed when you call up the calibration menu as described earlier during calibration.

This is only necessary, however, when the seed quantity is controlled with SEED/m2.
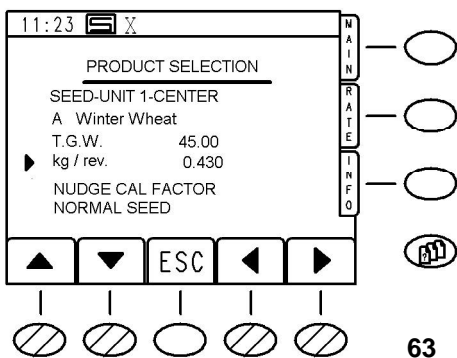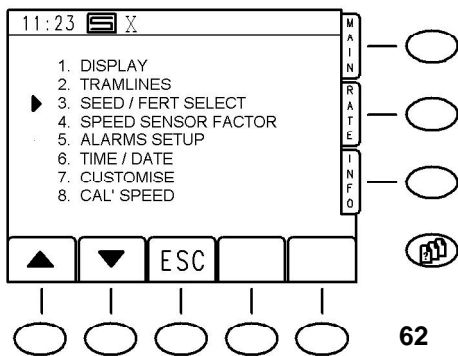
b) Compensation for Seed Quantity Deviations

Due to the varying characteristics of seeds, especially mixing during transport, quantity deviations may occur over large areas despite precise calibration and careful maintenance of the seed library.

The Artemis software offers the unique option of compensating for these errors.

To use this function the following outline parameters **must** match on the seed drill :

1.) The machine must be calibrated beforehand on the field as described on page 18!

2.) The machine must be set in kg/ha. If SEED/m2 is set, you must change the settings.

3.) Error compensation can be carried out individually for each seed in the seed library. The seed key values must be calculated as described on page 22 and then entered.

4.) No tramlines should be created when sowing the test area – pre start should not be used. **These can produce false results**.

If, however, the same tramline rhythm is used and/or pre start is constantly used, it may be useful to maintain the normal manner of operation. **This is not recommended, however.**

5.) The seed quantity must **not** be changed during measurement!

6.) Measurement is carried out on an area of 1 ha.

Measurement can also be carried out on any desired area. The values to be calculated must, however, be converted according to the area !
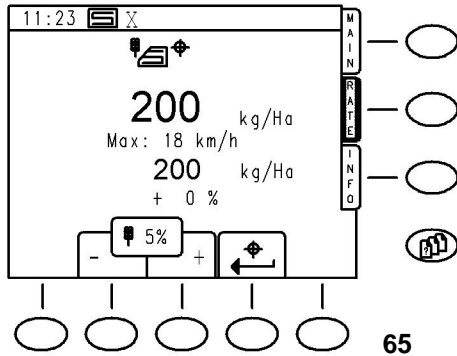
In a subsequent example, compensation is carried out using the following figures:
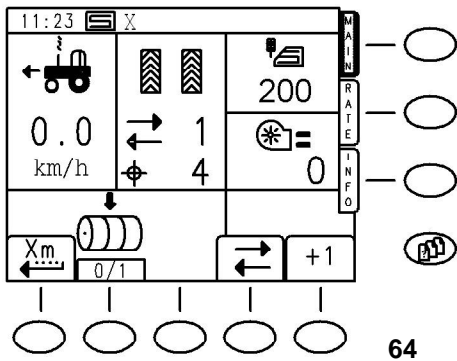
Seed	Winter Wheat
kg/rev.	0.430
Seed Quantity	200 kg/ha
Selected measurement area:	2 ha

Approximately 500 kg of seed is required for the measurement.

Set the metering device, fill the machine, select the winter wheat seed type and calibrate the machine as precisely as possible.

Close the calibration flaps.

Before starting to sow, check again that the seed quantity of 200 kg/ha is correctly displayed on the 'Main' function page. (**Fig. 64**)

If it is not displayed correctly, set the quantity on the 'RATE' function page to 0 deviation.

Set the partial area counter 'PART' to 0. (**Fig. 65**)

Now sow 2 ha of land.

