



OPERATION MANUAL



SJ824/1026/1032/1424/1432/1832

AC MACHINE

SWU04+SIM02 (1992-2002)

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PREFACE

This precision surface grinding machine is used for surface grinding of metallic/non-metallic components and is produced in conformity with the provisions of the Council Directive of 14th June 1989 on the approximation of the laws of the EEC Member States relating to machinery (89/392/EEC) with supplementing Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.

Correct installation by instructed personnel - mechanically and electrically - before use of the surface grinding machine is of critical importance. Follow the instructions carefully and proceed in the order as described in this manual.

The surface grinding machine must only be operated by personnel instructed in the use hereof.

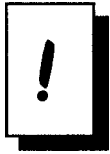
Attention to the rotating grinding wheel as well as to all moving parts of the machine must always be paid by the operator of the machine.

The operator must always carry protective glasses when operating the machine.

Any amendment made on this surface grinding machine without our approval will make our fulfilment of the EC-Declaration of Conformity void.

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Chapter 1, Introduction



Correct installation before use of the surface grinding machine is of **critical importance**. Follow the instructions carefully and proceed in the order shown in Chapter 5.

1.1 The operation manual

This manual is primarily intended for use by the operator responsible for the daily operation of the grinding machine. The manual is valid for software version 1.4.0 and higher versions. It is organized as follows:

The daily operation is described in chapters 2, 3 and 4. They give a brief **description** of the machine controls and a more thoroughly **functional description** of the surface grinder, followed by an **example** of a grinding job.

This manual also includes description of subjects, which are not considered as the daily use of the machine. These special functions including **installation**, **maintenance** and **trouble shooting** are described in the chapters 5, 6 and 7.

Chapter 8 includes an outline of the **technical specifications** of the surface grinder.

The appendix includes **illustrations**, **electrical description** and **machine test sheet**.

1.2 The surface grinding machine

The surface grinding machine consists of the following main parts:

- Machine base
with table and cross saddle.
- Column
with wheelhead and dresser.
- Hydraulic power station
with pump and magnetic valves.
- Coolant tank
with pump.
- Control panel box
with keyboard, displays, handwheel and emergency stop.
- Electrical cabinet.
- Machine control.
- Extra equipment,
for instant magnetic chuck, frequency converter, coolant filter and exhausting system.

1.3 Definition of axis

The linear movements of the machine take place by the following 5 axis:

- **V-axis**
Movement of the dresser diamond.
Positive direction away from the wheel.
- **W-axis**
Hydraulic movement of the dresser.
- **X-axis**
Longitudinal table movement.
Positive direction to the right.
- **Y-axis**
Vertical movement of the wheelhead.
Positive direction away from the table surface.
- **Z-axis**
Cross saddle movement.
Positive direction against the operator.

Chapter 2, Control elements

This section describes the control elements, which are directly accessible by the operator.

To some of these elements a function is attached, that is fully described in Chapter 3.

2.1 Control panel

2.1.1 Display

See drawing in Appendix A.1.

The control system can be set to work in metric or inch units. See Chapter 5, Configuration. The values shown in the displays depend on this setting.



Wheel speed

Metric and
Inch: 15 - 35 m/Sec.

Shows the wanted wheel speed.
The wheel speed is adjusted automatically when the position of the dresser diamond is changed, for instant by dressing.
Frequency converter must be installed (extra equipment).



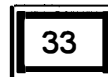
Cross feed

Metric: 00 - 20 mm
Inch: 0.0 - 0.8"
(Only for 824)

Metric: 00 - 30 mm
Inch: 0.0 - 1.2"
(Only for 1026 - 1832)

Shows the wanted intermittent cross feed.
To be used only for surface grinding with intermittent cross feed.

On some machines a special version of the cross feed can be selected, thus changing the meaning of the display readout (Extra equipment).



Cross speed

Metric: 00 - 99 x10 mm/min.
Inch: .00 - .32 x10 feet/Min.
Note. The decimal point is omitted when inch-unit is chosen.

Shows the wanted continuous cross feed.
To be used only for surface grinding with continuous cross feed.

46

Holding power, magnetic chuck

Metric and
Inch: 1 - 6

Shows the wanted holding power for the magnetic chuck.

The area corresponds to 40%-100% of the maximum holding power.

When the chuck is turned off the value 0 (zero) is shown.

Magnetic chuck must be installed (extra equipment).

Magnetic chuck must be chosen via switch (See Chapter 5, Configuration).

47

Position display

Metric: 000.000 - 999.999 mm
Inch: 00.00000 - 99.99996"

Primary use:

Shows the position of the selected axis, as follows:

When the **V-axis** is selected the wheel diameter is shown.

The value is calculated on basis of the position of the dresser diamond.

This value *cannot* be reset.

When the **Y-axis** is selected, vertical measurement is shown.

This value can be reset.

When the **Z-axis** is selected, cross measurement is shown.

This value can be reset.

Secondary use:

Presentation of messages for the operator and switch information.

31

Summation display

Metric: 0.000 - 9.999 mm
Inch: 0000 - 9996 100th

Before execution of an automatic cycle this display shows the total grinding area. If fine grinding is installed (extra equipment), the total grinding area is the sum of the grinding areas for coarse and fine.

During execution of an automatic cycle this display shows how much is ground off the workpiece.

34

Grinding area, coarse

Metric: 0.000 - 9.999 mm
Inch: 0000 - 9996 100th

Before execution of an automatic cycle this display shows how much is to be ground off the workpiece during coarse grinding. During execution of an automatic cycle this display continuously shows the remaining value to be ground off the workpiece in the coarse grinding area.

35

Downfeed, coarse

Metric: 01 - 99 μ
Inch: 04 - 96 100th

Shows the wanted downfeed value for coarse grinding in an automatic cycle.

36**Grinding area, fine**

Metric: 00 - 99 μ
Inch: 00 - 96 100th

Before execution of an automatic cycle this display shows how much is to be ground off the workpiece during fine grinding. During execution of an automatic cycle this display continuously shows the remaining value to be ground of the workpiece in the fine grinding area.

38**Number of sparkouts**

Metric and
Inch: 0 - 9 passes

Before execution of an automatic cycle this display shows how many sparkout passes are to be performed. If the value is zero no sparkouts will take place. During execution of an automatic cycle this display shows how many sparkout passes are still to be performed.

37**Downfeed, fine**

Metric: 1 - 9 μ
Inch: 4 - 8 100th

Shows the wanted downfeed value for fine grinding in an automatic cycle.

39**Dressing interval, coarse**

Metric: 000 - 200 μ
Inch: 000 x 800 100th

Shows how much is to be ground off the workpiece between each dressing of the wheel. Is used during coarse grinding in an automatic cycle.

If the value is zero only one dress will take place. This will be performed before start of the coarse grinding.

41**Dressing interval, fine**

Metric: 00 - 20 μ
Inch: 00 - 80 100th

Shows how much is to be ground off the workpiece between each dressing of the wheel. Is used during fine grinding in an automatic cycle.

If the value is zero only one dress will take place. This will be performed before start of the fine grinding.

40**Diamond feed for dressing, coarse**

Metric: 00 - 30 μ
Inch: 00 - 96 100th

Shows the wanted diamond feed value during coarse grinding in an automatic cycle.

If the value is zero no dresses will take place during coarse grinding.

42**Diamond feed for dressing, fine**

Metric: 0 - 9 μ
Inch: 0 - 8 100th

Shows the wanted diamond feed value during fine grinding in an automatic cycle.

If the value is zero no dresses will take place during fine grinding.

43

Coolant in automatic cycle

Shows whether coolant shall be turned on and off automatically in an automatic cycle.

"1" (In) means "Yes"

"0" (Out) means "No"

- -

45

Automatic return to starting position

Shows whether the wheelhead/ wheel shall return to starting position when parking in an automatic cycle.

"1" (In) means "Yes"

"0" (Out) means "No"

44

Exhausting in automatic cycle

Shows whether Dust extractor/ Aquaseparator shall be turned on and off automatically in an automatic cycle.

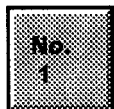
"1" (In) means "Yes"

"0" (Out) means "No"

Dust extractor/Aquaseparator must be installed (extra equipment). Exhausting in automatic cycle must be installed (extra equipment).

2.1.2 Keyboard

See drawing in Appendix A.1.

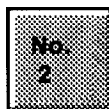


Start

Starts manual grinding or automatic cycle. This includes a.o. table movement, cross movement and execution of an automatic cycle. See also Chapter 3, Start. A LED is lit to indicate that the start-function is selected.

Conditions for activating the Start-function:

- If automatic cycle is selected the wheel motor must be started.
- If magnetic chuck is installed (extra equipment), it must be turned on or not selected in the configuration.
- Wheel dressing must not be in progress.

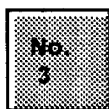


Stop

Stops manual grinding or automatic cycle. This includes a.o. table movement, cross movement and execution of an automatic cycle. See also Chapter 3, Stop. A LED is lit to indicate that the stop-function is selected.

Conditions for activating the stop-function:

- None



Automatic cycle

Selects automatic cycle on or off. See also Chapter 3, Automatic cycle.

A LED is lit to indicate that an automatic cycle is selected.

Conditions for selecting automatic cycle on or off:

- Stop-function must be selected and executed.
- Parking must not be in progress.



Slot grinding

&



Area grinding with intermittent cross feed

&



Area grinding with continuous cross feed

Selects grinding mode. See also Chapter 3, Manual grinding and Chapter 3, Automatic cycle. A LED is lit to indicate the selected grinding mode.

Conditions for switching between slot grinding and area grinding:

- Stop-function must be selected and executed.
- Parking must not be in progress.
- Automatic cycle must not be in progress.vikling.

Conditions for switching between area grinding with intermittent or continuous cross feed:

- Stop-function need not to be selected.
- Parking may be in progress.
- Automatic cycle may be in progress.

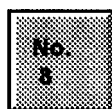


Parking

Starts manual parking of the table and the cross saddle. See also Chapter 3, Manual parking. A LED is flashing to indicate that the parking is in progress.

Conditions for activating manual parking:

- Wheel dressing must not be in progress.



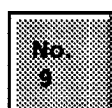
Coolant

Turns the coolant on and off. A LED is lit to indicate that coolant is on.

When coolant filter is installed (extra equipment), it will be turned on and off simultaneously.

Conditions for turning coolant on:

- Dust extractor (extra equipment) must not be on.
- Aquaseparator (extra equipment) may be on.



Exhausting

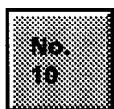
Turns the exhausting system on and off.

A LED is lit to indicate that exhausting is on.

Dust extractor or Aquaseparator must be installed (extra equipment).

Conditions for turning the exhausting system on:

- If a dust extractor (extra equipment) is used coolant must be off.
- If an aquaseparator (extra equipment) is used coolant may be on.

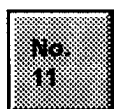


Wheel motor

Turns the wheel motor on and off.
A LED is lit to indicate that the wheel motor is on.

Conditions for stop of wheel motor:

- Stop-function must be selected and executed.
- Parking must not be in progress.
- Wheel dressing must not be in progress.

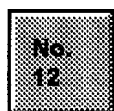


Disengagement of magnetic chuck

Turns off and demagnetizes the magnetic chuck.
A LED indicator flashes during the demagnetizing.
Magnetic chuck must be installed (extra equipment).

Conditions for disengagement of magnetic chuck:

- Stop function must be selected and executed.
- Parking must not be in progress.

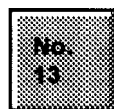


Engagement of magnetic chuck

Turns on and magnetizes the magnetic chuck.
When the magnetic chuck is engaged the holding power is shown in the display.
Magnetic chuck must be installed (extra equipment).

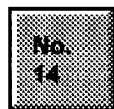
Conditions for engagement of magnetic chuck:

- Demagnetizing must not be in progress.



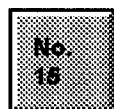
x1

&



x10

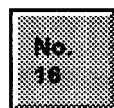
&



x100

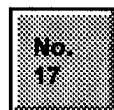
Select feed range for handwheel.
A LED is lit to indicate the range selected.

These keys are further described in Chapter 2, Handwheel.



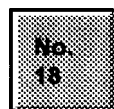
V-axis

&



Y-Axis

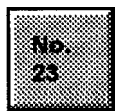
&



Z-Axis

Selects the axis for the hand-wheel.
A LED is lit to indicate the axis selected.

These keys are further described in Chapter 2, Handwheel.

**X-axis to the right**

&

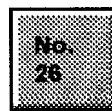
**X-axis to the left**

These keys will operate the table in manual jog to the right or left, respectively. The keys are marked with an "X" above the keys. Table speed is adjusted by means of the handle for regulation of the table speed.

See Chapter 2, Control elements on the machine.

Conditions for table movements in manual jog depend on the actual situation.

See Chapter 3, Manual movements, Manual grinding and Automatic cycle.

**Z-axis, back**

&

**Z-axis, forward**

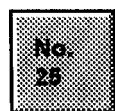
These keys will operate the cross saddle in manual jog back and forward, respectively. These keys are marked with a "Z" to the right of the keys.

