Timberjack 3000

Operator's Manual
Timberjack 3000
F289780 (English)

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

Worldwide Construction And Forestry Division
LITHO IN U.S.A.

A2. Safety precautions

Always observe the safety zone as specified in the instruction manual for the base machine. This is important when you are felling trees that could injure bystanders, or if the saw chain breaks, which could result in serious injury if one or more links hit a bystander.

DANGER

Safe working distance: 60 metres
Safety distance means that nobody may reside within this distance from the machine as long as the engine is running, regardless of reason. This does not apply to a person who is in the cab with the door closed.

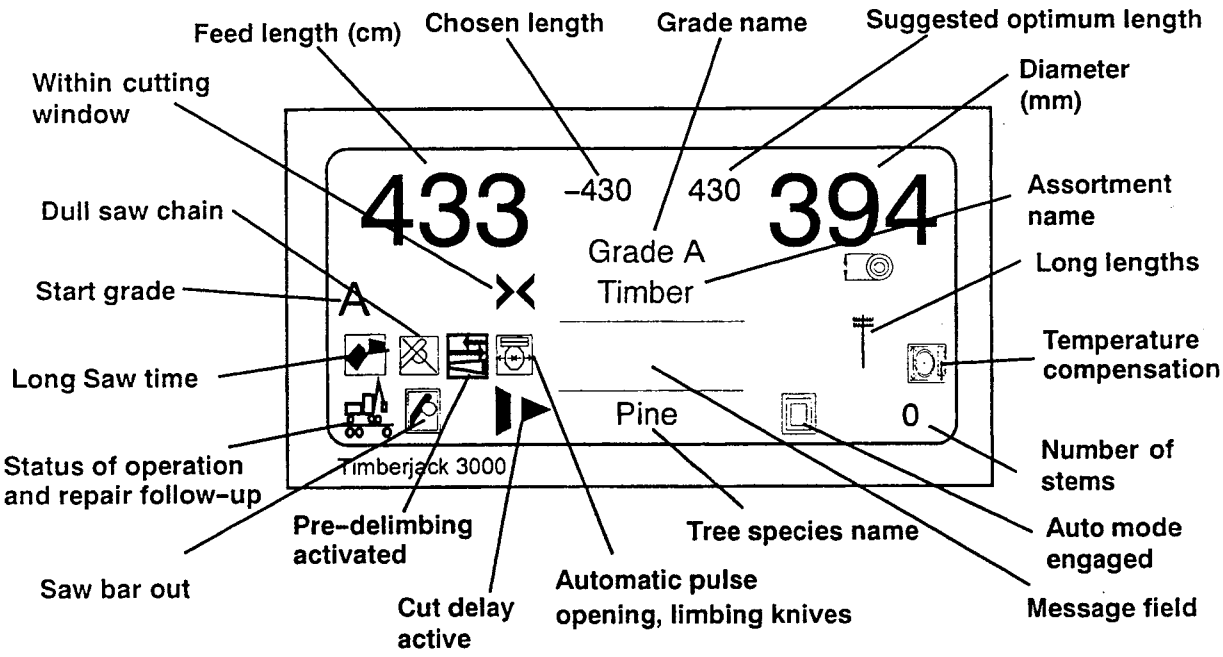
This safe working distance should be regarded as an absolute minimum. If local regulations require a larger safe distance then the local regulations will apply.

DANGER

Before carrying out any adjustment on the head, always switch off the engine of the base machine. If the engine is running and the hydraulic system is pressurised there is a risk that the feed rollers, limbing knives, tilt or saw functions may cause fatal injury.

A4.2 Operating mode

When the system is in operating mode the same menu is always displayed. The display gives you the following information:



1. **Feed length (cm)**

   The system continuously measures the length of the stem and displays the measured length in cm.

2. **Within cutting window**

   When the system has reached the desired length within acceptable tolerances the symbol >< appears on the display and is followed by an audible signal.

3. **Dull saw chain**

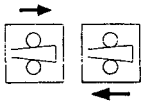
   Indicates the time to change saw chain because the cut time has become too long.

4. **Start grade**

   The grade name can be changed.

6. Loader control 

Head close, Head open and Resetting. Resetting means that the head opens and the head is tilted up. The computer is now ready to process the next stem.

7. Feed forward – feed reverse 

Use these keys to start feeding forward/reverse. Feed forward cannot start until the saw bar has returned to its guard. See A7.7.

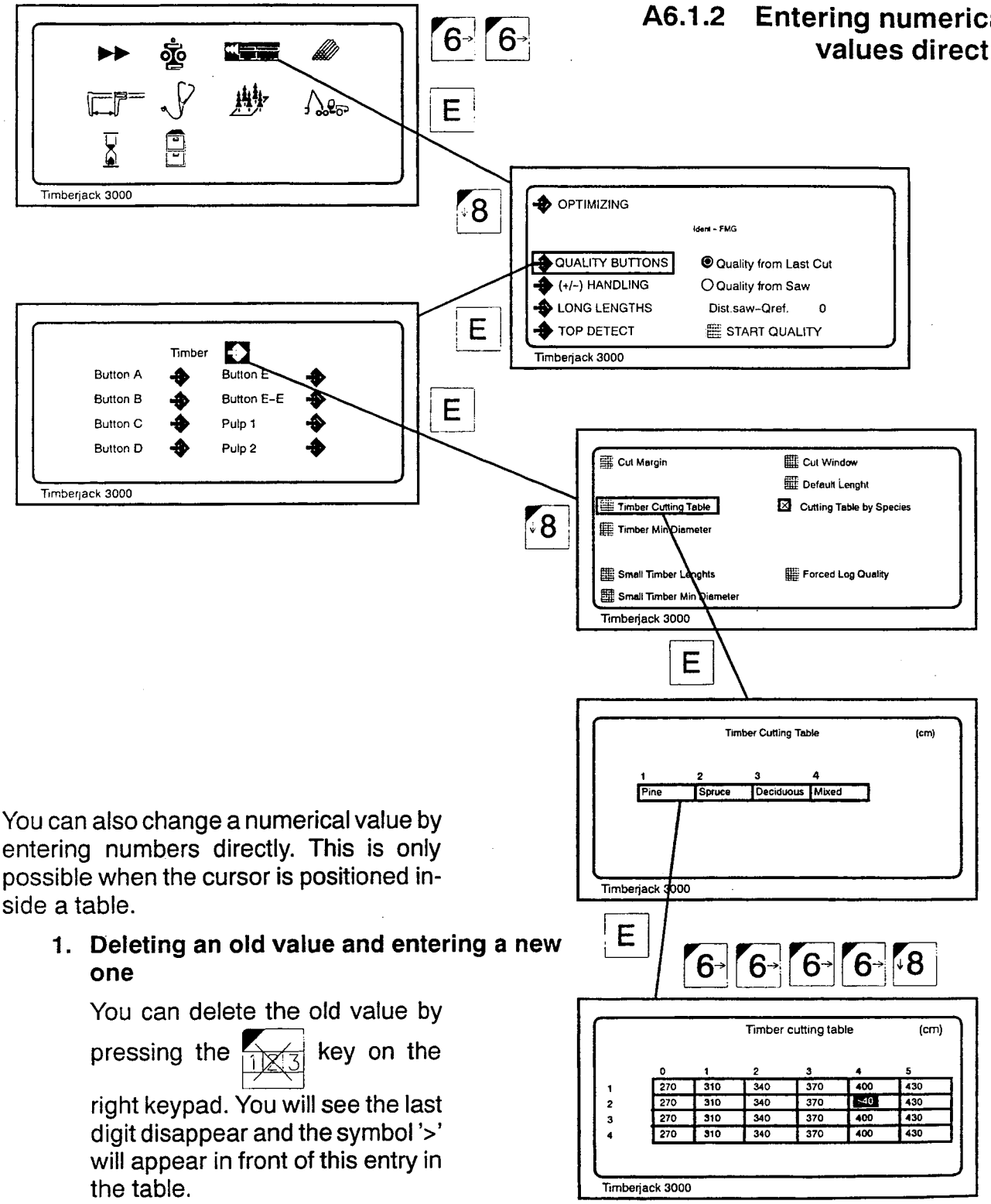
Before the first cut, the felling cut, feeding takes place at reduced speed (Reverse Creep Feed) when you press the feed reverse key. This helps you reverse the head as close to the root as possible once you have grasped the tree.

NOTICE! If the bar jams out of the guard during felling you can use the Reverse Creep Feed to help free the blade, but consider the hazards first!

8. Cut 

Sends cutting signal to head as long as key is held down. When you release the key the saw returns to the guard. See also Auto cutting mode. Pressing   at the same time resets the length measurement without cutting.