The current area status can be called up at any time on the "**INFO**" – "**PART**" function screen.
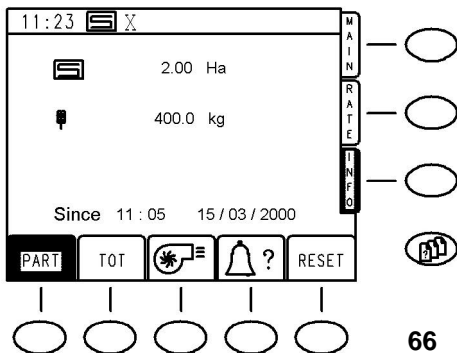
Stop when exactly 2.00 ha have been completed.

Empty the remaining seed from the hopper and weigh it.

Subtract the weight of the remaining seeds from the original quantity of seed (500 kg).

(Example: 84 kg)   500 - 84 = 416 kg

Divide the result by 2 because 2 ha were used as the measurement area.

416 / 2 = **208 kg**

67

This is the value of the **ACTUAL WORK WEIGHT** which will be required for subsequent settings.

Now go to the seed selection screen.

The following display appears (**Fig. 67**) indicating the current seed.

Move the arrow to the line '**NUDGE CAL FACTOR**' and press Enter.

The anticipated seed quantity for 1 ha is displayed. (**Fig. 68**)

Confirm this by pressing <**ENTER**>.

68

The actual work weight is now required:

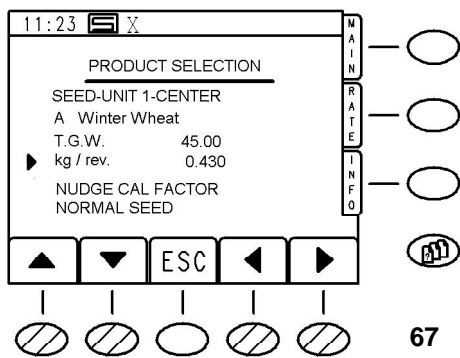Enter the value obtained from the calculation above (in the example above: 208) (**Fig. 69**)

Complete input by pressing <**ENTER**>.

The control now shows a sowing error due to mechanical influences and asks whether the current seed should be compensated for.

The following display appears: (**Fig. 70**)

69

During measurement in the example, 4% too much was used. Press <**ENTER**> to confirm the value.

The display now changes back to the seed selection screen with the current seed.

Note the value for "**kg/rev**" in **Fig. 71** in comparison to Fig. 67:

The value is automatically corrected for the current seed through the measurement.

70

The measurement is not absolutely necessary because the errors which arise are relatively small. There is virtually no difference in the calibration sample.

It is a good idea to apply the measurement in large sections if several hopper refills are necessary and clear quantity deviations from the correct sample are detected over large areas as a result of the mechanical influence of the seed on the metering (flow behaviour).

71
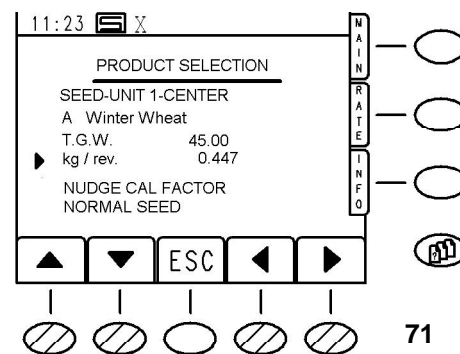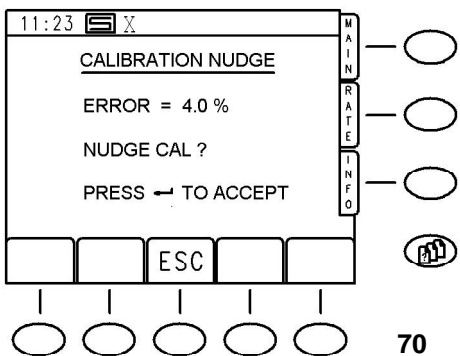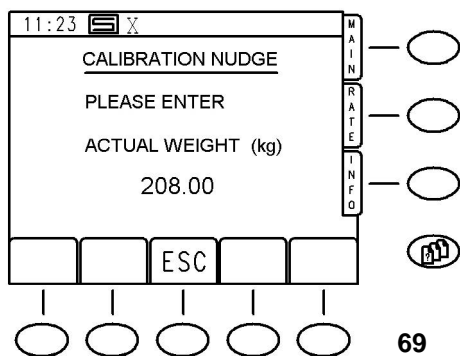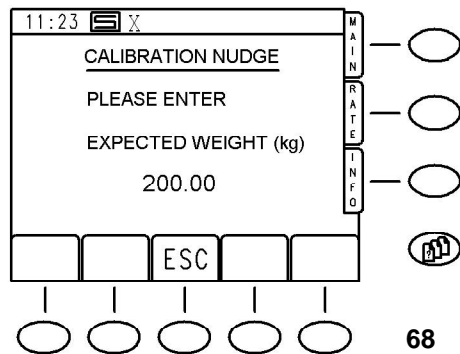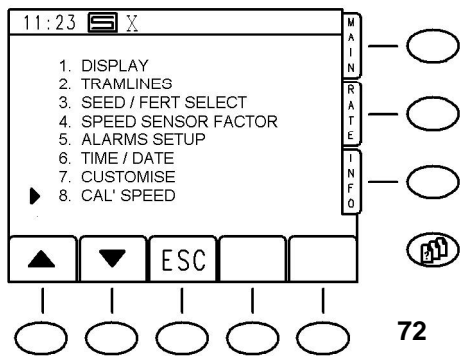
4.1.4 Calibration Speed

