



Kuhnke Electronics Instruction Manual

PG 674

Operating Terminal for KUAX 674 / 673

E 390 GB

4 April 1996 / 65.135

This manual is primarily intended for the use of the designing engineer, the project planning engineer, and the developing engineer. It does not give any information about delivery possibilities. Data is only given to describe the product and must not be regarded as guaranteed properties in the legal sense. Any claims for damages against us – on whatever legal grounds – are excluded except in instances of deliberate intent or gross negligence on our part. We reserve the rights for errors, omissions or modifications. Reproduction even of extracts only with the editor's express and written prior consent.

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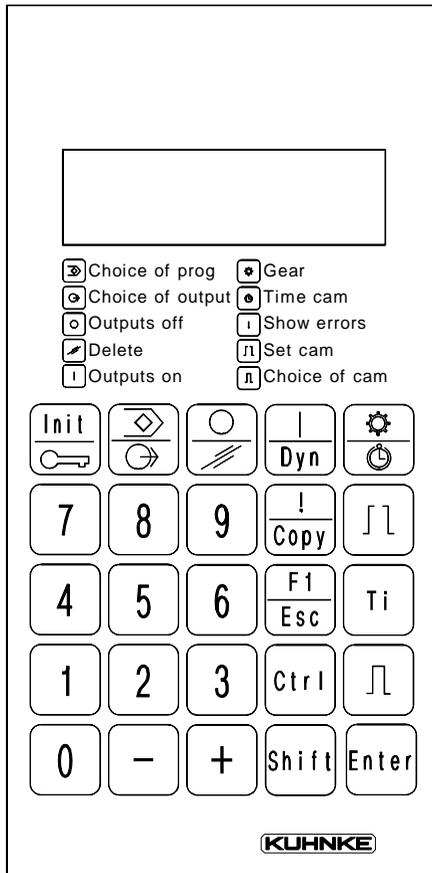
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Sales & Service

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1. Introduction

The PG 674 is a small, handy device with a keyboard and two-line display. It is used for operating the electronic cam control units Posi Control KUAX 674 and KUAX 673. It is separated from the cam control unit to allow variable use. It can be connected with the cam control unit via the programming interface at any time, even when the machine is running. This makes it easy to check or modify the programs at the machine.



Introduction

The PG 674 is available in two designs:

Hand-held terminal

As a portable hand-held terminal it can easily be transported and connected to the control device. The integrated buffered memory allows you to load programs from one controller and transfer them to another controller.

Built-in terminal

As a built-in terminal the device is firmly built into i.e. the door of the switching cabinet and is thus permanently available as an operating and display device.

The present operating manual exclusively describes the hardware of the PG 674 and how you use it to operate controllers.

The control devices themselves are described elsewhere:



<i>Controller</i>	<i>Instruction manual</i>
KUAX 674	E 375 GB
KUAX 673	E 293 GB

•

2. Reliability, Security

2.1. Target group

This instruction manual contains all information necessary for the use of the described product (control device, software, etc.) according to instructions. It is written for the **personnel of the construction, project planning, service and commissioning departments**. For proper understanding and error-free application of technical descriptions, instructions for use and particularly of notes of danger and warning, **extensive knowledge of automation technology** is compulsory.

2.2. Reliability

Reliability of Kuhnke controllers is brought to the highest possible standards by extensive and cost-effective means in their design and manufacture.

Amongst which are:

- selecting high-quality components,
- quality arrangements with our sub-suppliers,
- measures for the prevention of static charge during the handling of MOS circuits,
- Worst-Case dimensioning of all circuits,
- inspections during various stages of fabrication,
- computer aided tests of all assembly groups and their efficiency in the circuit,
- stress-test in raised ambient temperatures during 72 hours realtime with nominal load on the outputs,
- statistic assessment of the quality of fabrication and of all returned goods for immediate taking of adjustment measures.

Text muß n

Despite these measures, the occurrence of errors in electronic control units - even if most highly improbable - must be taken into consideration.

2.3. Notes

Please pay particular attention to the additional notes which we have marked by symbols in this instruction manual:

2.3.1. Danger



This symbol warns you of dangers which may cause death, (grievous) bodily harm or material damage if the described precautions are not taken.

2.3.2. Dangers caused by high contact voltage



This symbol warns you of dangers of death or (grievous) bodily harm which may be caused by high contact voltage if the described precautions are not taken.

2.3.3 Important information / cross reference



This symbol draws your attention to important additional information concerning the use of the described product. It may also indicate a cross reference to information to be found elsewhere.

2.4. Security

Our product normally becomes part of larger systems or installations. The following notes are intended to help integrating the product into its environment without dangers for man or material/equipment.

2.4.1. To be observed during project planning and installation



- 24V DC power supply:
 - provide sufficient separation of low voltage,
 - apply power packs in accordance with IEC 364-4-41 or CENELEC HD 384.4.41 (VDE 0100, Part 410) respectively.
- In case of power breakdowns or power fades: the program has to be structured in such a way as to create a defined state at restart that excludes dangerous states.
- Emergency switches or other emergency installations have to be realized in accordance with EN 60204/IEC 204 (VDE 0113). They have to be effective at any time.
- Safety and precautions regulations for qualified applications have to be observed.
- Please pay particular attention to the notes of warning (→ 2.3. Notes) which, at relevant places, will make you aware of possible sources of errors.
- The relevant standards and VDE regulations are to be observed in every case.
- Control elements have to be installed in such a way as to exclude unintended operation.
- Control cables have to be laid in such a way as to exclude interference (inductive or capacitive) which could influence the operation of the controller.



