rOtring NC-scriber

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Schnitt A–B
Section A–B

Betriebsanleitung

NC-scriber CS 100

Art. Nr. 691 152

Operating Instructions

NC-scriber CS 100

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NC-scriber CS 100

Operating Instructions

Art. No. 691 152

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1.1 The NC-scriber CS 100
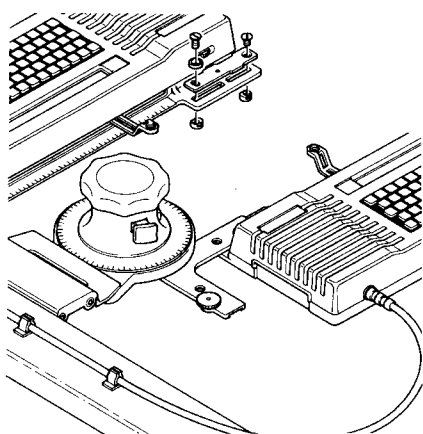

1   Chuck plate for attachment to drafting head

2   Height adjustment for the scribing tool

3   Scribing arm

4   Technical pen with standard thread or
rotring rapidoplot MPP 5P

5   LCD for input control

6   ON/OFF switch

7   Cassette slot with cassette

8   Plug connection, supply cable

9   Input keyboard
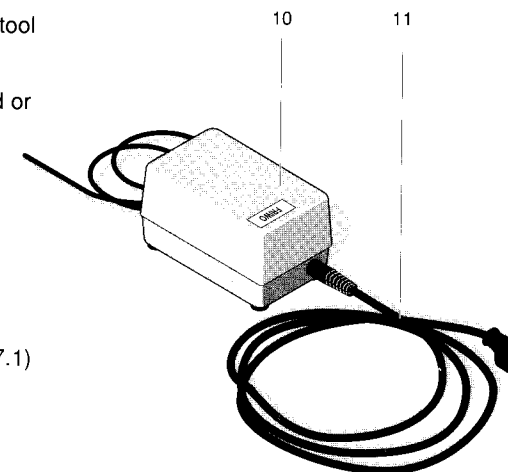
10   Power unit (for voltage, see Sect. 7.1)

11   Mains cable

1.2 Attachment to Drafting Head

The NC-scriber comes with chuck plates fitting most drafting machines.

The elongated holes in the chassis make it possible to use also the chuck plate of the drafting machine's ruler.

1.3 Inserting the Scribing Tool

Insert a technical pen (barrel removed) or the rotring rapidoplot MPP 5P into the scribing arm.

Adjust the height of the drawing nib to about 1.5 mm.

1.4 Starting Operations

Switch on power and press **START CHECK**. The NC-scriber is ready for operation.

Action/Input	Display	Result

Switch on power

```
CS 1ØØ   X.X    4KB
```
Software version   Memory capacity

[START CHECK]

```
         TEXT                    MM
THØ3.5Ø  ♦  TW1.ØØ  ♦  TAØ9Ø  ♦  T/
```
Character height Character   Inclination   Text follows
(3.5 mm)   width   (vertical)
                  (factor 1)

1.5 Multiple Key Functions

The keys offer up to 3 functions.

The first function is executed directly.

The second and third functions are available after pressing the corresponding function key.

1.6 Status Display

```
2.FUNCT MONITOR      INS   RM   CASS   TOL   COM  TEXT        INCH MM        UP
2.FUNCT
  FIX  |            Display for 36 characters
3.FUNCT
```
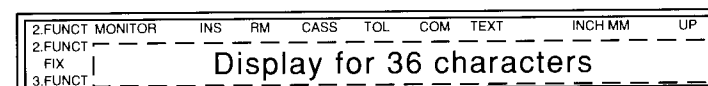
Functions selected via keyboard and shown on the LCD:

Display shows	Meaning
[2 FUNCT] 2.FUNCT	The next character is capitalized
[2 FUNCT] 2.FUNCT FIX	All following characters are capitalized
[FUNCT 3] 3.FUNCT	Special characters (lower left corner of the keys)
[CASS] CASS	Cassette is activated
[TOL ⊙] TOL	The tolerance function is activated
[INS UP] INS	Characters are inserted into memory
UP	Operating mode with pen up

Other functions which can be selected via the parameter menu:

Display shows	Meaning
MONITOR	Line memory
RM?	Memory output
M	Memory input
M?	Memory display, editing, copying
TEXT	Text mode
COM	Command entry mode
INCH	Measuring unit: inch
MM	Measuring unit: mm

9/10 h　10/10 h
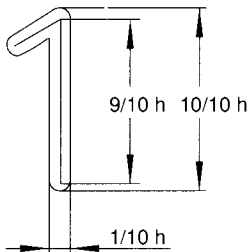
1/10 h

2.1 Input and Display

To attain precisely the selected character height of a standard font, e. g. ISO 3098/I, use a pen of line width 1/10 h.

Max. character height:

Capital letters 30 mm
Capital letters with diacritical marks 25 mm.

Action/Input	Display	Result
A B C D	TEXT / abcd	abcd
2 FUNCT / A B C	2.FUNCT TEXT / Abc	Abc
2 FUNCT / A B C	2.FUNCT TEXT / FIX / ABC	ABC
FUNCT 3 ; / FUNCT 3 :	TEXT / ; : / 3.FUNCT	; :
(key)	TEXT / ↡	Line change
FUNCT 3 / (key)	TEXT / ← / 3.FUNCT	Return to start of line
(key)	TEXT / ↟	Return to start of 1ˢᵗ line
FUNCT 3 / (key)	TEXT / → / 3.FUNCT	Move to right end of line

Action/Input	Display	Result
(arrow keys) To move the scribing arm	TEXT / ← → ↑ ↓	Shift: 1/10 TH / Hold down key: Moving
BS Backspace (up to 16 characters)	TEXT / abcee	abcee
Position the scribing arm first. FUNCT 3 TAB Set TAB	TEXT / ▣	**Tabulator**, max. 40 TABs
TAB Reach TAB	TEXT / ▸|	acemogpj / adspry / dbeaejm / jlsanchez ‖ kcdmen / kcvmwn / lweop / xfcksuv ‖ gphiq / uldwbc / ulwnoyz / skcmec
TAB FUNCT 3 TAB Delete TAB		
UL Hold down key	TEXT / —	abcdefg
FUNCT 3 UL Hold down key	TEXT / — / 3.FUNCT	abcdefgh
M TOL + 2 TOL	TOL　TEXT / m▣+2	m^2
2 FUNCT H TOL – 2	TOL　TEXT / H▣-2▣0	H_2O
TOL 2 FUNCT O		For tolerance indications, see page 19.