Conditions for cross movement in manual jog depend on the actual situation.

See Chapter 3, Manual movements, Manual grinding and Automatic cycle.

**Y-axis, upwards**

&

**Y-axis, downwards**

These keys will operate the wheel-head in manual jog upwards and downwards, respectively. These keys are marked with a "Y" to the left of the keys.

Conditions for vertical movement in manual jog depend on the actual situation.

See Chapter 3, Manual movements, Manual grinding and Automatic cycle.



Wheel dressing (DRESS)

Starts the wheel dressing. This key can be activated both in or out of an automatic cycle. See Chapter 3, Manual dressing and Chapter 3, Dressing in automatic cycle. The LED indicator flashes during dressing.

Conditions for activation out of an automatic cycle:

- Stop-function must be selected and executed.
- Parking must not be in progress.

Note. The operator must manually feed the V-axis.

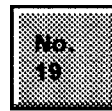
Conditions for activation in an automatic cycle:

- None



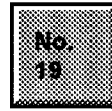
Information

Calls forward and removes switch-information. While switch-information is shown the LED indicator is lit.



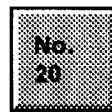
Digit 0

:



Digit 9

Enters a digit into a selected display. See also Chapter 3, Entering parameters.



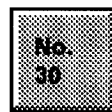
Cursor, up

&



Cursor, right

Selects a display for entering a value. See also Chapter 3, Entering parameters.



Enter

Enters an edited value into a selected display and selects the next display. See also Chapter 3, Entering parameters.

2.1.3 Handwheel

The handwheel (electronic hand pulse generator) is used to move a selected axis manually.

- Selection of axis for handwheel is done by means of the keys **V-axis**, **Y-axis** or **Z-axis**.
- Selection of feed range for the handwheel is done by means of the keys **x1**, **x10** or **x100**.

The feed range shows how far the axis moves when the handwheel is used:

$$\begin{aligned}x1 &= 1\mu / 4 \text{ 100th per graduation} \\x10 &= 10\mu / 40 \text{ 100th per graduation} \\x100 &= 100\mu / 400 \text{ 100th per graduation}\end{aligned}$$

When the handwheel is turned to the right (clockwise) the selected axis will move in its negative direction.

When the handwheel is turned to the left (counter-clockwise) the selected axis will move in its positive direction.

Note that the maximum speed of the axis is limited. This means that, if the handwheel is moved faster than the max. speed of the axis, the distance covered does not correspond to the distance indicated by the handwheel. However, the control panel display will always indicate the correct position of the axis.

Conditions for use of handwheel, selection of axis and feed range depend on the actual situation.

See Chapter 3, Manual movements, Manual grinding and Automatic cycle.

2.1.4 Emergency stop

When the emergency stop switch is pressed it breaks the power supply to all moveable parts of the machine or their belonging circuit.

The emergency stop switch is released by turning it clockwise. After release of the emergency stop the machine is restarted as described in Chapter 3, Turn on the machine.

2.2 Control elements on the machine

See drawing in appendix A.2.

#

Handle for regulation of table speed

This handle enables the operator to adjust the speed of the longitudinal table travel. Set to **red mark** for zero speed and to **green mark** for max. speed.

Note. Max. table speed can only be expected when the oil has attained its proper working temperature.

#

Handle for regulation of dresser speed

This handle is used to fine-adjust the speed of the dresser cross movement.

With the handle at **1** the speed is 100 mm/Min.

With the handle at **3** the speed is 300 mm/Min.

#

Table stop dogs

Indicate the reversal positions for the longitudinal table travel on right and left side, respectively.

#

Cross saddle stop dogs

Indicate the reversal positions for the cross saddle, back and forward, respectively.

Chapter 3, Functional description

3.1 Power on

To turn on the machine:

- Operate the main switch on the electrical cabinet.
Note. Allow at least 5 sec. before a restart.
 - Information about machine number, software-version and hardware-version appears on the control panel.
 - If the message "Release E.stop" appears on the control panel, then release the **emergency stop**.
 - Wait till the message "Press START" appears on the control panel.
 - **Activate START.**
The control activates the power supply to the machine.
The messages "Powering up" and "Homing" appears on the control panel .
 - Wait till the control has moved the V-axis to its reference position and the positiondisplay starts flashing.
The value shown is the wheel diameter that corresponds to the position of the V-axis at the starting of the machine.
 - If the position shown corresponds to the actual wheel diameter, then activate **Enter**.
The control then automatically moves the V-axis back to the position indicated

or

Move the V-axis by means of the handwheel till the dressing diamond has contact with the periphery of the wheel. It is possible to start the wheel motor and to activate the dresser cross movement.
When the V-axis is in its place then activate **ENTER**.
- After an emergency stop or an alarm released with the ENTER key, a restart is made as follows:
- Make sure that the **emergency stop** is released.
 - Wait till the message "Press START" appears on the control panel.
 - **Activate START.**
The control activates the power supply to the machine.
The messages "Powering up" and "Homing" appears on the control panel .

3.2 Entering parameters

Via the keyboard the grinding parameters shown in the displays can be changed. This is done, as follows:

- **Activate Cursor up, Cursor right or Enter.**
The display selected by the cursor for entering of parameters will flash.
- **Select another display by means of the cursor keys, Cursor up, Cursor right or Enter.**
The display selected will flash.
- **Enter the wanted value with the digit keys 0 - 9.**
Note. Entering of digits into the display can be done continuously.
An incorrect value can be deleted by overwriting it with the correct value, eventually with preceeding zeros.
- When the wanted value is shown in the display, activate **Enter**.

If the value is valid it will be stored in the control.
The new value will become active immediately and the next display will be selected automatically.

If the value is *not* valid it will be rejected.
The nearest valid value will automatically be entered into the display and the display remains selected.
- When the entering has been completed, the selected display will shortly after stop flashing. The cursor will remain at this display, but is "invisible".

3.3 Manual functions

Some of the manual functions are simple turn on/off functions. Other of the manual functions include a certain part of automatic, but are called manual, because they are activated manually by the operator.

Some of the functions are also briefly described in Chapter 2, Keys.

3.3.1 On/off functions

The on/off functions are the easiest way to operate the machine. These functions include:

- Wheel motor
- Engagement of magnetic chuck.
Magnetic chuck must be installed (extra equipment).
- Disengagement of magnetic chuck.
Magnetic chuck must be installed (extra equipment).
- Coolant
When coolant is on, the coolant filter, will also be on (extra equipment).
- Exhausting
Dust extractor or Aquaseparator must be installed (extra equipment).

3.3.2 Start

This function starts manual grinding or an automatic cycle.

When **Start** is activated, the following is performed automatically:

- The cross movement is started if area grinding is selected.
- The table movement is started.
- Execution of a grinding program is started if automatic cycle is selected.
- Feed range x1 is selected.
- Coolant is started if automatic cycle and coolant in automatic cycle are selected. Coolant in automatic cycle must be installed (extra equipment).
- Exhausting is started if automatic cycle and exhausting in automatic cycle are selected. Dust extractor/Aquaseparator must be installed (extra equipment). Exhausting in automatic cycle must be installed (extra equipment).

3.3.3 Stop

This function stops manual grinding or an automatic cycle.

When **Stop** is activated the following is performed automatically:

- Cross movement is stopped.
- Table movement is stopped.
- Execution of a grinding program is temporarily stopped, if automatic cycle is selected.
- Coolant is stopped, if automatic cycle and coolant in automatic cycle are selected.
- Exhausting is stopped, when automatic cycle and exhausting in automatic cycle are selected.
Dust extractor/Aquaseparator must be installed (extra equipment).
Exhausting in automatic cycle must be installed (extra equipment).
- If wheel dressing is in progress, this will be completed.

3.3.4 Manual dressing

Here only manual dressing out of cycle will be described. See also Chapter 3, Dressing in cycle.

Note. The operator must manually feed the V-axis before the dressing is activated.

When **Dressing** (DRESS) is activated (and automatic cycle is not selected) the following is performed automatically:

- Coolant to dresser is opened.
Note. The coolant pump is *not* started automatically.
- Dresser diamond is moved once across the wheel.
- Coolant to dresser is closed.
Note. The coolant pump is *not* stopped automatically.
- Compensation for the changed wheel diameter.

Compensation for the changed wheel diameter means that the Y-axis is moved a distance towards the table surface that corresponds to the diamond feed for dressing.

How much to compensate is determined as follows:

- The position of the V-axis after the latest dress is used as reference.
- The diamond feed is the difference between the position of the V-axis before the dressing and the position of the V-axis after the latest dressing.
- If the diamond feed is more than 30μ or carried out in the positive direction of the V-axis no compensation will take place.
- If the V-axis is moved while the dressing is in progress no compensation will take place.

Automatic monitoring is done to ensure that the wheel diameter does not become less than permitted.

3.3.5 Manual parking

When **parking** is activated the following will be performed automatically:

- Stop-function will be executed if the start-function is selected.
- Wheelhead will be moved to starting position for the automatic cycle, if automatic return to starting position and automatic cycle are selected.
- The table is moved to the parking position.
The magnetic chuck (extra equipment) must be engaged or not selected in the configuration.
- The cross saddle is moved to the parking position if area grinding is selected.
The magnetic chuck (extra equipment) must be engaged or not selected in the configuration.

3.4 Manual movements

Manual movements are characterized by the following:

- Stop-function is selected.
 - Automatic cycle is not selected
- or
- Automatic cycle is selected, but not yet started (See also Chapter 3, Automatic cycle).

Manual movements are the easiest form of operating the axis of the machine. The fundamental movements can be made manually by the handwheel or continuously using manual jog.

Conditions for use of handwheel for manual movements:

- The x100 feed range can only be used, when the magnetic chuck (extra equipment) is engaged or not selected in the configuration.
- Parking must not be in progress.

Conditions for activating the manual jog:

- The magnetic chuck (extra equipment) must be engaged or not selected in the configuration.
- Wheel dressing must not be in progress when the X- or Z-axis are to be moved.
- Parking must not be in progress.

Note. When operating the Y-axis in manual jog, pay attention to the coasting (freerun) of the vertical rapid feed motor.

3.5 Manual grinding

Manual grinding is characterized by the following:

- Start-function is selected.
- Automatic cycle is not selected.

The following three grinding modes can be selected:

- Slot grinding.
- Area grinding with intermittent cross feed.
- Area grinding with continuous cross speed.

Table- and saddle movement

The table movement takes place automatically.

When **slot grinding** is selected the cross saddle will be locked electrically. Displays for cross feed and cross speed are turned off.

When **area grinding with intermittent cross movement** is selected the cross feed will take place at every table reversal. The feed is indicated by the parameter cross feed.

Display for cross feed is turned on and the value can be changed.

Display for cross speed is turned off.

When **area grinding with continuous cross speed** is selected the cross saddle is moved with a continuous speed. The speed is indicated by the parameter cross speed.

Display for cross speed is turned on and the value can be changed.

Display for cross feed is turned off.

Vertical feed

The vertical feed is made manually by the handwheel. Further it is possible to move the Y-axis using manual jog.

Conditions for using the handwheel for the Y-axis during manual grinding:

- Y-axis must be selected.
- x100 feed range can only be used, when the magnetic chuck (extra equipment) is engaged or not selected in the configuration.

Conditions for activating manual jog on the Y-axis during manual grinding:

- The magnetic chuck (extra equipment) must be engaged or not selected in the configuration.

Note. When operating the Y-axis in manual jog pay attention to the coasting (freerun) of the vertical rapid feed motor.

Cross feed

For **face grinding**, cross feed can manually be provided to the saddle by means of the handwheel.

Conditions for use of handwheel in the Z-axis during manual grinding:

- Slot grinding must be selected.
- Z-axis must be selected.
- x100 feed range must not be selected.

Dressing

Manual dressing can be performed.

3.5.1 Parameters for manual grinding

The feed of the cross saddle during area grinding is indicated by the following displays (as per Chapter 2, Display):

- Cross feed
- Cross speed

The parameters can be set as described in Chapter 3, Entering parameters.

3.5.2 Preparations

The following should be performed before manual grinding can be activated:

- Set **stop dogs** for the table movement.
- Set **handle for regulation of the table speed**.
- Select **grinding mode**.
- Set **position of the cross saddle**, if slot grinding is selected.
- Set **stop dogs** for cross saddle, if area grinding is selected.
- Set eventually the wheelhead/wheel to starting position for grinding.
- Set **parameters**.
- Turn on, if desired, the **coolant and exhausting** systems.

3.5.3 Execution

Start manual grinding by activating **Start**.

Give manual feed to the Y-axis by means of the handwheel.

If slot grinding is selected, the Z-axis can be selected and the cross saddle moved by the handwheel. This is used for face grinding.

On the control panel the position display is currently updated.