To achieve a high degree of conceptual safety in planning and installing an electronic controller it is essential to follow the instructions given in the manual exactly because wrong handling could lead to rendering measures against dangerous failures ineffective or to creating additional dangers.

2.4.2. To be observed during maintenance and servicing

- During measuring and checking operations on a controller in a power-up condition, precaution regulation VBG 4.0 has to be observed and §8 (Admissible deviations during working on parts) in particular.
- Repairs must only be executed by the trained Kuhnke personnel (usually in the main factory in Malente). Warranty expires in any other case.
- Spare parts:
Only use parts approved of by Kuhnke. Only genuine Kuhnke modules must be used in modular controllers.
- Modules must only be connected to or disconnected from the controller with no voltage supplied. Otherwise they may be destroyed or (possibly not immediately recognizably!) detracted from their proper functioning.
- Always deposit batteries and accumulators as special waste.

2.4.3. Measures for the prevention of electrostatic charge

Electrostatic charge is dangerous for components and assembly groups. It is a peculiarity of electrostatics to not destroy the sensitive components but to damage them in a not immediately conceivable way. It is because of this that devices stop functioning after some time of service.

The ESD measures (ESD = electrostatic discharge) executed in the factory are only guaranteed to be effective if they are also regarded by the user (service).

Please note:

- Only store parts in their factory-packing or in an antistatic packing of similar quality.
- Assembly groups must only be touched by persons who are grounded via a wrist bracelet and/or a discharging mat and shoe-grounding strips (⚠ observe protection of people!).
- Only ship assembly groups in their factory-packing or in an antistatic packing of similar quality.



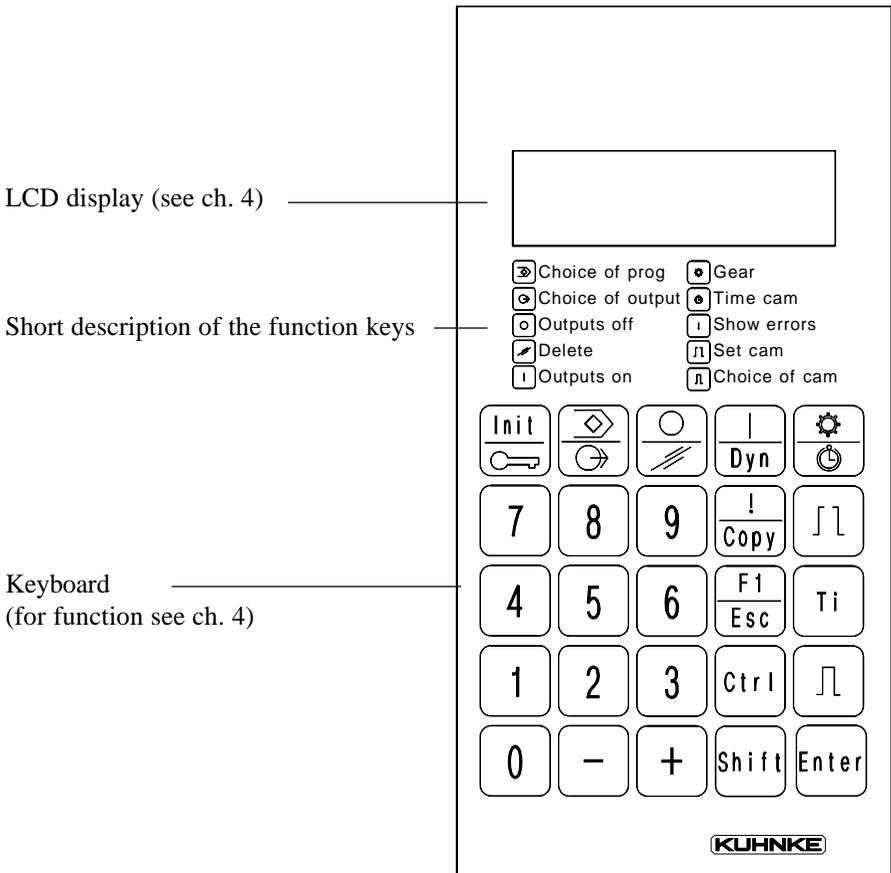
Reference to literature (Fa. 3M Deutschland GmbH, Neuss): Information brochure
Interesting Facts about Electrostatics in Micro-Electronics

3. Design of the PG 674

The operating terminal PG 674 is used for programming the cam control unit (see "4. The PG 674 as a programming device").

It can be supplied as a portable hand-held terminal and as a built-in terminal.

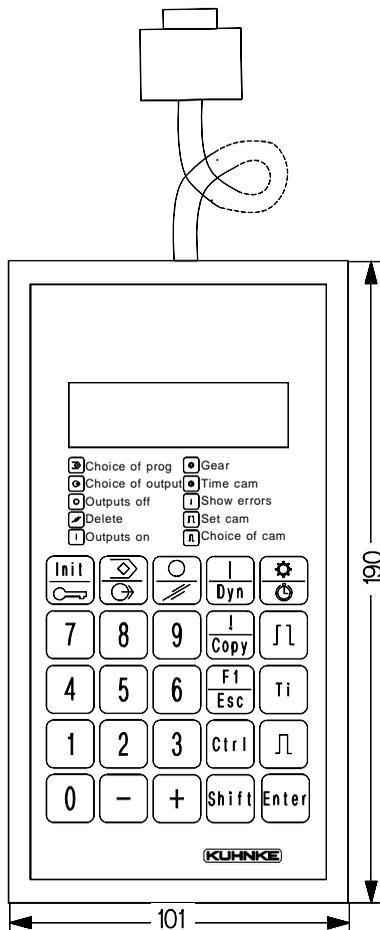
3.1. Display and operating elements



3.2. Hand-held terminal PG 674 (674.001.00)

The hand-held terminal can be connected to and disconnected from the cam control unit during operation.

