MICROGRAPH PLUS (7)

1 POWER CHARACTERISTICS

- CC100: Representation of 7 curves at the same time (ideal curve included), distinction in colours
  EC100/color: Representation of 3 curves at the same time (ideal curve included), distinction in colours
  EC100/mono and EC100-S: Representation of 3 curves at the same time (ideal curve included), different stroke types
- free choice and compilation of the curves from the parameters of each existing unit:
  Screw stroke
  Hydraulic pressure
  Injection speed
  Mould cavity pressure (option)
  further parameters as option (e.g. heatings, further hydraulic pressures...)
- per selection (=group of curves) 1 ideal curve can be determined, thus altogether 4 ideal curves. Optionally this can be expanded to 8.
- Representation of the ideal curve as hose, colour can be determined at colour screen
- 4 Selections (groups of curves) can be compiled at will separated from each other; at CC100 a selection consists of up to 7 curves, at EC100 and EC100-S of up to 3 curves
- Magnifier function: 3 sections per group of curves can be defined freely, separately of each other, and be called up fast
- fast call-up of full, semi and quarter image with the numeric keys, partial images with cursor
- permanent display of the chosen section in small full image
- all set parameters and setups per mould data set stored on floppy
- Scales can be faded in and changed directly via function key, also afterwards
- Ideal curve can be allocated to each selected parameter
- Ideal curve can be derived from ´Group of curves´. Only with extended memory (RAM disk).
- Families of curves can be stored on diskette
- 2 Monitoring windows separated from each other adjustable freely
- digital, exact actual value display on optional curve position via function key and cursor
- Display of the switchover point, of the flow number and of the flow number measuring window
- simultaneous recording of the chosen curves
- Monitoring selectable per hose or integral

2 SIMPLE SETTING (FOR THOSE IN A HURRY)

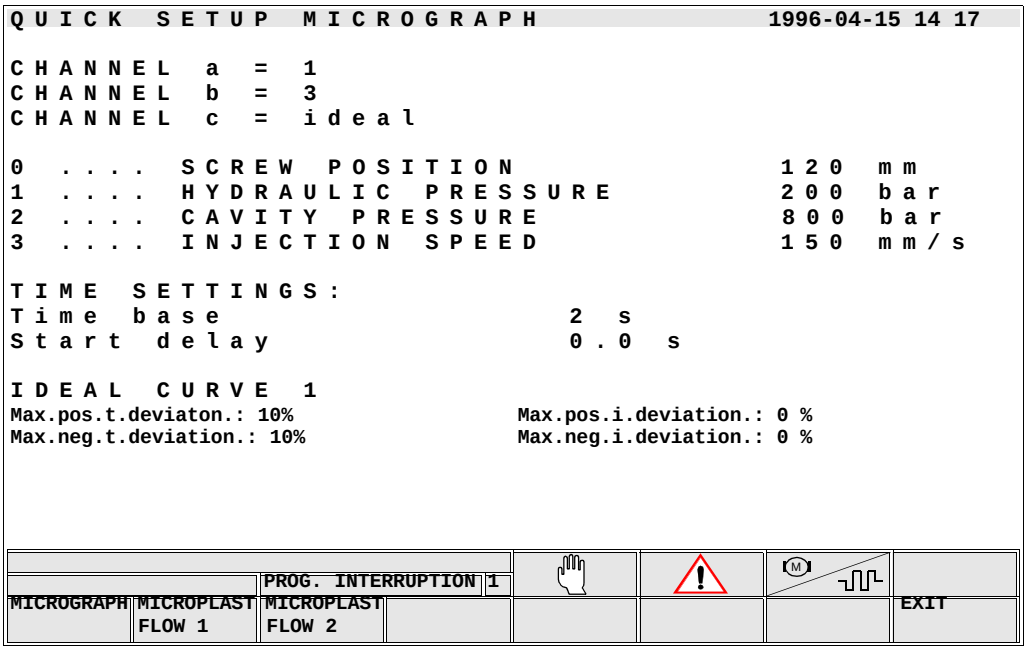
2.1 AUTOSETUP - SIMPLE SETTING AUTOMATICALLY

Starting position:
The machine runs in automatic mode and produces good parts, with cycle end the parameters which are necessary for the automatic self-setting are stored temporarily.

Setting process:
The operator presses the function key "AUTO SETUP" in the submenu "QUICK SETUP MICROGRAPH". Thus from the temporarily stored parameters the following calculations are carried out:

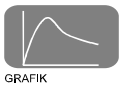
- The rounding-off of the injection time yields the measuring time
- The measuring delay time is set to zero
- The scales for the screw position, the hydraulic pressure, the injection speed and the Mould cavity pressure is derived from the actual/peak values, always the next higher value from a fixed table is used as machine setting, e.g.: Current peak value of the injection-speed = 0 (after switching on the control unit) ---> value 50 mm/s is preoccupied.

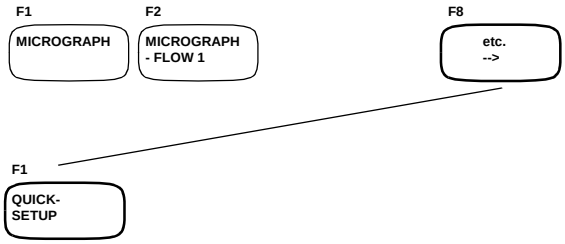
The calculation results are represented compiled on the screen on the page ´QUICK SETUP MICROGRAPH´ (--> item "SINGLE SETTING MANUALLY)
At the first setting (after reset of the data) in principle the hydraulic pressure curve (1) and the injection speed curve (3) are selected and represented.
As ideal curve the last hydraulic pressure curve is taken, with a tolerance of 0% (adjustable value, service mode).
When already curves are selected, these selected ones are represented and those of channel A are assumed as ideal curve.



2.2 SIMPLE SETTING MANUALLY

Choose the screen page "MICROGRAPH" and actuate:





It appears the page ´QUICK SETUP MICROGRAPH´ for the input and survey of the single settings.

2.2.1 SINGLE SETTING - PARAMETER AND SCALE CHOICE

Choose on the screen page ´QUICK SETUP MICROGRAPH´ for channel a and/or b a parameter from the list (0 to 3) and set the scale correspondingly.

Further, choose the time base for the recording period. If the graphic recording shall start delayed to the injection beginning, input this start delay time.

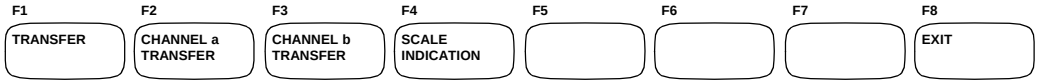
Afterwards return with function key F8 ´etc.´ to the graphic image again and start the injection process. You will find your basic setting confirmed.

2.2.2 SINGLE SETTING - MONITORING

If you want to derive from an injection parameter which now appears as curve on the screen a quality and/or rejects criterion, activate the monitoring function:

At first you set on the ´QUICK SETUP MICROGRAPH´ image a positive and negative deviation tolerance for ideal curve 1, choose F8 and afterwards F6 "Ideal curve" :

New row of function keys:



Now determine with F2 and/or F3 which channel, a or b, shall be used for quality control.
After the choice you see the concerned curve surrounded with a red tube (channel c). This represents the set tolerance zone. In case of exceeding and/or not reaching the error message "DEVIATION" arises, the produced part is valued as rejects.

