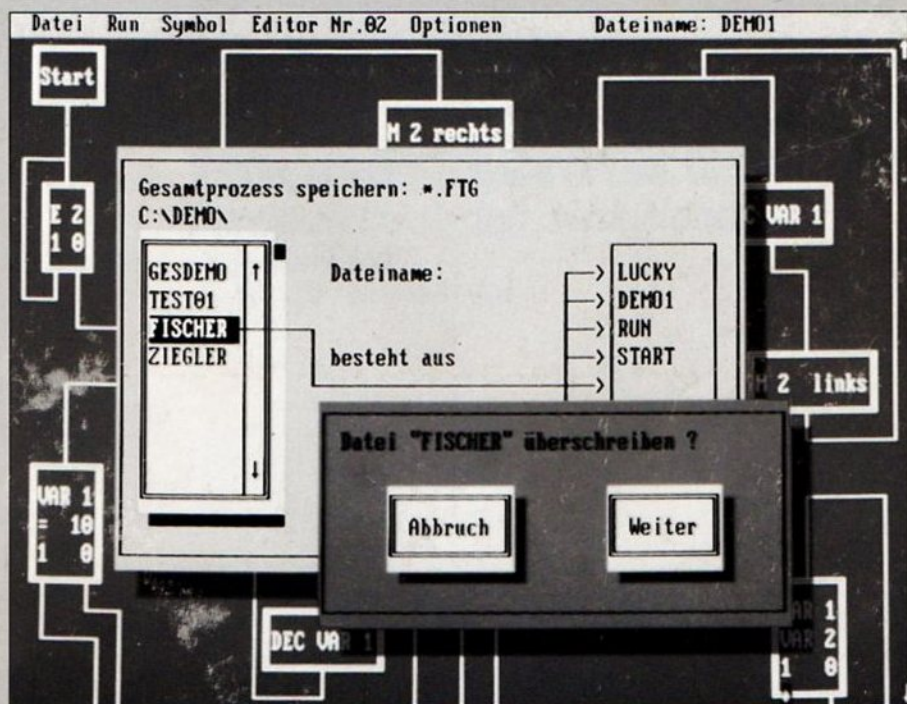


LUCKY LOGIC



LUCKY LOGIC

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English version	from page 21 to page 38
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LUCKY LOGIC

English version
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Matching Lucky Logic to the computer

LUCKY LOGIC is matched to your computer automatically. The first time you start up the program, it determines which graphics card is installed in the computer and how fast it can process data. This information is stored in the FISCHER.DAT file, and is loaded in future every time you start the program.

If you wish to run the program on another computer, or if you ever change your computer hardware, all you need to do to adapt LUCKY LOGIC to the new situation is to delete the FISCHER.DAT file.

If you do not want to have different colors on the screen when working with LUCKY LOGIC (e.g. if you are using PC VGA graphics with a monochrome monitor), you can let the program know by calling it up as follows:

LUCKYLOG M

If you want to use the English version of the program, the call is as follows:

LUCKYLOG E

Important!

Lucky Logic is available for IBM PC-compatible computers, Atari ST and Commodore Amiga 500/2000. The package therefore contains four disks - one 5 1/4" disk for PCs and one 3 1/2" disk each for PCs, Atari and Amiga.

How to use Lucky Logic

A welcome screen appears first of all when you start the program. Just press any key to begin work. The LUCKY LOGIC program controls your fischertechnik models via the fischertechnik interface connected to the computer. LUCKY LOGIC is extremely simple to use; almost all actions can be performed with the mouse. All the program functions can be called up via menus. More experienced users can also call all the menu commands directly by means of short key codes (listed in the menus).

Important!

The program will only work correctly if the interface is connected and ready for operation, in other words if it is being supplied with power by the separate power supply unit.

You can position switches, lamps and motors individually on the screen and draw connectors with the mouse. When you run the control program, the interface is driven and the model is controlled by the computer.