The connecting cable is firmly attached to the hand-held terminal. It serves both communication with the cam control unit and supplying power to the hand-held terminal (24 V DC), which are supplied by the cam control unit.



3.3. Built-in terminal PG 674 (674.010.00)

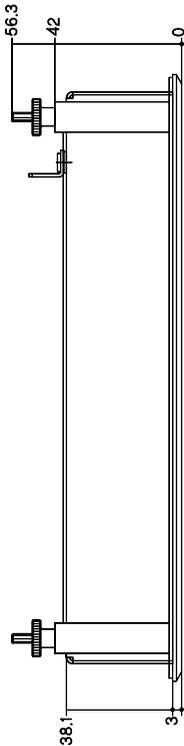
As a built-in terminal, the PG 674 has a connector on the rear side for the connecting cable to the cam control unit. The 24 V DC supply voltage is separately connected to a 2-pin screw-type locking connector.



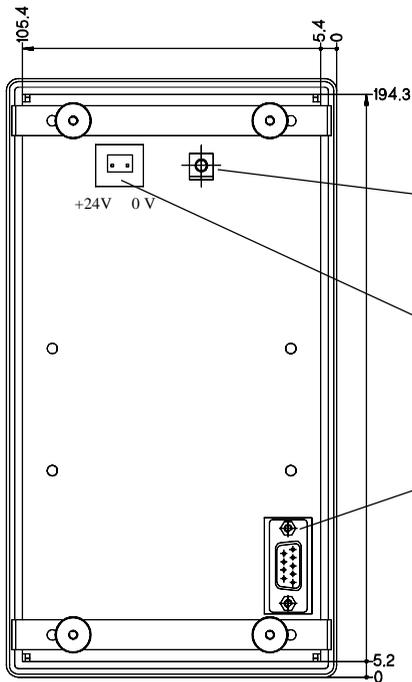
The built-in terminal is expected to be available as from Version 2.0 in the spring of 1995.

3.3.1. Design and Dimensions

Side view



Rear view



Connections:

Faston connector for protective ground

Screw-type locking connector for 24 V DC supply

Sub-D connector for connecting cable to the cam control unit

+24V 0 V

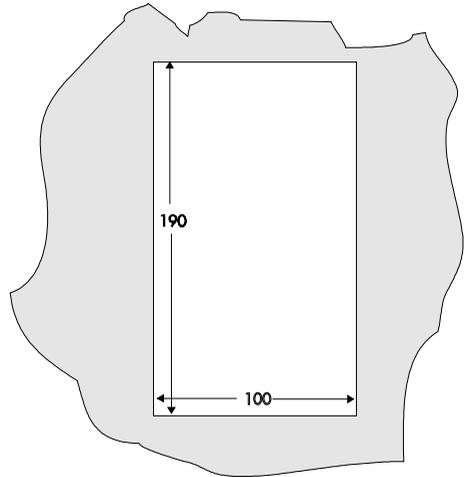
Cable order no.: 674.150.31

3.3.2. Installation

The PG 674 is installed in a front panel (i.e. switching cabinet door).

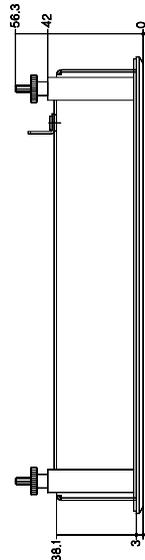
To do this you must cut out an opening in the front panel:

3.3.2.1. Front panel cutout



3.3.2.2. Inserting the built-in terminal

- Remove the rear mounting brackets of the PG 674:
to do this unscrew the 4 nuts.
- Push the PG 674 from the front into the front panel cutout.
- Screw the mounting brackets on again.



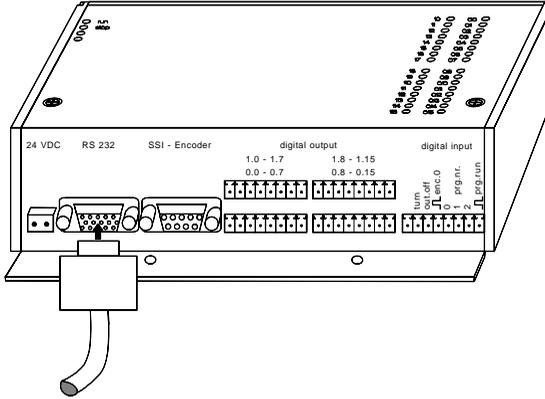
3.4. Technical specifications

Design	-hand-held terminal or -built-in terminal for front panel installation
Housing	
Hand-held terminal	plastic
Built-in terminal	aluminium
System of protection	IP 65 (for built-in terminal only at the front)
Power supply	
Voltage	24 V DC \pm 20 %
Current consumption	typ. 150 mA / max. 200 mA
Interfaces	V.24 (RS232) for connection to the controlling unit
Display	
Lines/Characters	LCD display 2 lines x 16 characters
Resolution	5 x 8 dots
Character size	~5 mm
Keyboard	25 keys
Program memory	
Type	RAM
Size	1 cam program
Buffering	accumulator
Ambient temperature	0...40 °C (during operation)
Order numbers	
Hand-held terminal	674.001.00
Built-in terminal	674.010.00
Connecting cable	674.150.31 (built-in terminal only)