A6.1.2 Entering numerical values directly

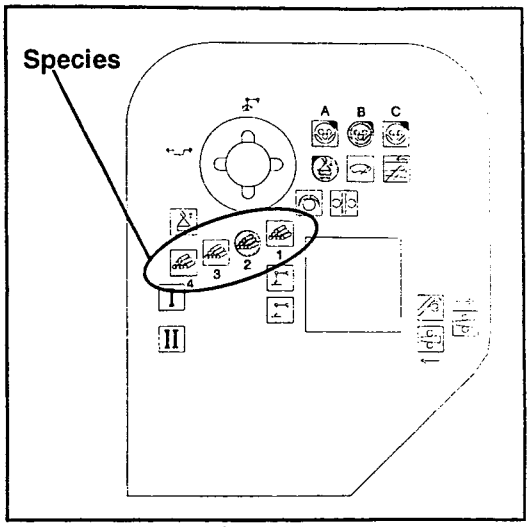


You can also change a numerical value by entering numbers directly. This is only possible when the cursor is positioned inside a table.

1. **Deleting an old value and entering a new one**

   You can delete the old value by pressing the key on the right keypad. You will see the last digit disappear and the symbol '>' will appear in front of this entry in the table.

A7.2 Selecting tree species



Before you start processing a stem you must tell the Timberjack 3000 which species of tree you will be using. You do this with the aid of four tree species keys on the left keypad.

A7.3 Selecting log length

The Timberjack 3000 works with two main types of length selection: manually selected (preset) lengths, and optimized lengths.

If you decide to work **without optimization** then the length will be taken from the preset lengths in the timber cutting table, the small timber table, or selected using the grade keys (special lengths).

If you decide to work **with optimization** then the length used will be the **suggested optimum length**. But remember, you can always ignore the suggested length and choose the length yourself.

You always have the last word in deciding the length!

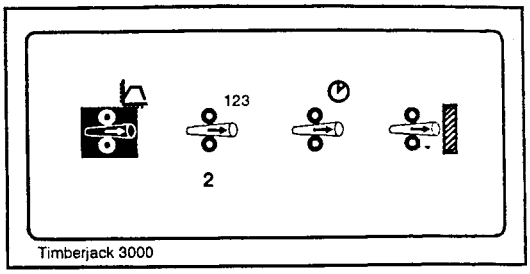
B **Minimum diameter for small timber** specifies the minimum allowable top diameter for a small timber log according to the lengths specified in the table for **small timber lengths** (= 'cutting table for small timber'). When this diameter limit is reached, the length of the log is reduced in modules according to the preset length limits for small timber. As with the cutting table for timber, the system searches through all the preset small timber lengths to find the longest possible log to cut. When the diameter drops below the minimum diameter, i.e. none of the lengths in the small timber table can be used without the top diameter of the log being smaller than the diameter limit, the system automatically switches to pulp. **If you set the minimum diameter for small timber higher than the minimum diameter for timber then small timber will never be cut.**

C **Minimum top diameter = the diameter limit at which the usable section of the stem ends.**
The minimum top diameter can be set as either the minimum diameter for pulp 1 or pulp 2. When the minimum top diameter is reached one of two things can happen:

1. If the parameter 'Min Top Search' is active (marked) then the system searches for the precise position of the minimum top diameter.
2. If the parameter 'Min Top Search' is NOT active then the system mode switches to manual and feed stops.

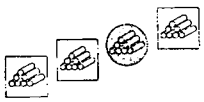
The parameter 'Top Defect Length' allows the minimum top diameter to be overshot by the set length (cm)

A7.7.3 Auto mode 2

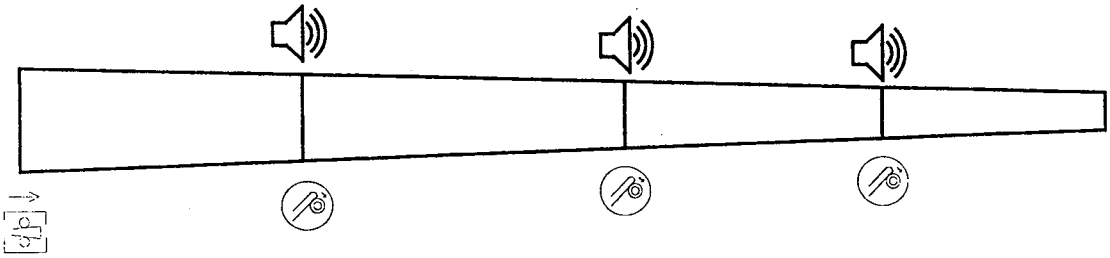


In auto mode 2 all you need to do is give the system 'permission to start', i.e. enter the species and press the → key. Processing starts and the chosen length is fed out automatically. When the chosen length is reached, feeding stops and you can give the order to cut. After cutting, the saw bar returns to its guard and processing restarts automatically, i.e. you do not need to press a key to start feed. The next length in the chosen cutting table is fed out. If you want to stop feed in this mode you simply press the → key.

Felling cut



Choose species (If repeat species is used you do not need to choose the species.)



Feed forward, press key once

Cut

Cut

Cut

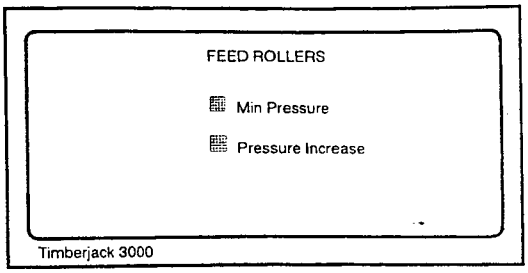
Press STOP **and feed stops**

Press  **and** → **, feed continues**

Auto mode 2

Set the Pressure Increase for the feed rollers to 0.

search path:  FEED ROLLERS

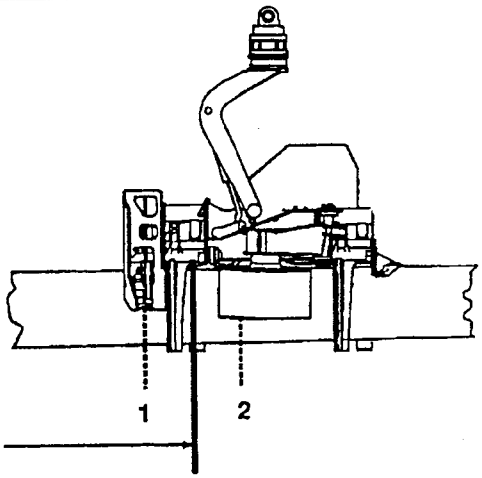


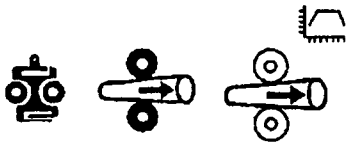
J Now you can fell a tree
Fell the main stem in the stand.

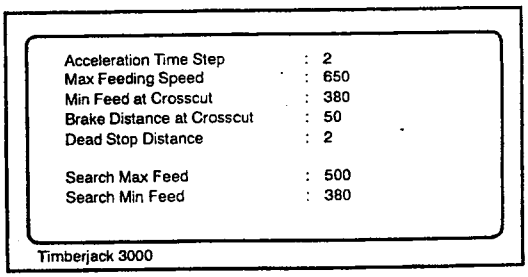
Choose a length and feed forward. Observe the position at which the feed stops on the stem, i.e., does the feed stop before the cutting zone or after it?

1. In this case, Min. Feed at Crosscut must be increased, since the feed has not managed to reach the selected length.
2. In this case, Min. Feed at Crosscut must be decreased, since the feed has gone too far.

Try this out on several trees and see how it works. It is better for the feed to go a little too far than stop too soon. This is a rough setting which will form the basis of fine adjustments later.



search path: 

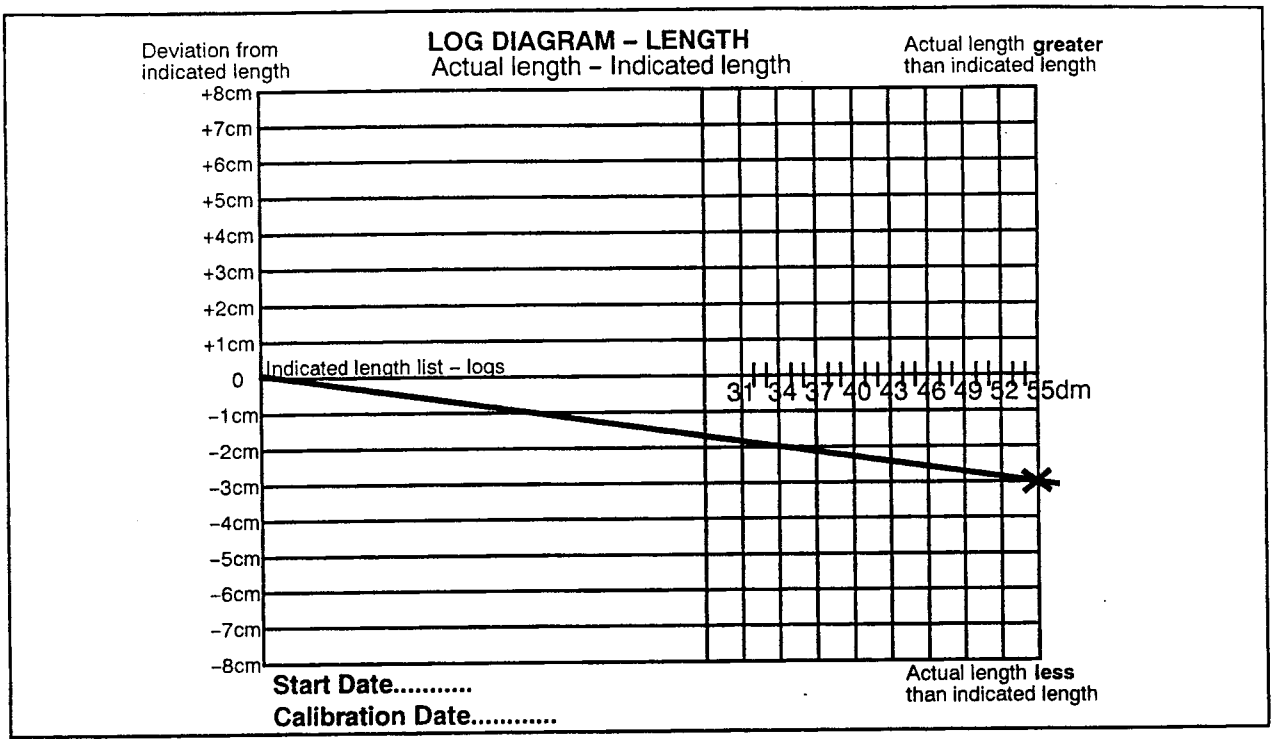


NOTICE

Never change the Max. Feeding Speed. Max. Feeding Speed is factory set. Only to be altered when components are changed.