The top of the screen is reserved for a menu line for selecting the various command groups. The remainder of the screen has been left free for the control program.

File	Run	Symbol	Editor No.01	Options
------	-----	--------	--------------	---------

The mouse pointer (cursor) is displayed on the screen in the form of a small lozenge. When you move the mouse around, the movement of the cursor on the screen corresponds to your hand movement. The two mouse buttons activate the actual program functions, e.g. they are used to select a file or to draw a connector. Two steps are necessary to select a program function:

1. Move the cursor to a menu option (for example) with the mouse.
2. Press one of the mouse buttons (the left and right-hand buttons may have different functions).

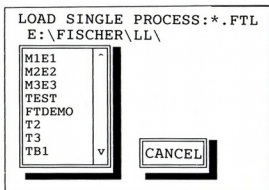
This method of making a choice is also known as clicking. The mouse is also used to position symbols and draw connectors when you produce drawings.

If you select a menu accidentally, either move the mouse pointer away from it (so that none of the menu options are highlighted any more) and press the right-hand mouse button or press the ESC key. In both cases the menu disappears.

Before we discuss the control functions, a few words of explanation are necessary about some of the general terms used in this manual:

Scrolling is the word used to refer to moving the screen or a window on the screen over the data. Scrolling is necessary, for example, whenever the circuit takes up more than 24 lines and will no longer fit on the screen. The screen can be considered to form a window which is moved vertically over the drawing. You can scroll by clicking one of the two arrows in the right-hand margin of the window.

You can also scroll through a list of files in order to select one of them, if there are more files on the hard disk or floppy disk than there is room in the window.



Connectors

When you have positioned the various symbols on the screen, you can join them up with connectors (lines); only horizontal and vertical lines are possible. First click an output. Then draw the connector with the mouse. Click the left-hand button to change directions. If you wish to join a connector up to another connector which already exists, simply move the cursor to the target line and click it. To delete a connector, move the cursor to the start of it (normally the output of a symbol) and click it with the right-hand mouse button.

Important!

It is not possible to form more than one junction (i.e. join up connectors) at any point on the screen, in other words no more than three connectors may converge in the same place. If there are several return paths to a single line, the connectors must therefore be arranged one below the other.

Process

A process is what controls an individual motor or - in more general terms - a particular output. Since the interface has 4 outputs, up to 4 "single processes" can be strung together in a "combined process". A separate editor is responsible for each single process; it has the same number as the motor it controls, in other words editor 1 contains the control program for motor 1, editor 2 that for motor 2, etc.

All the single processes which make up a combined process are processed in parallel by the program - all the motors and lamps connected to the outputs must after all be controlled at the same time.

If two interfaces are connected to the computer (see interface manual), the number of inputs and outputs is doubled, making a total of 16 inputs and 8 outputs (and thus 8 processes) available.

Variables

LUCKY LOGIC uses variables numbered from 1 to 99 to buffer values (VAR 1, VAR 2, VAR 3, etc.). These variables are valid in all processes; as a result, the single processes can exchange information via the variables, for example one process can use a variable to inform another process that it has finished what it is doing.

Important!

Since the variables are used by all the single processes, always choose the variable number carefully, so that the processes do not interfere with each other (in other words they must only interact where they are actually supposed to).

Interface

The interface forms the link between the fischertechnik models and the computer, since the computer ports cannot provide enough power on their own to supply a motor, for example. In addition the interface protects the ports of the computer if you make a mistake when wiring up a model. It also incorporates an automatic timer, which cuts off the power to the motors if the computer stops sending control commands. You will often wish to make changes when testing the control software. The timer stops the model automatically, so that you don't have to interrupt the power supply to the interface every time you want to modify the program. The model carries on again as normal as soon as the computer sends more commands. It is also possible to connect two interfaces to the same computer (see interface operating manual). LUCKY LOGIC is already configured for a second interface.