4. The PG 674 as a programming device

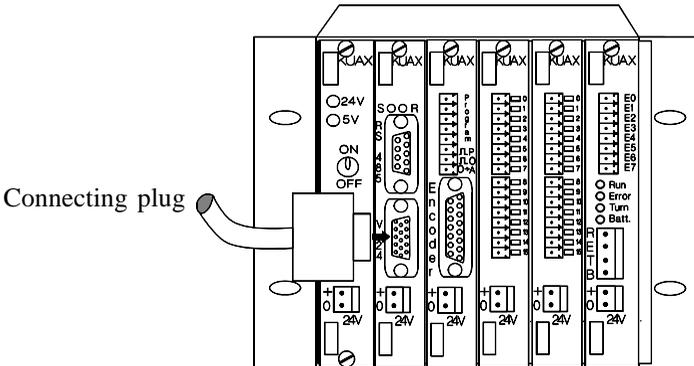
The cam control units KUAX 674 and KUAX 673 can be randomly programmed. The devices are equipped with a RS 232 serial interface for connection of the programming device.

Connection of the programming device to the KUAX 674



Connecting plug

Connection of the programming device to the KUAX 673



Connecting plug

4.1. General information on the operating terminal

The PG 674 is available both as a hand-held and built-in terminal. Using the appropriate connecting cable, it is connected to the „RS 232“ programming interface on the cam control unit. The hand-held terminal is supplied via the cam control unit.

The built-in terminal must have a separate supply.

Both types of terminal basically take over 3 tasks:

- Programming
- Choosing a program
- Commissioning testing and monitoring machines

The display consists of 2 lines with 16 characters each. Four pieces of information are permanently displayed in the standard display:

- Current program number
- Encoder position
- Encoder speed
- Output number

The key pad consists of 25 keys, 7 of which have a double function. The keyboard has been labelled for international use, partly with symbols. These symbols are also briefly described on the terminal.

The operating terminal has its own memory which is protected against data loss by an accu. This memory has the program number 32 and is suitable for copying programs from one cam control unit to another.



-This instruction manual already describes how to handle operating terminals with version 2.0 which are expected to be available as from the spring of 1995.

-This instruction manual is also valid for the operating terminals with version numbers < 2.0 although there are marginal differences in the display and keyboard labelling. These are fairly obvious, however. The handling of the device corresponds to that described in instruction manual E 293 GB for the KUAX 673, .

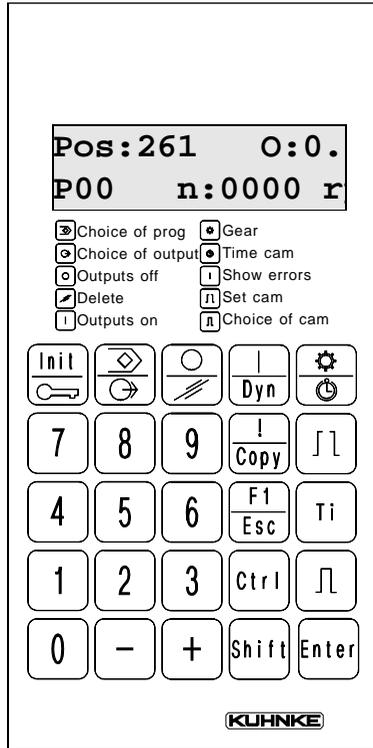
-The differences result from the further development and standardizing of the operating terminals.

4.2. Front view

LCD display
2 x 16 characters

description of
keyboard symbols

membrane key pad
25 keys



Double allocation of function keys

Some of the function keys have a double function. To activate the lower function you simply press the key. For the upper function you must first press the Shift key. "Shift" will appear in the display in this case. Example:



selected function = "Key"



selected function = "Initialization"

The PG 674 as a programming device

4.3. Key pad

The key pad consists of a numeric block (numbers 0-9), plus and minus keys, a Shift key, an Enter key and 11 function keys.

4.3.1. Function keys



Enter the key code (0-255) to activate the open mode.



Initialize the cam control unit: set encoder resolution, number of outputs, dead time allowance and encoder zero point.



Choice of output.



Choice of program number.



Delete (program or output) and/or undo last entry.



Switch all outputs off (for switching on see below).



Activate dynamic mode and program dead time compensation (for outputs 0.00-0.15).



Switch outputs on again (see above "Switch all outputs off").



Program time cam.



Set encoderr speed reduction (gear function).



Copy program.



Display status and error messages of the cam control unit.



Program new cams (using the numeric key pad).



Cancel function without accepting the entries (escape).



(Reserved for additional functions).



Teach-in (program cams using the current encoder position).



Show/change key code, special functions (Control).



Check present cam and edit if necessary.



Shift key (upper case switch) for double function keys (indiated as SHIFT in the display).



In devices with version numbers < 2.0, the Shift key is labelled like this: ⤴



Enter key (Return). Accepts entries and stores them if necessary (indicated as ENT in the display).



In devices with version numbers < 2.0, the Enter key is labelled like this: ↵

The PG 674 as a programming device

4.4. Operating modes of the operating terminal PG 674

4.4.1. Restricted operating mode

The PG 674 always returns to this operating mode when the supply voltage is switched on. You can only leave this mode by entering a number code via the KEY button (see ch. 4.6.1.).

Functions allowed

- Choice of program for machine operation (see ch. "4.6.7. Choice of program").
- Control of the switch on and switch off points of cams. You must directly choose the desired cam using Program and Output selections.
- Switch on the open operating mode by entering the defined key code.



The key code is factory-set to "0".

4.4.2. Open operating mode

You activate the open operating mode by entering the key code (see ch. 4.6.1.).

Functions allowed

- All functions without restrictions.



When in the open operational mode, you can modify programs and switch outputs on and off. For security reasons, only authorized personnel should know the key code.