2.2 Parameters Menu

	COM		MM
1	TH Ø 3.5 Ø TW 1. Ø Ø TA Ø 9 Ø		TD + Ø Ø

Menu line	Character height		Character width	Italics	Character spacing
	01.80 mm	07.00 mm	Factor 0.7	75°	+ 00
	02.50 mm	10.00 mm	Factor 1.0	90°	- 10
	03.50 mm	14.00 mm	Factor 1.4	105°	+ 10
	05.00 mm				

	COM		MM
2	BT Ø FR Ø I H Ø PR 1 UL Ø		PS 2

Menu line	Beginning of text	Frame	Unit of measurement	Parameter reset	Underscore	Writing speed
	0 = OFF	R = Rectangle	0 = mm	0 = OFF	0 = OFF	1 = Slow
	1 = ON	B = Oval	1 = inch	1 = ON	1 = ON	2 = Normal
		C = Circle				
		0 = Execute				

	COM		MM
3	MO Ø CP Ø LA 1 LW 1. Ø Ø		LS 1. Ø Ø

Menu line	Monitor	Raster spacing	Line type	Dash length, intermittent lines	Dash spacing
	0 = OFF	0 = OFF	1. ——	Factor 0.7	Factor 0.7
	1 = ON	1 = ON	2. — — ·	Factor 1.0	Factor 1.0
			3. — —··	Factor 1.4	Factor 1.4
			4. ——··		

	COM		MM
4	RT Ø Ø Ø SC 1. Ø Ø LDR Ø 1.6		MI Ø

Menu line	Rotation in degrees		Scale	Line spacing	Mirror inversion
	000	180	0.50	A = Absolute: 05.6 mm	0 = OFF
	090	270	1.00	R = Relative: 01.6 mm	1 = ON
			2.00		

	COM		MM
5	BN Ø 1 : X + Ø Ø Y + Ø Ø MC Ø		TP Ø

Menu line	Wide-pen effect	Memory cassette	Text alignment
	01 = Number of executions	0 = OFF	0 = OFF
	X+ = Distance in X-direction	R = Read	R = Flush right
	Y+ = Distance in Y-direction	W = Write	L = Flush left
	01: X+00Y+00	V = Verify (compare)	M = Centered
	02: X+01Y+01	P = Protected	B = Block
	02: X+02Y+02	U = Unprotected	

	COM		MM
6	SP Ø CT 4 ISO 3 Ø 98 / I		

Menu line	Spacing	Fonts
	0 = OFF	CT1 DIN 17 T (technical symbol/keyboard)
	1 = ON	CT2 UNIVERSAL
		CT3 ISO 3098 T (technical symbol/keyboard)
		CT4 ISO 3098/I
		CT5 Font cassette in cassette slot

Use the spacebar to leaf through the parameter options.
Activate selected parameters by pressing ENTER.

2.3 Selecting Parameters from the Menu

[PARAM IP]

Menu line 1 appears.

The 1st method

Use the cursor keys to step through the menu and overwrite the parameters.

Vertical	Menu lines 1 to 6, upwards or downwards.
Horizontal	The cursor jumps to the next selectable parameter within a line.

The 2nd method

[PARAM IP] [6]

Press **PARAM**: Menu line 1 appears. For other menu lines, press 2 to 6 as required.

The 3rd method

[PARAM IP] [R] [T]

Press **PARAM** and key in the parameter code, e. g. **RT** for rotate. The cursor moves directly to the selected parameter.

To change parameters:
All parameters can be overwritten.

Spacebar for parameter options

All parameters have default values which can also be selected by pressing the spacebar.

To confirm changed parameters

[ENTER]

Press **ENTER** key

[STOP]

Any procedure is immediately aborted.

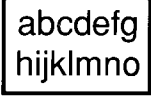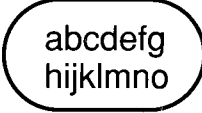## 2.4 Menu 1: Character Height - Extended/Condensed - Italics - Spacing

			COM		MM
1	THØ3.5Ø	TW1.ØØ	TAØ9Ø	TD+ØØ	

Action/Input	Display	Result
Character height Range: 1 to 30 mm Option: 1.8 mm 7.0 mm 2.5 mm 10.0 mm 3.5 mm 14.0 mm 5.0 mm Example: Character height 12.5 mm	THØ3.5Ø TH12.5Ø	abcdefghijklm abcde
Note: Make room for higher characters. Press "Start of 1st line" key.		
Extended/condensed writing Range: 0.01 to 9.99 Option: 0.70 1.00 1.40 Example: Character width 0.50	TW1.ØØ TWØ.5Ø	abcdef abcdefghijklm
Italics Range: 45° to 135° in 1° steps Option: 75°, 90°, 105° Example: Italic 76°	TAØ9Ø TAØ76	*abcdef*
Character spacing Range: +/- 99 Option: -10, +00, +10 Example: Reduce character spacing by 10/100.	TD+ØØ TD-1Ø	abcde abcde

2.5 Menu 2: Beginning of a Line - Framing

				COM	MM
2	BTØ	FRØ	IHØ	PR1	ULØ	PS2

Action/Input	Display	Result
Beginning of a line Position the scribing arm.	BTØ	Text starts at the normal beginning of the line on the left side.
Set start of line.	BT1	Text starts at the new beginning of the line.
Framing text If the scribing arm is in the first line, press "Line change" for space. 1. Select frame type. 2. Enter text or number. 3. Execute frame with **FRØ**. Here you can also use the text alignment and under-scoring functions.	FRØ	OFF Width and height of frame correspond to number of characters and lines. abcdefg hijklmno
Frame, rectangular	FRR	
Frame, oval	FRB	abcdefg hijklmno
Frame, circle To center a single character, press "arrow-to-right" key about 3 times.	FRC	12 .1
Execute frame	FRØ	Execution/OFF

Menu 2: Measuring Unit - Parameter Reset - Underscoring - Writing Speed

			COM		MM
2	BTØ	FRØ	IHØ	PR1	ULØ	PS2

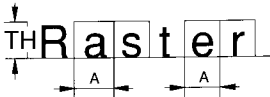| Action/Input	Display	Result
Measuring unit mm	**IHØ** The display shows "MM"	**metric** Character height, lines, circles, coordinate system.
Measuring unit inch	**IH1** The display shows "INCH"	**inch** Character height, lines, circles, coordinate system.
Parameters reset	**PR1**	**ON** Parameters changed in a memory are reset to the previously used values after closing the memory.
Avoiding parameter reset	**PRØ**	**OFF** Parameters changed in a memory remain valid after closing the memory.
Underscoring of text You can also underscore in the "text justify" mode (**TP**) and within a frame (**FR**). 1. Enter the text, e. g. abcdefg 2. Press \<CR\> (line feed). Pressing the keys [keys] causes underscoring of the last entered line of text.	**UL1**	**ON** All characters subsequently input are earmarked for underscoring. abcdefg <u>abcdefg</u>
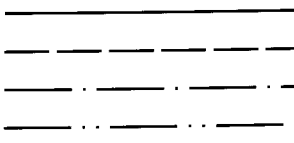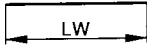
Menu 2: Measuring Unit - Parameter Reset - Underscoring - Writing Speed