File

As soon as the cursor is positioned to the "file" command in the main menu, a pull-down menu appears. The desired file command can then be selected with the mouse pointer (the color changes). The command is executed when it is clicked with the left-hand mouse button. This main menu option contains all the commands for loading and saving processes on floppy disk or on the hard disk. The "file" option must also be selected in order to exit the program.

Load single process F3

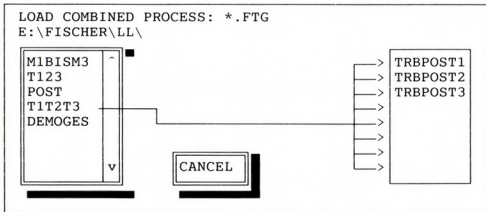
This menu option can be used to load a single process in the currently active editor (the number of the active editor is displayed in the top line next to the "editor" command). The number of the controlled motor or output is always the same as the number of the active editor. A circuit which is already complete can thus be adopted for another motor, and then modified if necessary.

The files with single processes which already exist are listed in a window; the desired file can then be clicked with the mouse. If there are more files than there is space in the window, the list can be scrolled up or down by clicking the arrows.

It is also possible to string several processes together to form a combined process with this option: the various editors are each loaded with single processes and the combination of them is stored as a combined process.

Load combined process Alt-F3

This menu option can be used to load several processes which belong together, e.g. the complete control program for all the motors or outputs of a model. If the mouse pointer is positioned to a combined process, the single processes which make up this process are displayed:



The control program can be compiled (--> Run combined process) and started immediately the combined process has been loaded.

The combined process can be extended if desired by entering additional processes (in editors which are still free) or by loading single processes. The files which already exist are listed in a window; the desired file can then be clicked with the mouse. If there are more files than there is space in the window, the list can be scrolled up or down by clicking the arrows.

Save single process F2

This menu option saves the process which is currently displayed on the screen. There are two ways of selecting the file name:

1. If the process already existed beforehand and has merely been modified, the file name can be clicked in the same way as when the process is loaded.
2. If a new file name is to be allocated, the words "file name" must be clicked in the window. The new name can then be entered (all inputs must be terminated by pressing the [->] key).

If the file name exists, the program asks again whether or not you really want to overwrite the old file, just to be on the safe side.

Save combined process Alt-F2

This menu option saves all loaded processes. There are two ways of selecting the file name:

1. If the combined process already existed beforehand and has merely been modified, the file name can be clicked in the same way as when the process is loaded.

2. If a new file name is to be allocated, the words "file name" must be clicked in the window. The new name can then be entered (all inputs must be terminated by pressing the [←→] key).

Clear screen Alt-C

This command can be used to clear the screen and create a new circuit. If the circuit which was previously displayed on the screen has not been saved (-> save single process), it will be irrecoverably lost. The program therefore always asks for confirmation. If you click "Cancel" at this stage, the screen remains as it is. If you click "Continue", everything on it is deleted.

Print logical flowchart Alt-P

This menu option can be used to print out the complete logical flowchart (in other words including the sections which are not visible on the screen at present).

A printout can be very useful - firstly so that you can file away the circuit for later use (in time you will build up a proper "process library"), and secondly it is often much easier to locate any errors in the circuit using a pencil and paper than by trial and error on the screen.

Important! The printer must be switched on and ready to print (paper loaded).

Exit program Alt-X

This menu option terminates the LUCKY LOGIC program.

If the circuit which was previously displayed on the screen has not been saved (-> save single process, -> save combined process), it will be irrecoverably lost. The program therefore always asks for confirmation. If you click "Cancel" at this stage, the screen remains as it is. If you click "Continue", everything on it is deleted.

Delete processes

The program menu does not contain an option for deleting processes, since you can get rid of them both quickly and simply using the operating system commands. The Lucky Logic files are easy to recognize from their extensions:

Single processes end with ".FTL", e.g. "DEMO.FTL". These files contain all the information about a single process.

Combined processes end with ".FTG", e.g. "DEMO.FTG". These files just contain the names of the single processes.