2.2.3 SINGLE SETTING - PARTIAL IMAGES

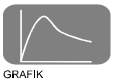
With the figure input keys 2 and 4 you can select partial images (magnifiers):

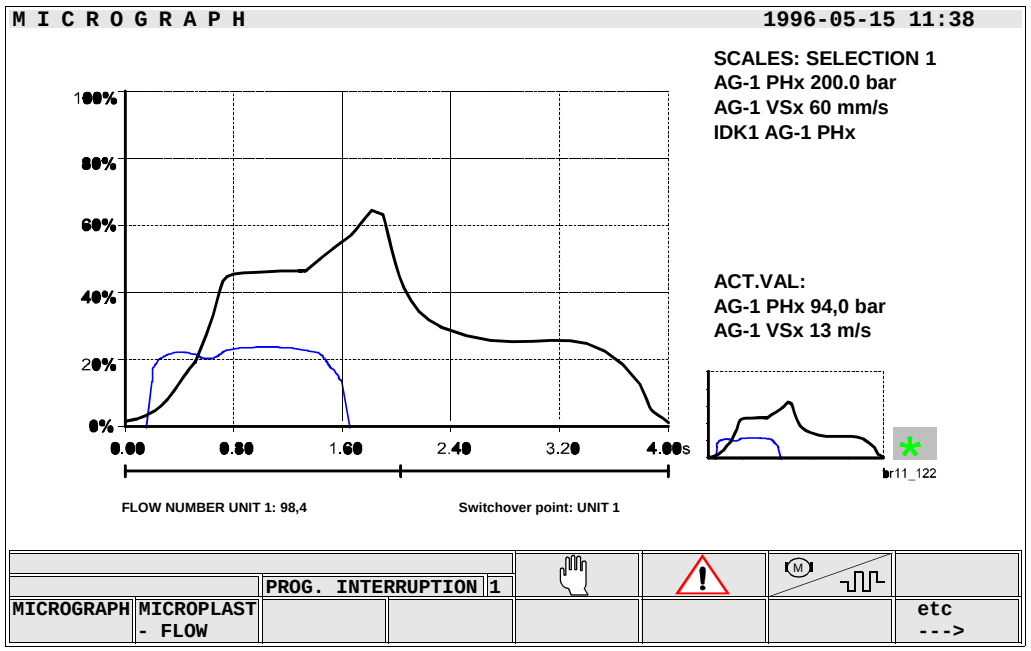
- 2 = Half image
- 4 = Quarter image
- 1 = back to the full image

In the small survey graphics at the right below on the screen you see the position of the current partial image. With the cursor keys "<-" and ->" the partial images can be displaced.

Example has been chosen:

Channel a = 1	Hydraulic pressure	Max. swing	= 200,0 bar
Channel b = 3	Injection speed	Max. swing	= 60 mm/s
Time base = 4s			



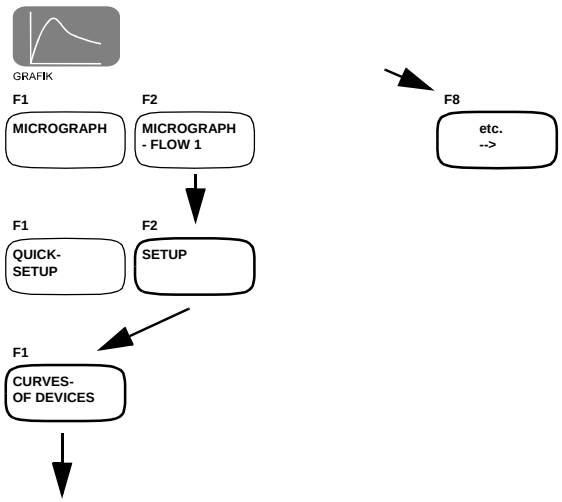


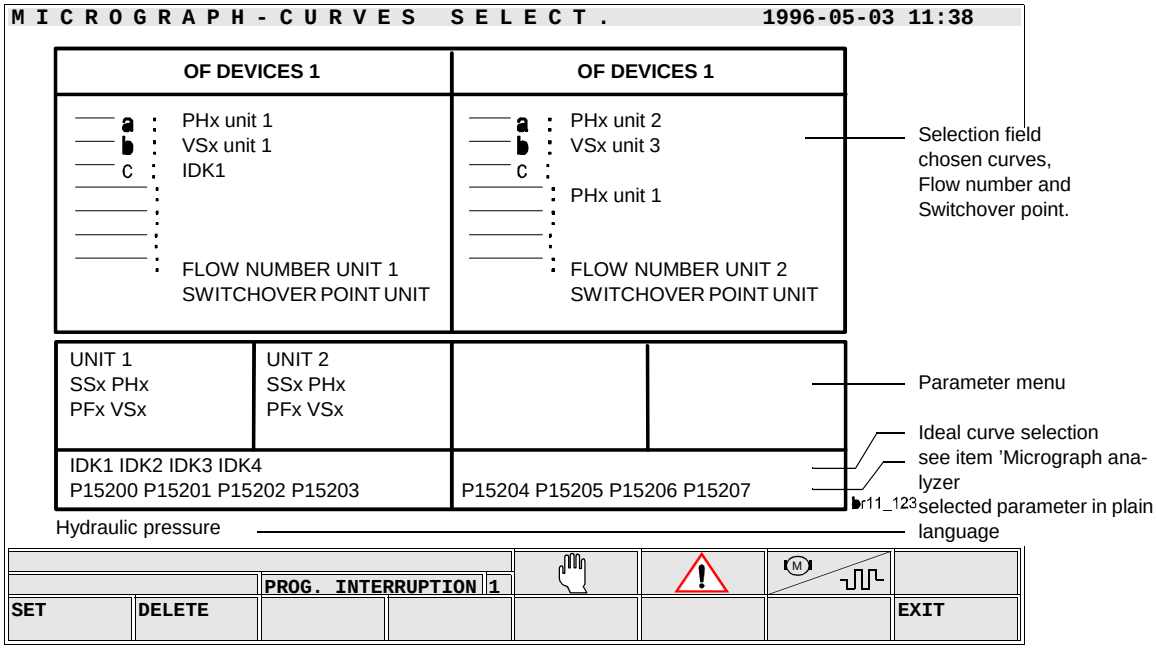
3 MICROGRAPH PLUS HAS MORE FUNCTIONS

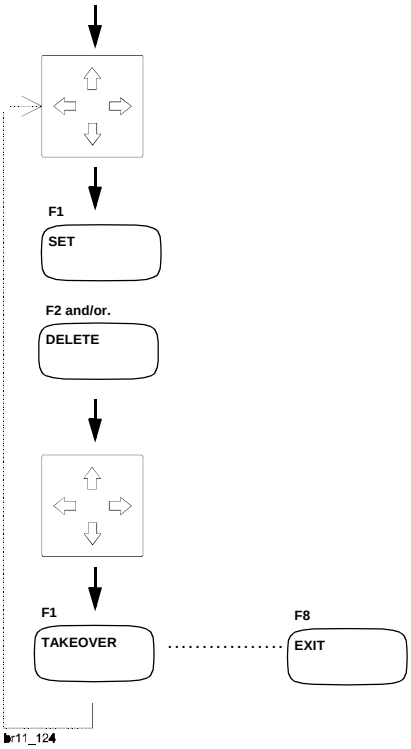
3.1 SELECTIONS (= CURVE GROUPS)

4 Selections (groups) of up to 7 curves each (3 at EC100 and EC100-S) and also flow number and switchover point display can be compiled individually. 1 selection each is represented on the screen, but all are recorded in the background in order that one has the possibility to watch all chosen curves after occurred injection process.