The calibration speed specifies the simulated speed with which the seed drill is to be calibrated.

At the same time, it is also the speed with which the pre start will be operated and with which the dosing runs when the motor button is pressed.

To change the calibration speed, call up the menu screen (**Fig. 72**) and select the item "**OPERATOR SETUP**".

In the following menu, select "**8. CAL SPEED**".

The following screen appears: (**Fig. 73**)

Use the numeric keypad to enter a different speed.

When you have entered the new speed, press <**ENTER**>.

The value should be between 1 km/h and a maximum of 13 km/h!

Press the <**ESC**> to exit the function.

Fig. 72

```
11:23  [=] X                    M
                                A
   1. DISPLAY                   I
   2. TRAMLINES                 N
   3. SEED / FERT SELECT        ─
   4. SPEED SENSOR FACTOR       R
   5. ALARMS SETUP              A
   6. TIME / DATE               T
   7. CUSTOMISE                 E
 ▶ 8. CAL' SPEED                ─
                                I
                                N
                                F
                                O
   ▲    ▼    ESC
```
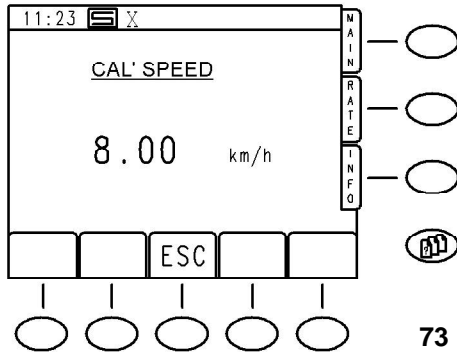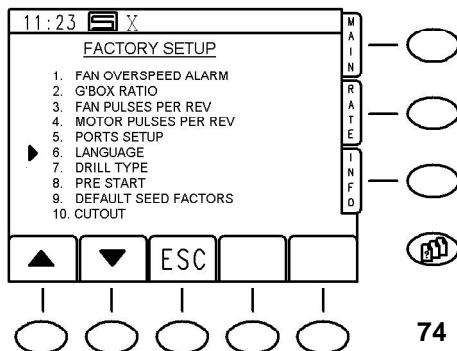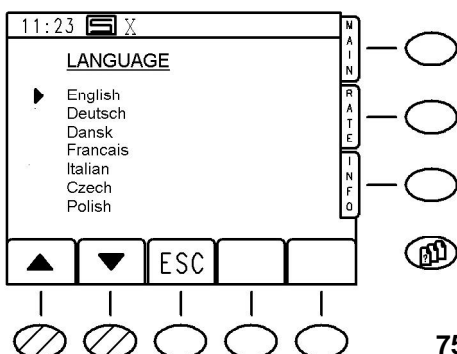**72**

Fig. 73

```
11:23  [=] X                    M
                                A
        CAL' SPEED              I
                                N
                                ─
                                R
                                A
     8 . 0 0     km/h           T
                                E
                                ─
                                I
                                N
                                F
             ESC                O
```
73

4.2 Changing the Factory Set-up

4.2.1 PIN-Code

To change the factory settings, call up the parameter menu and select **3. "FACTORY SET-UP"**.