Run

The "run" command in the main menu controls compilation of the processes, and is used to start a combined or single process or to test it step by step. As soon as the cursor is positioned to the word "run", a pull-down menu appears on the screen. The desired command can then be selected with the mouse pointer (the color changes). The command is executed when it is clicked with the left-hand mouse button.

Compile single process F9

This menu option can be used to check whether or not the circuit has been entered correctly for one process; the program checks the junctions and connectors of each symbol. If the circuit is correct, an OK message appears in a window in the middle of the screen. You can then start the process after clicking the message with the mouse. A process is only compiled if it has been saved beforehand.

If the circuit contains an error, explanatory information appears instead of the message and you must rectify it before you can continue.

Compile combined process Alt-F9

This menu option can be used to check whether or not the circuit has been entered correctly for all processes (similar to compiling single processes). All the single processes which are marked with a "_" in the editor menu are compiled consecutively. The combined process is only compiled if all single processes have been saved beforehand.

If an error has been made in one of the processes, the compilation procedure is interrupted and a message is output during the single process containing the error.

RUN single process Shift-F9

This menu option starts a single process. It is a useful option for testing the various control functions of a model step by step. If all the single processes run the way you want them to, you can test their interaction in the combined process. The process is executed and the model is controlled. You can stop the process again by pressing any key on the computer keyboard.

RUN combined process Ctrl-F9

This menu option simultaneously starts all the single processes which have been loaded - in other words all the input and output components in your model which are connected to the interface. The option can be used to test the interaction of the single processes and to start a finished control program. The control program is executed, and can be stopped again by pressing any key on the computer keyboard.

Symbols

The circuit for a process is constructed by positioning the symbols for the fischertechnik components on the screen and then joining them together. You can then check the circuit with the compile command. The program checks whether or not all the symbol inputs and outputs are connected together and whether you made any mistakes when you designed the circuit. The message which appears either tells you that the circuit is OK or indicates any errors.

You can access the LUCKY LOGIC symbols by activating the "symbol" command in the main menu. Select the desired symbol with the mouse pointer (the color changes). When you click it with the left-hand mouse button, it is highlighted on the screen. You can then position the symbol where you want it in two steps:

1. Move the pointer to any position on the screen and press the left-hand mouse button again; the symbol will be set at this point. You can repeat this step as often as you like until the symbol is positioned exactly where you want it.
2. Then confirm the symbol's position by pressing the right-hand mouse button.

If you wish to reposition a symbol elsewhere later on, you must first delete all its connectors. You can then click the top left-hand corner of the symbol with the left-hand mouse button and move it to a new position as described above.

If you wish to delete a symbol, you must also delete all its connectors first. Then click the top left-hand corner of the symbol with the right-hand mouse button.



Each process begins with the start symbol. This symbol must therefore always be set first when designing a new circuit. It serves as the starting point for constructing the remainder of the circuit. If the process is a recurring process, the return path is joined up between the start symbol and the next symbol. Only one start symbol is set for each process.



If a process must only be run once, there is no return path (-> start). In this case the output of the last symbol is linked to the end symbol. It is possible to set several end symbols in the same circuit or to link several outputs to the same end symbol.

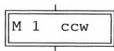


The input symbol represents an input line (switch or sensor). There are two output lines at the symbol - one for the value 0 and one for the value 1. The program continues executing either in the 0 branch or in the 1 branch, depending on the switch position (0 = switch connected to ground, 1 = switch connected to +5 V).

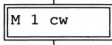
The input number can be entered by clicking the "I" with the left-hand mouse button and then keying in the number (all inputs must be terminated by pressing the [<+>] key). The two outputs of the symbol can be swapped by clicking the 1 output.



The motor off symbol switches off a motor. The motor number is the same as the number of the process (-> editor). The word "motor" of course also refers to any other components connected to the output, e.g. lamps, magnets, etc.