The operator has the following possibilities to influence the course of manual grinding:

- To set the handle for **regulation of table speed** and the two **stop dogs** for the table travel.
- To set the two **stop dogs** for the cross saddle travel.
- To change **grinding mode**.
- To change **parameters**. This is done by entering new values for the parameters.
- To turn on/off the **coolant**.
- To turn on/off the **exhausting**. Dust extractor/Aquaseparator must be installed (extra equipment).
- To interrupt manual grinding by activate **STOP**.
- To interrupt manual grinding by activating **Parking**. This will automatically activate the stop function.

When the stop function has been selected the operator has the following possibilities:

- To perform **manual dressing**. See Chapter 2, Manual dressing.
- To disengage the **magnetic chuck**. Magnetic chuck must be installed (extra equipment).
- To stop the **wheel motor**.
- To perform manual **parking**.

3.6 Automatic cycle

Automatic cycle is selected by activating the button **Automatic cycle**.

An automatic cycle can consists of the following:

- Coarse grinding.
- Automatic dressing during coarse grinding.
- Fine grinding.
- Automatic dressing during fine grinding.
- Sparkout.

The following grinding modes can be selected:

- Slot grinding.
- Area grinding with intermittent cross feed.
- Area grinding with continuous cross speed.

Table- and cross saddle movement

The table movement takes place automatically.

When **slot grinding** is selected the cross saddle is locked electrically. Displays for cross feed and cross speed are turned off.

When **area grinding with intermittent cross feed** is selected you can distinguish between coarse, fine and sparkout. Fine grinding must be installed (extra equipment).

During **coarse grinding** the cross feed will take place at every table reversal. The feed is indicated by the parameter cross feed.

During **fine grinding** and **sparkout** the cross saddle is moved with a continuous speed. The speed is indicated by the parameter cross speed.

The displays for cross feed and cross speed are both turned on and the values can be changed.

When **area grinding with continuous cross speed** is selected the cross saddle is moved with a continuous speed. The speed is indicated by the parameter cross speed.

The display for cross speed is turned on and the value can be changed. The display for cross feed is turned off.

Vertical feed

The vertical downfeed movement takes place automatically.

For **slot grinding** the downfeed can be selected to take place for every table reversal or every second table reversal. See Chapter 5, Configuration. Vertical feed for every second table reversal must be installed (extra equipment).

During **area grinding** the vertical downfeed will always take place for each cross saddle reversal.

Sparkout

The number of sparkouts are counted in the following way:

- During slot grinding one sparkout corresponds to one pass of the table.
- If vertical feed for every second table reversal is selected one sparkout corresponds to two passes of the table. Vertical feed for every second table reversal must be installed (extra equipment).
- During area grinding one sparkout corresponds to one pass of the cross saddle.

Dressing

Automatic dressing in the coarse area can be programmed.

Automatic dressing in the fine area can also be programmed.

Extra dresses during coarse grinding is possible.

Extra dresses during fine grinding is also possible.

For the sake of clarity the functions regarding wheel dressing are separately described in Chapter 3, Dressing in automatic cycle.

3.6.1 Parameters for grinding

The feed of the cross saddle during area grinding is indicated by the following displays (as per Chapter 2, Display).

- Cross feed
- Cross speed

The grinding program consists of the following parameters, and are shown only when automatic cycle is selected (as per Chapter 2, Display):

- Summation display
- Grinding area, coarse
- Downfeed, coarse
- Grinding area, fine
- Downfeed, fine
- Number of sparkouts.

If a value is entered into the summation display, the total grinding area will automatically be divided between coarse and fine.

If a value is entered into one of the grinding areas of coarse or fine, the summation display will automatically be updated.

The following settings for automatic cycle will be shown only when automatic cycle is selected, and when the functions are installed (extra equipment) (as per Chapter 2, Display):

- Coolant in automatic cycle
- Exhausting in automatic cycle
- Automatic return to starting position

The parameters can be set as described in Chapter 3, Entering of parameters.

3.6.2 Preparations

The following should be performed before automatic cycle is activated:

- Set **stop dogs** for table movement.
- Set handle for **regulation of table speed**.
- Select **grinding mode**.
- Set **position of the cross saddle**, if slot grinding is selected.
- Set **stop dogs** for cross saddle travel, if area grinding is selected.
- Set wheelhead to **starting position** for grinding.
- Select **automatic cycle**.
- Set **parameters**.
- Turn on, if desired, **coolant and exhausting** systems.

3.6.3 Execution

Until an automatic cycle is started all manual movements, as described in Chapter 3, Manual movements, can be performed.

Start automatic cycle by activating **Start**.

The execution of the automatic cycle is shown on the control panel, with a current updating of the following displays:

- Summation display
- Grinding area, coarse
- Grinding area, fine
Fine grinding must be installed (extra equipment)
- Number of sparkouts
- Position display

Normally an automatic cycle will be executed without intervention by the operator. The cycle is completed with automatic parking of the table and eventually of the cross saddle. If programmed, automatic return to starting position will take place

The operator has the following possibilities to influence the execution of an automatic cycle:

- To set the handle for **regulation of table speed** and the two **stop dogs** for the table travel.
- To set the two **stop dogs** for the cross saddle travel.

- To change **grinding mode** (only during coarse grinding).
- To change **parameters**. This is done by entering new values for the parameters.
Note. The summation display and the grinding areas for coarse and fine cannot be changed.
- Turn on/off the **coolant**.
- Turn on/off the **exhausting**.
Dust extractor/Aquaseparator must be installed (extra equipment).
- To add additional dresses by activating the **DRESS** key.
See Chapter 3, Dressing in automatic cycle.
- To interrupt an automatic cycle temporarily by activating **Stop**.
- To interrupt an automatic cycle temporarily by activating **Parking**.
This will automatically activate the stop function.

When the automatic cycle is temporarily interrupted the operator has the following possibilities:

- To disengage the **magnetic chuck**.
Magnetic chuck must be installed (extra equipment).
- To stop the **wheel motor**.
- To perform manual **parking**.
- To end an automatic cycle by deactivating automatic cycle.

3.7 Dressing in automatic cycle

Dressing in automatic cycle can be performed **automatically and manually**.

Feed to the dressing diamond is automatically done before every dress.

The dressing diamond is moved once across the wheel.

The operator can adjust the dressing speed using the **handle for regulation of dresser speed**.

3.7.1 Parameters for dressing

The dressing programme consists of the following parameters shown only when automatic cycle is selected (as per Chapter 2, Display):

- Dressing interval, coarse.
- Diamond feed for dressing, coarse.
- Dressing interval, fine.
- Diamond feed for dressing, fine.

3.7.2 Preparations

The following must be performed before start of an automatic cycle:

- Set handle for **regulation of dresser speed**.
- Set parameters.
- Be sure that the position of the dresser diamond corresponds to the periphery of the grinding wheel.

3.7.3 Execution

Dressing in an automatic cycle can be started in the following ways:

- Automatically at the beginning of each grinding area.
 - Automatically when an amount has been ground off the workpiece as indicated by the parameter dressing interval.
 - Manually by activating the **DRESS** key.
- When dressing in an automatic cycle is started, the following will take place automatically:
- Stop of table and saddle movement.
 - Temporary stop of execution of the grinding program.
 - Valve for coolant to dresser is opened. **Note.** The coolant pump is *not* started automatically.
 - Diamond feed for dressing as specified for the grinding area currently active.
 - Dresser diamond is moved once across the wheel.
 - Valve for coolant to dresser is closed. **Note.** The coolant pump is *not* stopped automatically.
 - Compensation for the changed wheel diameter.
 - Start of table and cross movement.
 - Execution of the grinding program continues.

Compensation for the changed wheel diameter means that the Y-axis is moved a distance towards the table surface that corresponds to the diamond feed for dressing.

Chapter 4, Example

The job in this example is to grind 0,125mm (=125 μ) off a workpiece in an automatic grinding cycle as area grinding with intermittent cross feed and automatic dressing of the grinding wheel.

The example is moreover based on the grinding parameters shown on the illustration of the control panel in Appendix A.

Note. It is implied that the extra equipment used in this example is installed.

Introductorily carry out the preparations for automatic cycle (see Chapter 3, Automatic cycle, Preparations) hereunder especially the following:

- Select the grinding mode **area grinding with intermittent cross feed** (key No. 5).
- Place the workpiece on the magnetic chuck and **switch on the chuck** (key No. 12).
- **Start** the table- and saddle movement (key No. 1) and the **wheel motor** (key No. 10).
- Set the **handle for regulation of table speed**.
- Set the **table stop dogs** and the **cross saddle stop dogs** for the desired travel.
- Move the wheelhead to **starting position** for the automatic cycle (touchpoint between wheel and workpiece).
Use **continuous vertical feed** (keys 24 and 25) and or use the **handwheel** for the Y-axis (key No. 17) with an appropriate feed rate (keys 13, 14 and 15).
- **Stop** the table- and saddle movement (key No. 2).
- Select **automatic cycle** (key No. 3).
- Enter values for the grinding programme as shown on the illustration of the control panel in Appendix A (See Chapter 3, Entering parameters).
- **Start wheel motor** (key No. 10).

When **Start** (key No. 1) is activated the control will execute the automatic cycle, as follows:

- The coolant pump will be turned on.
- Before coarse grinding a **coarse-dress** with 10 μ diamond feed will take place. Automatic compensation for the changed wheel diameter will be made by moving the Y-axis 10 μ towards the workpiece.
- **Coarse grinding** with 4 μ downfeed at every reversal of the cross saddle. The cross saddle moves intermittently with a 20mm cross feed.
- For every 45 μ movement in the coarse area, a **coarse dress** with 10 μ diamond feed and compensation will take place.
- Before fine grinding a **fine dress** with 5 μ diamond feed will take place. Automatic compensation for the changed wheel diameter will be made by moving the Y-axis 5 μ towards the workpiece.
- **Fine grinding** with 2 μ downfeed at every reversal of the cross saddle. The cross saddle moves continuously with a speed of 300mm/Min.
- For every 10 μ movement in the fine area a **fine dress** with 5 μ diamond feed and compensation will take place.
- **Sparkout** with 3 passes of the cross saddle. The cross saddle moves continuously with a speed of 300mm/Min.
- The coolant pump is turned off.
- The wheelhead returns to starting position for the automatic cycle. Table and cross saddle move to their parking positions.

The automatic cycle is now completed.

Chapter 5, Installation



The installation of the machine must only be made by **instructed personnel**.

Note: Do not activate any machine movement before all table- and saddleways have been degreased and lubricated!

5.1 Unpacking

The surface grinding machine was carefully packed for shipment to ensure precision working.

It is **vital** to exercise great caution when removing the packing to avoid damage to machine parts.

Unpacking should be performed in the following order:

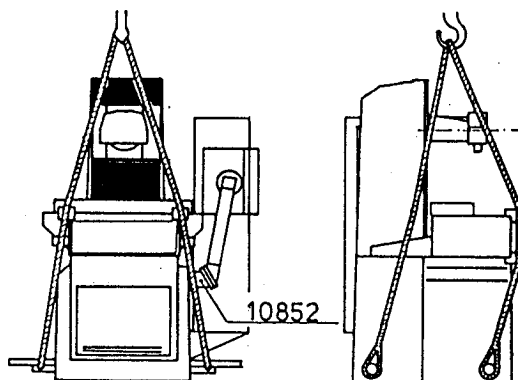
- Remove packing.
- Detach the hydraulic power station, control panel, switchbox, table protection guards, coolant tank and other accessories secured to the bottom of the packing.
- Examine the machine for damage in transit.
- Remove the bolts securing the machine to the bottom of the packing.

5.2 Lifting and installation

Note. The machine should be lifted as shown below. Use two iron rods with a diameter of 1-3/4" and a length of 1100 and 1300mm respectively, and two straps approximately 6 meters long.

