HINRICHS

ELECTRONIC
VISIONS FOR THE PRESENT

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TECHNICAL DOCUMENTATION

for the

PROGRAMMABBLE INJECTOR CONTROL

J 6

Note for the user

We should like to make it clear from the outset that these devices are used in many different machines. Because we mainly supply the control to machine manufacturers and like to maintain intensive customer service, we are only too happy for customers to request program adaptations and circuit changes requiered for the different types of machine from us. In this way, is can be ensured that user-friendly operation is provided for the user.
If certain features that are important for the user, such as modified operation, or additional functions are integrated into the control, these are described in the Section "Options and Modifications".

The functions marked * in the Operating Instructions are optional and not integrated into every control.

INHALTSVERZEICHNIS

1. SYSTEM DESCRIPTION

The I6 programmable injector control is a computer-controlled, self-monitoring program control-ler that has been specially developed for control operations on injectors.

1.1 FEATURES

Program number 0

In this program the user can change the pump pressure and the velocity of the needle bar **manually while the machine is running**.

Program number 1 - 20

Up to **20 programs** can be programmed, stored and retrieved again. Existing programs can be overwritten if necessary. **During programming the machine is stopped.**

1.2 FUNCTION OF THE DISPLAYS AND THE KEYS

The front panel is subdivided into the following function blocks:

The **function block PROGRAM** is used to find the required program.

| Display field | Display of the current program number |

    If you press this key, the program number is incremented

    If you press this key, the program number is decremented

The **function block PUMP** is used to control the pump

| Display field	During the execution phase and in program number 0 the pump pressure behind the filter (actual pressure) is displayed in bar. In programming mode the set pressure is entered.
	In program number 0 you can use this key to switch on the pump.
	If you press this key, the program number is incremented
	If you press this key, the program number is decremented

The **function block NEEDLE BAR** is used to control the needle bar
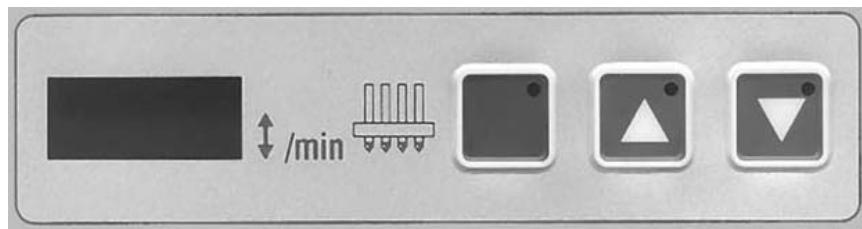
| Display field | During the execution phase and in program number 0 the velocity of the needle bar is displayed in strokes/min (actual value). |

Display field

During the execution phase and in program number 0 the velocity of the needle bar is displayed in strokes/min (actual value).
In programming mode, you can enter the set velocity of the needle bar.

**In Program number 0** you can use this key to switch on the needle bar
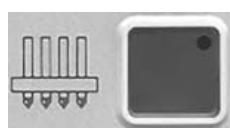
If you press this key, the program number is incremented

If you press this key, the program number is decremented

FUNCTION KEYPAD
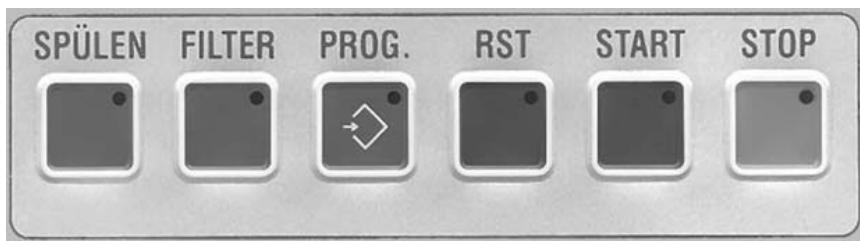
RINSE key

Use the "RINSE" key to activate the rinse program.

FILTER key

If you press the filter key, the pump pressure in front of the filter is displayed in the "pump" display field.

(plant-specific - only possible if the plant is equipped with two pressure sensors).

PROG. key

Use this key to call a program or to store a program that has been created (program 1 to 20)

RST key

To activate the plant on a cold restart or on restart after a fault.

START key

To start the program displayed in the program function block (program 1 to 20).

STOP key

Use the STOP key to shut down all functions. The plant returns to its reset position.

2. OPERATING INSTRUCTIONS

2.1 START-UP

Main switch in "on" position

Display fields are off
Lamp in the RST key is lit

Press the RST key

The lamp in the RST key goes out
The value 0 appears in the display fields:
Program number, Pump pressure and Needle bar

2.2 MANUAL OPERATION - PROGRAM NUMBER 0

In **program number 0** the user can operate both the pump and the needle bar manually. It is also possible to change both the pump pressure and the velocity of the needle bar while the machine is running.