Example, refer to fig.:

The line drawn from the origin will clearly show that at a length of 550 cm, you should calibrate the length by 3 cm, because this is too short. Refer to paragraph A8.2.1.



NOTICE! Always calibrate the length on the longest length of timber.

Under "Indicated Length", you should write the value 550 and under "Measured Length", you should enter the value 547. The measuring error on the shorter lengths will then be corrected automatically.

When calibration is finished, you should immediately start a new diagram to see that the calibration has had the desired effect. When the centre of the measured values is right on the 0 line, the measuring equipment has been correctly set (the same number of values located above and below the line at every point).

A10. Displaying production results

You can check how much you have produced at any time by getting the computer to display production results on the screen.

Do as follows: switch from operating mode to settings mode and mark the production symbol with the cursor. You will see the following menu:

Now select PRODUCTION TOTALS and you will be given the following options:

- Volumes
- Numbers
- Run lengths
- Bunch handled production
- Unclassified

1. If you choose VOLUMES you will see the following menu:

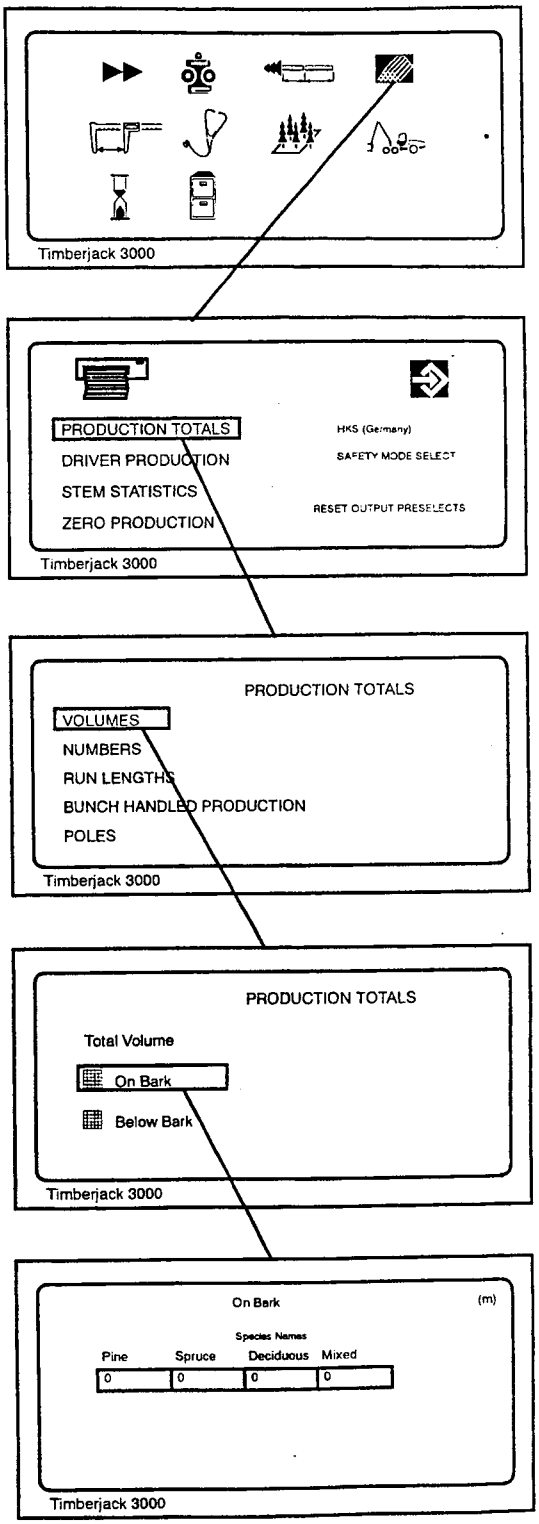
A Move the cursor to **On bark** and press E

The total volume on bark will be displayed.

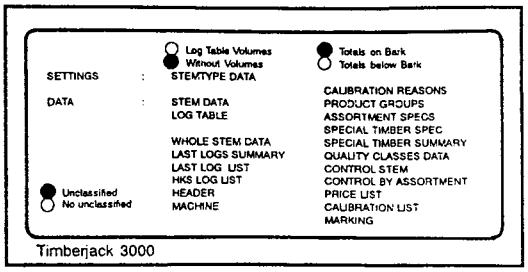
B Move the cursor to **Below bark** and press E. The total volume below bark will be displayed.

NOTICE! If you have not entered any bark parameters the total volume on bark will be the same as the total volume below bark.

The total volume is the total solid volume of the stem including everything you have cut from that stem between felling and resetting.

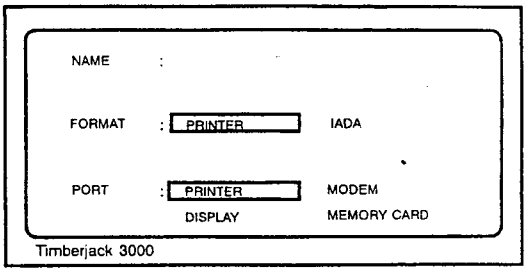


When you are happy with the assembly of your report, you return to the previous menu by pressing the key.



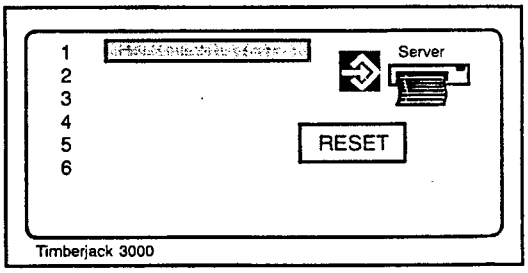
Finally you should check that the **Printer** is marked as the **Port**.

If you want to check the report first without printing it out on the printer, you can mark the **Display** field alongside **Port**.



The report is then sent to the display instead of to the printer. Before you can print the report out on the printer you will have to mark the 'Printer' as the port once again.

You have now completed setting up the report and can return to the previous menu by pressing the key. There you will see the name of your report at the top of the menu as report number 1.

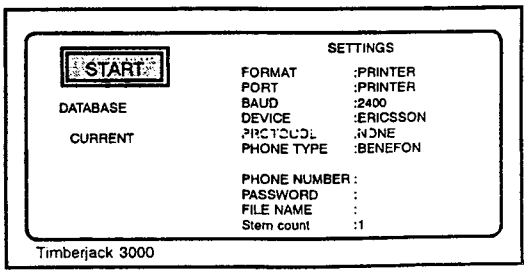


A11.2.1 How to start printing out

First check that the printer power supply is switched on, i.e. that the 'Power' lamp is lit. Then check that there is no fault with the printer, i.e. that the 'Error' lamp is NOT lit.

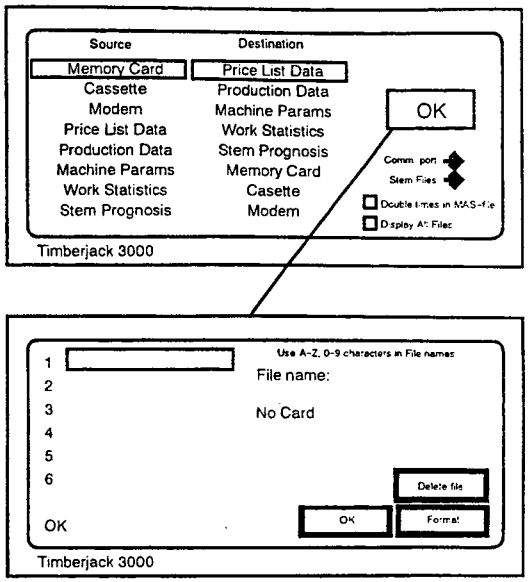
Start by selecting the desired report no. 1...6 using the cursor and the E key.

You will now see a menu with the cursor positioned over the word 'START' at the top left of the menu.



If you now press the E key printing will start.

A12.1.1 Entering price list data into the 3000



When you want to load a new price list from the memory card to the Tj 3000 for use during optimization.