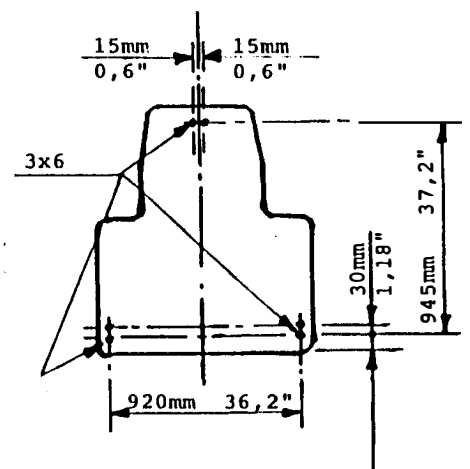
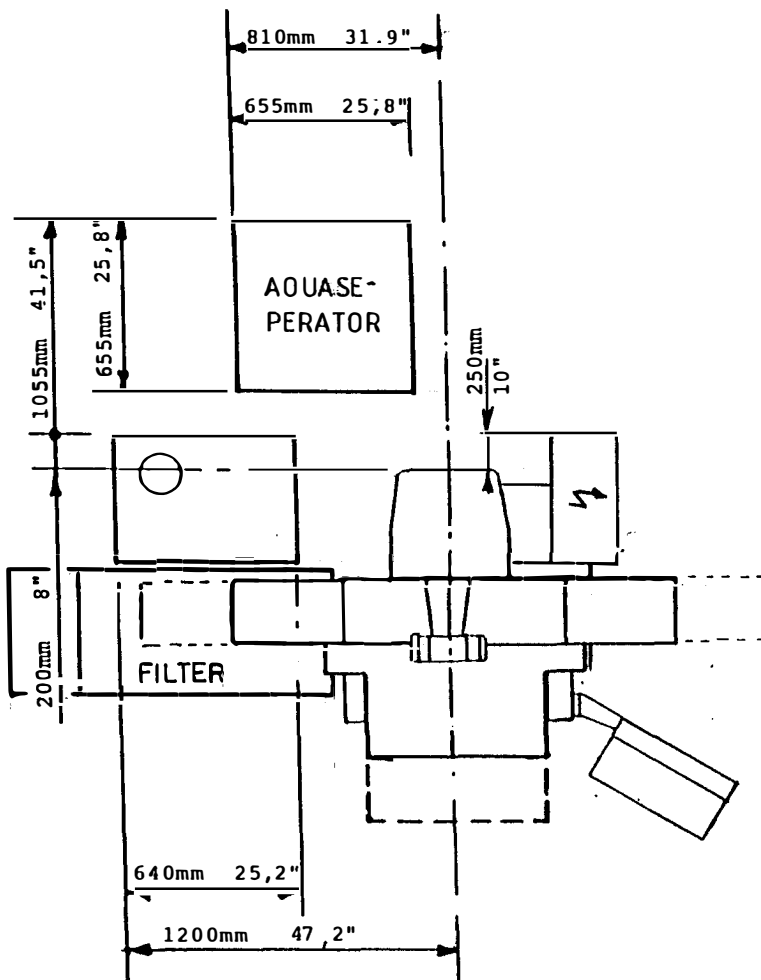
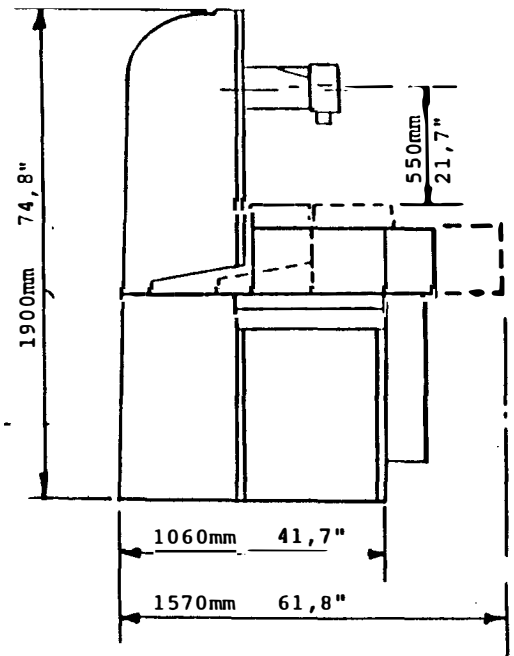
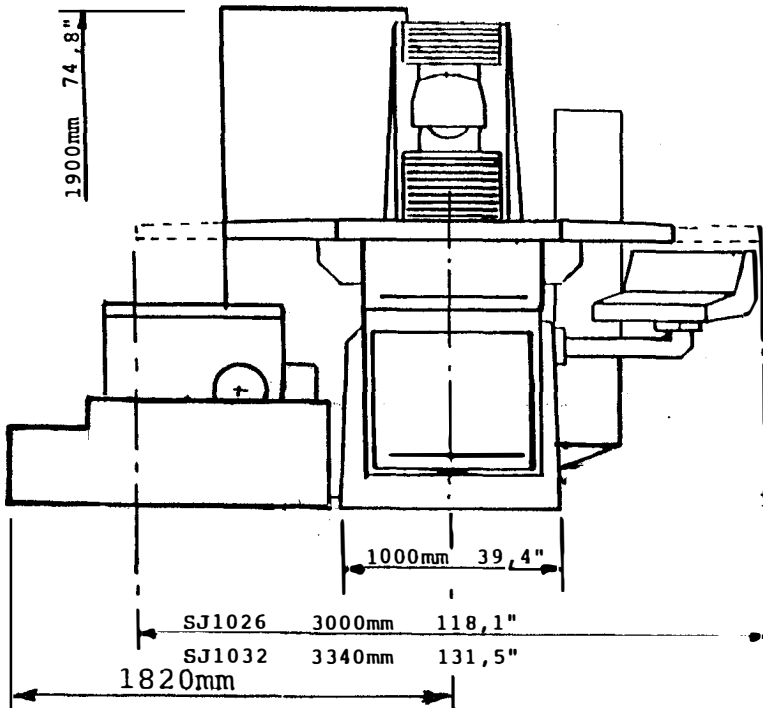
The machine should be installed on a sound, vibrationfree floor. No special bed is needed. Any floor will do, provided it can withstand the weight of the machine without vibrating. See Foundation plan.

- Lift the machine out of the packing and place it on the installation site. Place the **foundation plates** supplied with the machine under the 3 adjusting screws in the machine base.
- Align the machine with the 3 adjusting screws provided in the machine base. To ensure accurate alignment, place a **machine level** on the machined surface of the table. Align the machine first along the **longitudinal table axis** and then along the **transverse axis**. Finally, recheck the **longitudinal alignment**.
- Two additional foundation plates are supplied for installation of models 1424/1432 and 1832. Place these plates under the two centre adjusting screws. Screw in by hand until they just touch the foundation plates.

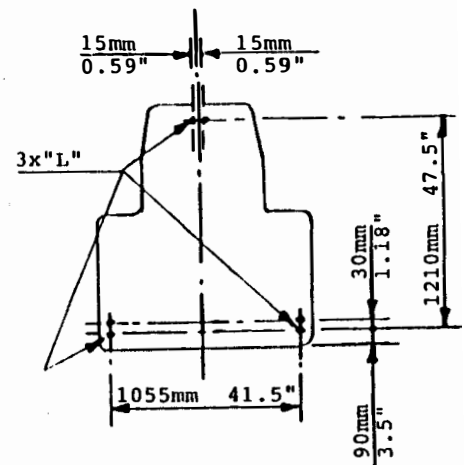
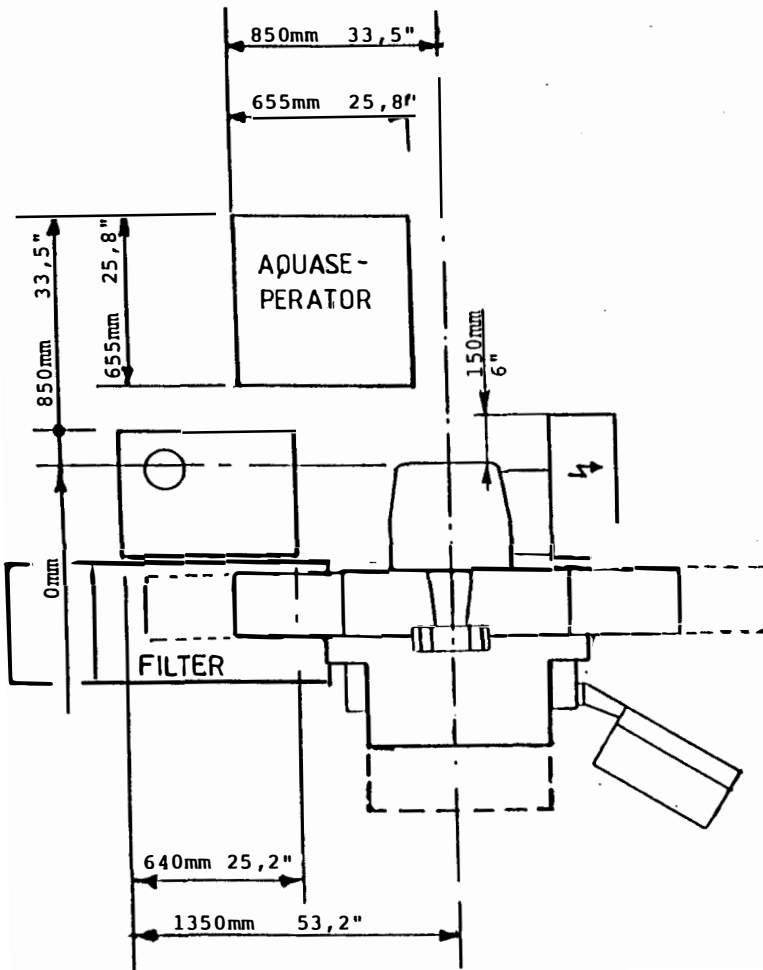
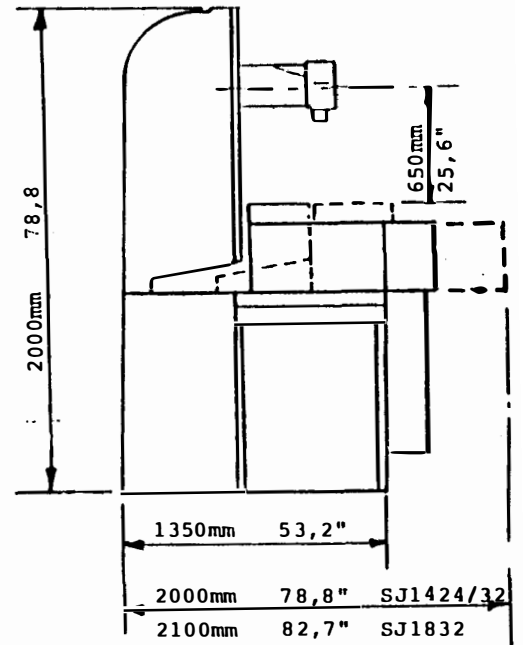
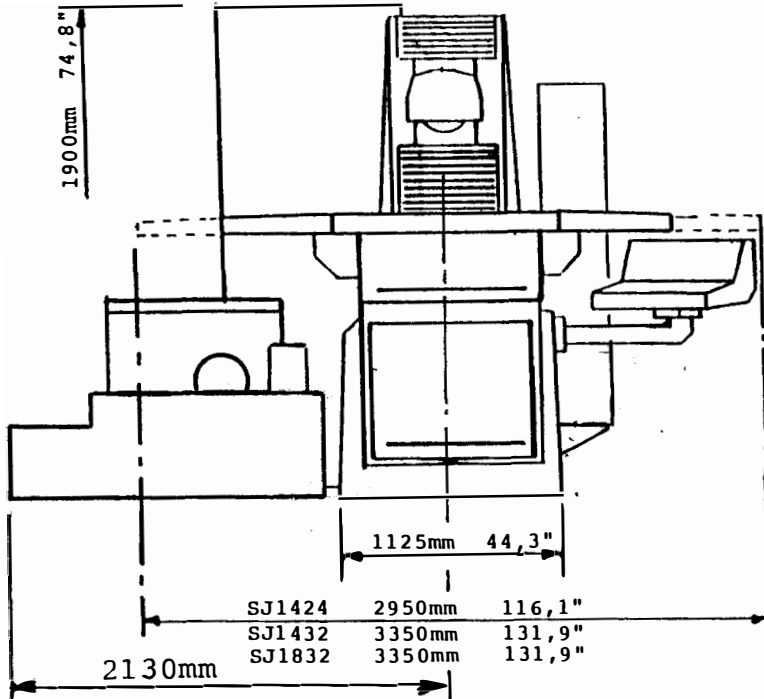