3.1.1 COMPILATION OF SELECTIONS







2 Selection windows are always visible on this image.
After the first opening:

OF DEVICES 1	OF DEVICES 2

with cursor key ----> one leafs on:

OF DEVICES 1	OF DEVICES 2

and further:

OF DEVICES 1	OF DEVICES 2

with cursor key <---- one returns

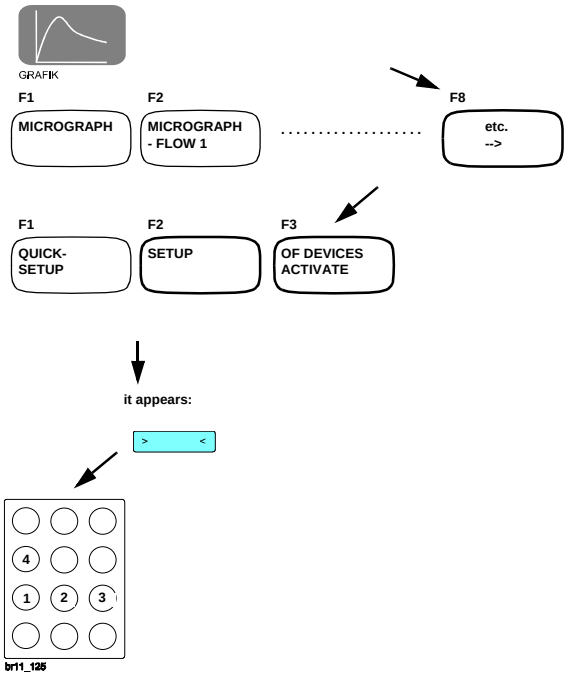
Setting a curve:
Set now the cursor field with the cursor keys "<-" and/or "->" into the requested selection field and with "^" and/or "v" to the requested colour course.
Press the function key F1 with the text "SET". The cursor field jumps in the parameter menu. F1 shows "TAKE OVER".
Now select a parameter with the cursor keys. An explaining text to the current parameter appears at the left below on the screen. With F1 "TAKE OVER" the parameter is transmitted into the selection field. The cursor jumps there.

Erasing and/or replacing a curve:
Set the cursor in the selection field to the curve to be erased and/or to be replaced. Function key F2 shows "ERASING". So erase with F2 the entry and set a new curve if desired.
With function key F8 "EXIT" leave the setting mode.

In the set mode it is also possible to choose per selection one, altogether 4 different ideal curves. The process for it corresponds like described; one moves the cursor field over the terms IDK1, IDK2, IDK3 and/or IDK4 and takes over.

Selection of flow number and switchover point display:
Set the cursor over the field "Flow number unit 1" and/or "Switchover point unit". By the input of the unit number you can now produce the corresponding display.

3.1.2 ACTIVATION OF SELECTIONS



On the graphic image at the right above one reads off the current group of curves:

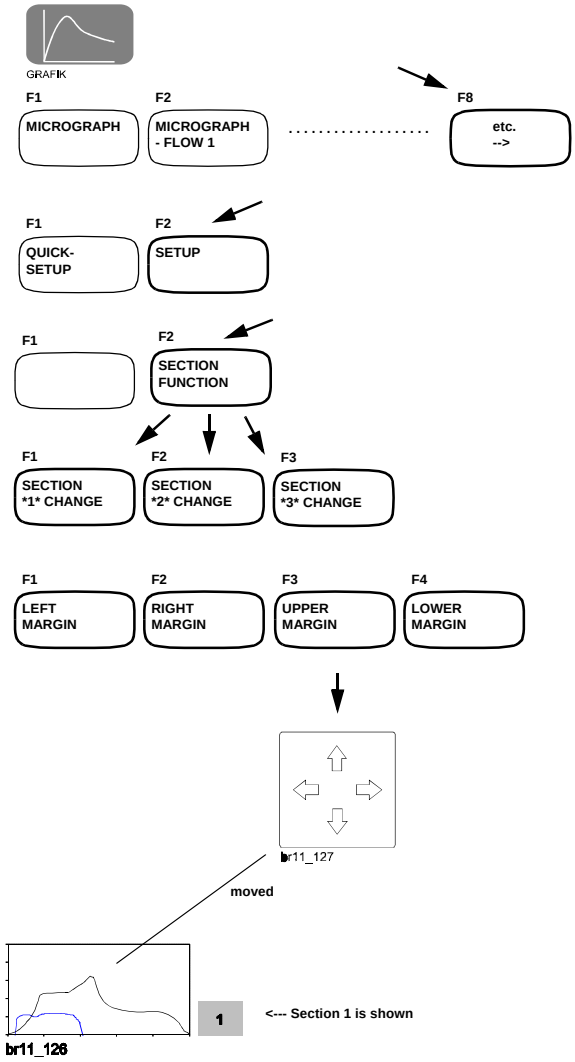
SCALES: SELECTION 1

In order to get to the other selections, one presses F8 (etc.) and then F3 (ACTIVATE SELECTION).
At the left below on the screen the blue input field appears. With pressing the numeric keys 1,2,3 or 4 choose one of the 4 groups of curves (selections).

3.2 SECTIONS

Besides half and quarter image, can be called up fast with numeric input keypad (2 and/or 4, return to full image with 1), exists the possibility to program 3 sections (magnifiers) separately of each other. In a small survey graphics on the screen at the right below the position and the section number can be read off.

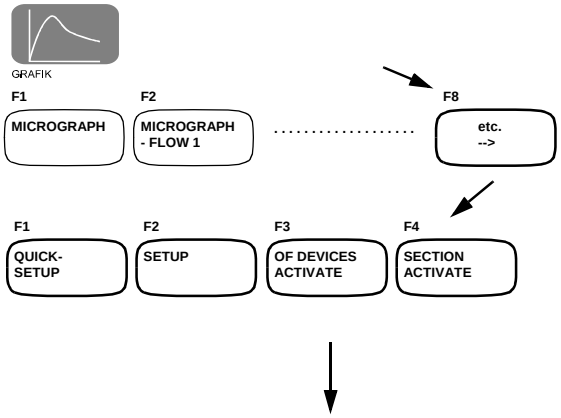
3.2.1 DEFINE AND PROGRAM SECTIONS



With key F8 (etc.), then F2 (setup) enter into the setting mode. Function key F2 brings a new line of keys. Here one chooses the section to be changed with F1, F2 and/or F3. Afterwards with F1, F2, F3 and F4 and the cursor keys the margins of the section can be set observing the small survey graphics.
press e.g. F3 "UPPER MARGIN" - F3 being represented inversely - with the cursor keys move the upper margin of the section.