Should the operating terminal remain on the machine, don't forget: before leaving the machine, quit the open operating mode (see also 4.6.2.):

To quit the open operating mode



("0" represents any number which is not the key code)

4.5. Display window of the operating terminal PG 674

The PG 674 has an LCD display with 2 lines of 16 characters each.

After switching on (connect PG 674 and/or switch on supply of the CPU), the PG 674 the following initial status message appears in the display:

```
PG 673/674 V1.00
* 0=D 1=GB *
```

(V1.00 is the version number of the PG 674. See ch. "4.6.5. System information" for display of the CPU software version of)

Language

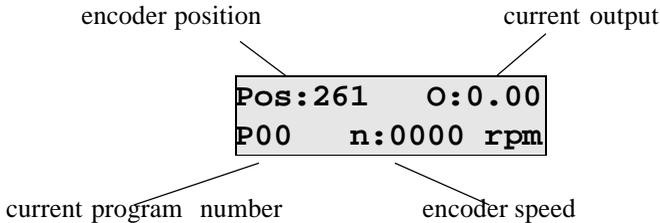
You can now choose the dialog language:

0=German, 1=English

You can change the language during operation (see "4.6.22 Choosing the dialog language")

Then the standard display appears:

4.5.1. Standard display



All of the commands and instruction sequences described in the following are started from the standard display. Exiting or cancelling (ESC) a command returns you to the standard display

The PG 674 as a programming device

4.6. Commands of the operating terminal PG 674

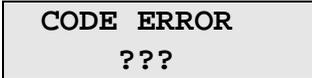
The PG 674 can be run in two operating modes (see ch. „4.4. Operating modes of the PG 674“). Switch on the „open“ operating mode to make use of all the commands:

4.6.1. Activating the open mode (entering the key code)

<u>Press</u>	<u>Display</u>	<u>Note</u>
		
 		key code (0...255)
		briefly displayed: Code OK

the open mode is now activated.

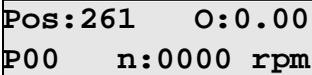
If the key code entered was incorrect, the following message will appear briefly:



```
CODE ERROR
???
```

In this case, the PG 674 will remain in the restricted operating mode.

This is followed by the standard display in both cases:



```
Pos:261    O:0.00
P00      n:0000 rpm
```

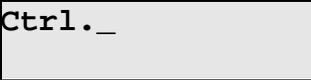
4.6.2. Exiting the open operating mode

Proceed as described in ch. 4.6.1. but entering an incorrect key code.

The restricted operating mode will be resumed.

4.6.3. Displaying the key code

In case the key code has been forgotten, it can be displayed briefly:

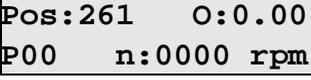
<u>Press</u>	<u>Display</u>	<u>Note</u>
		
		do not press Enter !
		displayed briefly: (Code= 099)

The device will automatically return to the standard display:



4.6.4. Changing the key code

Only possible when in the open operating mode.

		
		
		new key code (here: 6)
		key code accepted

The PG 674 as a programming device

4.6.5. System information

Three pieces of information are displayed with this command:

- type of operating terminal (here: standard type)
- resolution of the initialized encoder (here 360)
- CPU software version (here: V0.1)

Press

Display

Note

Ctrl

Ctrl._

4

**default
360pulses V0.1_**

system information

mit beliebiger Taste zur Standardanzeige zurück.

4.6.6. Displaying status and error messages

Display the operating state of the cam control unit:

Shift

SHIFT

!
Copy

Run ON

okay message and outputs "ON"

or error message:

**Stop OO
encoder error**

enc. error and outputs "OFF"

the following is a list of possible error messages:

- encoder error (i.e. no encoder connected, wrong type...)
- battery failure
- short circuit at the output
- check sum (program error)
- undervoltage
- speed too high for the current operating mode

Press any key to return to the standard display.

4.6.7. Choosing a program

The cam control unit can store several programs:

- KUAX 674: programs 0...7
- KUAX 673: programs 0...31

You can always select one of these programs for programming and/or operation.

Apart from the actual programs, the operating terminal has its own program memory which is addressed under number 32. This is used i.e. for copying a program from one controlling device to another.

There are various reasons for changing the program:

- to write a new program;
- to modify an existing program;
- to copy a program from one controller to another or
- to let the machine run with another program.

You choose the program either via the connected programming device or via the assigned inputs (see instruction manual of the controller).

4.6.7.1. Giving access to the choice of program function

In the open operating mode (see "4.4. Operating modes...") you are basically allowed to change from one program to another using the operating terminal.

In addition to this the programmer can stipulate whether or not this may also be allowed in the restricted operating mode. You can only specify this when in the open operating mode.

See the next page for how to assign authorization.

The PG 674 as a programming device

To give access to program selection in restricted mode

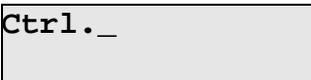
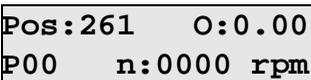
Anyone with access to the operating terminal should be able to change programs no matter what operating mode is set. This can be of significance when it is necessary to change programs frequently without problems occurring.

<u>Press</u>	<u>Display</u>
	
	
  	

This setting is saved and buffered by the accu.

To deny access to program selection in restricted mode

Only people who know the key code are authorized to change programs using the operating terminal. They must change to open mode prior to changing the program. This restriction can be of significance when a change of program during operation could lead to destruction or malfunction of any kind.