5.3 Foundation plans

Foundation plan for 1026/1032

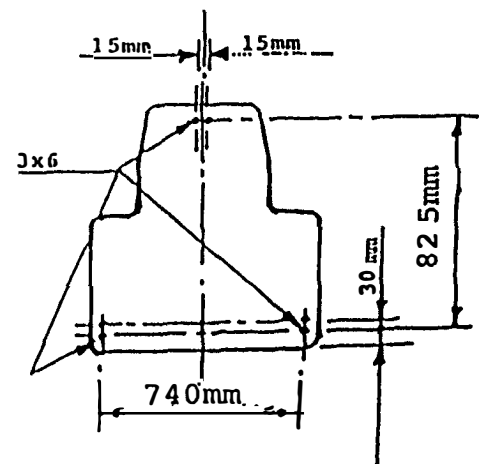
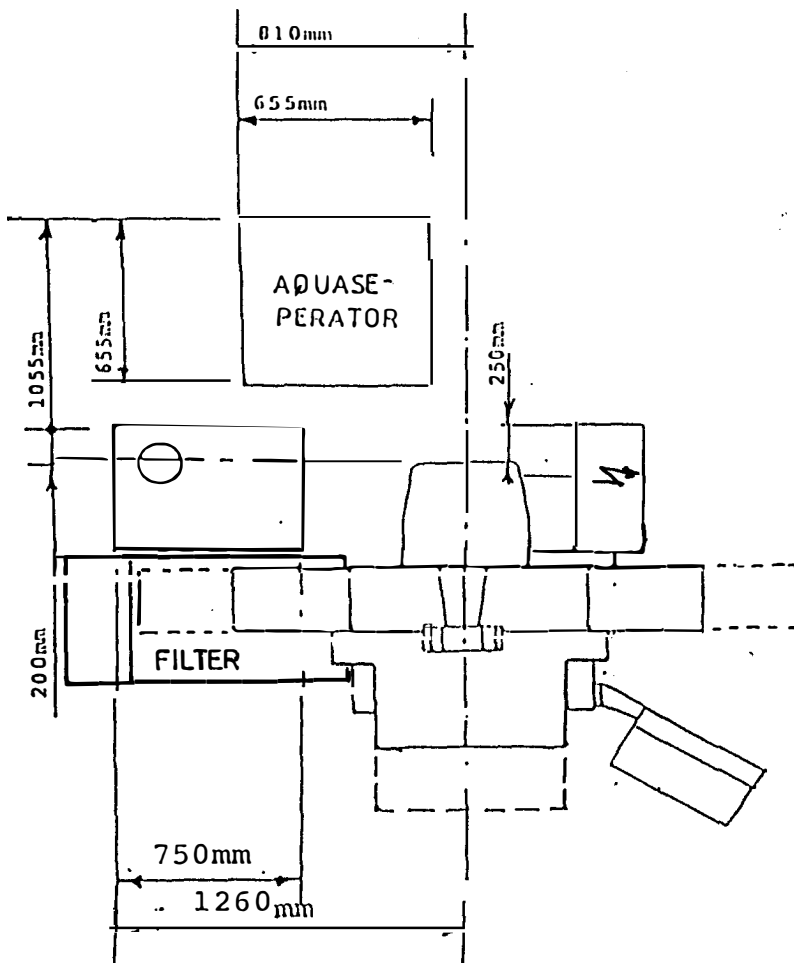
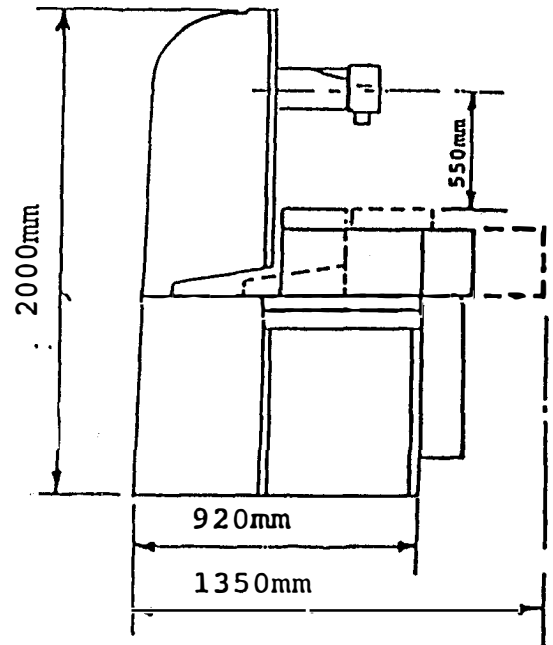
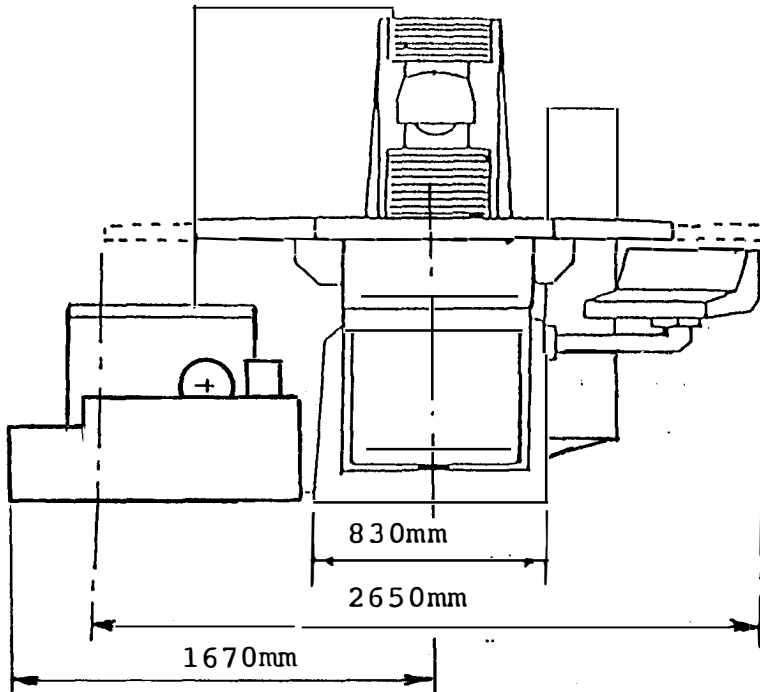


Foundation plan for 1424/1432/1832



5.3 Foundation plans

Foundation plan for 824



5.4 Degreasing

Before shipment, all unpainted machine surfaces were coated to prevent corrosion. This coating can be removed with paraffin.

It is particularly **important** to clean the exposed surfaces of the table slideways.

Do not use paraffin to clean the ribbed **rubber plates** on the saddle and control panel.

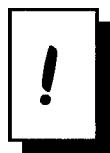
After degreasing, a protective film of lubricating oil should be applied to all machined surfaces.

5.5 Assembly

The surface grinding machine is assembled as follows:

- Mount the table protection guards by means of the screws in the end of the table.
- Mount the left piston rod for the longitudinal cylinder by inserting the threaded end in the packing box. Be careful not to damage the packing.
- Mount the right-hand piston rod in the bracket at the underside of the table end guard. Fasten the inner nut only so much that the piston rod can still be turned. Then tighten the outer counter-nut. See the drawing attached to the piston rod.
- Place the hydraulic power station behind the machine on the left-hand side, as shown in the foundation plan.
- Mount all hydraulic hoses between the hydraulic power station and the machine in symmetrical order after removing all pre-installation plugs.
- Mount the coolant hose to the coolant pump and the drain pipe from the cross saddle.
- Remove the forwarding bracket and place the control panel box in the correct position.
- Mount the splashguard for coolant on the table by means of the 2 screws and packings placed in the table.

5.6 Power connection



The power connection must only be made by **instructed personnel**.

It is **essential** that the machine is connected correctly to the mains supply.

See instruction for power connection in Appendix C, Electrical description.

5.7 Configuration

Note. Configuration must only be made by **instructed personnel**.

In the electrical cabinet there are switches, by which it is possible to change some of the machine functions (See also Appendix B, El-Diagrams).

When the setting of the switches is changed, the new setting will come into force only when the machine has been turned off and turned on again.

- With **switch 1** it is possible to select the required measure unit.

Position "OFF" selects metric.

Position "ON" selects inch.
- With **switch 2** it is possible to select that the magnetic chuck is not used. Magnetic chuck must be installed (extra equipment).

Position "OFF" selects that the magnetic chuck is in operation.

Position "ON" selects that the magnetic chuck is not in operation.
- With **switch 3** it is possible to select when the vertical feed during slot grinding in an automatic cycle shall take place.
Vertical feed for every second reversal of the grinding table must be installed (extra equipment).

Position "OFF" selects vertical feed for every reversal of the grinding table.

Position "ON" selects vertical feed for every second reversal of the grinding table.
- With **switch 4** it is possible to select that digital measuring scale is not used. A digital measuring scale must be installed (extra equipment).

Position "OFF" selects that digital measuring scale is in operation.

Position "ON" selects that digital measuring scale is not in operation.
- With **switch 5** it is possible to select special version of the cross feed. Special version of the cross feed must be installed (extra equipment).

Position "OFF" selects normal cross feed.

Position "ON" selects special version of the cross feed.

5.8 Filling the oil reservoir

Detach the front panel of the machine base and fill the reservoir with lubricant until the sighting glass is half full.

Reservoir capacity is approx. 5 litre.

As lubrication oil we recommend MOBIL OIL VACTRA No. 2, or as stated in the lubrication chart pos. 5.

Remove the top cover of the pump station and fill in approx. 70 litre hydraulic oil into the reservoir.

We recommend MOBIL OIL VACOULINE 1405, or as stated in the lubricating chart pos. 5.

5.9 Lubrication

Perform lubrication as described in the lubrication chart.

Table- and saddleways are kept lubricated by an automatic lubrication pump, controlled by pulses generated by the hydraulic system.

This function can be checked through the inspection glass on the left-hand side of the saddle. A pulse should be given at every second table reversal.

All moving parts, which do not require lubrication in accordance with the lubricating chart, are mounted in sealed, factory-lubricated bearings, which only need lubricating if the parts are dismantled for inspection.

5.10 Bleeding the hydraulic system

Sometimes air is trapped in the hydraulic power system, and the system must be bled as follows:

- Set **handle for regulation of table speed** to low speed.
- Place the two **table stop dogs** in their extreme positions.
- Select **slot grinding**.
- Activate the **Start-key**.
- Let the table travel until a smooth, continuous movement is obtained in both directions.
- Activate the **Stop-key**.
- Activate **Wheel dressing (DRESS-key)** to move the dresser diamond across the grinding wheel. The dresser stops automatically, when a limit switch is activated.
Repeat until a smooth and continuous movement is obtained in both directions.

Chapter 6, Maintenance

6.1 Cleaning

For cleaning the machine it is possible to start the coolant without starting the wheel motor.

Note. As the wheel may absorb coolant this can create an out-of-balance condition. If so, the wheel must be balanced.

6.2 Filters

The air filters mounted in the electrical cabinet ventilation system and in the frequency converter (extra equipment) should be inspected regularly and replaced when necessary.

The suction filter and return filter on the hydraulic power station should be replaced once a year.

6.3 Fitting and balancing the grinding wheel

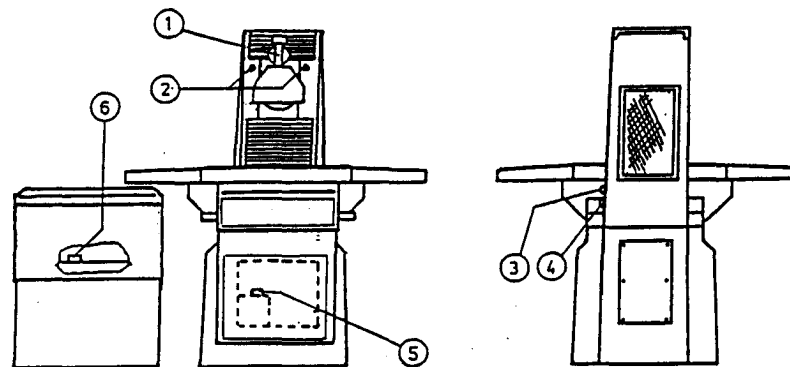
Procedure for flange and wheel balancing:

- Remove all balancing weights from the hub.
- Clamp the wheel on the hub and mount the entire unit on the grinding spindle.
Note. The nut securing the hub to the spindle has **left-handed thread**.
- Dress the wheel until circular. See Chapter 3, Manual dressing.
- Remove the wheel-and-hub unit from the grinding spindle.
- Locate the heaviest point of the wheel-and-hub unit by using a balancing arbor and balancing stand. Place one of the weights opposite this point.
- Balance the unit as accurately as possible by positioning and adjusting the other weights symmetrically in relation to the first weight.
- Mount the wheel-and-hub unit on the grinding spindle, dress the wheel again and the wheel is ready for use.

6.4 Lubrication chart

Lubrication should take place according to the timetable specified in the lubrication chart.

See also the comments on lubrication chart.



| | | OLIE - OIL - ÖL | | | | | | | | 7/97 |
|------|--|------------------------------------|-----------------|----------------|--------------|-------------|--------------|---------------|----------------|-------------|
| POS. | SMØRESTEDER LUBRICATION POINTS SCHMIERSTELLEN | INTERVAL INTERVAL INTERVALLE | MOBIL | STATOIL | SHELL | ESSO | Q 8 | TEXACO | CASTROL | BP |
| 1. | AFRETTER WHEEL DRESSER ABRICHTER | HVER UGE WEEKLY JEDE WOCHE | VACTRA NR. 2 | GLIDEWAY ZX 68 | TONNA T.68 | FEBIS K. 68 | WAGNER Q8 68 | WAY LUBRIC 68 | MAGNAGLIDE D68 | MACCURAT 68 |
| 2. | SPINDELSLÆDE SPINDLE SLIDE SPINDELSCHLITTEN | HVER UGE WEEKLY JEDE WOCHE | VACTRA NR. 2 | GLIDEWAY ZX 68 | TONNA T.68 | FEBIS K. 68 | WAGNER Q8 68 | WAY LUBRIC 68 | MAGNAGLIDE D68 | MACCURAT 68 |
| 3. | VERTIKALSPINDEL VERTICAL LEADSCREW VERTIKALSPINDEL | HVER UGE WEEKLY JEDE WOCHE | VACTRA NR. 2 | GLIDEWAY ZX 68 | TONNA T.68 | FEBIS K. 68 | WAGNER Q8 68 | WAY LUBRIC 68 | MAGNAGLIDE D68 | MACCURAT 68 |
| 4. | TVÆRSPINDEL CROSS SPINDLE QUERSPINDEL | HVER UGE WEEKLY JEDE WOCHE | VACTRA NR. 2 | GLIDEWAY ZX 68 | TONNA T.68 | FEBIS K. 68 | WAGNER Q8 68 | WAY LUBRIC 68 | MAGNAGLIDE D68 | MACCURAT 68 |
| 5. | SMØREOLIEBEHOLDER LUBR. OIL TANK SCHMIERÖLBEHÄLTER | HVERT ÅR YEARLY JÄHRLICH | VACTRA NR. 2 | GLIDEWAY ZX 68 | TONNA T.68 | FEBIS K. 68 | WAGNER Q8 68 | WAY LUBRIC 68 | MAGNAGLIDE D68 | MACCURAT 68 |
| 6. | PUMPESTATION HYDR. PUMP STATION HYDRAULIKSTATION | HVERT ÅR YEARLY JÄHRLICH | VACOU LINE 1405 | HYDRAWAY HM 32 | HYDROL DO 32 | NUUTO H. 32 | HAYDN Q8 46 | REGAL R&O 32 | MAGNAGLIDE D32 | HLP-D 32 |

Capacity 5 ltr.
Capacity 70 ltr.