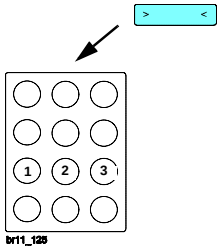
With F8 (EXIT) leave this function.

3.2.2 ACTIVATE SECTIONS

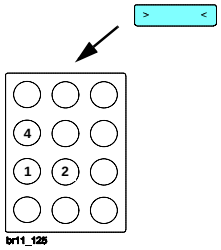


After occurred setup the call-up of the set windows can happen very fast.
With F8 (etc) and then F4 (ACTIVATE SECTION) the blue input field appears at the left below on the screen.
The figures 1, 2 or 3 bring the corresponding section.
The chosen section can be read off on the survey graphics.
A "*" in this display indicates half, quarter or full image.
Half and quarter image can be displaced with the cursor keys "<-" and/ or "->" by half a partial image.

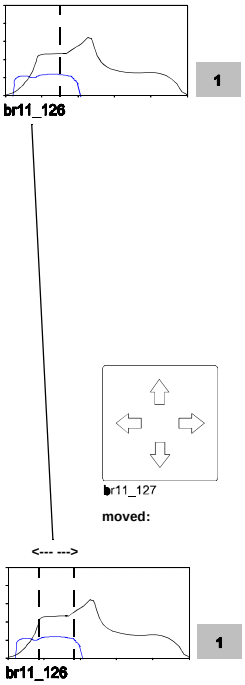
it appears:



Call-in of a full image-,
Semi or quarter image:

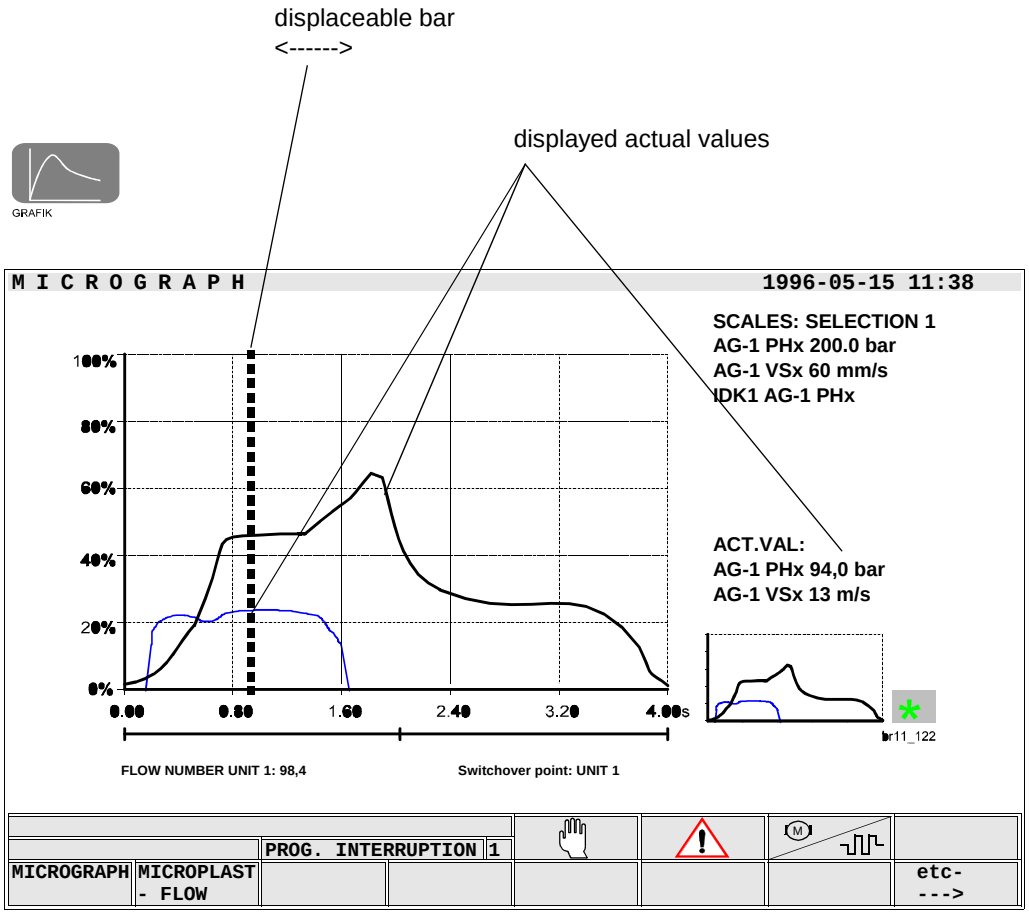


e.g. Quarter image:

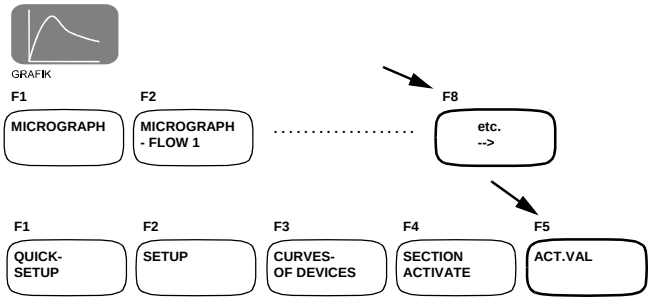


3.3 ACT.VALUES

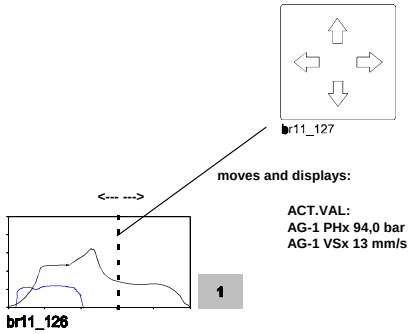
At the right in screen middle current actual values can be read off on determinable curve points. At not chosen functions the values display '*.*'. A pointer as vertical stroke can be faded into the graphics and be displaced with the cursor keys"<-" and/or "->". On current position the actual values display correspondingly.
During the actual value fading-in the curve recording is continued.



3.3.1 FADE IN, FADE OUT ACTUAL VALUES



Enter into the setting mode with key F8 (etc.), then with F2 (SETUP). Pressing the key F5 brings the bar into the graphics. The actual values on the points of intersection with the curves are displayed digitally. The bar can be displaced with the cursor key "<-" and/or "->".



3.4 CONTROL

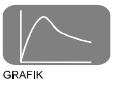
The graphic recording of actual values offers the possibility to make a tolerance evaluation by comparing curves and/or the area under the curves (integral) or parts of it. So one determines an occurred curve to the "ideal curve", after which each further shot in this parameter is compared with this ideal curve and is valued corresponding to tolerance band.