<u>Press</u>	<u>Display</u>
	
	
  	

4.6.7.2. Changing the program number

<u>Press</u>	<u>Display</u>	<u>Note</u>
	<pre>SHIFT</pre>	
	<pre>controller STOP? Yes=ENT No=ESC_</pre>	"NO" cancels the function
	<pre>program act.:0 des.:_</pre>	
	<pre>program act.:0 des.:1_</pre>	possible entries: 0...7
	<pre>Pos:261 O:0.00 P00 n:0000 rpm</pre>	choice of program OK

If there is no access right (see ch. 4.6.7.1.), then the following message will appear briefly:

```
CODE ERROR
???
```

then the device will resume the standard display with the unchanged program number:

```
Pos:261 O:0.00
P00 n:0000 rpm
```

The PG 674 as a programming device

4.6.8. Initializing the cam control unit

Before programming a cam control unit for the first time or if the hardware constellation has been changed, you must adapt the software to the hardware. We call this operation "Initialization". During initialization, you set the following parameters:

- number of outputs: 16 or 32
- encoder resolution (180, 360 or 1,000 imp/rotation)
- encoder zero point (current position as zero point)
- activate or deactivate dynamic mode



If a cam control unit with existing programs is reinitialized, parts of the program can be deleted.

Example:

- 32 outputs
- encoder resolution 360
- set zero point
- dynamic mode activated

Press

Display

Note



SHIFT



**controller STOP?
Yes=ENT No=ESC_**

"NO" cancels



**032 outputs ?
Yes=ENT No=ESC_**

number of outputs in steps of 16



**INIT:180 pulses?
Yes=ENT No=ESC_**

encoder resolution, ESC=next



**INIT:360 pulses?
Yes=ENT No=ESC_**

Enter=accept

<u>Press</u>	<u>Display</u>	<u>Note</u>
		current encoder pos.=zero point?
	<pre>dyn.act.= Enter not act.= ESC</pre>	activate dynamic mode?
	<pre>Pos:261 O:0.00 P00 n:0000 rpm</pre>	initialization complete

4.6.9. Choosing an output

You may allocate "any" number of cams to each output. The limit is set by the encoder resolution. A cam consists of a switching-on and the corresponding switching-off position of the output. You will have to select the corresponding output before you can program, modify or display cams.

Example:

- choose output O0.05



```
output act.:0.00
des.:_
```



```
output act.:0.00
des.:0._
```

possible entries (group): 0...1



```
output act.:0.00
des.:0.5_
```

possible entries (output): 0...15



```
Pos:261    O:0.00
P00      n:0000 rpm
```

choice of output OK



It's also possible to choose an output by stepwise pressing the "+" or the "-" keys.

The PG 674 as a programming device

4.6.10 Programming cams

You may allocate "any" number of cams to each output. The limit is set by the encoder resolution. A cam consists of a switching-on and the corresponding switching-off position of the output. Program the cams either by entering the output switching points via the numeric key pad or by using the teach-in method.

Cam numbering

The cams are numbered consecutively from 0 to n for every output. The numbers are assigned to the rising pulse edges in ascending order. This means that i.e. a cam which is switched on at position 10 has a smaller number than the cam which is switched on at position 15.



We strictly advise you against programming cams while the machine is running. Doing so could lead to undefined switching states that are dangerous to both man and machine.

Programming cams using the numeric key pad

Example:

- output O0.05: cam ON = 155, cam OFF = 275

<u>Press</u>	<u>Display</u>	<u>Note</u>
	<code>Outp.:0.05[]</code> <code>Edges: _</code>	
	<code>Outp.:0.05[]</code> <code>Edges:155_</code>	switching-on point
	<code>Outp.:0.05[]</code> <code>Edges:155 _</code>	
	<code>Outp.:0.05[]</code> <code>Edges:155 275_</code>	switching-off point
	<code>Pos:261 O:0.00</code> <code>P00 n:0000 rpm</code>	

Programming cams using the teach-in method

Example: Output O0.00: cam ON = 156, cam OFF = 312

Press Display Note

Setting the switching-on point

Ti	Pos:156 O:0.05 TI [156
----	------------------------------

Run drive into desired position, then:

Enter	Pos:156 O:0.05 TI [156±?	accept encoder position
-------	--------------------------------	-------------------------

+	or	-	optimize switching point if nec.
---	----	---	----------------------------------

Enter	Pos:156 O:0.05 TI [156]156	accept switching point
-------	--------------------------------------	------------------------

Setting the switching-off point

Run drive into the desired position, then:

Enter	Pos:156 O:0.05 TI [156]312±?	accept encoder position
-------	--	-------------------------

+	or	-	optimize switching point if nec.
---	----	---	----------------------------------

Enter	Pos:312 O:0.00 P00 n:0000 rpm	accept switching point
-------	--	------------------------



Since version 2.3 the reduced position is displayed of outputs with encoder reduction.

The PG 674 as a programming device

4.6.11. Optimizing cams

Modify cams that have already been programmed. This can also be done with the machine running.

Example: output O0.00, cam 2

- change switching-on point from 149 to 152
- change switching-off point from 345 to 340

<u>Press</u>	<u>Display</u>	<u>Note</u>
	Cam no: _ ?	which cam?
	Cam no: 2_ ?	cam 2 selected
	P00 Cam002_ O0.05 149[]312	(use + or - to select another cam)
	P00 Cam002 O0.05 _149[]312	cam 2 to be optimized
 or 	P00 Cam002 O0.05 _150[]312	optimize switching-on point
	P00 Cam002 O0.05 150[]312_	accept value
 or 	P00 Cam002 O0.05 150[]345_	optimize switching-off point
	P00 Cam002 O0.05 _150[]345	accept value
 or 	P00 Cam002_ O0.05 150[]345	cam is optimied, continue with:

<u>Press</u>	<u>Display</u>	<u>Note</u>
either:  or 	<pre>P00 Cam003_00.05 350[]370</pre>	select next/previous cam
or:  	<pre>Pos:312 O:0.00 P00 n:0000 rpm</pre>	quit optimization

4.6.12. Displaying cams

Display the switching points (on and off) of the cams of the current output. This function also allows you to make any changes necessary.