			COM		MM
2	BTØ	FRØ	IHØ	PR1	ULØ	PS2

Action/Input	Display	Result
3. Key in the text, e. g. hijklmnop. 4. End of underscoring.	**ULØ**	**Execute/OFF** <u>abcdefg</u> <u>hijklmnop</u>
If **CASS** (cassette) is called up, underscoring will be switched off.		The text is underscored at a distance equaling 3/10 of the previously used character height.
Writing speed	**PS2**	**Approx. 2 cm/s**
Writing speed reduced	**PS1**	**Approx. 0.5 cm/s**

2.6 Menu 3: Monitor - Raster-Size Characters - Line Types - Intermittent Lines

```
                              COM              MM
     3   MOØ   CPØ   LA1   LW1.ØØ   LS1.ØØ
```

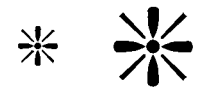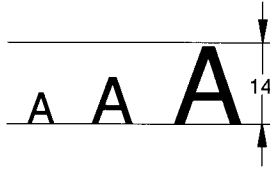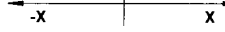| Action/Input	Display	Result
Monitor OFF	**MOØ**	OFF
Monitor ON	**MO1** The display shows "MONITOR"	ON Line memory is activated
Text can be entered line by line	ABCDE	Input is shown on the display
[↵] or [RUN]		The displayed text is written
Raster-size characters	**CPØ**	OFF
Raster-size ON	**CP1**	ON
ISO 3098 A = 0.8 x TH DIN 17 A = 1.0 x TH UNIVERSAL A = 1.0 x TH		
Line type [UL]	**LA1** **LA2** **LA3** **LA4**	
To change length of line elements, e. g. factor 2.25 Option: 0.70 - 1.00 - 1.40	**LW2.25**	
To change intervals, e. g. factor 2.00 Option: 0.70 - 1.00 - 1.40	**LS2.ØØ**	
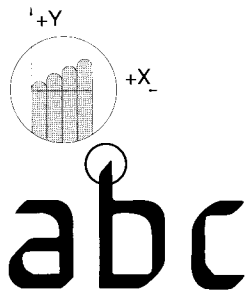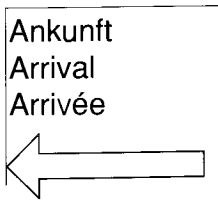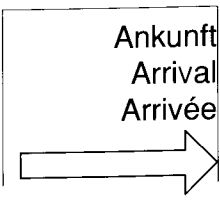
2.7 Menu 4: Writing Direction - Scales - Line Spacings - Mirroring

```
                              COM              MM
     4   RTØØØ   SC1.ØØ   LDRØ1.6   MIØ
```

Action/Input	Display	Result
Writing direction **Rotate direction** [ ]	**RTØØØ** **RTØ9Ø**	Writing direction 0°
Option: 000° 090° 180° 270°	**RT18Ø** **RT27Ø**	
Scale for symbols and memory contents	**SC1.ØØ**	
Scale factor 2	**SC2.ØØ**	
Option: 0.50 - 1.00 - 2.00		Factor 1 Factor 2
Line spacing (LDR relative)	**LDRØ1.6**	New line spacing, baseline to baseline: TH 3.5 x 3.2 = 11.2 mm
e. g. space factor 3.2, selected character height TH 3.5 mm	**LDRØ3.2**	
Change the line spacing (LDA absolute)	**LDAØ5.6**	
e. g. spacing 14 mm absolute	**LDA14.Ø**	
Mirroring	**MIØ**	OFF
Mirroring text or symbols:	**MI1**	 ON
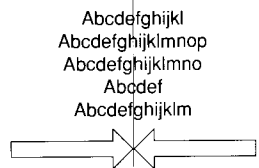
2.8 Menu 5: Wide Pen Effect and Text Alignment

```
                              COM              MM
  5  BNØ1:X+ØØY+ØØ      MCØ ---    TPØ
```

Action/Input	Display	Result
Wide pen effect (Ornamental font)	BNØ1:X+ØØY+ØØ	OFF
Example		
1. Number of executions: 4	BNØ4	
2. Distance in X-direction: +3/10 mm	BNØ4:X+Ø3	
3. Distance in Y-direction: +4/10 mm	BNØ4:X+Ø3Y+Ø4	
Option: 01:X+00Y+00 02:X+01Y+01 02:X+02Y+02		
Text alignment	TPØ	OFF
Flush left		
1. Position the scribing arm.		
2. Set left aligned.	TPL	ON
3. Enter text.		
Press the line feed key: The line will be written.		Ankunft Arrival Arrivée
4. End of text alignment.	TPØ	OFF
Flush right		
1. Position the scribing arm.		
2. Set right aligned.	TPR	ON
3. Enter text.		Ankunft Arrival Arrivée
Press the line feed key: The line will be written.		
4. End of text alignment.	TPØ	OFF

abc

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Menu 5: Text Alignment and Memory Cassette

```
                              COM              MM
  5  BNØ1:X+ØØY+ØØ      MCØ       TPØ
```

Action/Input	Display	Result
Text centered		Abcdefghijkl Abcdefghijklmnop Abcdefghijklmno Abcdef Abcdefghijklm
1. Position the scribing arm.		
2. Text centered.	TPM	
3. Enter text.		
4. End of text alignment.	TPØ	
Justified text		ON
1. Position the scriber arm.		60 mm
2. Set text block.	TPBØØØ.Ø	**Airport**
3. Enter block width in mm, e. g. 60 mm.	TPBØ6Ø.Ø	Airport, aeroport, airport, aeroport, airport, aeroport, air
4. Key in text.		Text justification is a style with left and right margins possible **through extending** or compressing the characters of a line.
Press the line feed key: The line will be written.		
5. End of text alignment.	TPØ	OFF

Memory Cassette

The memory contents of the NC-scriber can be saved on a cassette (option) and loaded back into the memory any time as a "block". The contents of the individual memory can be