You are then required to enter a PIN code. (**Fig. 78**)

The PIN code for the factory settings is 9375.

```
11:23  [=] X                    M
       FACTORY SETUP            A
                                I
   1. FAN OVERSPEED ALARM       N
   2. G'BOX RATIO               ─
   3. FAN PULSES PER REV        R
   4. MOTOR PULSES PER REV      A
   5. PORTS SETUP               T
 ▶ 6. LANGUAGE                  E
   7. DRILL TYPE                ─
   8. PRE START                 I
   9. DEFAULT SEED FACTORS      N
  10. CUTOUT                    F
                                O
   ▲    ▼    ESC
```
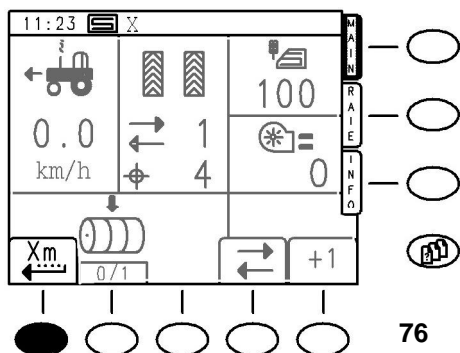**74**

4.2.2 Select Language

To change the display language select "**6. LANGUAGE**".

In the screen which appears, move the arrow to the desired language and press <**ENTER**>.

The control changes automatically to the "**FACTORY SET-UP**" screen in the selected language.

Press <**ESC**> to return to the menu selection.

```
11:23  [=] X                    M
                                A
       LANGUAGE                 I
                                N
 ▶ English                      ─
   Deutsch                      R
   Dansk                        A
   Francais                     T
   Italian                      E
   Czech                        ─
   Polish                       I
                                N
                                F
                                O
   ▲    ▼    ESC
```
75

4.2.3 Pre Start

Pre Start is a useful function in order to avoid, for example, fault locations when driving or a reset after a break.

The machine is brought into the working position with the nominal RPM of the using fan.

When you press the <**S1**> "**PRE START**" button on the screen (see page 9) the machine starts to sow at the calibration speed.

During the waiting period **X** the softkey display flashes.

Once the waiting period has finished, there are two short audible signals.

The sowing machine must now be brought up to working speed with normal acceleration.

Pre Start **Y** is provided for this purpose – it runs after the audible signal has sounded.

Once it has run, the machine is once more controlled using the speed sensor.

To avoid the formation of gaps or heaps when driving, both time values should be carefully selected.

a) Calculating Pre Start X:

The preset standard value of 4 seconds is approximately the correct value for a front hopper machine on a circular spike harrow or compact harrow.
On drawn combi-speed machines, the time is slightly shorter; in the case of front hopper machines with an additional agropack, the time is slightly longer.

To determine the correct time, do the following:

Raise the machine, switch on the electronics and run the using fan at nominal RPM.

Engage the handbrake! Alight from the tractor and make sure that the metering wheels are completely full.
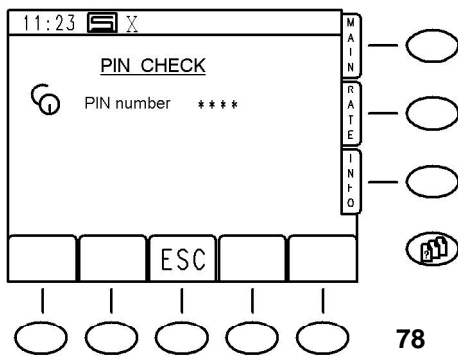
Place a basket or similar below a blade.