6.6 Adjustment of hydraulic power system

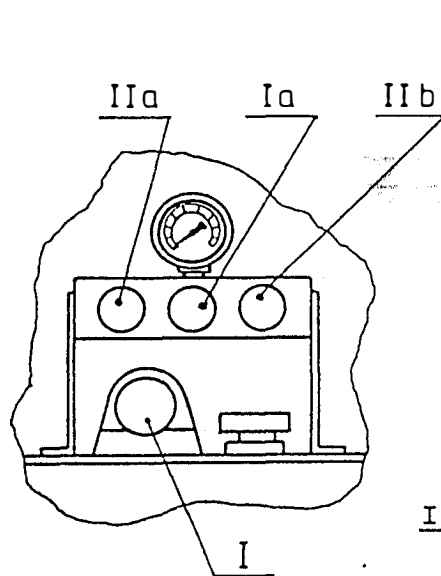
The hydraulic power system can be adjusted by means of adjusting screws. The following adjustments can be made:

- Adjustment of table reversal

These screws allow adjustment of table overrun on the left and right-hand side of the table, respectively. This is the distance the table moves after passing the proximity sensors controlling table reversal. The amount of overrun increases at high table speeds, during grinding of heavy workpieces, and when the machine is warm.

Note. The longer the overrun, the softer the table reversal.

Turn the adjusting screw **counterclockwise** to reduce and **clockwise** to increase the amount of overrun.



| | |
|-----|--|
| IIb | Adjustment screw for table reversals, right. |
| Ia | Shut-off valve for pressure gauge. |
| IIa | Adjustment screw for table reversals, left. |
| I | Adjustment screw for hydraulic pressure. |

- Adjustment of hydraulic pressure

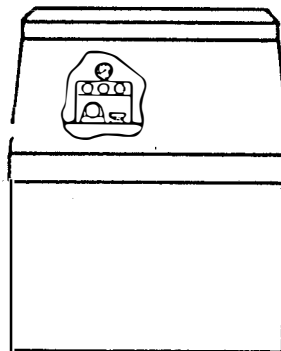
The hydraulic pressure will be set correctly from the factory. However, it can also be adjusted by means of the regulating screw on the overpressure valve. Turn screw **counterclockwise** for lower and **clockwise** for higher pressure.

- Locking the manometer

To lock the manometer, turn the adjusting screw **clockwise**.

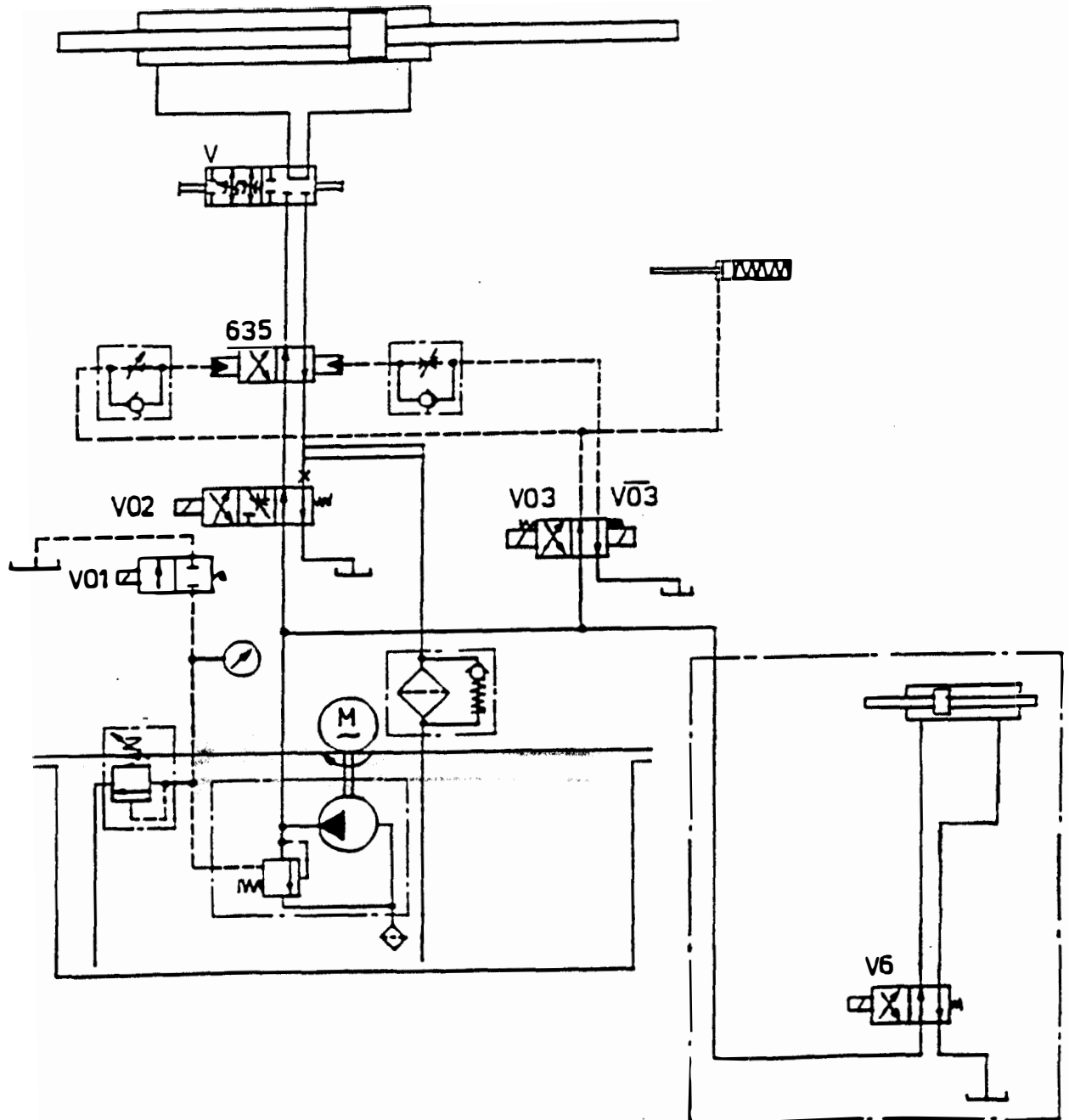
To adjust one of the hydraulic control functions mentioned above:

- Remove the top part of the hydraulic power station.
- Slacken the relevant thumb screw.
- Adjust the relevant adjusting screw.
- Tighten the thumb screw.
- Mount the top part of the hydraulic power station.



| SJ | Hydraulic pressure |
|---------|----------------------|
| 618 | 17kg/cm ² |
| 824 | 18kg/cm ² |
| 1026/32 | 19kg/cm ² |
| 1424/32 | 20kg/cm ² |
| 1832 | 20kg/cm ² |

6.7 Diagram of hydraulic power system



| SJ | Hydraulic pressure |
|---------|----------------------|
| 618 | 17kg/cm ² |
| 824 | 18kg/cm ² |
| 1026/32 | 19kg/cm ² |
| 1424/32 | 20kg/cm ² |
| 1832 | 20kg/cm ² |

Chapter 7, Trouble Shooting

7.1 Unsatisfactory grinding results

- **Machine not grinding parts parallel.**

Excessive heat expands workpiece.

Magnetic chuck surface not flat.

Incorrect grinding parameters.

- **Discoloured spots on work from overheating.**

Table speed too slow.

Insufficient coolant.

Grinding wheel too hard.

Worn out or too fine dressed wheel.

Dresser diamond not sharp.

Downfeed too excessive.

- **Vibration marks on work.**

Outside vibrations from other machinery.

Grinding wheel not properly balanced.

Coolant not turned off by stopped wheel creating out of balance condition.

Worn out or too fine dressed wheel.

Dresser diamond not sharp.

- **Cross feed lines on work.**

Dresser out of alignment.

- **Short grain marks on work.**

Wheel too soft.

Coolant not filtered properly.

7.2 Functional failure

- **No hydraulic table movement.**

Handle for regulation of table speed on RED MARK (stop) position.

Voltage to the magnetic valves not correct.

Mains supply out of order.

Proximity switches for table reversal out of order.

- **Wheel motor, motor for rapid vertical feed, hydraulic pump motor or coolant motor not operating.**

Overload has disengaged.

Mains supply out of order.

- **Stepping motor for V-axis or Y-axis not operating.**

Hand pulse generator (handwheel) out of order.

Fuses for stepping motor control out of order.

7.3 Alarms

An alarm message appears when an alarm state is registered by the control system.

- All the moveable parts of the machine are stopped automatically.
- The actual alarm will be shown on the control panel as long as the alarm state exists and until the operator releases the alarm message.

Following alarm messages may appear:

- | | |
|---|--|
| <p>1 "A: Communication" Failure in communication between control panel and interface unit in the electrical cabinet. Released by switching off the machine.</p> <p>2 "A: E.stop error" Error in the circuit of the Emergency Stop. Released by switching off the machine.</p> <p>3 "A: Circuit break" One or more circuit-breakers have switched off. Released by switching off the machine.</p> <p>4 "A: XL + XR" XL and XR are activated at the same time. Released by activating the ENTER-key.</p> <p>5 "A: ZF + ZB" ZF and ZB are activated at the same time. Released by activating the ENTER-key.</p> <p>6 "A: Servo error" Error in the Servomotor system. Released by switching off the machine.</p> | <p>7 "A: Keyboard err." Two or more keys have been activated at the same time. Released by switching off the machine.</p> <p>8 "A: XP + XR" XP and XR are activated at the same time. Released by activating the ENTER-key.</p> <p>9 "A: ZP + ZB" ZP and ZB Are activated at the same time. Released by activating the ENTER-key.</p> <p>10 "A: WF + WB" WF and WB are activated at the same time. Released by switching off the machine.</p> <p>11 "A: No WF or WB" Wheel dresser drifted away from limit switch. Released by switching off the machine.</p> <p>12 "A: YOT + YOB" YOT and YOB are activated at the same time. Released by switching off the machine.</p> <p>13 "A: Wheel K1" Wheel motor relay K.1 not activated. Released by switching off the machine.</p> <p>14 "A: Hydr. pump K2" Hydr. pump relay K.2 not activated. Released by switching off the machine.</p> <p>15 "A: Coolant K3/K5" Coolant pump relays K3 and K5 not activated. Released by switching off the machine.</p> <p>16 "A: Magnet. chuck" Error in magnetic chuck operation. Released by switching off the machine.</p> <p>17 "A: Freq. conv." Error by frequency converter.</p> |
|---|--|

- | | | | |
|----|--|----|---|
| | Released by switching off the machine. | 22 | "A: SIM software" Software-error in SIM. Released by switching off the machine. |
| 18 | "A: V-step.motor" Error by stepping motor control for V-axis. Released by switching off the machine. | 23 | "A: No. DL" (Not used.) Released by activating the ENTER-key. |
| 19 | "A: Y-step.motor" Error by stepping motor control for Y-axis. Released by switching off the machine. | 24 | "A: Configuration" Error by configuration module or by switch setting. Released by switching off the machine. |
| 20 | "A: Wheeldiameter" Grinding wheel diameter too small. Released by activating the ENTER-key. | 25 | "A: EXE-box" Error by digital scale or by EXE-box. Released by switching off the machine. |
| 21 | "A: SWU software" Software-error in SWU. Released by switching off the machine. | | |

7.4 Switch-Information

The operating status of machine sensors and switches can be seen in the position display.

The Switch-Information will appear as follows:

- Call for displaying switch-information by activating the **i**-key.
- One line of information will appear at a time. Call for displaying the wanted information by activating **Cursor up**, **Cursor right** and **ENTER**-key.
- When a switch/sensor is active the state will be shown as "1".
When a switch/sensor is *not* active the state will be shown as "0".
- Remove switch-information by activating the **i**-key.

See also the diagram of machine switches.

The following lines of information can be shown ("?" means that the status will here be indicated with either "1" or "0"):

- VH=? WF=? WB=?