Example: output 00.05, cam 2

	<pre>Cam no: _ ?</pre>	which cam?
	<pre>Cam no: 2 _ ?</pre>	cam 2 selected
	<pre>P00 Cam002_00.05 150[]345</pre>	cam is displayed
 or 	<pre>P00 Cam003_00.05 350[]370</pre>	select next/previous cam

if a cam does not exist, the display looks like this:

```
P00 Cam..._00.05
...[           ]...
```

Optimizing the selected cam:

	<pre>P00 Cam002 00.05 _150[]345</pre>	cam 2 to be optimized
---	--	-----------------------

proceed as described in ch. "4.6.11. Optimizing cams".

The PG 674 as a programming device

4.6.13. Deleting cams

If a cam is deleted, the numbers of the cams above the deleted one are automatically adjusted by -1.

Example: output 00.00, cam 2 (ON = 149, OFF = 312)



```
Cam no: _ ?
```

which cam?



```
Cam no: 2_ ?
```

cam 2 selected



```
P00 Cam002_00.05  
149[            ]312
```

(use + or - to select another cam)



```
P00 Cam002 00.05  
delete ?_
```

Enter=delete, ESC=cancel



```
P00 Cam002_00.05  
350[            ]370
```

next cam moves one up



```
Pos: 312    O: 0.00  
P00    n: 0000 rpm
```

quit function

4.6.14. Deleting outputs

Delete all cams programmed for one output in a program. You must set program number and output before you can delete the cams.

Example: program 0, output O0.00

Press	Display	Note
	<code>delete prog = 1 delete outp = 2_</code>	program or output?
	<code>Delete O:0.00 ? Yes=ENT No=ESC_</code>	delete output
	<code>Pos:312 O:0.00 P00 n:0000 rpm</code>	deletes output

4.6.15. Deleting programs

Delete all cams contained in a program. You must set the program number before you can delete the cams.

Example: program 0

	<code>delete prog = 1 delete outp = 2_</code>	program or output?
	<code>Prg.00 delete ? Yes=ENT No=ESC_</code>	delete program
	<code>Pos:312 O:0.00 P00 n:0000 rpm</code>	deletes program

The PG 674 as a programming device

4.6.16. Copying programs

The cam control units can receive several programs (KUAX 674: No.s 0...7, KUAX 673: No.s 0...31). If several programs have to be created for one machine, they very often only differ in minor details. The PG 674 provides the copying function to facilitate programming. Use this function to copy a complete program to another program number. Afterwards, it is an easy task to do the necessary adjustments (see "4.6.11. Optimizing cams").

The copying function is independent of the currently set program.



Copying overwrites an existing program at the destination position.

Example: copy program 0 to program 5

<u>Press</u>	<u>Display</u>	<u>Note</u>
	<code>copy from _</code>	which program?
	<code>copy from 0_</code>	program 0
	<code>copy from 0 > _</code>	where to?
	<code>copy from 0 > 5_</code>	to program 5
	<code>copy from 0 > 5 Yes=ENT No=ESC_</code>	are you sure?
	<code>Pos:312 O:0.00 P00 n:0000 rpm</code>	function OK.

4.6.17. Program transfer

Apart from the programs (0...7/31) in the memory of the cam control unit there is also program no. 32 (for some old devices: no. 8). This program is in the memory of the operating terminal PG 674. In the display, it is called "BT" .

It is used for:

- program transfer from one cam control unit to another
- transfer to the place of programming (KUAX 674 and PC running NOBES 674) for program backup and documentation
- intermediate storage of a program when copying and/or exchanging programs



Do not transfer programs when machine is running. Reason: when copying between program 32 (BT) in the operating terminal and programs 0...7/32 in the cam control unit the program is stopped for a few seconds and the outputs are switched off for the same period.

Press

Display

Note

!
Copy

copy from _

which program?

0

copy from 0_

program 0

Enter

copy from 0 > _

where to?

3 **2**

copy from 0 >32_

to the operating terminal

Enter

Copy from 0 > BT
Yes=ENT No=ESC_

are you sure?

Enter

controller STOP?
Yes=ENT No=ESC_

really?? (stop = outputs off)

Enter

Pos:312 O:0.00
P00 n:0000 rpm

after a few seconds: function

OK

The PG 674 as a programming device

4.6.18. Activating the dynamic mode of outputs

Outputs O0.00 to O1.15 can be put into dynamic mode. There are 2 different types of dynamic mode:

- dead time compensation
- time cam

The dynamic mode is toggled on or off for all all dynamic outputs once during initialization (see "4.6.8. Initializing the cam control unit").

Apart from this general control function there is also a corresponding mechanism for every individual output:

<u>Press</u>	<u>Display</u>	<u>Note</u>
		call up function
use the Enter key to choose an output, i.e.:		
		output O0.04 selected
		activate dynamic mode
or:		
		deactivate activated dyn. mode

if you want to enter the time constant for deadtime compensation of the selected output, continue as described in chapter:

 "4.6.19. Deadtime compensation"

otherwise complete by pressing:

		end
---	---	-----

4.6.20 Time cams

Outputs O0.00 through O1.15 can work as so-called time cams (see ch. "4.4.2. Time cam") in dynamic operation. Their purpose is to switch on the assigned output for a defined length of time (in the range of 0 through 5,000 ms). The time cams are switched on at the switching-on point defined in the program and switched off again after this time.