Gently lift the speed sensor so that the speed sensor cut-off is deactivated – rotate the speed sensor a short distance.
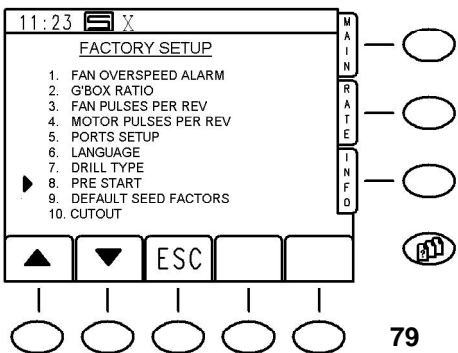
The correct pre start **X** is the time it takes for the first grain minus 1 second to reach the basket. (Subtract 1 second because this is the minimum reaction time when moving).
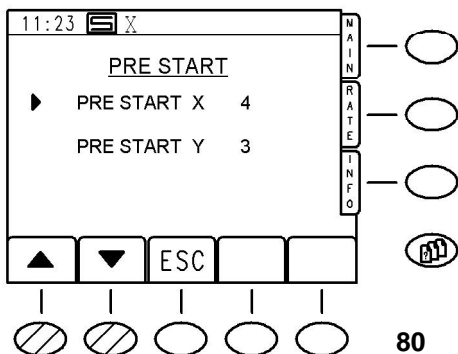
76
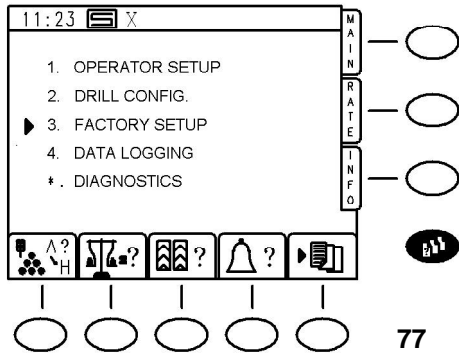
b) Calculating Pre Start Y:

The specified value of 3 seconds is normally adequate. The time depends greatly on the reaction capabilities of the driver as well as the desired working speed.

If the desired working speed is very high, e.g. >12 km/h in the case of combi-speed machines, the time it takes to reach this speed should be included in **Y** time.

This is only necessary, however, when the calibration speed is clearly below the desired travelling speed!

Under normal circumstances, the recommended Pre Start Y time should not be changed.

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c) Changing the Pre Start Value:

On the menu screen, select "**3. FACTORY SETUP**". (see page 11)

You are requested to enter a PIN code. (**Fig. 78**)

The PIN code for the factory settings is 9375!

Be very careful when changing operating parameters and factory settings.

Note the old values and the new values.
In the event of a fault or after the machine is reset to the standard settings, you can re-enter your settings without having to recalculate them.


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The following display appears for the Factory-Set-up: (**Fig. 79**)

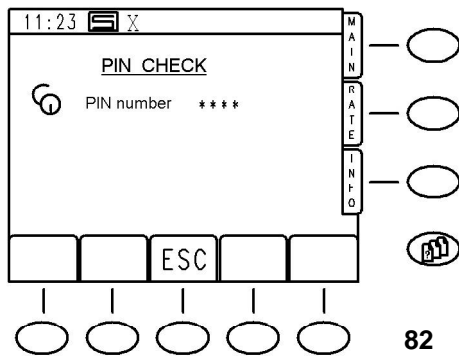Select "**8. PRE START**" and press <**ENTER**>.

The following display appears: (**Fig. 80**)

You can change the values in this menu by selecting the appropriate line with the arrow and then entering the appropriate time in seconds using the numeric keypad. Always confirm values by pressing the <**ENTER**>.
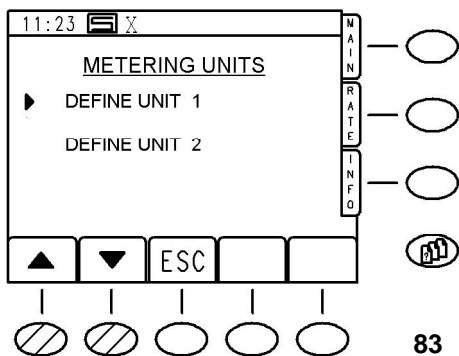

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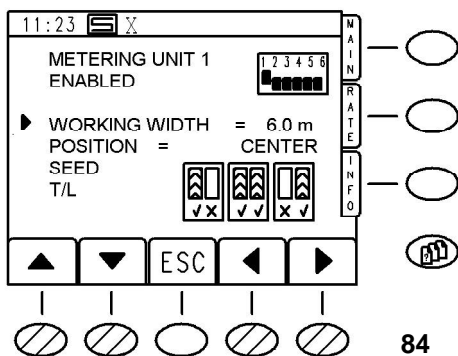Press <**ESC**> twice to return to the parameter menu screen.
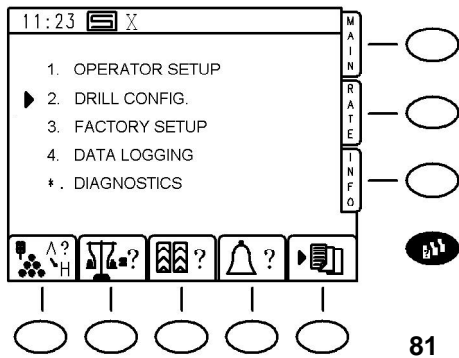
4.3 Machine Configuration, CAN-Configuration

The special machine configuration for the seed drill is called up in the menu screen (**Fig. 81**).