1. Insert the memory card into the 3000.

NOTICE! If you have production in the Tj3000, it is important to print a report of production in accordance with chapter A11, since all production data disappears when a new price list is entered.

2. Move the cursor to the "File Handling" , press [E].
3. Highlight MEMORY CARD under SOURCE, press [E].
4. Highlight PRICE LIST DATA under DESTINATION, press [E].
5. Highlight OK, press [E].
6. Highlight the correct name, press [E].
7. Move the cursor to the right and then down to OK, press [E].
8. Highlight YES, press [E].
9. Wait until the price list has been loaded and "Done!" appears on the display. Wait also until RECALC has disappeared.
10. Press and at the same time to exit straight out to the operating mode.

B3. Adjustment parameters and terminology

B3.1 General

In order for the Tj 3000 to work well, there are a number of parameters, also known as "Adjustment parameters" or "Machine parameters" which can be adjusted. These will provide you with the opportunity to adapt/adjust speeds and times for the system's various functions.

The parameters are individual to each machine and harvester head, meaning that one machine may not function as well at some parameters as another would. However, the variances between different machines are extremely marginal, meaning that the parameters from one machine should be able to function well on another with only a few very minor adjustments.

You may also adapt the cross-cutting table, length selection, maximum, average and minimum limits for lengths and diameters, according to the conditions in the area you are clearing.

If this time is set at too low a value this means that the limbing knives and feed rollers will close fully even with brief pressure on the button.

The parameters DT: Max Closing Speed and DT: Min Closing Speed are closely linked with this function. If the minimum speed is set too low, this may mean that nothing will happen before the feed rollers and limbing knives come together.

If you are unaccustomed to the system, it may be necessary to increase the parameter equivalent to a somewhat longer time in the beginning and gradually reduce it.

The default value is 40.

C DT: Max Closing Speed

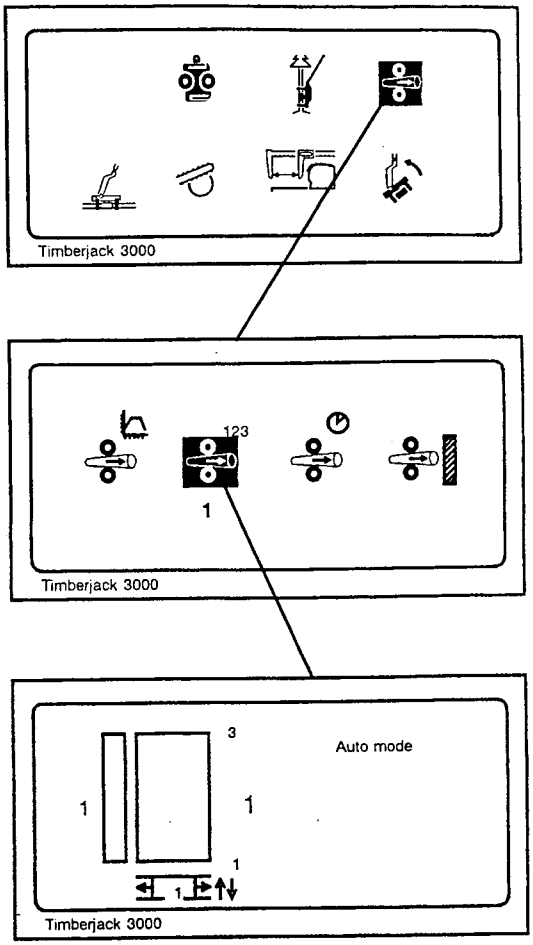
When you use a harvester head with proportional hydraulic valves (only available as additional equipment), for example on 746B, 762B and 743, this parameter will limit the maximum current value which is output by the 3000. You will get this current when the button is activated at maximum.

With the button activated at maximum, you will get the maximum speed which the knives can attain. This maximum speed is equivalent to the corresponding parameter value.

If a harvester head is not equipped with proportional valves, this value should be set at 2000.

The default value is 2000.

B3.4.2 Auto Mode



This parameter provides you with the option of selecting the automatic level you wish to use when feeding the stem.

The value can be set between 1 ... 3, with each value for this parameter being equivalent to a level of automation.

1. **Auto Mode 1**

   The feeding runs only when one of the feeding buttons are pressed. This means that the harvester head will feed as long as you hold down the feed button, and will stop as soon as the button is released or the correct length is reached.

2. **Auto Mode 2**

   With this level of automation selected, feeding will be automatic after you have entered the tree species. The feed forward button works as start/stop of feeding.

   Feeding aims at the chosen length. You must have chosen species.

   This function is often called "Permission to Start". When the harvester head reaches the cutting zone, it will automatically stop at this point.

If the Min. Pressure is set at too high a value, this will result in unnecessary wear on axles, feed roller motors and increased fuel consumption, since feeding will be problematic.

If Min. pressure is set at too low a value, this will result in slipping and considerable bark and tree damage.

To control the point at which the "Min. pressure" parameter breaks in and increases the pressure which has been set as the minimum mechanical pressure on the harvester head, you should:

NOTE

Dismantle H23 (Tilt Up) and contacts 490, 491 (Forward/ Backward Feed), and 484 (saw).

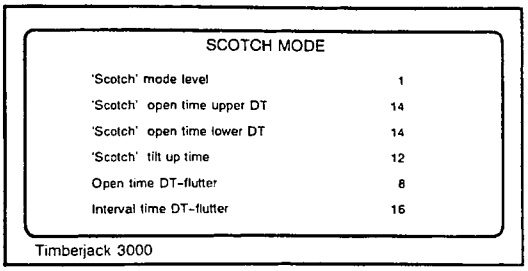
1. Connect a 250 bar manometer to the pressure outlet for "Clamping Pressure – Feed Rollers" on the harvester head
2. Change the "Min. Pressure" parameter to a low value, such as 20. Once you have done this, you can be sure that this parameter will not come into play when you want to check the pressure on the harvester head when it is not loaded.
3. Close the head, ensure that it is empty, and keep the "Forward Feed" button depressed at the same time as you take a reading of the pressure on the manometer.

This means that if you opt to set Scotch mode to level 1, the cut, reverse feed and forward feed buttons on the left keypad, as well as the length selection buttons 7 and 8, will lose their original functions.

If you opt to set Scotch mode to level 2, the Color A, Color B and Color C buttons, as well as the length selection buttons 7 and 8, will lose their original functions.

As the operator, you can decide yourself which is most practical for your needs.

If you have selected level 2, for example, you can revert to the manual color marking function temporarily by setting Scotch mode to level 0.



B Scotch open time upper DT

This is activated only in Scotch mode level 1 or 2.

By pressing [Cut] on the left keypad (mode 1) or [Color A] (mode 2), you can open the upper delimbing tools to the desired level. The open time controls how far the knives manage to open.

If you hold down the button, the knives remain in the position to which they had opened during the open time. When the button is released, the delimbing tools close again.

The default value is 14.

D Saw Calibration

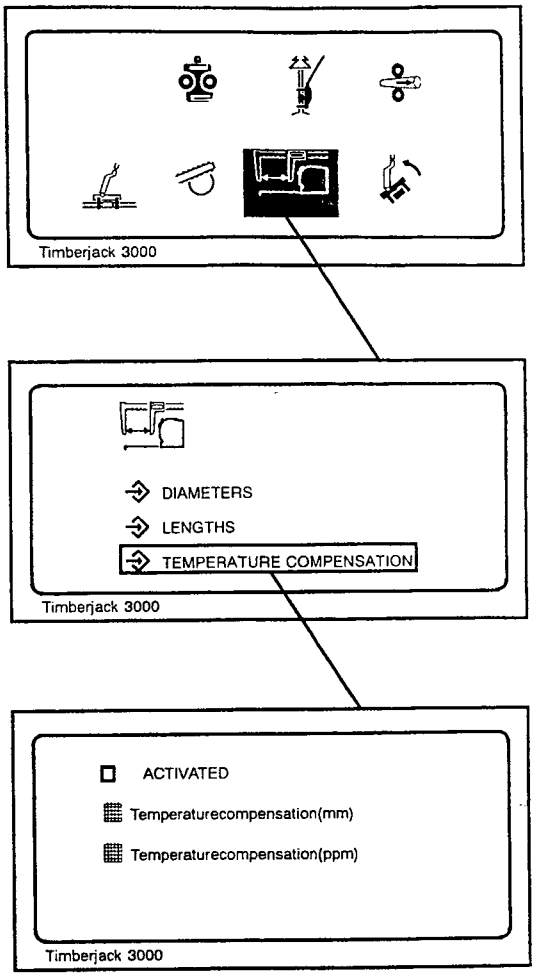
Using this parameter, you will change the sawing depth for all diameters, although not for the very smallest, for which you will have to use the Saw Start Point parameter to obtain good calibration.

The default value is 75.

E Calibration Curve

Using these parameters you can finely adjust the calibration of through-sawing, for specific diameter intervals.

B3.7.3 Temperature compensation



Temperature compensation is a function for optimising diameter measurement and, as a result, volume calculation. This function enables you to adapt measurements according to the prevailing conditions.