The function is not carried out until:

- the time cam as such is switched on (see below),
- the output is in dynamic mode (see ch. "4.6.18. Activating the dynamic mode of outputs") and
- the dynamic mode of all dynamic outputs (see ch. "4.6.8. Initializing the cam control unit") has been activated.

Press

Display

Note



```
time-cam O:0.00
█
```

call up function

use the Enter key to select an output, e.g.:



```
time-cam O:0.00
█ █
```

output 0.01 selected

switch time cam on or off (if switched on already):



```
time-cam O:0.00
█ █
```

switch time cam on/off

enter length of time:



```
time act.:0000
O:0.01 des.:_
```

prompt for length of time



```
time act.:0000
O:0.01 des.:50_
```

enter time



```
time-cam O:0.00
█ █
```

time accepted

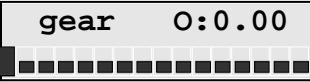
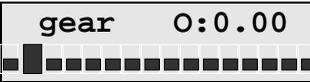


```
Pos:312 O:0.00
P00 n:0000 rpm
```

end

4.6.21. Encoder speed reduction – electronic gearing

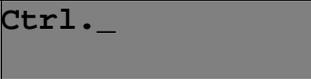
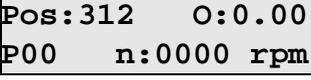
The speed of outputs O0.00 through 0.15 can be reduced so that the programmed cams extend to 2, 3, 4, 5, 6, 7, 8 rotations of the encoder (see ch. "4.4.3. Encoder speed reduction").

<u>Press</u>	<u>Display</u>	<u>Note</u>
		
		call up function
use the Enter key to select an output, i.e.:		
		output 0.01 selected
switch encoder speed reduction on or off (if switched on already):		
		switch reduction on/off
enter reduction factor:		
		prompt for reduction factor
		factor 2 entered
		

The PG 674 as a programming device

4.6.22. Choice of language

The operating terminal can be supplied with English or German labelling. The operating program is identical in both cases. Normally, you set the language for dialogs with the operating terminal upon switching the device on (see ch. "4.5. Display window"). You have the opportunity of changing the dialog language later, though:

<u>Press</u>	<u>Display</u>	<u>Note</u>
		
		
		0=German, 1=English
		selects German
		

4.6.23. Setting the display contrast (as from version 2.0)

The brightness of the display (Contrast) can be set via the keyboard. This function is only available when switching the operating terminal on.

<u>Press</u>	<u>Display</u>	<u>Note</u>
press key 0 when switching the PG 674 on:		
	<code>0:End 1:Continue 2:Single 3:Setup</code>	
	<code>Contrast +: 1 Contrast -: 0</code>	higher: 1, lower: 0
	<code>0:End 1:Continue 2:Single 3:Setup</code>	return
	<code>PG 673/674 V1.00 * 0=D 1=GB *</code>	to startup



This function is only available in devices from version 2.0.

The PG 674 as a programming device

4.6.24. Self-test of the operating terminal (as from version 2.0)

In devices with version numbers 2.0 or higher, the self-test function has been revised. It now offers:

- testing of the display (LC),
- testing of the RAM memory (RAM),
- testing of the keyboard (Keyboard),
- testing of the serial interface (V.24). This test has not been designed to be done by the user, however, as a special short-circuit connector is required (with pins 2 and 3 short-circuited).

This function is only available when switching the operating terminal on.

<u>Press</u>	<u>Display</u>	<u>Note</u>
press key 0 when switching the PG 674 on:		
0	0:End 1:Continue 2:Single 3:Setup	
2	0:End 1:LC 2:V24 3:RAM 4:Keyboard	start individual test
		testing 1: display, 2: V.24, 3: RAM, 4: keyboard
1	11111111 1111111111111111	testing display: digits 1...9
danach:	0:End 1:LC 2:V24 3:RAM 4:Keyboard	
3	** RAM test ** XXXX	testing RAM memory
danach:	** RAM test ** RAM ok! _	okay message or error message
Enter	0:End 1:LC 2:V24 3:RAM 4:Keyboard	

4

```
Press key
row: 1 column: 1
```

testing keyboard

The operating terminal now expects you to press all the buttons one after the other (starting top left, row by row). In the lower line of the display you can see the key which you are to press next:

```
row:    <#>
column: <#>
```

then:

```
Press
Test ok !_
```

okay message or error message

Enter

```
0:End 1:LC 2:V24
3:RAM 4:Keyboard
```

0

```
0:End 1:Continue
2:Single 3:Setup
```

return

0

```
PG 673/674 V1.00
* 0=D 1=GB *
```

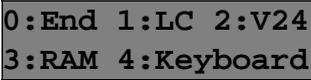
to startup

The PG 674 as a programming device

4.6.25. Self-test of the operating terminal (versions < 2.0)

The operating terminal PG 674 (versions < 2.0) has a built-in self-test. It tests the following:

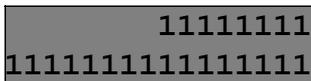
- the display,
- the program memory and
- the keyboard

<u>Press</u>	<u>Display</u>	<u>Note</u>
		
		testing display (automatically)
then:		testing keyboard

The operating terminal now expects you to press all the buttons one after the other (starting top left, row by row). The displayed number indicates the coordinates of the key and is to be interpreted as follows:

- 1st digit: row
- 2nd digit: column

If the keyboard test has been completed successfully, the following will be displayed:



```
      11111111
1111111111111111
```

Press any key to return to the standard display

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