MCØ	=	Memory cassette OFF
MCR (read)	=	Load cassette contents into the memory
MCW (write)	=	Transfer memory contents to the cassette
MCV (verify)	=	Compare contents of cassette & memory
MCP (protect)	=	Cassette is write-protected
MCU (unprotect)	=	Cassette is unprotected

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Menu 5: Memory Cassette

```
                              COM                    MM
   5   BNØ1:X+ØØY+ØØ      MCØ        TPØ
```

Action/Input	Display	Result
Memory cassette	**MCØ**	OFF
Transfer the memory contents to the cassette. [ENTER]	**MCW** MEMORY CASS WRITE?	Memory contents are/were transmitted.
Compare contents of cassette and the memory. [ENTER]	**MCV** MEMORY CASS VERIFY?	Contents identical/ Not identical
Write-protect the cassette. [ENTER]	**MCP** PROTECT MEM. CASS?	Cassette is write-protected.
Cancel the write-protection. [ENTER]	**MCU** WRITEPROTECT OFF?	Cassette is not write-protected.
Load cassette contents into memory. [ENTER]	**MCR** MEMORY CASS READ?	Cassette contents in memory.
Output of an individual memory from the cassette, block 1, e. g. memory 12: [CASS] [1] [1] [2] [RUN]		Memory 12 is output.

2.9 Menu 6: Spacing - Writing Fonts

```
                                 COM               MM
   6    SPØ    CT4   ISO   3Ø98/I
```

Action/Input	Display	Result
Spacing *	**SPØ**	OFF AWAY Tele
Spacing * * Only for ornamental fonts (not for standardized technical fonts).	**SP1**	ON AWAY Tele

Selecting a font

Action/Input		Display	Result
Keyboard: "TW technical"	Art. No. 691 154	**CT1**	DIN 17T
"TW" "alpha"	691 153 691 155	**CT2**	UNIVERSAL
"TW technical"	691 154	**CT3**	ISO 3098/T
"TW" "alpha"	691 153 691 155	**CT4**	ISO 3098/I
Ornamental font: Insert font cassette.			
"TW" "alpha"	691 153 691 155	**CT5**	According to the font cassette inserted.

2.10 Default Parameters

Default (or "start") parameters are those that are automatically available after pressing **START CHECK**; they are programmed to be fixed and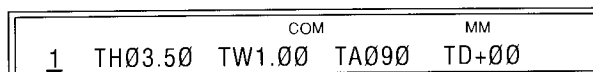 independent from the optional parameters, which can be selected from the parameters menu. However, you can also write default parameters for individual applications and store them in the default-value memory.
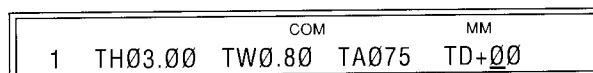
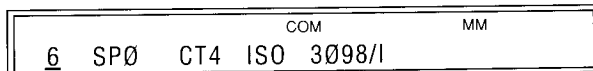| Action/Input	Display	Result

Changing the start parameters

Example:

Character height (TH) 3 mm
Character width (TW) Factor 0.8
Italic (TA) 75°
Font (CT2) UNIVERSAL

[FUNCT 3] [RM M] [S] [T] [RUN]		COM	MM
	1 THØ3.5Ø	TW1.ØØ TAØ9Ø	TD+ØØ

Character height　Ø3.ØØ
Condensed　　　　Ø.8Ø
Italic　　　　　　　Ø75

	COM	MM
1 THØ3.ØØ	TWØ.8Ø TAØ75	TD+ØØ

Call up menu line 6.

	COM	MM
6 SPØ	CT4 ISO	3Ø98/I

CT2 UNIVERSAL

	COM	MM
6 SPØ	CT2 UNIVERSAL	

[INS UP]　Unchanged parameters are accepted into the default-value memory.

[ENTER]　New parameters are accepted and will supersede any existing in the memory.

[RUN]　The new parameters are now set and confirmed.

Reading start parameters

[M?] [S] [T] [RUN]　Display shows start parameters of default-value memory.
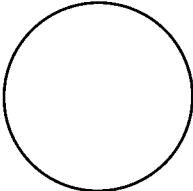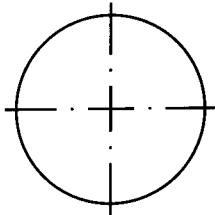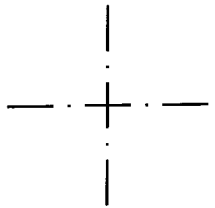
[RUN]　Default-value memory is closed.

3.1 Dimensioning and Tolerances

Action/Input	Display	Result

Drawing an arrowhead

| [→] Hold key [→] | TEXT　　　MM
TAØ9Ø ◆T/← → | |

| [2] [0] [TOL ⊙] [+] [+]
[0] [,] [5] [TOL ⊙] | TEXT　　　MM
T/2Ø ▮++Ø,5▮ | 20$^{+0,5}$ |

| [2] [0] [TOL ⊙] [+] [2 FUNCT]
[−] [0] [,] [5] [TOL ⊙] | TEXT　　　MM
T/2Ø ▮+-Ø,5▮ | 20$^{-0,5}$ |

| [2] [0] [TOL ⊙]
[+] [+] [0] [,] [5]
[−] [−] [0] [,] [2]
[TOL ⊙] | TOL TEXT　　MM
T/2Ø ▮++Ø,5

TOL TEXT　　MM
--Ø,2▮ | 20$^{+0,5}_{-0,2}$ |

| [2] [0] [TOL ⊙]
[+] [+] [0] [,] [5]
[TOL ⊙] | TEXT　　　MM
T/2Ø ▮±±Ø,5▮ | 20$^{±0,5}$ |

3.2 Circles - Coordinate Axes

Action/Input	Display	Result

Drawing circles

(max. diameter 45 mm)

FUNCT **3**   TOL ⊙

    MM
⊙ C̲M̲0̲1̲0̲0̲

C = Circle   Diameter
A = with coordinate axis   MM = mm
+ = only coordinate axis   I = Inch

Circle program **ON**.
The scribing arm moves to its position.

→   Move cursor and overwrite parameter.

RUN   Press **RUN** after positioning NC-scriber. Press **RUN** again for multiple output.

The circle will be executed. The last setting remains valid.