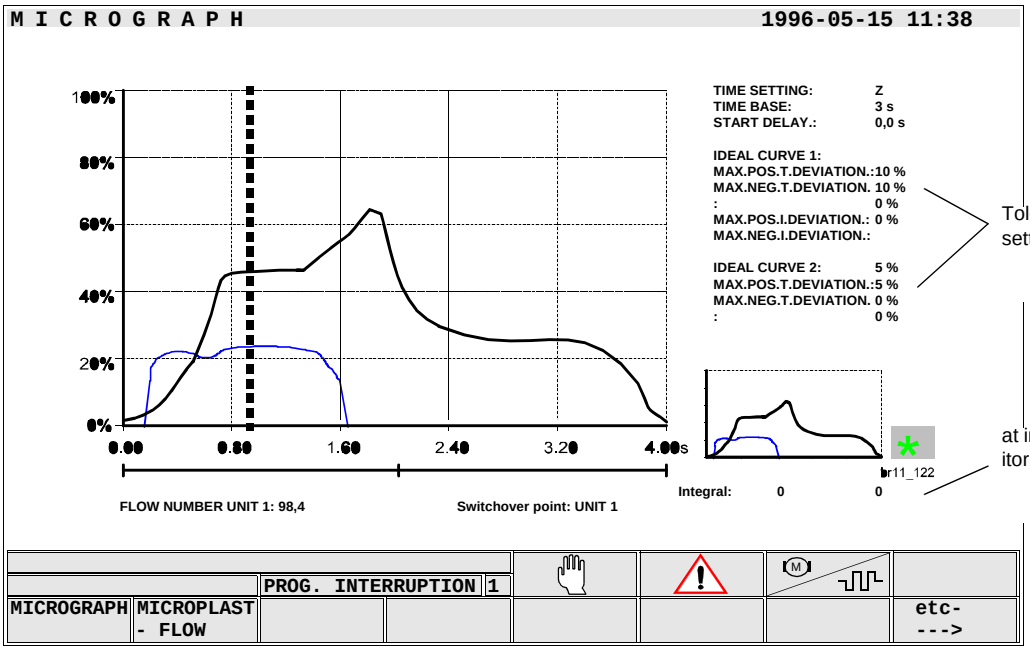
Two kinds of monitoring are provided:

TUBE: Around the ideal curve a tolerance limit is drawn in the form of a tube.

INTEGRAL: The area under the ideal curve is valued as ideal area.

At the reaction of the monitoring at the left below in the graphic window the message 'DEVIATION' arises. After rejects evaluation at mould opening then the errors 20, 1061, 5009 and/or 5010, 'REJECTS GRAPHICS x' appear depending on which ideal curve has reacted.
Before the evaluation the ideal curves and current recordings in the switchover point are synchronized, i.e. the new curve course is displaced (in the computer internally) until the switchover points lie one on top of the other.
Two parameters of free choice can be used for ideal curves, but only one per group of curves (selection).
Also only parts of a curve can be monitored. For this purpose 2 different windows can be set at will, optically represented by 2 bars under the graphics.

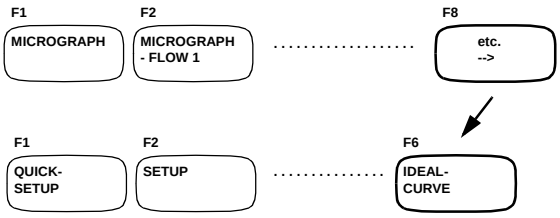
Screen page  **+ F8 + F2 + F5 (MICROGRAPH PARAMETERS)**



You determine the 'thickness' of the tube around the ideal curve with ´Max.pos(/neg).t.deviation´ and/or the +/- tolerance of the area under the curve with ´Max.pos(/neg).i.deviation´. In vertical direction apply the inputs as per cent values of the respective parameter dimension, horizontally as per cent values of the chosen time base.
The input 0 % switches the monitoring off, in each case separately for ideal curve 1 and/or 2, 3 or 4.

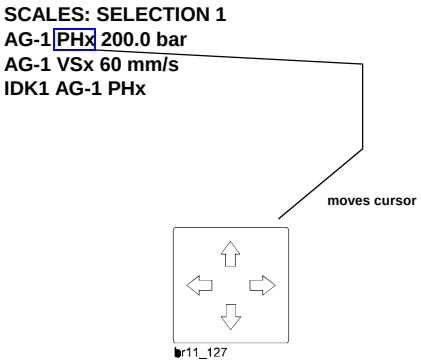
Display at integral monitoring:
At active integral monitoring a display line appears under the small survey window. See above graphics. The left value shows the integral of the ideal curve, the one standing at the right the integral of the actual curve to be monitored.

3.4.1 IDEAL CURVE - SELECTION

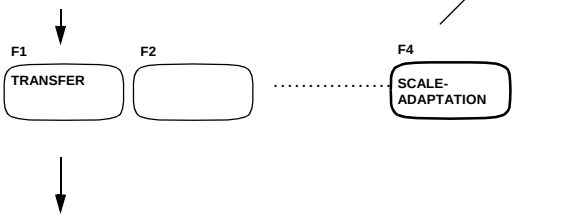


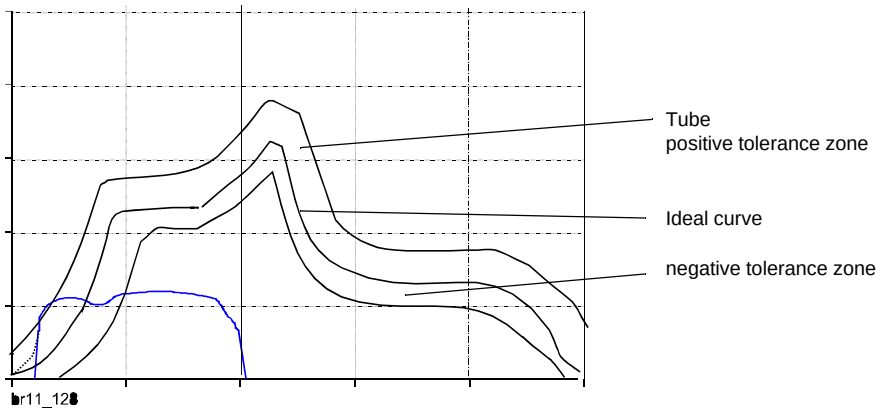
At the compilation of curve groups, see item Selections, reserve a colour and a place for the ideal curve. When you have utilized the simple setting before, the ideal curve 1 on channel c is occupied with 'red'. Now go back to the graphic image (F8, "EXIT").
With F8 (etc.) you get to the next line of function keys. Press F6 (IDEAL CURVE) now).
In the selection display at the right above on the screen a cursor field appears. Move the cursor with "^" and/or "v" to the curve which shall serve as ideal curve. With the function key F1 (TRANSFER) execute the command. It appears around the curve course a tube in chosen colour and according to the set tolerance indications. At the right beside the display IDK1 (2,3,4) the chosen parameter stands.

it appears in the cursor zone:



If per cent values for deviations are changed afterwards, with ´F4´ ´SCALE ADAPTATION´ the new values are adapted to the existing scale. This is only required when one and the same IDK is used in several selections, otherwise the adaptation happens with F1 ´TRANSFER´ automatically.