The motor ccw symbol starts the motor rotating counterclockwise (if the connected motor rotates in the wrong direction, you must swap its plugs round). The motor number is the same as the number of the process. The word "motor" of course also refers to any other components connected to the output, e.g. lamps, magnets, etc. You can change between clockwise and counterclockwise by clicking the "M" with the left-hand mouse button.

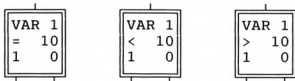


The motor cw symbol starts the motor rotating clockwise (if the connected motor rotates in the wrong direction, you must swap its plugs round). The motor number is the same as the number of the process. The word "motor" also refers to any other components connected to the output, e.g. lamps, magnets, etc. You can change between clockwise and counterclockwise by clicking the "M" with the left-hand mouse button.



The VARxx = 0 symbol introduces a variable into the circuit. "xx" represents the number of the variable. The variable is set to zero as default. All variables can be numbered consecutively from 1 to 99. The variable number can be entered by clicking the "V" of "VAR" with the right-hand mouse button and then keying in the number (all inputs must be terminated by pressing the [\leftarrow +] key).

The variables apply to all the single processes which make up a combined process and serve as a means of exchanging data between the single processes. On the other hand, there is also a risk of errors creeping in if you use the same variable for several different processes.



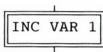
The VARxx = nnn symbol enables a variable to be compared with a fixed value (= constant; xx represents the number of the variable and nnn is any number). If the current value of the variable is the same as the fixed value, the program continues at the 1 output. If not, it continues at the 0 output.

The outputs can be swapped by clicking the 1 output. Enter the variable number first by clicking the "V" with the left-hand mouse button, and then press [\leftarrow +] to enter the reference value (all inputs must be terminated by pressing the [\leftarrow +] key).

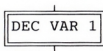
The comparison function can also establish whether the specified variable is lower (<) or higher (>) than a predefined value. To do so, click the "=" sign in the symbol. The reference condition changes to the next alternative each time you click it - just carry on clicking until the condition you want appears in the symbol.



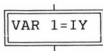
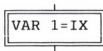
The VARxx = VARyy symbol enables two variables to be compared with one another (xx and yy are the numbers of the two variables). If the values of the two variables are identical, the program continues at the 1 output. If not, it continues at the 0 output. The outputs can be swapped by clicking the 1 output. You can enter the two variable numbers consecutively by clicking the first "V" with the left-hand mouse button (all inputs must be terminated by pressing the [\leftarrow +] key).



The INC VARxx symbol enables the value of a variable to be incremented by 1 (xx represents the number of the variable). The variable number can be entered by clicking the "I" of "INC" with the left-hand mouse button (all inputs must be terminated by pressing the [\leftarrow +] key).



The DEC VARxx symbol enables the value of a variable to be decremented by 1 (xx represents the number of the variable). The variable number can be entered by clicking the "D" of "DEC" with the left-hand mouse button (all inputs must be terminated by pressing the [\leftarrow +] key).



The VARxx = IX symbol causes a value of the analog input IX to be read in and a variable to be set to this value (xx represents the name of the variable). Enter the variable number first by clicking the "V" with the left-hand mouse button (all inputs must be terminated by pressing the [\leftarrow +] key). You can swap between the IX and IY inputs by clicking the "I" of "IX" or "IY".

Editor

In LUCKY LOGIC the term "editor" simply means that you can enter or modify a process. There is a separate process for each output, and thus also a separate editor. This option in

the menu can be used to select the control program for a particular output in order to "edit" it.

The editor can be selected by activating the "editor" command in the main menu at the top of the screen. As soon as the cursor is positioned to this command, a pull-down menu appears on the screen. The desired editor can then be selected and clicked with the mouse pointer. If a process has already been allocated to the editor, the name of the file is displayed and the process is loaded.

If no processes have been allocated, a file name is not displayed (in the diagram above, for example, only editor 1 is already allocated a process: file name = TEST). Editors 5 to 8 should obviously only be used if two interfaces are connected to the computer.