Circle without coordinate axis

FUNCT **3**   TOL ⊙   C   M
0   2   5   0
RUN

    MM
⊙ CM0250

Circle with coordinate axis

FUNCT **3**   TOL ⊙   A   M
0   2   5   0
RUN

    MM
⊙ AM0250

Coordinate axis without circle

FUNCT **3**   TOL ⊙   +   M
0   2   5   0
RUN

    MM
⊙ +M0250

4.1 Symbol Cassettes

rotring symbol cassettes are available for a variety of technical fields.
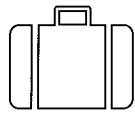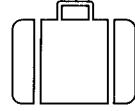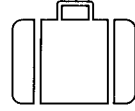
Each cassette comes with a list showing number and starting point of each symbol.

For change of scale, see Sect. 2.7.

IMPORTANT:

After inserting a cassette, press the **STOP** key.

Action/Input	Display	Result

4.2 Drawing a Symbol

CASS

  CASS   MM
T/ ⊞ DEC   001

Cassette is activated.

Enter the symbol number, e. g. 124

Cassette name   Symbol number

1   2   4   RUN

  CASS   MM
T/ ⊞ DEC 124   124

The scribing arm moves to its starting position.

Move NC-scriber to align nib over symbol starting point in drawing.

RUN

To repeat the symbol

RUN

  CASS   MM
T/ ⊞ DEC 124   124

End of using the symbol cassette

CASS

           MM
T/ ⊞ DEC 124 ⊞

End of access to the symbol cassette.

After changing the cassette press **START CHECK**.

5.1 Memory

The memory capacity of 4 Kbyte is sufficient for ca. 3800 characters.
The addresses 01 to 99 can be accessed arbitrarily.
Stored data will be retained when power is switched off.

Use the following keys for access to memory:

[RM M]		Memory output
[FUNCT 3]	[RM M]	Memory input
[M?]		Reading the memory contents

Action/Input	Display	Result
5.2 Direct input		
[FUNCT 3] [RM M] Activate the memory	TEXT MM ◆ T/ MØØ	Memory is activated.
[1] [2] Enter the address, e. g. 12	TEXT MM 12 3822 Selected Capacity address in byte	**Attention** Activation deletes any information stored in the memory.
[RUN]		
Enter text.		
[RUN] [RUN] 1. Conclusion 2. Output	TEXT MM Abcdefghijk	Abcdefghijk
5.3 To Find and Open the Next Free Address		
[FUNCT 3] [RM M]	TEXT MM ◆ T/ MØØ	Memory is activated.
[RUN]	TEXT MM 13 379Ø Free Capacity address in byte	The NC-scriber automatically selects the next free memory.
Key in text.		
[RUN] [RUN] 1. Conclusion 2. Output	TEXT MM Abcdefghijk	Abcdefghijk

---

Action/Input	Display	Result
5.4 Changing Parameters During Memory Input		
[PARAM IP] Change parameter, e. g. TH 8 mm	M 1 TH Ø3.50 T	Parameter menu line is displayed.
[ENTER] Confirm	TEXT MM TH Ø8.ØØ ◆T/	Ready to key in new text.
5.5 Output of Memory Contents		
[RM M] Call up the memory	RM TEXT MM ◆T/ RM 12_	Selected address is displayed.
[1] [2] Address e. g. 12		
[RUN] [RUN] Memory display and output	TEXT MM ◆T/ ◁ 12	Output of memory content. For repeat, press **RUN** again.
5.6 Read/Change Memory		
[M?] Call up the memory	M? COM MM ◆T/ M? 12	
[1] [2] Address e. g. 12		
[RUN] Memory display	M? COM 12 3822 THØ Selected Capacity Memory address in byte contents	Memory contents and parameters are shown. Contents can be edited.
[←] [→] Arrowheads to move text		
[←] [→] Cursor keys		
[A] [B] [C] Write		Characters are overwritten.
[INS UP] Insert, ON/OFF		Characters are inserted to left of cursor.
[DEL] Delete		Character above cursor is deleted.
[RUN] Close memory		The changed contents are saved.

5.7 To Copy and Change the Memory Contents

This procedure has an advantage over the one of Sect. 5.6: The contents are copied at the new memory address, where they can be changed, while the contents remain unchanged at the source address.

Action/Input	Display	Result

Copy memory

| FUNCT 3   M? | Call up the memory | | |

```
        COM   MM
   M? Ø1,ØØ
```

| 0   1 | Source address (file) e. g. 01 | | Display shows: |

```
              COM
   Ø1,Ø9 2823 THØ
```

– Memory address
– Remaining memory capacity
– Contents
– Parameters

| , | Comma |

| 0   9 | Target address, e. g. 09 |

| RUN | | | The contents are copied. |

If 00 is used as the virtual target address, the next free one will be automatically used.

Make your changes.

| RUN | 1. Display shows memory. | | 1. The changed contents are saved at the target address. |

| RUN | 2. Start of output. | | 2. Output of memory contents. |

Action/Input	Display	Result

5.8 Delete a Single Memory

| FUNCT 3   RM M | Call up the memory | | |

```
      TEXT     MM
   ◆T/      M Ø6
```

| 0   6 | Address, e. g. 06 |

| RUN | 1. Display shows memory | | The contents of address 06 are deleted. |

| RUN | 2. Close memory |

5.9 To Clear the Entire Memory

Use only if "ERROR D" message appears (memory contents defective)

Attention: Memory reset

Contents of the entire memory are irretrievably deleted.

| FUNCT 3   RM M   —   — | | | |

| RUN | | | |

5.10 Expanded Memory Operations

Basic memory operations, such as input and output, are covered in Sect. 5.1 through 5.9.

In the remaining parts of Sect. 5, the scope of memory operations will be expanded to include some of the functional modes of the NC-scriber.

5.11 Text Mode and Command Mode

These two important modes of operation are useful for input or editing of text, parameters and programming instructions (commands) in the memory. The mode that is activated is indicated by **TEXT** or **COM** in the menu line of the display.

5.12 Editing in the Memory

Texts and parameters can be changed in the memory even after it has been closed.

Text is edited in the **TEXT** mode.

Programming instructions and parameters are edited in the command mode (**COM**).

5.12.1 To Edit Text

To change a character:

● Overwrite it with the new one.

To delete:

● Press the **DEL** key.

To insert:

● Press the **INS** key (ON/OFF function).
● Key in the text.

Press **RUN** to store the changed text in the memory.

5.12.2 To Edit Parameters

Parameters can also be changed within a text. Examples: To stress a word or a text passage by using italics, a different font or a different character height.

● Place the cursor to the right of the insertion.
● Press the **INS** key.
● Press **ENTER**.

The NC-scriber is now in the **COM** mode. A diamond (lozenge) sign appears ahead of the cursor position, followed by several question marks which are superimposed on the text that follows.

● Key in the parameter and confirm with **ENTER**.

  A diamond sign appears on the LCD.