Select program number 0

using
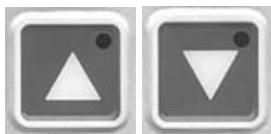
Key in the function field: Program number

Switch on the pump

Press the **green key** in the function field: Pump

The lamp in the green key lights up

Set the required pump pressure

using
Key in the function field: Pump

In the "pump" display field you can read the pump pressure entered in bar.

Switch on the needle bar
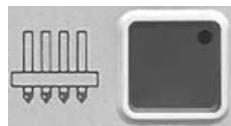
Press the **green key** in the function field: Needle bar.

The lamp in the green key lights up.

Set the required velocity of the needle bar
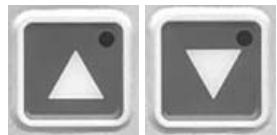
Using
Key in the function field: Needle bar

In the display field "Needle bar" you can read the set velocity of the needle bar.

Stop the plant

using the
STOP key in the function keypad

The display fields "Program number", "Pump pressure" and "Needle bar velocity" begin to blink. When the minimum velocity has been reached and the OT signal has been detected, the display fields "Pump pressure" and "Needle bar velocity" are refreshed.

## 2.3   AUTOMATIC OPERATION - PROGRAM NUMBERS 1 TO 20

In **program numbers 1 to 20,** the user can call up and start previously programmed programs. However, before such programs can be started automatically the required values must have been stored in the programs in question. How each program is programmed is explained in the following description.

Creating and storing a program

Select the program number

using
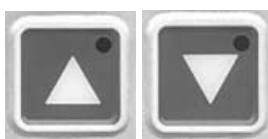
Key in the function field: Program number

and then **Initiate programming enable** by
Pressing the PROG. key in the function keypad
for at least 1 sec

Lamp in the PROG. key lights up

Set the required pump pressure

using
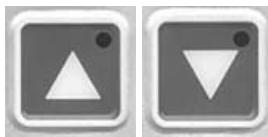
Key in the function field: Pump

You can read the pump pressure in bar in the display field "Pump".

Setting the velocity of the needle bar

Key in the function field: Needle bar

You can read the set velocity of the needle bar in strokes / min in the display field "Needle bar".

Store the set values

by pressing the
PROG. key in the function keypad

Lamp in the PROG. key goes out

Note:

If the display field "Pump pressure" or "Needle bar" blinks when you press keys △ ▽ for the program number or the PROG. key - i.e. on exiting the programming operation, no value has been entered for this value.

The value 000 is impermissible!

2.4   STARTING AND STOPPING A PROGRAM

In program numbers 1 to 20

Select the required program number

using
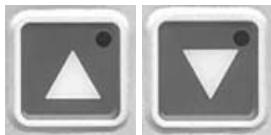
Key in the function field: Program number

Starting a program

Press the START key in the function keypad**.**

Stopping a program

Press the STOP key.

The display fields "Program number", "Pump pressure" and " Needle bar velocity " start to blink. When the min. velocity has been reached and the OT signal has been detected, the display fields "Pump pressure" and " Needle bar velocity " are refreshed with the stored values.

2.5   RINSE PROGRAM

The **RINSE program** must **never be started while the machine is running.** This program can be called both in program number 0 and in program numbers 1 to 20.

Starting the rinse program

Press the RINSE key

The lamp in the RINSE key lights up.

The symbol **CL** (= Clean) appears in the display field "Program number"

The **needle bar** is now automatically moved **to** the **bottom dead centre** BDC.

After that, the **pump pressure** is automatically set to **half its maximum value**.

Vary the pump pressure in the rinse program

- by pressing

Key in the function field: Pump

the pump pressure can be varied.

You can read the pump pressure in bar in the display field "Pump pressure".

Stopping the rinse program

Press the **STOP key**

The lamp in the RINSE key goes out.

After the rinse program has been terminated, the needle bar is **automatically** moved **to the top dead centre TDC**.

3. SERVICE SETTINGS

Note: Only qualified personnel must set or change these functions.