This is important, for example, in order to inspect the settings for the work width.

4.3.1 PIN-Code

When you select "**2. Drill Config**" you are asked to enter a PIN code. (**Fig. 82**)

Enter the PIN 7223 and confirm by pressing <**ENTER**>.

4.3.2 Check Machine Data

The standard control program value for the working width is 6m.

This value is set again if the software is reset even if the machine has another work width. The work width can be changed in steps of 0.10m.

The correct setting is very important otherwise the machine will not function properly!

In order to change the work width, you must first call up the machine configuration. (**Fig. 81**)

Since it is possible to connect up to 2 independent metering units to the control, you are asked to specify the relevant metering unit.

For Turbodrill machines, there is only the first metering unit **UNIT 1**., even if it has two metering units together.

Select **UNIT 1** with <**ENTER**> in order to display the parameters.

The name of the metering controller is displayed in the first line as well as the settings for the coding switch on the controller. **IMPORTANT, DO NOT CHANGE ANYTHING!**

The next line below this can be used to deactivate the controller. **IMPORTANT, DO NOT CHANGE ANYTHING!**

The following line contains the work width assigned to the controller. (The default value is 6 m).

This can be changed by selecting the lines with the cursor keys and entering the new work width in metres (e.g. 4.5 m).
Changes are only required here!

The next line is used to specify on which side of the machine the controller works. Selecting left or right is only useful if two controllers are fitted!

The standard setting is centre (1 controller only).
IMPORTANT, DO NOT CHANGE ANYTHING!

This description is intended for information purposes only – changes to settings other than the work width are both unnecessary and inadvisable.
Do not change the default values!

Press <**ESC**> twice to return to the menu screen.

The next line is used to specify whether the controller is used for seeds or fertilisers (only useful if two controllers are fitted).
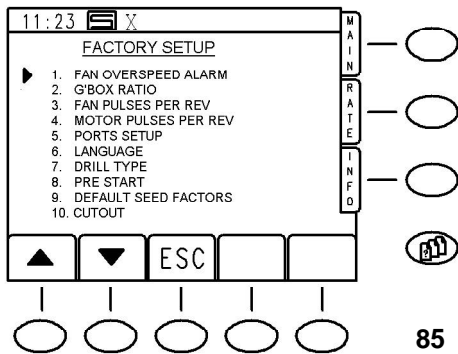
The standard setting is SEED.

Finally, the T/L line is used to specify which tramline system is to be used.
Asymmetric right/left and symmetric tramlines.

All options are activated as standard.
Important, do not change any settings!

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5. Additional Settings, Diagnostics Screen

The following paragraphs describe the remaining menu options on the '**FACTORY SET-UP**' screen which generally describe the environmental parameters of the mechanical drive components - They should not be changed. (**Fig. 85**)

1. FAN OVERSPEED ALARM

This contains the absolute upper limit for the fan RPM. This figure depends on the type of fan. **The default value must not be changed!**

2. G'BOX RATIO

Transfers the electrical motor to the metering shaft. The existing **default values should not be changed!**

3. FAN PULSES PER REV

This specifies how many fan sensor impulses per revolution are to be given. B
With RABE seed drills, this value is **always "1".**

4. MOTOR PULSES PER REV

Indicates how many shaft encoder impulses are given to the metering motor per revolution. **Do not change the existing values!**

5. PORTS SET-UP

Describes the use of both serial ports on the control unit (e.g. communication with other systems)

7. DRILL CONFIG

Specifies various program processes depending on the machine type (function currently not activated!).

9. DEFAULT SEED FACTORS

Default values independent of the metering for the chamber weight of normal and small seeds per revolution in accordance with the metering wheel.

10. CUTOUT

Option for reversing the operation of the speed sensor switch.

*. DIAGNOSTICS

Diagnostics screen for the CAN module detected at the control bus. This screen displays the various inputs and RPMs for test purposes.