● Key in **T** and **/** (for "Text to follow").

The NC-scriber is now again in the **TEXT** mode; the question marks disappear.

Press **RUN** to store the changed program in the memory.

Press **RUN** again for memory output.
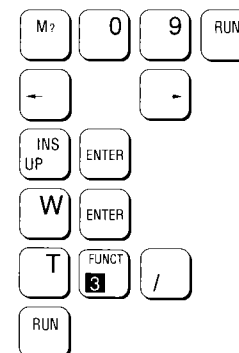
5.13 WAIT Command in a Program

The "Wait" command (**W**) in a program interrupts the written memory output, which can then be complemented with additional data (e. g. variables) keyed in and written out directly. Parameters can also be changed at this time.

To continue memory output, press **RUN**. "W" commands can be keyed in directly during memory input or inserted later.

5.13.1 Entering "W" Command during Memory Input

● Press **3.FUNCT** and **IP**.

● Key in **W** ("Wait" command).

● Press **ENTER**.

● Continue memory input.

5.13.2 Belated Input of "W" Command

● Call up memory for reading (**M?** and memory address).
● Place the cursor to the right of the insertion.

● Press **INS** and **ENTER**.

● Key in **W** ("Wait" command) and **ENTER**.

● Key in **T/**.

● Close memory with **RUN**.

%

5.14 Comment in a Program

Comment (indicated in the program by %) can be a word used to quickly recognize on the LCD any desired element of lengthy memory contents.

When reading the contents on the LCD, use the 2 dimensioning-arrow keys to make the cursor jump to the left (or right) from one comment to the very next.

5.14.1 Entering Comment during Memory Input

- Press **3.FUNCT** and **IP**.

- Key in % and the comment, e. g. a word.

- Press **ENTER**.

- Continue memory input.
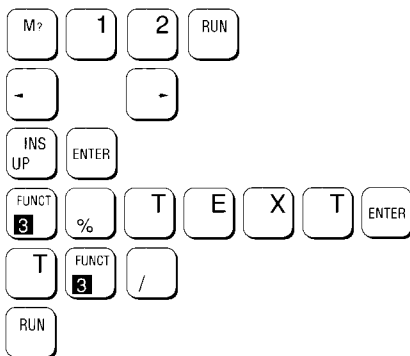
5.14.2 Belated Input of Comment

- Call up memory for editing (**M?** and memory address).
- Place the cursor to the right of the insertion.
- Press **INS** and **ENTER**.

- Key in %, the comment and press **ENTER**.

- Key in **T/**.

- Close memory with **RUN**.

W%

5.15 WAIT Command with Comment

The "Wait" command **W%** in a program interrupts the output of the memory contents; the programmed comment appears on the LCD and may call for such action as, for example, direct input of text.

Pressing **RUN** will continue the output of the memory contents.

5.15.1 Entering "W" Command with Comment During Memory Input

- Press **3.FUNCT** and **IP**.

- Key in **W%** and the text of the comment.

  For the text, use only the characters A through Z and 0 through 9 and the signs . + - : /.

- Press **ENTER**.

- Continue memory input.
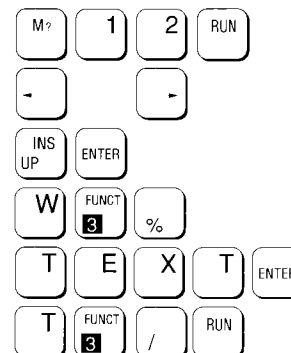
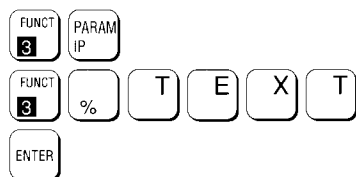### 5.15.2 Belated Input of "W" Command with Comment

- Call up memory for editing (**M?** and memory address).
- Place the cursor to the right of the insertion.
- Press **INS** and **ENTER**.
- Key in **W%** and the text of the comment.
- Press **ENTER**.
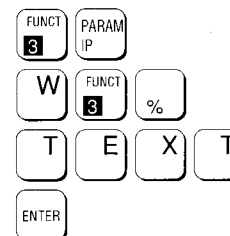- Key in **T/**.
- Close memory with **RUN**.

5.16 A Programming Example

Task

A framed area of text is to be programmed, one part of which is fixed, the other variable and to be filled in upon call-up.

Upon memory call-up the scribing tool is to wait – regardless of its actual position – at the beginning of the variable text until the **RUN** key is pressed.

Functions used in this task:

Frame (**FRR**)
Use of an external font (**CT5**)
Tabulator (**TAB**)
Memory output/scribing tool stop (**W**) at the beginning of the variable text until it is keyed in and **RUN** is pressed.

Boiler Operating Data

Pressure:

Temperature:

Inspecting Cycle:

Boiler Operating Data

Pressure: 60 bar

Temperature: 80 °C

Inspecting Cycle: 200 h

5.16.1 Programming Procedure

1. Switch on power and press **START CHECK**.

2. Open up memory, e. g. 03.

3. Call up the parameter menu (**PARAM**).

4. Select the character height (menu line 1, THØ5.ØØ) and confirm with **ENTER**.

5. Fix the starting point for memory output: Press "Start of 1ˢᵗ line, upper left".

6. Key in the "WAIT" command: **3.FUNCT**, **IP**, **W**, **ENTER**.

7. Call up the parameter menu (**PARAM**).

   – Frame, rectangular (menu line 2, **FRR**).

   – Parameter reset OFF (menu line 2, **PRØ**).

   – Select font, e. g. external cassette font (menu line 6, **CT5**).

By switching off "parameter reset", the font parameters selected for this memory address will stay in effect past the "WAIT" command.

8. Press **ENTER** to confirm the parameter.

9. Key in Boiler Operating Data, press "line change".

Boiler Operating Data

Pressure: 60 bar

Temperature: 80 °C

Inspecting Cycle: 200 h

---

10. Set new character height (**PARAM**, menu 1, THØ4.ØØ, **ENTER**, **PARAM**, menu 6, CT2, **ENTER**).

11. Key in **Pressure:**.

12. Use the spacebar to move about 24 spaces to the TAB position for the first variable data, e. g. **60 bar**.

13. Fix the **TAB** (**3.FUNCT**, **TAB**).

You can also use the directional arrows to move to the TAB position, in which case the distance moved will be stored as a numerical value.

14. Key in the Wait command (**3.FUNCT**, **IP W**, **ENTER**).

15. Press "line change".

16. Key in **Temperature:** and press **TAB**.

The scriber arm moves to the TAB position that was fixed in steps 12 & 13.