Once the editor has been selected, the circuit can be edited. The entire width of the screen can be used to do so. If necessary, the screen can be scrolled up and down by clicking the arrows in the right-hand margin. You can click the "_" symbol to switch compilation of the process on and off (-> compile combined process).

The number of the currently selected editor (= number of the process = number of the motor) is always displayed in the menu line at the top of the screen.

Here are a few useful hints for working with the editor:

- A symbol cannot be moved again (i.e. repositioned) until all its connectors have been opened up (i.e. deleted). It is a good idea to order a printout of the program, so that you can still remember afterwards where the connectors were drawn.
- If you wish to reconstruct a circuit, you do not necessarily need to delete all the symbols you no longer require for the time being (and then retrieve them again later via the menu); instead you can "park" them in another area of the screen where there is free space and then integrate them in the circuit again later on.
- The variables apply to all processes. If a variable is altered in one process, the same alteration is made instantaneously in all the other processes.

Options

The options menu only contains two functions, which are executed when you click the left-hand mouse button:

Help F1

This menu option provides information on all the functions of the program - it is basically a shortened version of the software manual for the computer. A menu with a list of keywords

appears on the screen. If you click one of the keywords, a brief description of the command or function will be displayed.

Interface diagnosis

LUCKY LOGIC can also be used to test the interface and the connecting cable. To do so, you must connect the motors to the outputs (M1 to M4) and the switches to the inputs (I1 to I8) (if you wish, you can use just one motor and one switch and then move them along one input or output at a time). If you are using two interfaces, you can also control inputs I9 to I16 and motors M5 to M8.

I 1	I 2	I 3	I 4	I 5	I 6	I 7	I 8	I 9	I10	I11	I12	I13	I14	I15	I16
1	1	1	1	1	1	1	1								

M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8
off	off	off	off				

I X	I Y
536	536

CANCEL

The input values of the switches appear in the top field. The display varies according to the switch positions.

The middle field is used for direct control of the outputs. The display is initially set to "off". You can toggle between "off" and "ccw" by clicking a motor field with the left-hand mouse button or between "off" and "cw" by clicking it with the right-hand button. There is obviously no difference between clockwise and counterclockwise as far as lamps and magnets are concerned.

The field in the bottom left-hand corner shows the values of the two analog inputs IX and IY. You can terminate the interface test by clicking the "cancel" field in the bottom right.

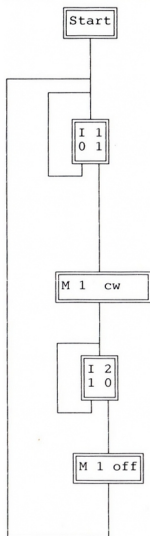
Examples

The examples below are designed to simplify your introduction to the program. All you need is the interface, one motor and two switches. The motor and the switches must be connected to the interface (the motor to M1 and the switches to I1 and I2). You can check whether or

not the connections are correct with the diagnosis function described above. When you press the switches, the value displayed for I1 or I2 should change. You can control the motor by clicking M1.

The first program switches the motor on with switch I1 and off again with switch I2. The table below shows what you must enter to write the program and the functions of the various symbols.

Program



Program inputs and functions

Select the "symbol" menu with the left-hand mouse button and then click the start symbol. It appears on the screen in color. Go to the desired position on the screen with the mouse and click the left-hand button. The symbol then moves to where the mouse is. Confirm the position by clicking the right-hand button.

Every program must begin with the start symbol.

Position the input symbol in the same way. Click the "I" and enter "01" as the switch number. Click the "1" of "1 0"; the value displayed at the bottom changes. Then draw a connector between "Start" and "I 1", and a return path. If you need to change direction, just press the left-hand mouse button.

The program waits until you press switch I1.

Position the "M 1 cw" symbol and draw a connector between "I 1" and "M 1 cw".

The motor starts up as soon as the switch is pressed.