The diameter measurement may be incorrect at certain times owing to various factors, such as the rising of the sap in the spring and early summer, rapid temperature changes, etc..

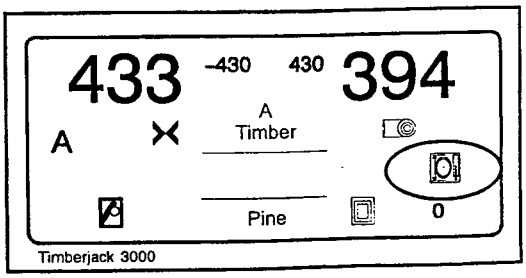
These factors can cause the bark to split away from the stem, for example, with the result that the expected diameter measurement on bark will be incorrect.

It is possible to correct this using temperature compensation. This function affects the diameter measurement calibration.

By checking off the box to activate this function, the "temperature compensation (mm)" and "temperature compensation (ppm)" parameters are activated. You can opt to use either one or both of these parameters.

When the weather conditions become more normal again and you want to revert to the previous calibration, simply remove the cross you used to activate the function.

NOTICE! ***When you have used temperature compensation, this will be specified in production printouts and machine parameters.***

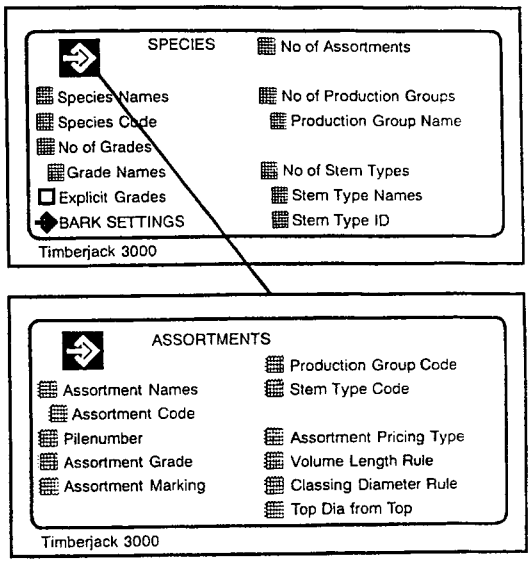


B4. Registration

B4.1 General

Group A7.6 has already given a concise summary of the way in which Registration and Classification of logs takes place. The term "grade" is also explained there.

In this chapter, we must go a little further in order to describe the Tj 3000's registration controls in different situations and what you can do to ensure that registration and classification of production is as accurate as possible.



4. **Grade Names**

   The operator can enter whichever name is to be used.

   During optimization, these will be given in the administration software while the price list is being drawn up.

   When changing the grade, the first letter of the grade name appears immediately to the left in the display.

5. **No. of Assortments**

   The maximum number is 10, which is also the default setting.

6. **Assortment Names**

   The operator can enter whichever name is to be used.

   During optimization, these will be given in the administration software while the price list is being drawn up.

7. **Assortment Grade**

   The Assortment Grade table is used for switching on the grade or grades which are permitted for registration in a certain assortment.

B5. Printouts

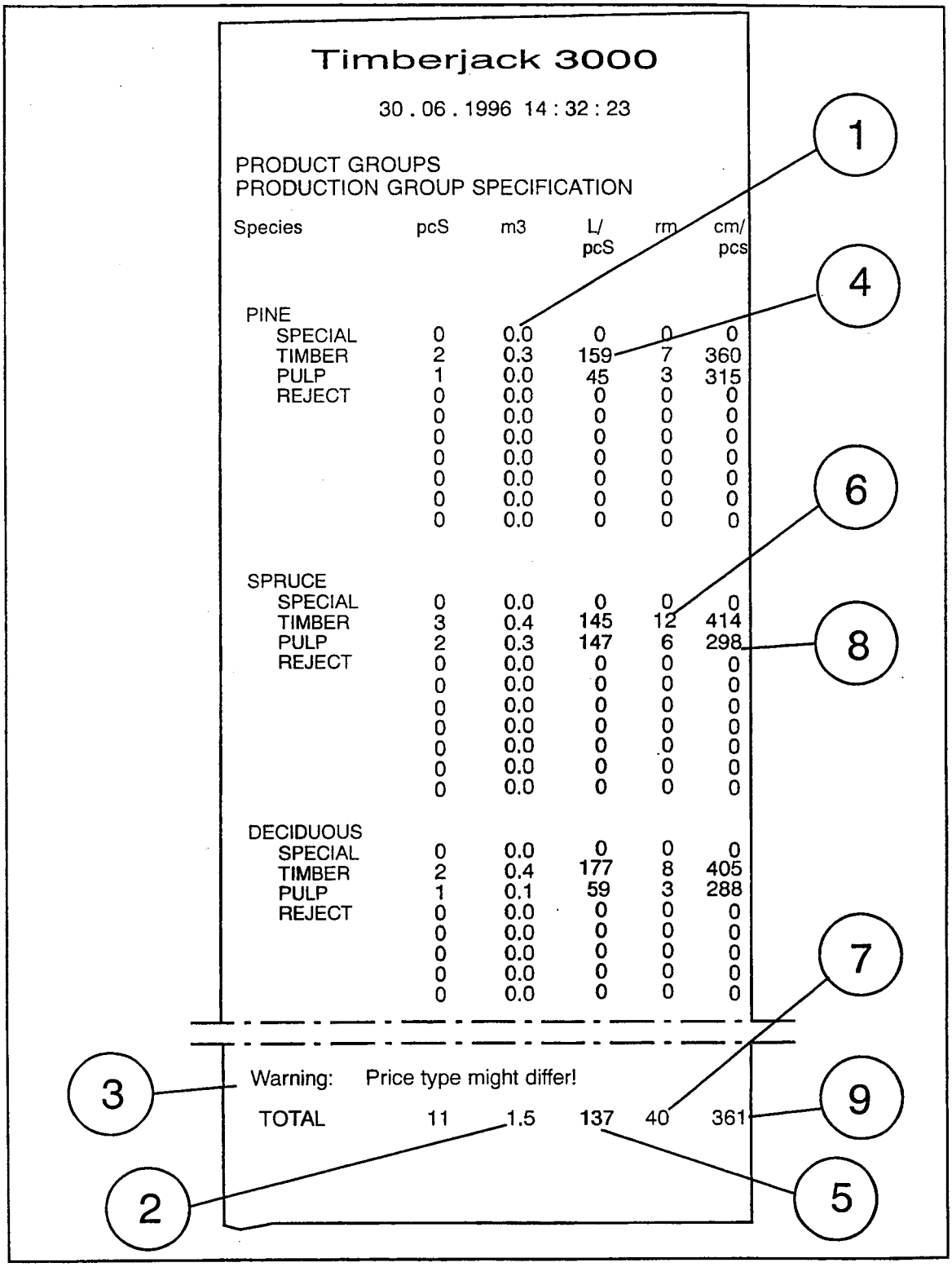
B5.1 General

This chapter contains illustrations and descriptions of a number of the reports which the Tj 3000 can print out.

To obtain the best overview of these printouts, this chapter has been designed so that you can see an example of the report and the descriptive text on a double-page spread.

In Group A11, you will be able to see how to compile a report and then print it out.

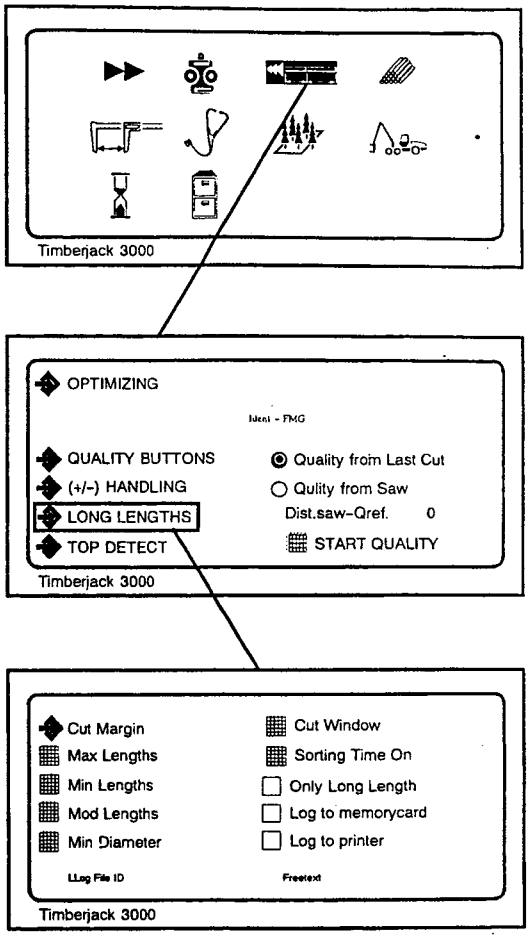
Apart from the descriptive text and sample reports, this chapter also shows the search paths to the menu where the respective report is located.