VH (V-axis home) is sensor for V-axis in reference position.

WF (W-axis front) is sensor for wheel dresser, forward.

WB (W-axis back) is sensor for wheel dresser, back.

- DL=? TF=?

DL (Dresser locked) is not used.

TF (Table feed) is switch for regulation valve for table speed.

- XP=? XL=? XR=?

XP (X-axis park) is sensor for table in parkposition.

XL (X-axis left) is sensor for table to the left.

XR (X-axis right) is sensor for table to the right.

- YOT=? YOB=?

YOT (Y-axis overtravel top) is switch for stop at the upper limit switch of the Y-axis.

YOB (Y-axis overtravel bottom) is switch for stop at the bottom limit switch of the Y-axis. Only for 1424/1432 and 1832.

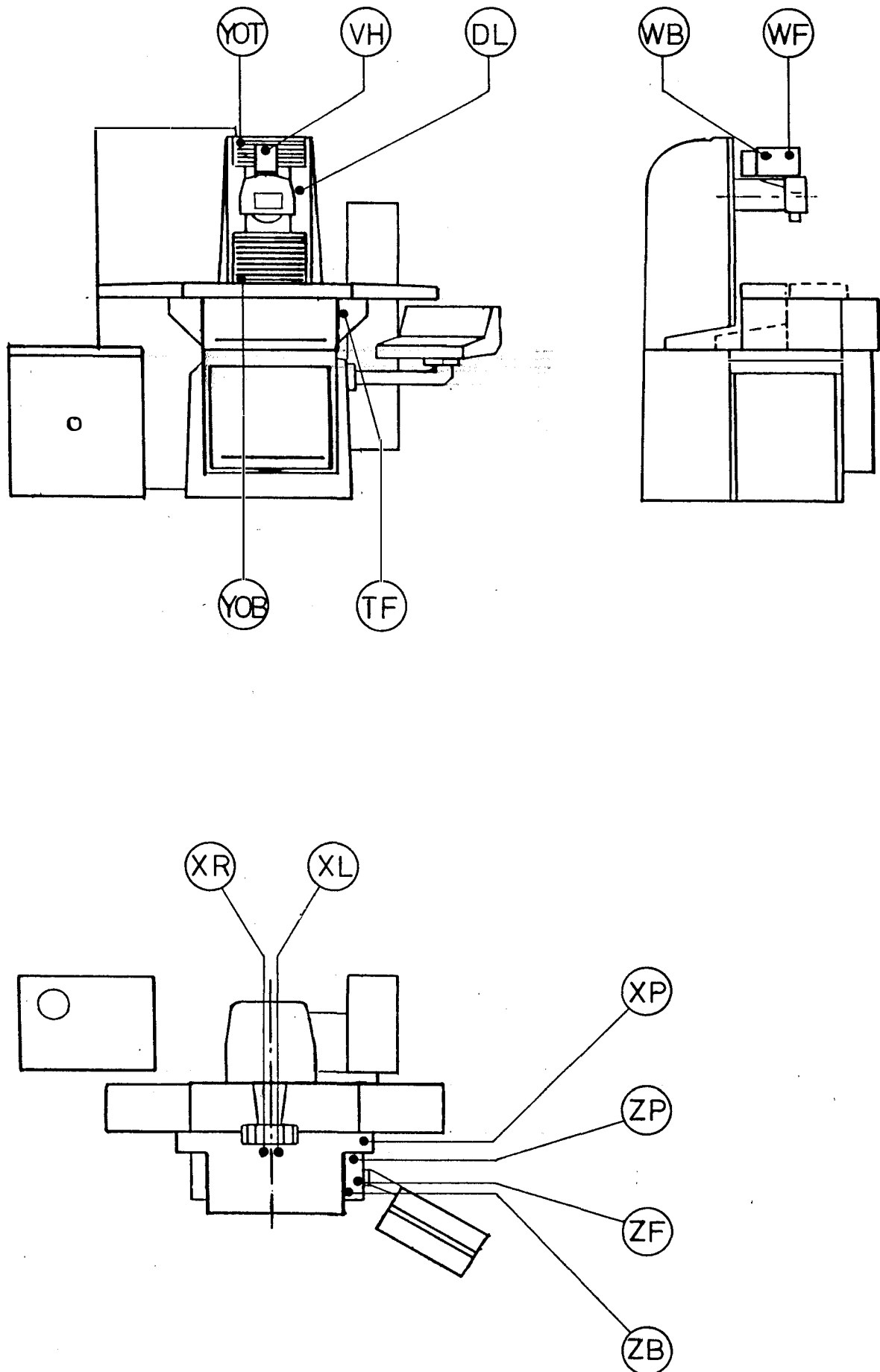
- ZP=? ZF=? ZB=?

ZP (Z-axis park) is sensor for Z-axis in parkposition.

ZF (Z-axis front) is sensor for cross saddle, forward.

ZB (Z-axis back) is sensor for cross saddle, back.

7.5 Diagram of machine switches



Chapter 8, Technical Specifications

8.1 Machine data

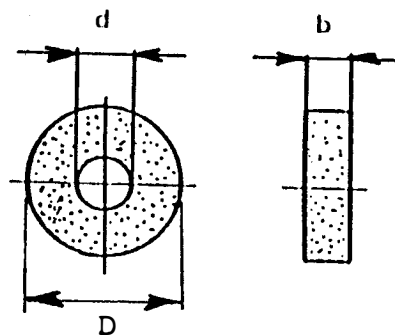
| | 824 | 1026 | 1032 | 1424 | 1432 | 1832 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Grinding capacity [mm] | 600 x 250 | 650 x 300 | 800 x 300 | 600 x 400 | 800 x 400 | 800 x 500 |
| Max. distance table - spindlecenter [mm] | 550 | 550 | 550 | 650 | 650 | 650 |
| Table setup area [mm] | 600 x 200 | 650 x 250 | 800 x 250 | 600 x 350 | 800 x 350 | 800 x 450 |
| Max. load on table incl. magnetic chuck [kg] | 200 | 250 | 300 | 400 | 400 | 400 |
| Weight of magnetic chuck [kg] | 70 | 74 | 99 | 104 | 121 | 183 |
| Net. weight of machine [kg] | 1500 | 1750 | 1900 | 2550 | 2700 | 2900 |

8.2 Wheel data

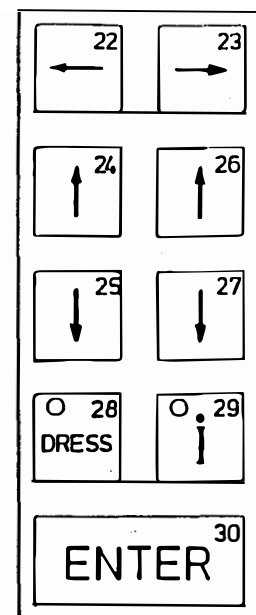
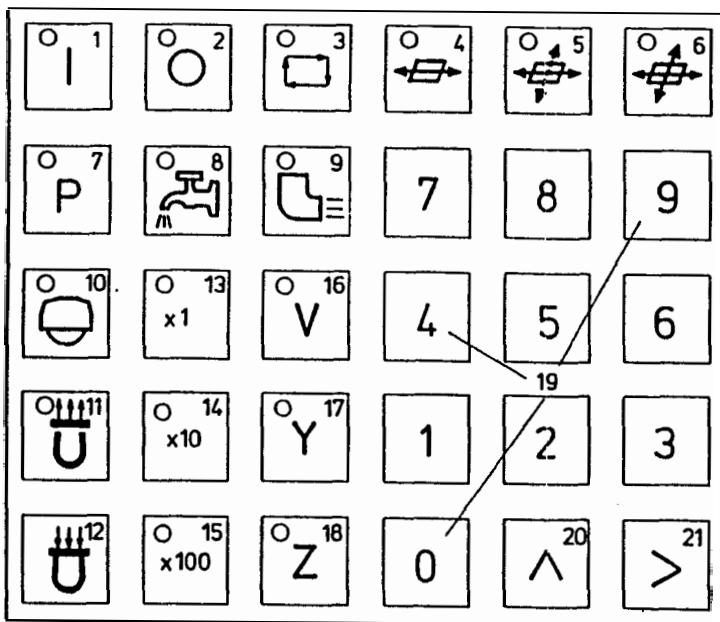
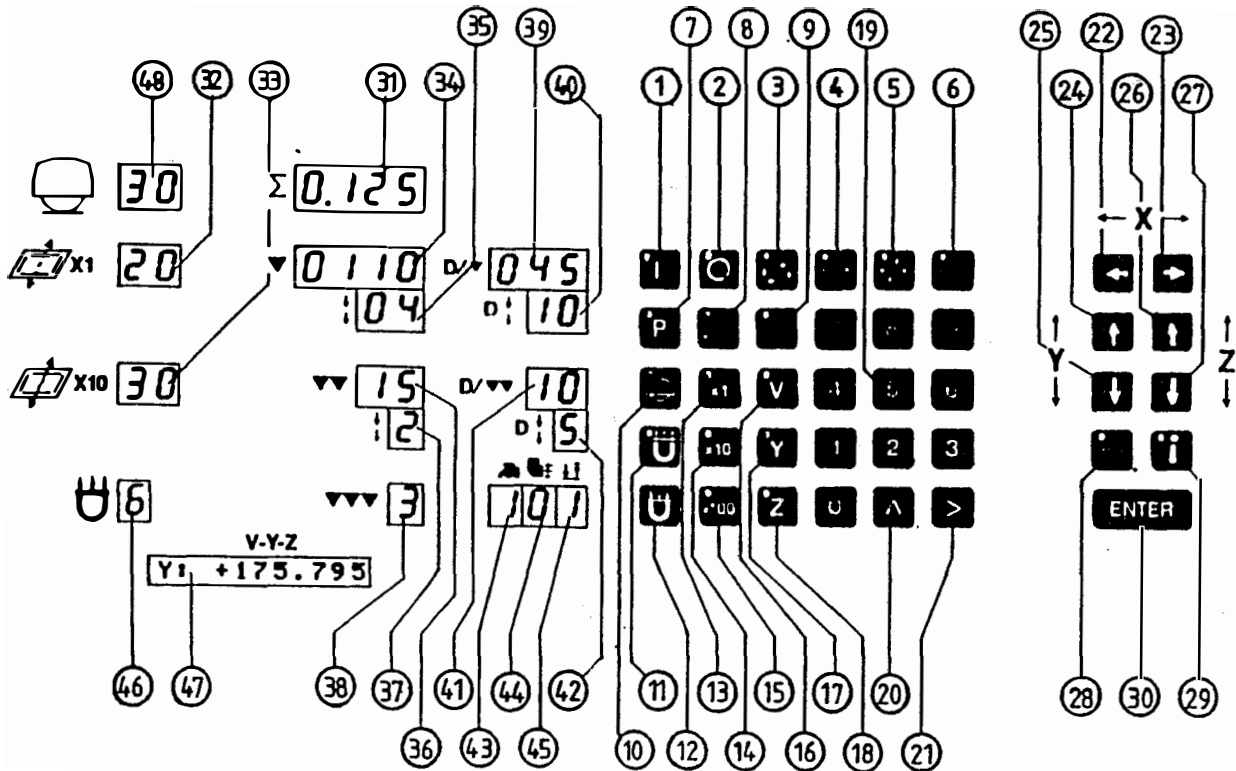
A standard wheel suitable for most materials is supplied with the machine.

However, in many cases you will find it advantageous to use wheels specially designed for the job in hand.

| | HZ | RPM | D | d | Standard b | Extra b |
|-----------|---------|-------------|--------------|--------------|-------------|-------------|
| 824 | 50 / 60 | 2800 / 3400 | 225 mm (9") | 76.2 mm (3") | 25 mm (1") | 38 mm (1½") |
| 1026/1032 | 50 / 60 | 1400 / 1700 | 350 mm (14") | 127 mm (5") | 40 mm (1½") | 50 mm (2") |
| 1424/1432 | 50 / 60 | 1400 / 1700 | 350 mm (14") | 127 mm (5") | 50 mm (2") | 76 mm (3") |
| 1832 | 50 / 60 | 1400 / 1700 | 350 mm (14") | 127 mm (5") | 50 mm (2") | 76 mm (3") |



Appendix A, Illustrations



Appendix A, Illustrations

A.1 Control panel incl. keyboard and display.