17. Key in the Wait command (**3.FUNCT**, **IP W**, **ENTER**).

18. Press "line change".

19. Key in **Inspecting Cycle:** and press **TAB**.

The scriber arm moves to the TAB position.

20. Key in the Wait command with comment (**3.FUNCT**, **IP** and **W%**, followed by the comment "OPERATING HOURS"). Confirm with **ENTER**.

21. Make the frame (**PARAM**, menu 2, **FRØ**).

22. Press **RUN** to close the memory.

23. Press **RUN** to start memory output.

The stored text will be written. The scriber arm stops at the insertion point for the pressure variable (**60 bar**), which you can then key in directly. To continue memory output, press **RUN**.

If the TAB positions are not exact, add or delete spaces during editing.

If you have set the TABs with the directional keys, just change the distance value on the display.

Boiler Operating Data

Pressure:	60 bar
Temperature:	80 °C
Inspecting Cycle:	200 h

[M?] [0] [3] [RUN]

5.16.2 To Read and Edit the Programmed Example in Memory

If you have made an error during programming, you can call up the memory contents on the LCD for editing.

● Call up memory for reading (M? 03).

Display

Ø3 2559 THØ3.5Ø ◆TW1.ØØ ◆TAØ9Ø ◆RTØØØ ◆W

Memory No. - Remain. storage capacity - Standard parameter for font (TH, TW, TA, RT) - Waiting for memory input

◆T/ ◆THØ5.ØØ ◆T/✝◆W◆FRR◆PRØ◆CT5 ◆T/Boiler Operating Data ⬇◆

Text mode ON* - Font parameter - Start of 1st line - Wait command - Rectangular frame ON - Parameter reset OFF -
Font CT5 - Text start: *Boiler Operating Data* - Line change

THØ4.ØØ◆CT2◆T/Pressure: (24 spaces)▣◆W◆T/⬇Temperature:⇥ ◆W◆

Character height 4 mm - Font CT2 - Text start: *Pressure:* - Move to TAB - Set TAB - Wait command -
Text mode ON* for insertion of variable text - Line change - Text: *Temperature:* - TAB - Wait command for text

T/⬇Inspecting cycle:⇥◆W%◆ OPERATING HOURS◆T/◆FRØ ◆T/◆E

Text mode ON* - line change - Text: *Inspecting cycle* - TAB - Wait command with comment *OPERATING HOURS*
on LC display - Text mode ON* - FRØ = Make frame - Text mode ON* - End of program

* Text mode ON is set automatically during memory input if a parameter input in the **COM** mode (3rd **FUNCT**, **IP**)
has been concluded with the **ENTER** key. **T/** indicates that the system is again in the text mode.

6.1 Standard Keyboard

International keyboard with typewriter layout.

6.2 Exchanging the Keyboard

Procedure:

● Insert a coin into the slot at the right side of the keyboard and use it as a lever.

● Pull off the keyboard towards the right.

● Install a new keyboard.

● Press **START CHECK**.

Note

Never remove the rubber pad that is underneath the keyboard!

A contact plug underneath the left-end tabs of the keyboard automatically makes the switchover on the control PCB.

If the contact plug is missing, the system recognizes the standard "TW" keyboard.

Important
Call up the desired internal font before you start writing, e. g. CT3, Menu line 6.
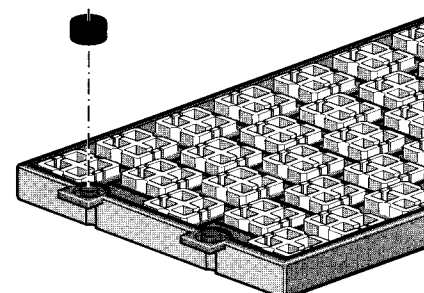
For location of the contact plugs,
see Sect. 6.4.

6.3 Key Functions

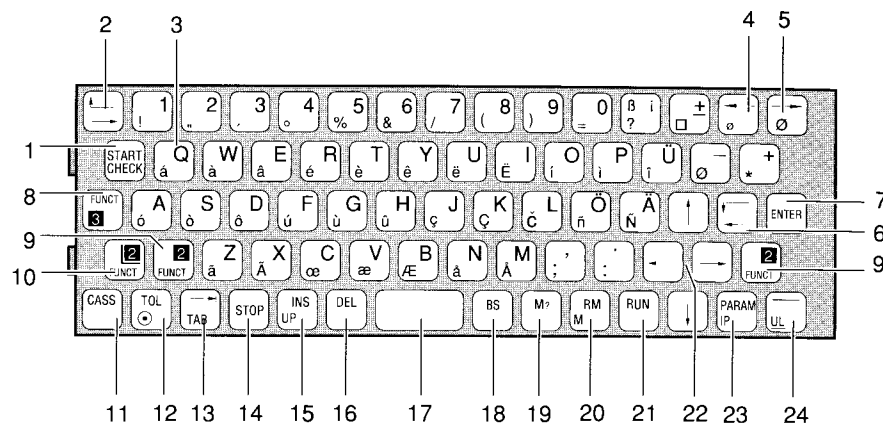| Key	No.	Function	
START CHECK	1	DIRECT	Scribing tool moves to the zero coordinate point, character height 3.5 mm, vertical, or start parameters **ST** are active.
↲	2	1st AND 2nd FUNCTION	Scribing tool moves to the start of the 1st line.
		3rd FUNCTION	Scribing tool moves to the end of the same line.
Q / á	3	1st FUNCTION .... 2nd FUNCTION .... 3rd FUNCTION	Character as lowercase letter. Character as capital letter. Special character or diacritical mark.
→ / o	4	1st AND 2nd FUNCTION .... 3rd FUNCTION	Draw left dimensioning arrow. Special character.
→ / ø	5	1st AND 2nd FUNCTION .... 3rd FUNCTION	Draw right dimensioning arrow. Special character.
↑	6	1st AND 2nd FUNCTION .... 3rd FUNCTION	Scribing tool moves to start of next line. Scribing tool moves to start of same line.
ENTER	7		Confirm changed parameters.
FUNCT 3	8	ON/OFF FUNCTION .... Display: 3.FUNCT	Single character or symbol of 3rd function.
2 FUNCT	9	ON/OFF FUNCTION .... Display: 2.FUNCT	Single capital letter or symbol of 2nd function.