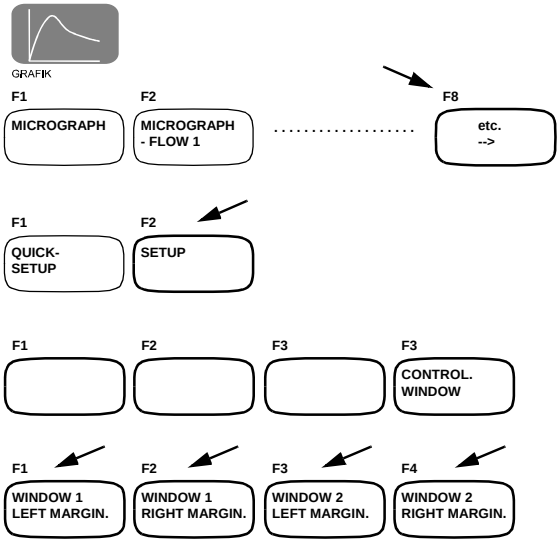




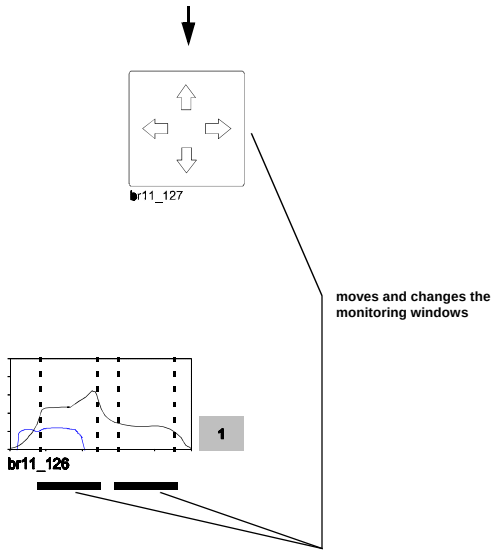
3.4.2 MONITORING WINDOWS

The two monitoring windows can only be set when an ideal curve is chosen. Without ideal curve the function key 'MONITORING WINDOWS' is faded out.
The windows can be set separately of each other in their size and placing - without overlap - in order to monitor e.g. only certain curve parts. Under the graphic image a bar displays the window edges in the colour of the chosen ideal curve.

Set monitoring windows:



With F8 (etc.) and afterwards F2 (SETUP) the setting soft key strip appears. F4 (MONITORING WINDOW) brings a new strip. One chooses the margin (e.g. window 1 left margin; the active soft key is backed green) to be changed and displaces with the cursor keys at the left and/or at the right the limitation to the requested point.



3.4.3 REJECTS EVALUATION AND ERROR MESSAGES

Rejects are given when with switched-on monitoring, i.e. input tolerance set values larger than 0%, in at least one window the current curve has not reached and/or exceeded the tolerance limit.
At the left below on the graphic screen page appears the error message "DEVIATION" white on red ground. When it is displayed yellow on red, start delay time or time base are not identical.
Also with not opened graphic page one recognizes a deviation message in the general error display line (or error page): "REJECTS GRAPHICS 1" (and/or ...2, 3 or 4). At multi-unit machines it is found from which injection unit a deviation has occurred in order to be able to delay possible rejects messages (normally 1 cycle). The rejects counter is counted up by 1 (screen page 'Production data') and with a rejects maximum value the max. number of rejects per hour can be determined. The shot counter is also counted up, the piece counter not. When the max.value is reached, the machine switches off.

3.5 SCALES

3.5.1 X-AXIS

On the abscissa (x-axis) it is recorded in time scale. The recording period (time base) can be set 1sec until 255 sec:

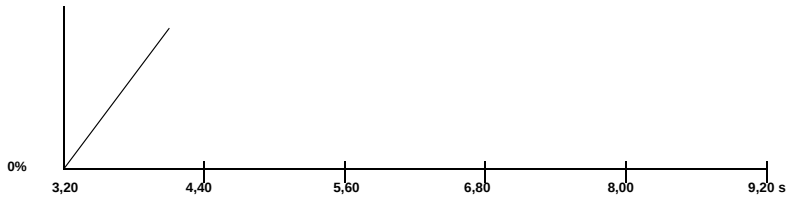
Screen page MICROGRAPH + F8 + F2 + F5 (MICROGRAPH PARAMETERS)

	TIME SETTINGS:		
e.g.	**TIME BASE:**	**6 s**	(1 - 255 s)
e.g.	**START DELAY.:**	**3,2 s**	(0 - 25,5 s)

A newly set time scale is shown on the X-axis immediately. The graphic recording remains unchanged until the next start injection, however.

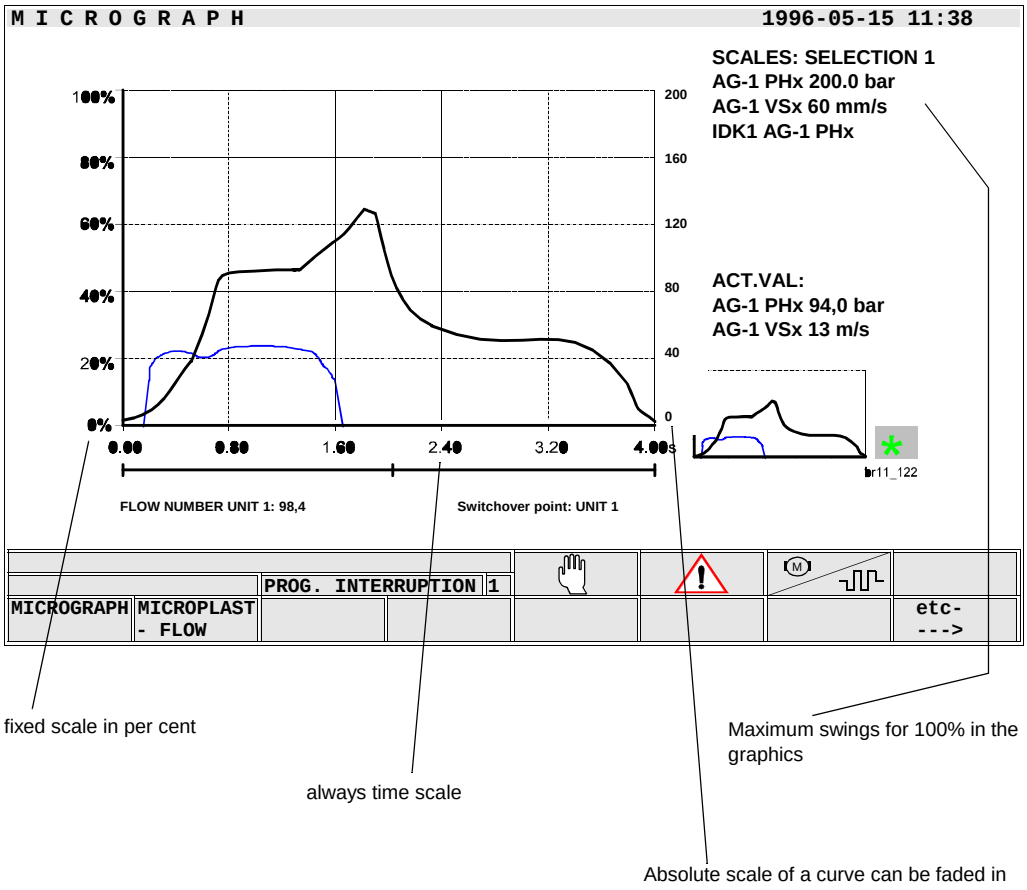
Attention to the chosen deviation tolerance for the monitoring circuit. With changing the time base also the width of the ideal curve tube changes (per cent values !).
Start delay:
With beginning injection runs a graphic start delay, after whose expiry the actual graphic recording begins. This delay time is considered in the time axis (x-axis):

e.g.: Start delay = 3.2 sec:



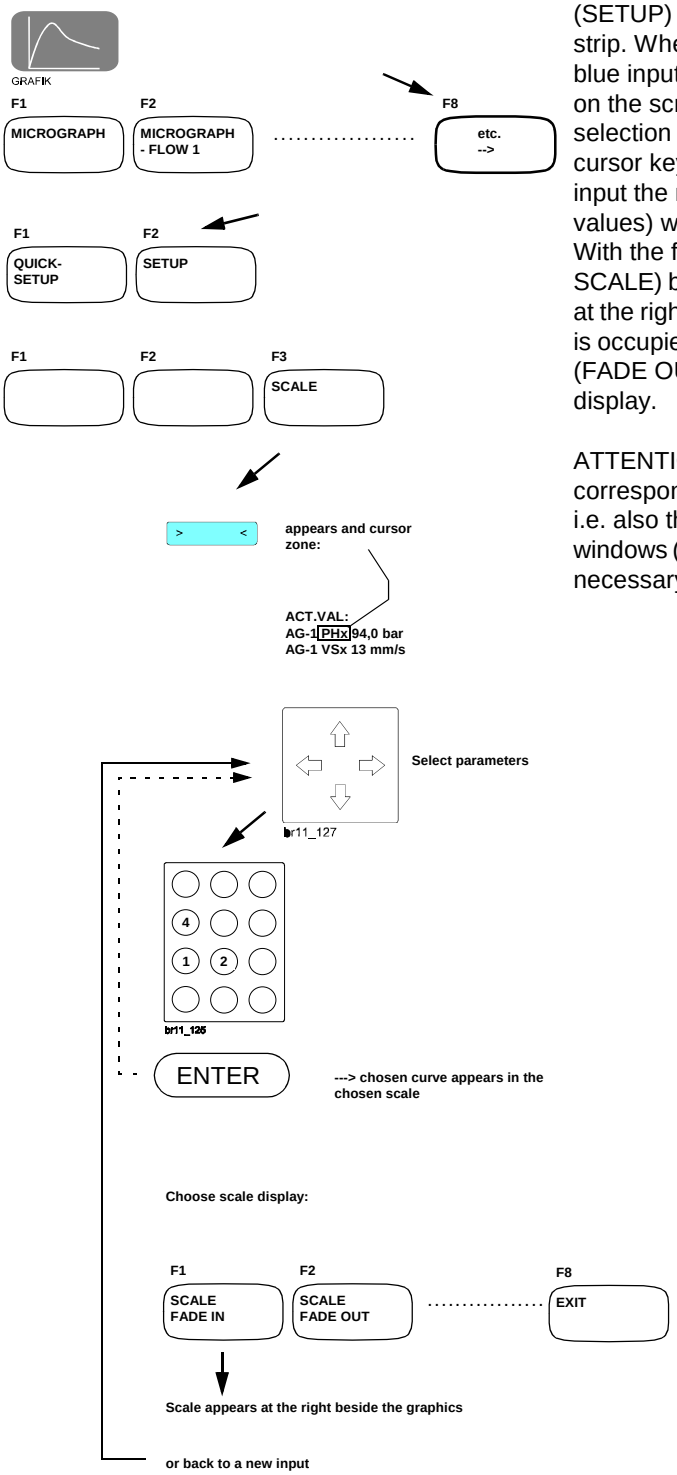
3.5.2 Y-AXIS

Screen page MICROGRAPH



The ordinate (Y-axis) carries a per cent scale permanently on the one hand, divided into 5 parts:
20%, 40%, 60%, 80%, 100%.
The maximum swings of the individual chosen parameters (curves) are listed up in the screen at the right above. These can be changed, the concerned curve taking over the new scale immediately. At the right margin of the graphics to a requested curve its scale can also be entered.

3.5.3 CHOOSE AND CHANGE SCALES

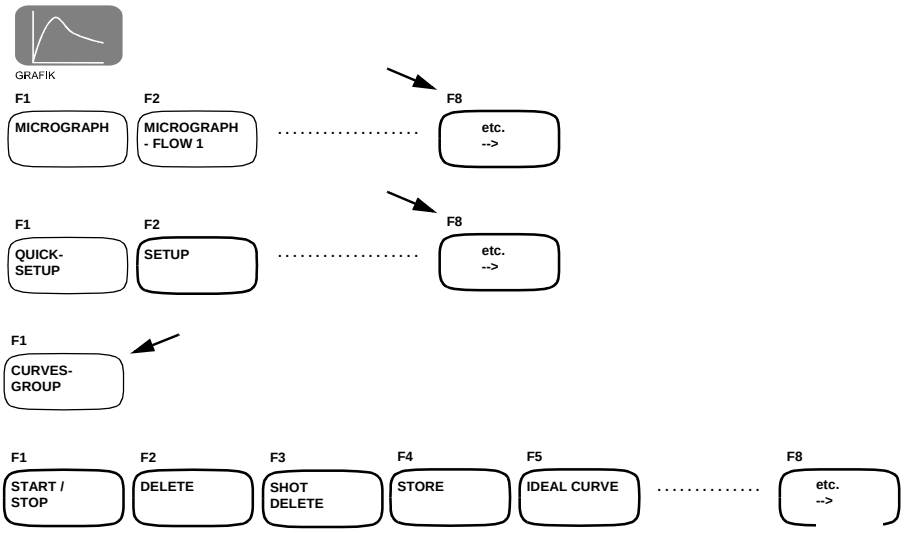


With F8 (etc.) and afterwards F2 (SETUP) enter into the setting soft key strip. When pressing F3 (SCALE) the blue input field appears at the left below on the screen and a cursor field in the selection table. Choose now with the cursor keys the parameters in turn and input the requested scales (in absolute values) with the figure input keys.
With the function key F1 (FADE IN SCALE) bring the scale of the parameter at the right into the graphic image, which is occupied with the cursor field. With F2 (FADE OUT SCALE) erase the scale display.

ATTENTION: In the survey graphics also correspondingly the scales are changed, i.e. also that the possibly preselected windows (magnifiers) must be changed if necessary.

3.6 GROUPS OF CURVES

Call-up:



The function of the group of curves can only be used in control systems with extended memory (RAM disk). It is activated by actuating the function key ´Group of curves´. It appear the already recorded curves.

The curves selected within an optional curve selection group are stored after each shot and displayed in the graphics. When changing the curve selection group also the recording for the curves selected in this group runs.
When the curve memory is filled fully, the oldest curves are overwritten by a new shot. The total number of the curves which can be stored is fixed with 30.