Pushbuttons

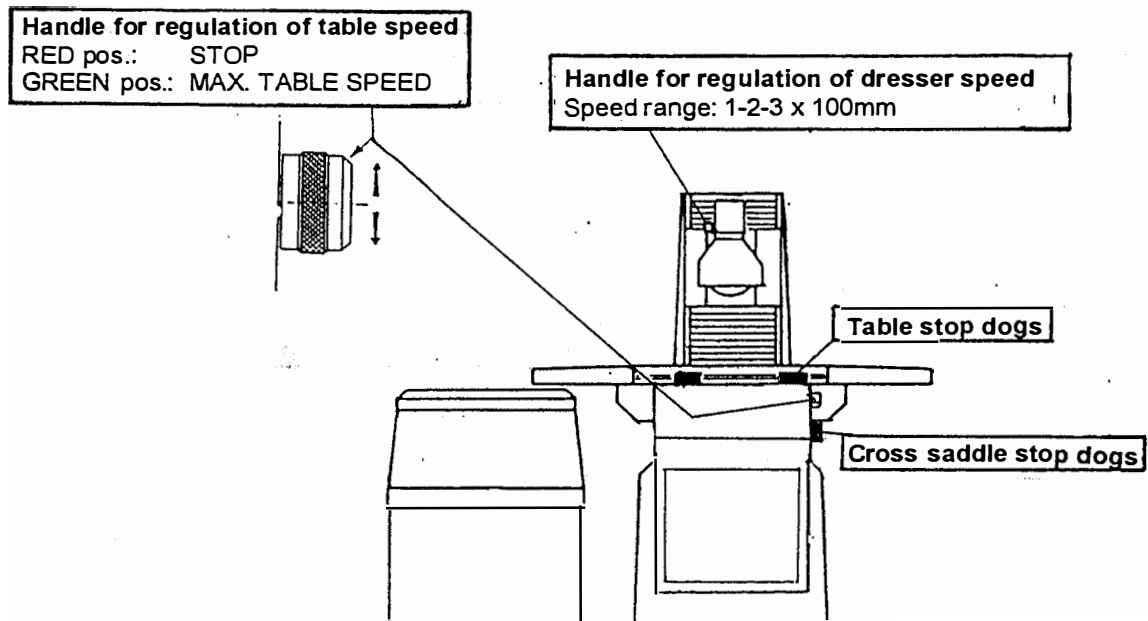
- (1) Start
- (2) Stop
- (3) Automatic cycle
- (4) Slot grinding
- (5) Area grinding with intermittent cross feed
- (6) Area grinding with continuous cross feed
- (7) Parking
- (8) Coolant
- (9) Exhausting
- (10) Wheel motor
- (11) Disengagement of magnetic chuck
- (12) Engagement of magnetic chuck
- (13) x1
- (14) x10
- (15) x100
- (16) V-axis
- (17) Y-axis
- (18) Z-axis
- (19) Digit 0 - digit 9
- (20) Cursor, up
- (21) Cursor, right
- (22) X-axis to the left
- (23) X-axis to the right
- (24) Y-axis, upwards
- (25) Y-axis, downwards
- (26) Z-axis, back
- (27) Z-axis, forward
- (28) Wheel dressing (DRESS)
- (29) Information
- (30) Enter

Display

- (31) Summation display
- (32) Cross feed
- (33) Cross speed
- (34) Grinding area, coarse
- (35) Downfeed, coarse
- (36) Grinding area, fine
- (37) Downfeed, fine
- (38) Number of sparkouts
- (39) Frequency of dressing, coarse
- (40) Diamond feed for dressing, coarse
- (41) Frequency of dressing, fine
- (42) Diamond feed for dressing, fine
- (43) Coolant in automatic cycle
- (44) Exhausting in automatic cycle
- (45) Automatic return to starting position
- (46) Holding power, magnetic chuck
- (47) Position display
- (48) Wheel speed

Appendix A, Illustrations

A.2 Machine picture with controls.



Appendix B, Electrical description

B.1 Power connection



The power connection must only be made by **instructed personnel**.

It is **essential** that the machine is connected correctly to the main supply.

- Mount the electrical cables from the machine base to the hydraulic power station.
- Mount the electrical cable from the coolant pump to the electrical cabinet.
- If the machine is equipped with a magnetic chuck:
Mount the electrical cable from the magnetic chuck via the coolant splash-guard to the electrical cabinet.
- Connect the main supply cable from the main supply to the machine.
- Switch on the machine as described in Chapter 3.
- Select the x100-key and move the wheelhead upwards by means of the **hand-wheel**.
- Remove the wooden block that props up the wheelhead.
- Check direction of rotation of the motors.



Never use the grinding wheel motor to control the motors direction of rotation.

Check the direction of rotation of the motors, as follows:

- Magnetic chuck (extra equipment) must be switched on or not selected in the **configuration**.
- Check that the direction of the vertical movement is correct by using the keys **Y-axis upwards** and **Y-axis downwards**.
The movement must correspond to the arrow-symbols of the keys.

In case the symbols *do not* correspond to the direction of the vertical movement:

- Turn off the main switch on the electrical cabinet.
- Interchange two of the three phases of the main supply cable of the machine.
- Perform the procedure for control of direction of rotation again.

If the direction of the vertical movement is correct all motors will have the correct direction of rotation.

Appendix B, Electrical description

B.2 Electrical diagrams

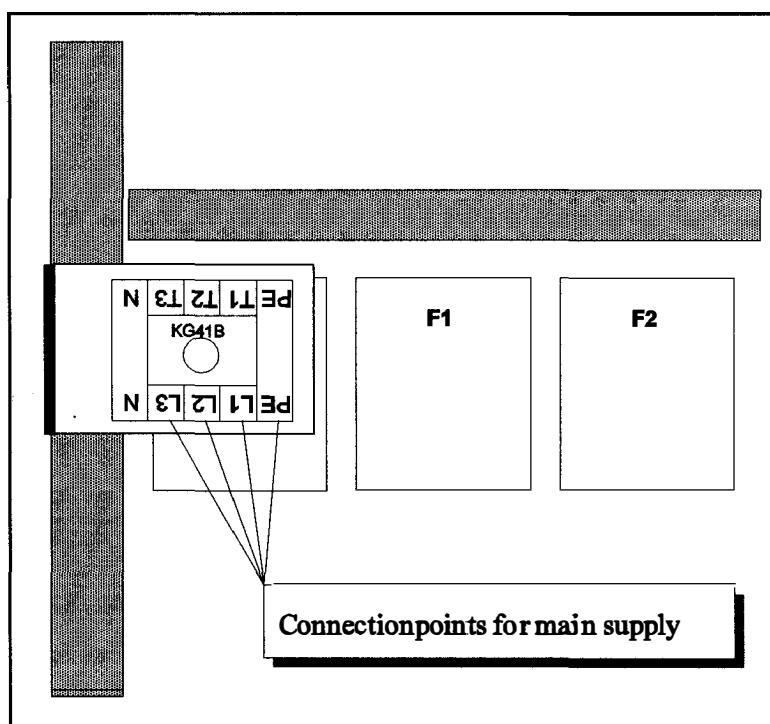
Electrical installation.

Connection of main supply.

The machine is delivered from the factory wired for the main supply in the import-country.

Connect the main supply to the main circuit breaker, located inside the electrical cabinet. Normally 3 phases and protective earth are needed. Use the terminals L1, L2, L3, and PE.

The connection cable must have 4 wires, each of 6 squaremillimeters. The installation must be fused by a fuse equal class gL, diazed or NH, of max. 63A, and minimum the total consumption.



| Consumption | | EU | EU | EU | South Am. | US CAN | US CAN | US CAN |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | 50Hz 220V | 50Hz 380V | 50Hz 415V | 60Hz 230V | 60Hz 230V | 60Hz 460V | 60Hz 575V |
| 1026/1032 | Standard kW | 33A | 19A | 18A | 34A | 32A | 17A | 14A |
| | Extra 5.5 kW | 38A | 22A | 21A | 38A | 36A | 20A | 15A |
| 1424/1432 | Standard kW | 39A | 22A | 21A | 39A | 37A | 19A | 15A |
| | Extra 7.5 kW | 45A | 26A | 25A | 46A | 44A | 23A | 18A |
| 1832 | Standard kW | 45A | 26A | 25A | 46A | 44A | 23A | 18A |

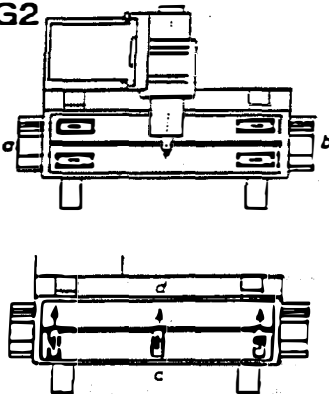
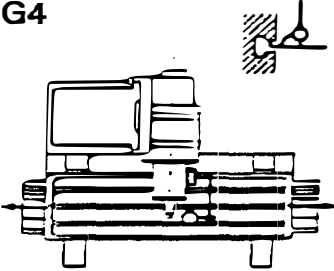
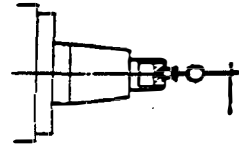
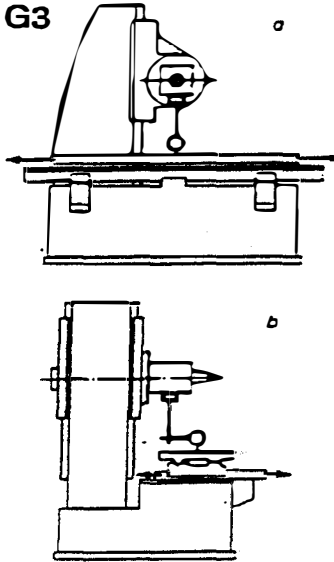
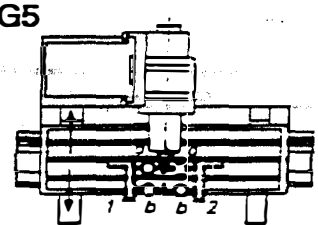
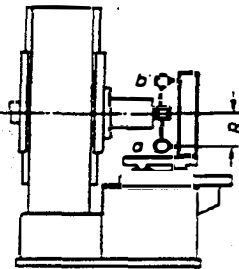
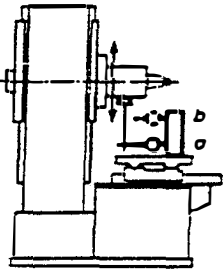
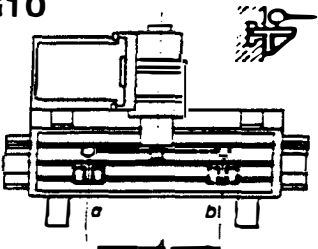
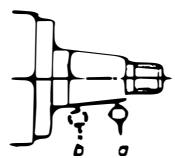
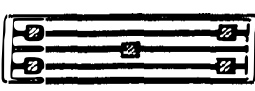

Appendix C, Test sheet

C.1 Test sheet

| | | TEST SHEET | JAKOBSEN | |
|-----------------|--|---|--------------------|--|
| DIN 8632 | | MACHINE TYPE: MACHINE SERIAL NO.: | | |
| | TEST | Tolerance permitted | Tolerance measured | |
| G2 | Bed level - longitudinal direction a - b | 0,02 in 1000 mm | | |
| | Bed level - transverse direction c - d | 0,02 in 1000 mm | | |
| G3 | Surface of table parallel to the longitudinal travel a | 0,01 in 1000 mm. Max 0,005 in 300 mm | | |
| | Surface of table parallel to the transversal travel b | 0,005 in 300 mm | | |
| G4 | T-groove of table parallel to the longitudinal travel | Max. 0,01 in 1000 mm. Max. 0,005 in 300mm | | |
| G5 | T-groove of table at right angles to the transversal travel a b | 0,01 in 100mm. Max. 0,03 in the movement | | |
| G6 | Vertical movement of wheel-head at right angles to the transversal direction of table a b | 0,01 in 100mm. Max. 0,05 in the movement | | |
| G7 | Runout of spindle, radial a b | 0,005 | | |
| G8 | Runout of spindle, axial | 0,005 | | |
| G9 | Grinding spindle parallel to the table. Measured at 180° swivelling arm 100 mm a b | 0,02 in 200 mm | | |
| G10 | Grinding spindle at right angles to the T-groove of table. Swivelling arm 200 mm a b | 0,02 in 400 mm | | |
| P1 | Test grinding of 5 test pieces | 0,01 in 400-800 mm | | |
| | | | | |
| DATO: | | SIGN.: <i>[Signature]</i> | SIDE: 1/2 | |

Appendix C, Test sheet

C.2 Illustration for test sheet

| ILLUSTRATION FOR TEST SHEET | | JAKOBSEN | |
|--|--|--|--------------------------------|
| DIN 8632 | | | |
| G2  | G4  | G8  | |
| G3  | G5  | G9  | |
| | G6  | G10  | |
| | G7  | P1  | |
| Elektromotorer - Electrical motors - Elektromotoren | | | |
| Spænding Voltage Spannung | V | Frekvens Frequency Frequenz | Hz |
| | | kW | omdr/min RPM umdr/min |
| | | | 50 HZ 1400 60 HZ 1700 |
| Spindelmotor Spindlemotor Spindelmotor | | | 1400 1700 |
| Pumpemotor Pumpmotor Pumpenmotor | | | 1400 1700 |
| Vertikalmotor (kun STD.maskiner) Verticalmotor (STD.machines only) Vertikalmotor (nur STD.maschinen) | | | 1400 1700 |
| DATO: 23/8 1991 | SIGN.:  | SIDE: 2/2 | |