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Key	No.	Function	
2 FUNCT	10	ON/OFF FUNCTION	Continued capital letters or symbol of 2nd function. Display: 2. FUNCT FIX
CASS	11	ON/OFF	Switch to cassette program. Display: CASS (cassette name).
TOL ⊙	12	1st AND 2nd FUNCTION (ON/OFF) .. 3rd FUNCTION	Tolerances, exponents, indices Display: TOL Circle program
TAB	13	1st AND 2nd FUNCTION .... 3rd FUNCTION	Tabulator: Move to TAB or delete TAB
STOP	14		Operations stop instantly.
INS UP	15	1st AND 2nd FUNCTION .... 3rd FUNCTION (ON/OFF)	Insertion of character or symbol into a memory already programmed. Display: INS Scribing tool motion with PEN UP.
DEL	16		Deletion of character in memory or on display, provided it has not yet been written.
	17		Spacebar during text mode. "Leafing" in the parameter menu.
BS	18		Backspace: Scribing tool moves back by 1 character (max. 16 characters). Also: Corrections during memory input.
M?	19	1st FUNCTION .... 3rd FUNCTION	Memory query, reading/editing contents, 01 - 99, change start parameters (**ST**, cf. Sect. 2.10). Copy memory contents.
RM M	20	1st AND 2nd FUNCTION .... 3rd FUNCTION	Call up memory for output of contents. Call up memory to enter an address.
RUN	21		Instruction for memory output, drawing a circle, drawing a cassette symbol.
↑ ← → ↓	22		Cursor keys for "leafing through" the menu lines; moving the scriber arm or the cursor; and for reading memory contents.
PARAM IP	23	1st AND 2nd FUNCTION .... 3rd FUNCTION	Calling up the parameter menu. Switch to command mode for direct parameter input.
UL	24	1st AND 2nd FUNCTION .... 3rd FUNCTION	Drawing a line. Underline text.

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6.4 Keyboard for the NC-scriber CS 100

Typewriter keyboard with QWERTY layout.

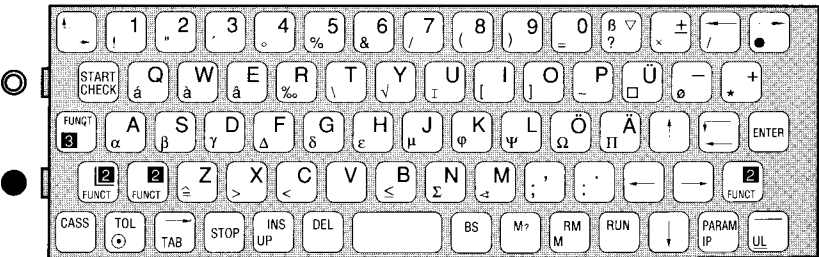(for resident and external fonts CT2, CT4, CT5, Menu line 6)
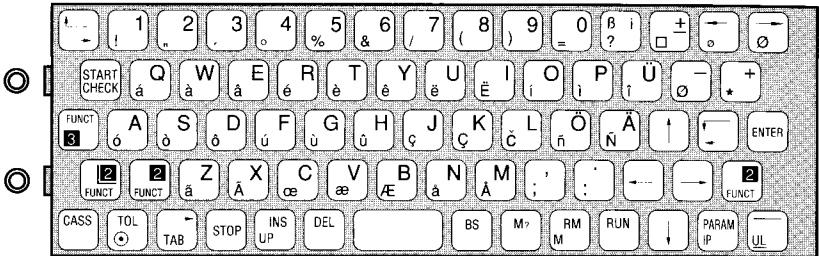
Art. 691 153: Keyboard "TW"

QWERTY keyboard with important mathematical symbols.
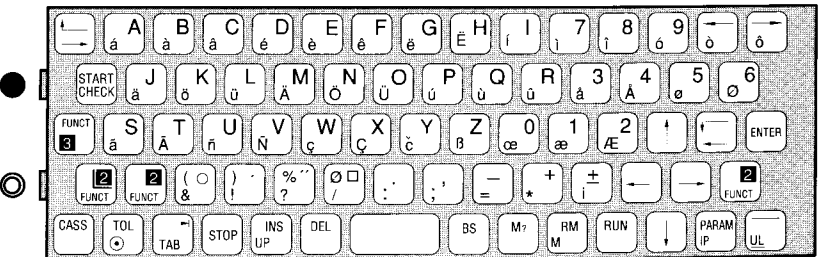
(for resident fonts CT1 and CT3, Menu line 6)
To make letters with ´, ` and ^, press "a, e or o" for the letter,
then **3.FUNCT** and á, à or â for the mark.

Art. 691 154: Keyboard "TW technical"

Alphanumeric character layout.
(for resident and external fonts CT2, CT4, CT5, Menu line 6)

Art. 691 155: Keyboard "alpha"

● Contact plug in place

6.5 Error Messages

Error message	Meaning
ERROR A	Character inclination exceeded
ERROR C	Key pressed in wrong sequence
ERROR CT	Selected font not available
ERROR D	Memory contents deficient
ERROR E	Memory (address) empty
ERROR F	Line length exceeds available area
ERROR H	Character height exceeded
ERROR N	Wrong memory address
ERROR O	Scale too large
ERROR P	Wrong parameter input
ERROR S	Cassette error
ERROR ⊙	Wrong diameter input
ERROR И	Memory filled to capacity, input ignored
MISSING CASS	Cassette not inserted. (After inserting a cassette, press the **STOP** key.)
ERROR KEY	Wrong key input
PRESS START	Before pressing **START CHECK** a key was already pressed

7.1 Specifications

Radio shielding: The CS 100 NC-scriber meets the applicable regulations of the *Deutsche Bundespost.*
The official regulations 10467/1984 of the *Bundesminister für das Post- und Fernmeldewesen* are observed.

Operating environment: Temperature 15 °C - 30 °C, humidity max. 90 %

Power requirements:

UK-Version: Power unit, 240 V ± 10%, 50/60 Hz

Version for the USA and Canada: Power unit, 110/220 V ± 10%, 50/60 Hz
Voltage switch on the underside of the unit

Power consumption: 40 W

Operating voltage, NC-scriber: +5 V, +15 V

Cable length: Total of 5.6 m

Range of the scribing arm: 190 x 45 mm

Character height: 1.0 to 30 mm in 0.1 mm increments

Character width: Variable, ± in % increments

Accuracy: Line resolution of 0.01 mm

Writing/drawing speed: **Normal operation:** ca. 2.0 cm/s

Step 1: ca. 0.5 cm/s

Step 2: ca. 2 characters per second with
TH = 3 mm

Memory: Capacity 4 Kbyte for max. 3800 instructions, 99 memory addresses

Memory cassettes: Sufficient for the entire RAM contents of the CS 100 NC-scriber.

Size and weight:

Operating unit

Size: 335 x 168 x 47 mm

Weight: ca. 1500 g

Power supply unit

Size: 111 x 68 x 49 mm

Weight: ca. 600 g