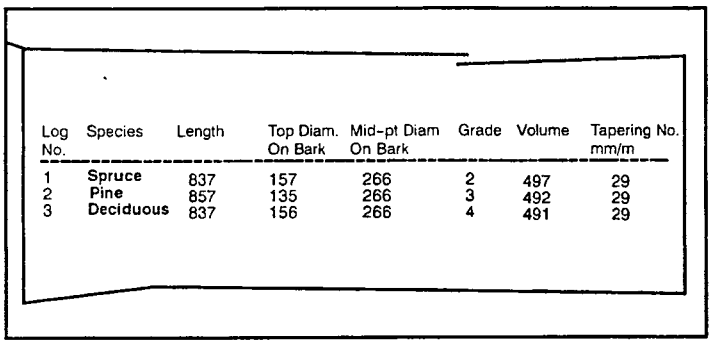

Timberjack 3000
30 . 06 . 1996 14 : 32 : 23
PRODUCT GROUPS
PRODUCTION GROUP SPECIFICATION
Species pcS m3 L/ pcS rm cm/ pcs
PINE
SPECIAL 0 0.0 0 0 0
TIMBER 2 0.3 159 7 360
PULP 1 0.0 45 3 315
REJECT 0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
SPRUCE
SPECIAL 0 0.0 0 0 0
TIMBER 3 0.4 145 12 414
PULP 2 0.3 147 6 298
REJECT 0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
DECIDUOUS
SPECIAL 0 0.0 0 0 0
TIMBER 2 0.4 177 8 405
PULP 1 0.1 59 3 288
REJECT 0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
0 0.0 0 0 0
Warning: Price type might differ!
TOTAL 11 1.5 137 40 361
1
2
3
4
5
6
7
8
9

1. Registering long lengths

In order to know the quantity of pole–timber you have produced, you can set up a special assortment which will register pole–timber.

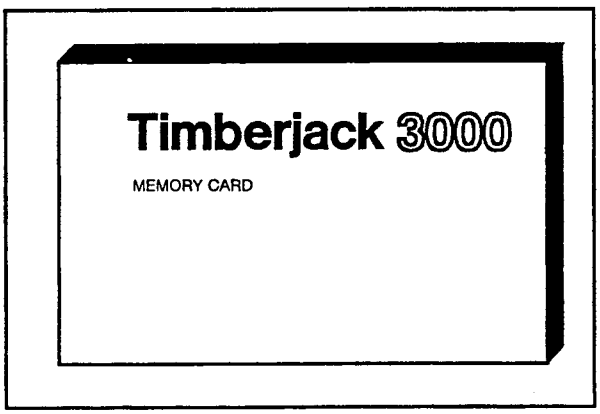
If you cannot set up a special assortment, you should check the box "Logs to Printer" which means that the printer will automatically print out a report of the quantity of pole–timber you have processed, after each stem.

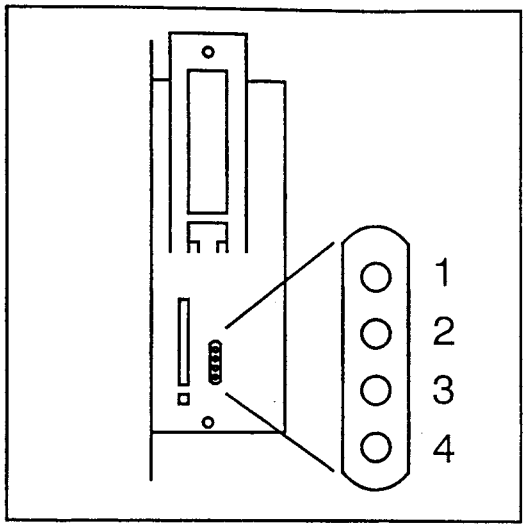




Log No.	Species	Length	Top Diam. On Bark	Mid-pt Diam On Bark	Grade	Volume	Tapering No. mm/m
1	Spruce	837	157	266	2	497	29
2	Pine	857	135	266	3	492	29
3	Deciduous	837	156	266	4	491	29

You could also check the box Logs to Memory Card which means that the log will be registered on the memory card.





4 – 1 The MCM is not connected to the CAN network. This may be due to a connector not properly fastened or that a cable has come loose between the PSU and the MCM. It may also be due to a connector device or cable between the PSU and the DM.

4 – 2 A fault in the CAN network power supply from the PSU may have occurred.

4 – 3 A serious fault in the CAN network, such as a short–circuit of the CAN cables, may have occurred.

2. KCM Light Emitting Diodes

An LED is located on the underside of each keypad.

When the LED flashes, the keypad is functioning normally and there should be no faults.

If the LED is constantly lit, this will be due to an internal fault in the keypad (KCM).

If the LED is not lit, this means that there is an internal error or that no current is being fed to the keypad.

B10. Color Marking and Stump Treatment

B10.1 Color Marking

The Timberjack 3000 system allows you to select an automatic color marking function for the timber being processed. The function can be engaged for each shortwood assortment (Assortment marking).

Depending on the accessories the harvester head is equipped with, the system allows you to use two or three marking colors and their combinations.

If the machine is equipped with the optimization function, it is also possible to use an automatic marking function for log lengths and diameters within each timber assortment (Log marking).

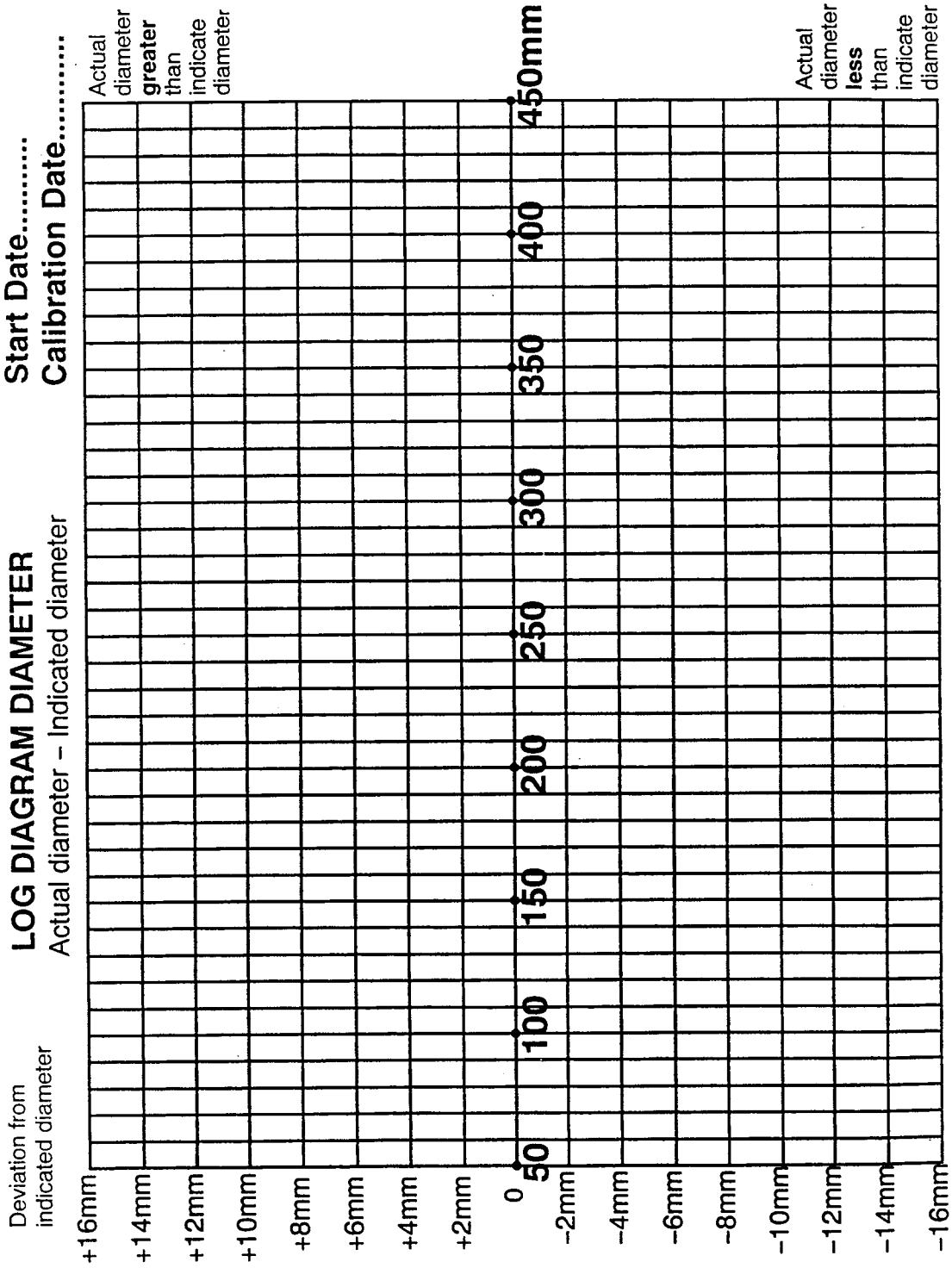
Before felling the tree it is also possible to manually engage the color marking function.

The color pump can also be forced by keeping the desired color key pressed, after which color will be injected at approximately two second intervals.

This feature can be used to mark logs lying on the ground or to bleed the color marking system. When the system has been started, the forcing feature only works after acquitting the program by pressing the head open button.