Calling the service setting
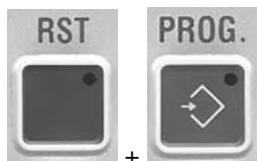
Press the **RST and PROG. keys simultaneously and put the main switch into the "ON" position.**

The symbol **SE** (= Service setting) appears in the display field "Program number"

Select the position number

... by pressing
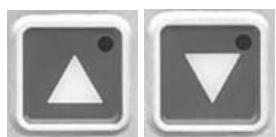
Key in the display field: Pump pressure

Vary the parameters

... by pressing

Key in the display field: Needle bar

The following functions can be set:

Position number	Parameter	Function
in	in	(unit)
display "Pump"	display "Needle bar"	

	Min. value	Max. value	In Steps of	
1	1	2	1	**Number of sensors for pump pressure** (quantity)
2	10	50	1	**Pressure difference for filters blocked up** (%)
3	50	500	10	**Sample & hold time** (ms)
4	5	30	1	**Counter constant** (pulses)
5	0,5	9,99	0,1	**Max. pump pressure** (machine-specific) (bar)
6	0,5	99,9	0,5	**Max. velocity of the needle bar** (strokes / min)
7	10	30	1	**Max. control range** (%)
8	0,1	0,5	0,1	**Hysterese pressure** (bar)
9	0,3	3	0,1	**Integrity time pump** (sec)

4. FAULT MESSAGES

The following faults are detected and displayed by the injector control:

Fault message	Abbreviation	Display field
Frequency converter pump	**Err**	**Pump**
Frequency converter needle bar	**Err**	**Needle bar**
Min. frequency FU needle bar	**ErF**	**Needle bar**
Limit switch top – TDC	**EO**	**Needle bar**
Limit switch bottom – BDC	**EU**	**Needle bar**
Pressure sensor behind filter	**SE1**	**Pump**
Pressure sensor in front of filter	**SE2**	**Pump**
Brake	**Ebr**	**Needle bar**
* Max. manipulated variable pump pressure	**OL**	**Pump**
* Max. manipulated variable velocity needle bar	**OL**	**Needle bar**
* Filter blocked up	**FIL**	**Pump**

After a fault message has been displayed, the outputs are reset. The lamp in the RST key lights up. Once the fault has been remedied, press the RST key to reactivate the plant.

* The fault messages "Max. perm. manipulated variable exceeded " and "Filter blocked up" are exceptions: In these cases the plant is not shut down.

If one of these fault messages is detected, ...

- this is indicated by alternation between the actual value and the fault message in the relevant display field. If the fault message "Filter blocked up" is output the lamp in the FILTER key also lights up.

A relay output (fault signal) is also available.

4.1   EXPLANATION OF TERMS AND FUNCTION DESCRIPTIONS

Detection of the top dead centre TDC

After a program stop, the needle bar is automatically moved to the top dead centre. If this operation is not completed within a set time of 15sec, there is a fault in the plant. The plant automatically shuts down and the **fault message EO (= limit switch top)** appears in the display field "Needle bar"**.**

Detection of the bottom dead centre BDC

When the RINSE program is called, the needle bar is automatically moved to the bottom dead centre. If this operation is not completed within a set time of 15 sec., there is fault in the plant. The plant automatically shuts down and the **fault message EU (= limit switch bottom)** appears in the display field "Needle bar"**.**

Low-power mode

Program numbers 1 to 20
If no raw material is on the conveyor belt during the execution phase, this is detected by the program controller, which automatically switches to low-power mode. In this case, the machine is operated with min. pump pressure and min. velocity of the needle bar until new raw material is detected on the conveyor belt.

connection diagramm
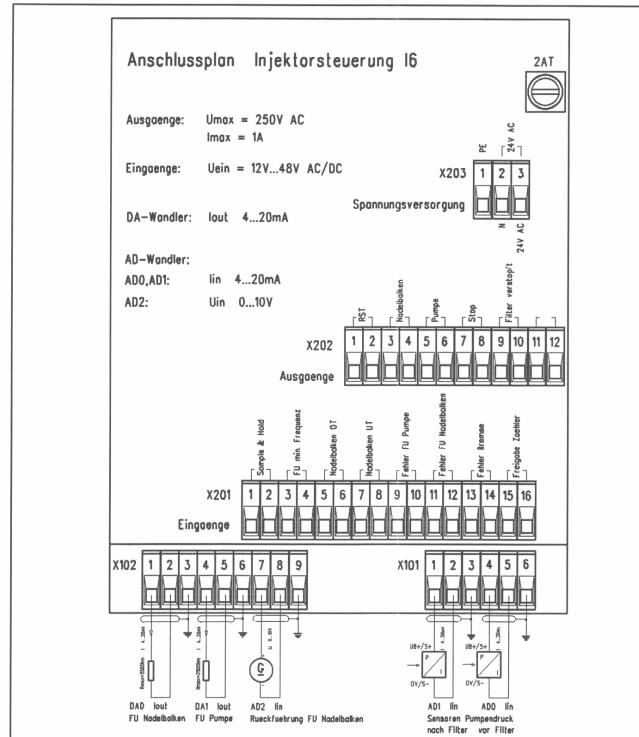
Anschlussplan   Injektorsteuerung I6