Position switch I2 and join it up in the same way as switch I1.

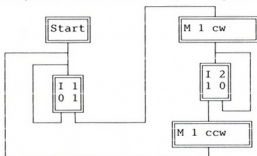
The program then waits with the motor running until you press switch I2.

Position the "M 1 off" symbol and draw a connector between "I 2" and "M 1 off".

The motor is now switched off.

Finally draw a return path to a point below the "start" symbol.

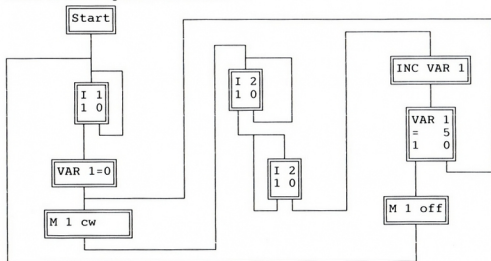
The second program switches the motor first to clockwise operation with switch I1 and then to counterclockwise operation with switch I2. This procedure can subsequently be repeated any number of times. Although the circuit looks different, it works in almost exactly the same way as the first one, except that "M 1 off" has been replaced by "M 1 ccw".



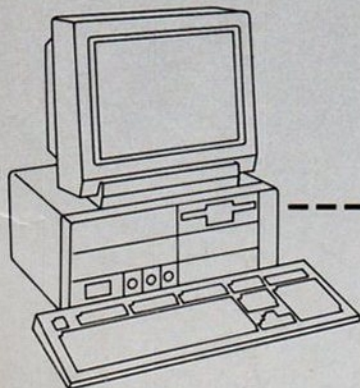
The last example shows how to count the number of times a switch is pressed. Start the procedure by pressing the switch connected to I1. The program then continues by setting VAR 1 to zero.

The motor now rotates clockwise. The purpose of the two consecutive queries regarding switch I2 is to establish one press of the switch (and one only). The program waits first of all until the switch is pressed. However, VAR 1 is not incremented by 1 until it is released again.

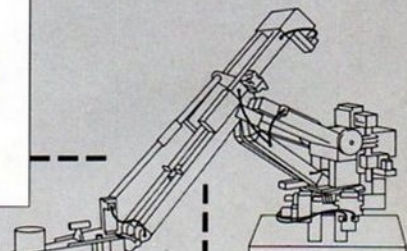
When the switch has been pressed a total of five times (e.g. by a momentary-action switch which is connected to the motor by a pulse wheel), the motor is stopped; the program waits for it to be started again with the switch at I1.



If you have any questions or technical problems, don't hesitate to get in touch with us at: **fischertechnik Service Department, D-7244 Tumlingen/Waldachtal, Tel. 7443/12-369**



fischertechnik
INTERFACE
30 520



fischertechnik Model
or
fischertechnik Kit
PROFI COMPUTING
30 490

fischertechnik
LUCKY LOGIC
30 521

Process Control
Software

fischertechnik
SPECIAL
POWER-SUPPLY
30 180

Zusätzlich erforderlich: INTERFACE (2 Stück anschließbar) Netzgerät (empfohlen Art. Nr. 30 180 POWER-SUPPLY)

Accessories required: INTERFACE (can be daisy-chained) Power pack (we recommend POWER-SUPPLY, ref. no. 30 180)

Nécessitent en plus: INTERFACE (2 pièces connectables) Bloc d'alimentation (nous recommandons l'art. réf. n° 30 180 POWER-SUPPLY)

Verder zijn nodig: INTERFACE (2 stuks aansluitbaar) Voedingseenheid (aanbevolen art. nr. 30 180 POWER-SUPPLY)

Complemento indispensabile: INTERFACE (2 piezas conectables) Bloque de alimentación (recomendamos art. núm. 30 180 POWER-SUPPLY)

Accessori richiesti: INTERFACCIA (si possono collegare n. 2) Alimentatore di corrente (consigliato: n. 30 180 POWER-SUPPLY)