C7. Diagrams

C7.1 Log diagram diameter

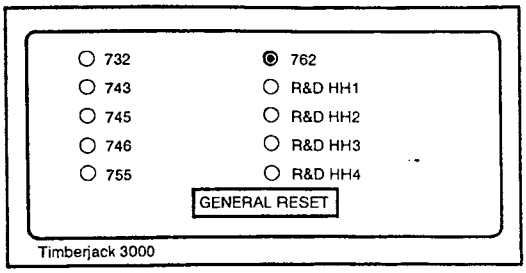


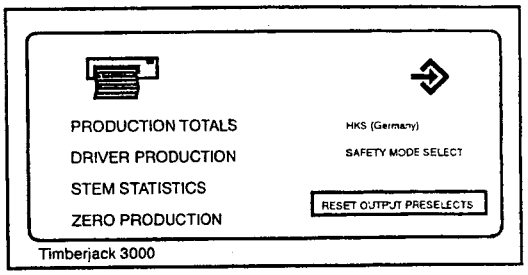
C10.2 Default settings, reset values

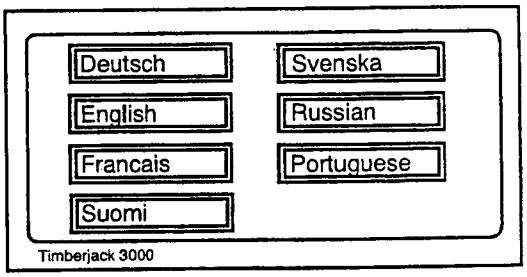
After carrying out operations such as loading software, it is important to follow the correct sequence of default settings and reset values.

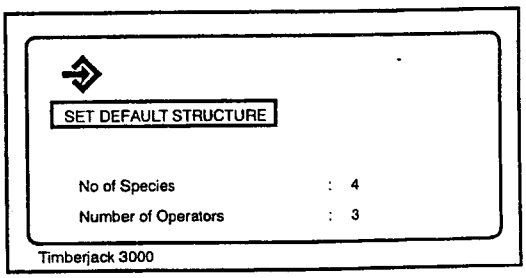
NOTICE! ***Follow the steps in their correct order.***

1. Select the harvester head type and do a general reset.
2. Reset the default printer settings (Output preselects).
3. Select the language.
4. Set the default structure for recording.

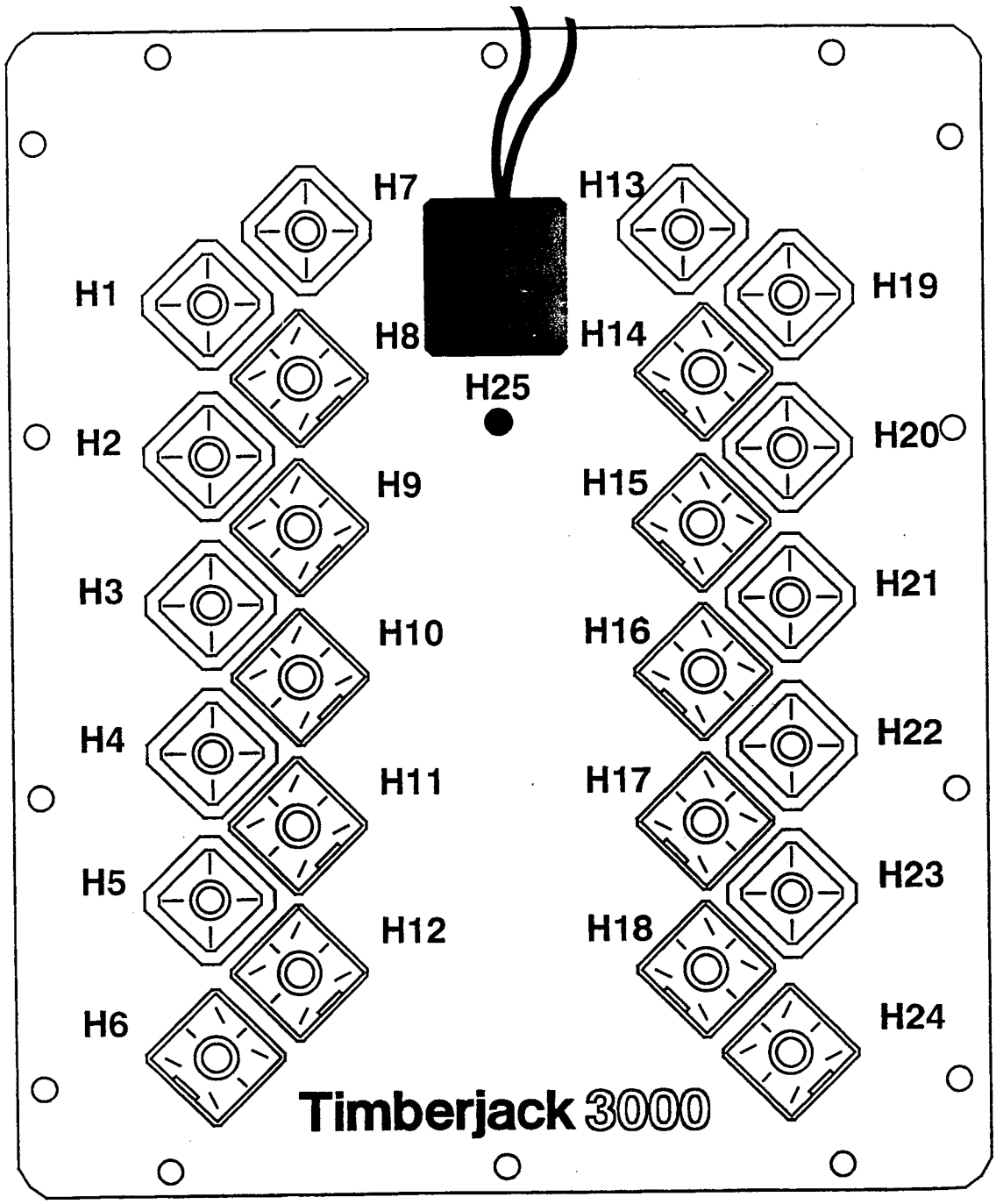






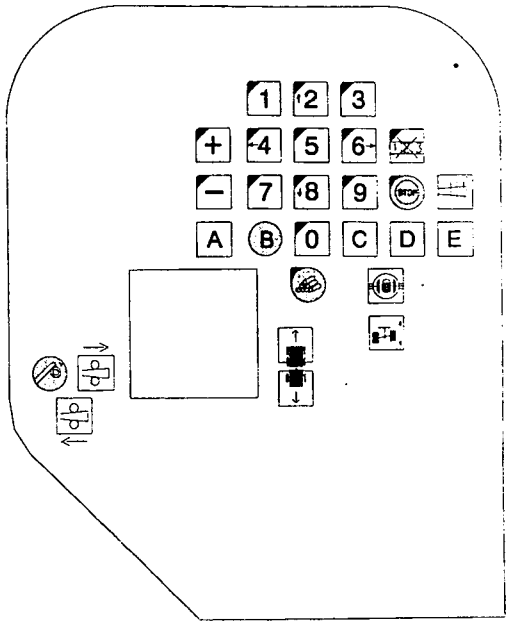


HHM


H7
H13
H1
H19
H8
H14
H25
H2
H20
H9
H15
H3
H21
H10
H16
H4
H22
H11
H17
H5
H23
H12
H18
H6
H24
Timberjack 3000

WARNING

Make sure the area around the head is clear when running the knife curve – the limbing tool will open and close.



The curve shown on the display should appear relatively smooth and there should be no straight lines.

C13.3.2 Start position

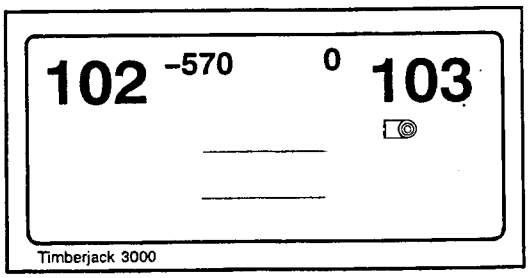
The correct start position of the sensors is checked with closed knives.