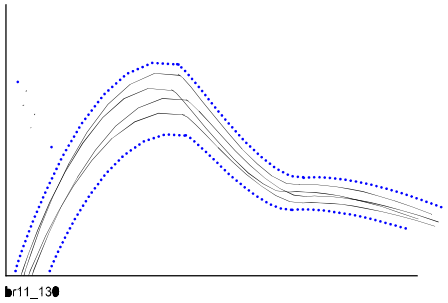
Start:
Starting of the group of curves recording. The function key text changes to ´STOP´. The recording begins with the next shot. Already recorded curves are not deleted. When the curve memory is full, the oldest curves are overwritten and deleted from the screen. The active recording and the number of the recorded curves are signalled with the display of the text ´GROUP OF CURVES START 0´ under the graphics and remain active despite screen page change until F1 ´STOP´ is actuated.

Stop:
Stopping of the recording of the family of curves. The function keys text of the key F1 changes to ´START´. The curve(s) from the current cycle is (are) no longer taken over. By renewed actuation of F1 the recording can be continued.

Erasing:
With F2 the whole memory of families of curves is erased with safety interrogation.

Erase shot:
With F3 the recorded curves of the cycle run last are erased.

Ideal curve:
A current group of curves can be transferred into an ideal curve with F5 (and afterwards F1). This ideal curve range is composed of the area of the band arisen by the recorded curves (envelope) plus a tube surrounding this area, defined by the tube tolerance limits ´Max.pos.t.deviation´ and ´Max.neg.t.deviation´ and integral limits ´Max.pos.i.deviation´ and ´Max.neg.i.deviation´.
(See also item ´Monitoring´).



Store on diskette:
With actuating the function key F4 the data of the current family of curves are written on diskette once.

Exit:
Leaving of the functions of the family of curves with F8. A started recording continues to run.

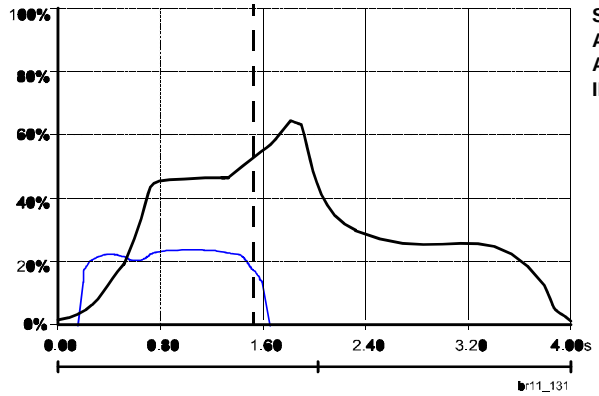
3.7 GENERAL

3.7.1 PRINTING THE GRAPHICS

Possibilities:

1. Each opened screen image can be printed out with the 'HARDCOPY' key on a graphic printer, connected to the control unit front panel interface.
2. A larger, better resolved print-out of the graphic image one gets with the function key F8 (etc.) and afterwards F7 (PRINT):

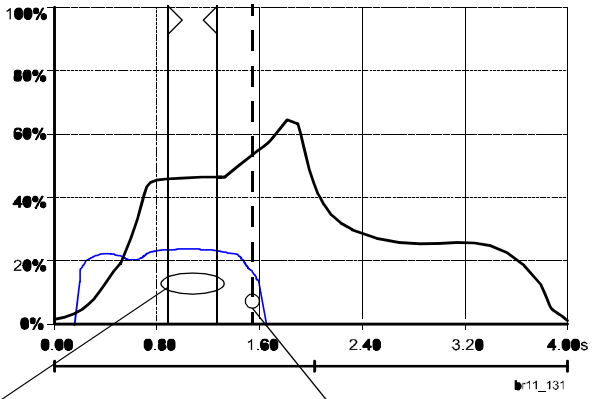
e.g.:



SCALES: SELECTION 1
AG-1 PHx 200.0 bar
AG-1 VSx 60 mm/s
IDK1 AG-1 PHx

FLOW NUMBER UNIT 1: 98,4 **Switchover point: UNIT 1**

3.7.2 FLOW NUMBER AND SWITCHOVER POINT DISPLAY



Flow number actual value display:
The two stroke points on the injection stroke, which represent the flow number measuring window, can be recognized as 2 vertical bars (blue) with small flag in the graphic image. Flow numbers of further units, if existing, can be displayed via the curve selection.

Switchover point display:
The switchover point position is represented as broken vertical bar. Via the curve selection the switchover point of an optional unit can be selected.

3.7.3 STORE

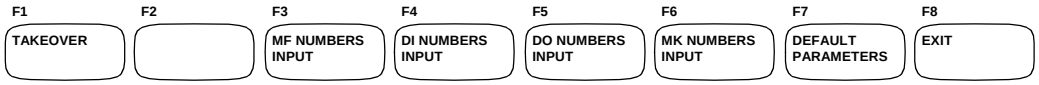
All machine settings, configurations and ideal curves are stored on the parts diskette together with the mould data.

3.8 MICROGRAPH AS ANALYZER

For the service case Micrograph Plus can be used as analyzer of digital and also analog signals.
The compilation and selection of the values and signals is made with the function 'Selection of curves' (item 3.1). To each curve of a group (max. 7 curves per group, max. 4 groups) a signal can be allocated.
The service user level '22222222' must be set at least in order to be able to see in the selection menu the entries of the selectable signals in the lowest screen line.

The standard occupation (= default) reads:
P15200 (temperature actual value heating zone 1) up to P15207 (zone 8)

At the selection of a colour stroke and/or curve with the key F1 'SET' the cursor jumps on the 1st parameter (P15200). A new row of function keys appears:



At first now set the cursor on the requested parameter. Select with F3 up to F6 the signal group and input the signal and/or parameter number. Conclusion with 'ENTER'.

Signals, parameters

F3	MF NUMBERS	Set and actual values, technical manual, chapter 'Tables'
F4	DI NUMBERS	digital inputs, technical manual, chapter 'Hardware' or on the control unit in the help text
F5	DO NUMBERS	digital outputs, technical manual, chapter 'Hardware' or on the control unit in the help text
F6	MK NUMBERS	on the control unit in the help text
F7	DEFAULT PARAMETER	this command resets to the standard values (temperature actual values zone 1 to 8)

Tm = Technical manual

START POINTOF THE RECORDING
The recording of the selected signals can occur in requested moments in the cycle, but only once in one cycle.

E.g. at 'Mould opening': The recording runs from beginning mould opening in the cycle or also in the manual mode when actuating the manual control key 'Mould opening', namely according to the measuring period (setting: Time base, screen page 'Micrograph parameters'.

Choose start point
When opening the screen page 'Micrograph parameters' (Micrograph + F8 (etc.) + F2 (setup) + F5) in F1 the function 'Trigger' appears'.
Press F1 'Trigger'. You now see a list with figures starting from 0 of start points. The valid start point is marked with a ' * '. Input now the requested number and confirm with 'ENTER'.

Standard setting and setting of the start point after switching on the control voltage is ' 0 ', i.e. 'Beginning injection, unit 1'.