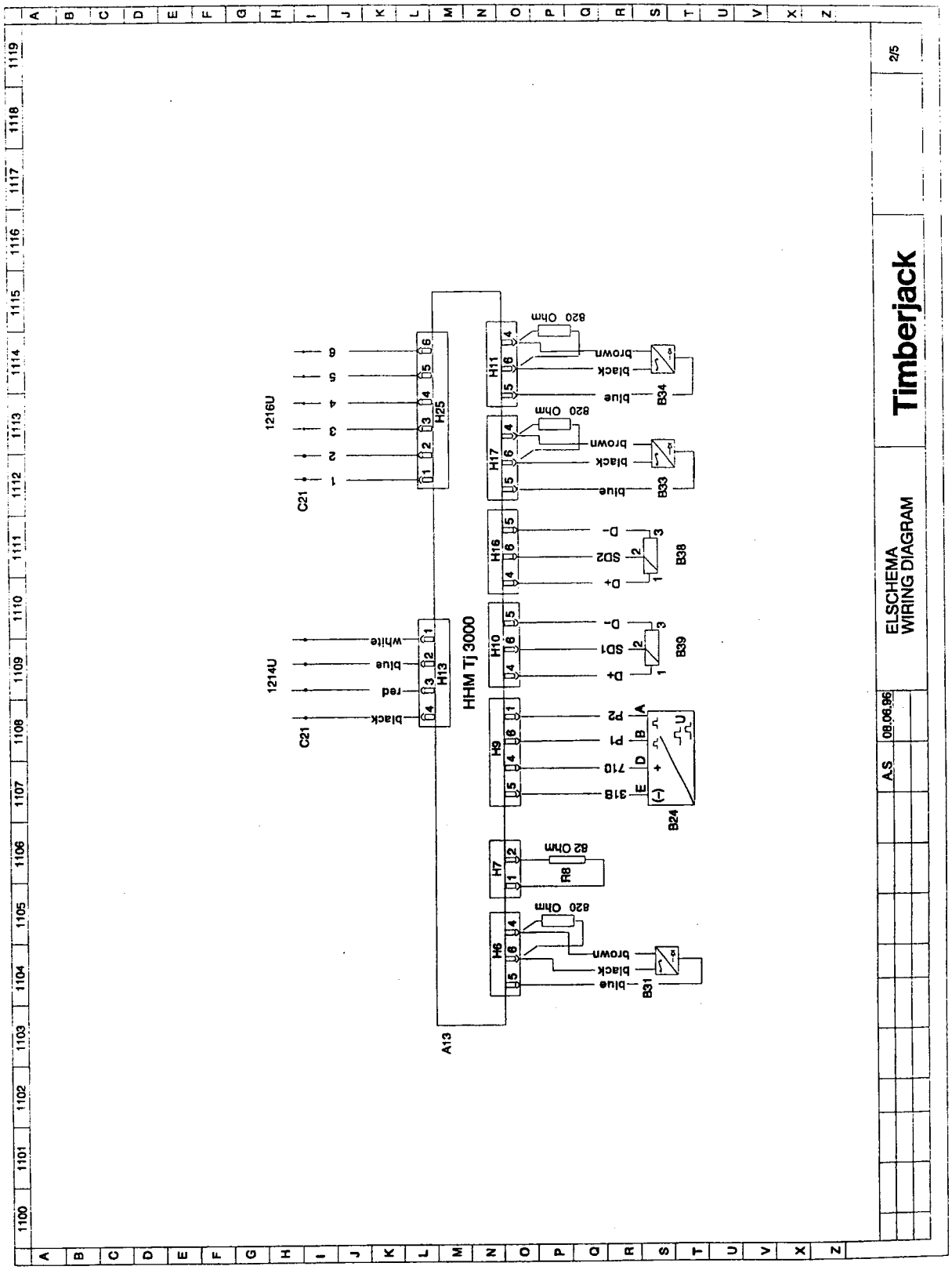
In operating mode, type the number 19 385 on the numeric keypad on the right panel.

You will then see two numbers in large type, and the rest of the display continues to show the operating mode.

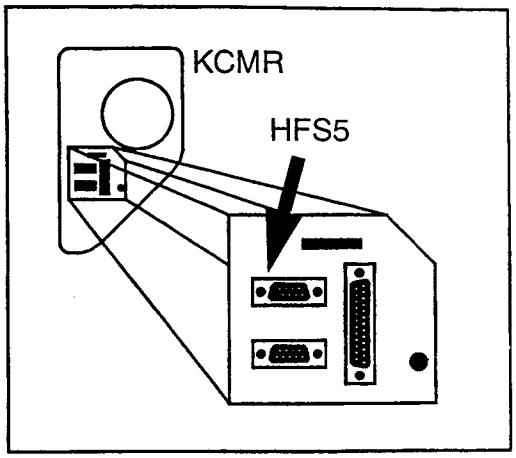
With the knives closed, the values should be approx. 100 with all the head types.

This checking can not be done on 'Scotch mode' levels 1 or 2.

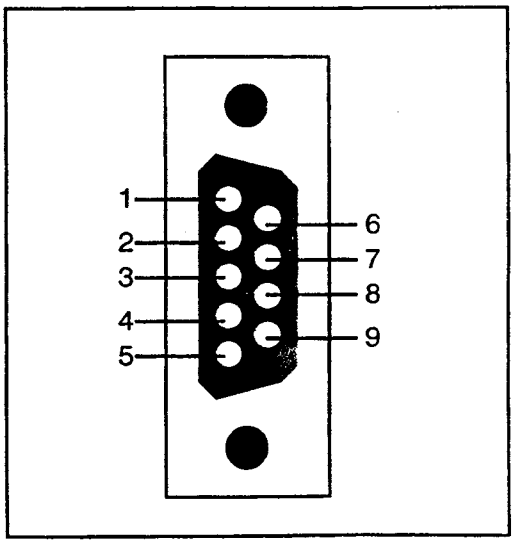



Timberjack
ELSCHEMA
WIRING DIAGRAM
2/5
A.S
08.06.96
HHM Tj 3000
A13
C21
1216U
1214U
H25
H13
H11
H17
H16
H10
H9
H7
H6
B34
B33
B38
B39
B24
B31
R8
820 Ohm
82 Ohm
brown
black
blue
white
red
D-
SD2
D+
SD1
P2
P1
710
318

3. Check that all connectors on the PSU, MCM, KCML and KCMR are secured firmly with both screws tightened, and that they are straight.
4. Check that the plug, D-sub, is secured firmly in the HFS 5 connector on the KCMR.
5. Check that the Joystick connector is secured correctly on the KCML and KCMR.
6. Check the power supply to the KCML and KCMR. Power supply is indicated by the LED, which should be flashing.
7. If you suspect that there is some fault in any of the cables, between the PSU and the KCML or between the KCML and KCMR, you should first disconnect all cables from the KCML and KCMR so that the keypads are not damaged. Then you should take a reading on each pin individually in the cable to see that the connectors are not broken.
8. Check the function of the CAN network by taking a measurement in the P8 contact device on the PSU. You can measure the resistances here between the pins:



7 and 8	here you should have approx. 82 Ω
2 and 3	here you should have approx. 82 Ω

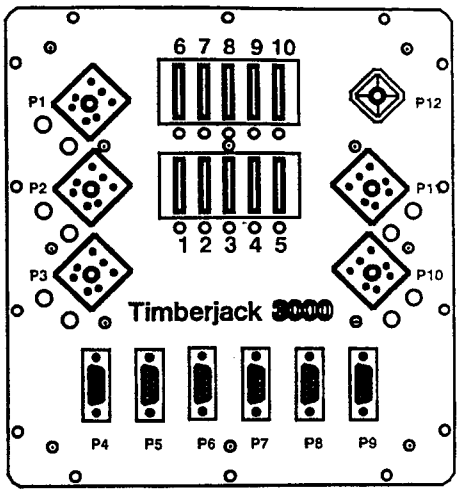


4. Fuse 5 or 7 in the PSU has blown (fault associated with MCM and CAN). See also Group C11 Fuses in the PSU
5. Fault in CAN cable or connector between the PSU and DM (display module)
6. Internal CAN fault in the DM
7. Fault in power supply to the CAN bus from the PSU, see also no. 4, fuse 5
8. Short circuit in the CAN bus

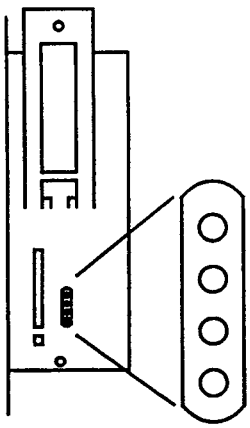
It is a good idea to start by checking the LEDs on the MCM unit. See Group B7.2.2.

If none of the LEDs lights up, the most likely explanation is a lack of power to the MCM or an internal fault. Check fuse number 7 for the 24 V supply to the MCM. See Group C11 Fuses in the PSU.

If the power supply is working properly, there is an internal fault in the MCM.



PSU

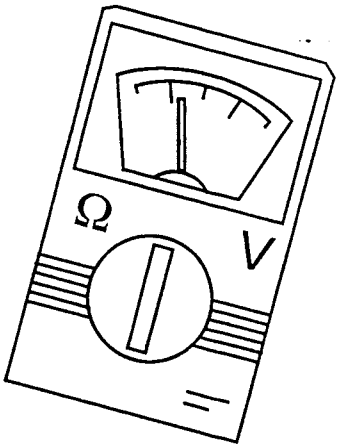


C23.2 Machine voltage high

This message is displayed when the voltage in the electrical system of the machine is too high.

This may be because the charging regulator is faulty, the cable to the batteries is faulty or the main power switch is faulty.

When you see this message you should immediately locate the fault by working through the above items.



C23.3 Diameter ref. low voltage

This message is displayed when the voltage to the diameter sensors, as measured by the HHM, is too low. The voltage should normally be 5 V.

The message is likely to be caused by a faulty connector, cable or sensor. The HHM itself could also be faulty.

Within the HHM, both sensors are supplied together, so that the Tj 3000 is unable to determine which side is causing the error.

When you see this message you should check all the above possible causes. You should also measure the voltage from the HHM.

If you do not solve the problem there is a possibility that the diameter measurements will be incorrect.