

## ROBO Interface

► The ROBO interface allows communications between a PC and a model. It transforms the commands from the software so that, for example, motors can be activated and signals from sensors such as scanners, photo transistors, reed contacts and NTC resistances etc. can be processed.

### Technical Data (See Fig. 1 p. 3.)

#### Size and Weight

Casing dimensions, LxWxH, 150x90x34mm, weight about 170g

#### Power supply 9V $\pm$ , 1000mA (1)/(3)

Two choices are available, either the fischertechnik power unit 9V $\pm$ , 1000mA, item No. 37109 connected to the DC socket (1) or the Accu Set item No. 34969 connected to +/- sockets (3). When connecting a power unit to the DC socket (1), the circuit to the sockets for the battery set (3) is automatically interrupted. After the power supply is turned on, there is initially a test of all LEDs and then the two green LEDs (6) and (7) blink alternately. The interface is ready for operation.

Current consumption without connected components: 50mA

#### Processor and Memory

Processor 16 bit, type M30245, clock frequency 16 MHz, 128 Kbyte RAM, 128 Kbyte flash

#### Outputs M1–M4 or O1 to O8

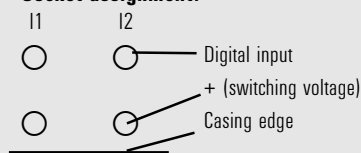
(14) Connection of four motors (forwards, backwards, off, eight speed levels) with 9V $\pm$ , continuous operation 250mA, short-circuit-proof.

As an alternative, up to eight bulbs or electromagnets may be connected to the eight individual outputs O1–O8 (the second pin of the power consumer is connected to the grounding socket (2)).

#### Digital Inputs I1–I8

(12) For digital sensors such as push buttons, photo transistors and reed contacts. Voltage range: 9V $\pm$ , switching threshold for ON/OFF is about 2.6 V, input resistance about 10k $\Omega$ .

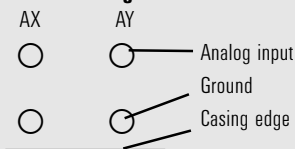
##### Socket assignment:



#### Analog Resistance Inputs AX and AY

(11) For connection of potentiometers, photo or NTC resistances. Measuring range 0–5.5k $\Omega$ . Resolution 10 bit.

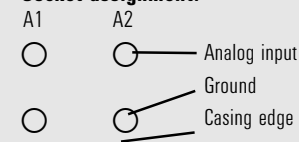
##### Socket assignment:



#### Analog Voltage Inputs A1 and A2

(10) For connection of analog sensors, which output a voltage of 0–10 V. Resolution 10 bit.

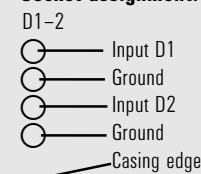
##### Socket assignment:



#### Inputs for Gap Sensors D1 and D2

(9) Special connections for two fischertechnik gap sensors.

##### Socket assignment:



#### Infrared (IR) Inputs

Using the IR receiver diode (18), the keys of the hand transmitter from the IR control set (item No. 30344 is needed as an addition) can be used as digital inputs. Which function the keys are to activate, can be programmed using the software, ROBO Pro.

#### Interfaces USB, Serial, IR

The interface is connected over the serial interface (16) or the USB interface (17) with the PC. A connection cable is supplied for each of the interfaces.

The device is compatible with the USB 1.1 and 2.0 specifications and works with a data rate of 12 Mbit/s.

#### Selection of the Interface

The selection of the interfaces is done by the programming software. The interface automatically accesses the interface, from which it is receiving data. Then the LED blinks, which is assigned to the particular interface, (6) for the USB and (7) for the serial. If data is not received from any interface, then both LEDs blink alternately ("autoscan mode").

#### Fixed Setting for a Certain Interface

By pressing the push button (5), you can select a certain interface. Then the LED for the selected interface lights up. As soon as data "flows" over the selected interface, the LED blinks. You can return to automatic interface selection by pressing push button (5) several times until the LEDs for the serial and the USB interface blink alternately again.

#### Infrared (IR) Test Function

If you press the push button (5) several times until the IR LED (8) lights up, then you can control the outputs of the interface, without connection to the PC directly, through the hand transmitter of the IR control set (item No. 30344 needed as an addition), for example, for test purposes. If this function is active, then the USB and the serial interface are shut off. You can return to the automatic interface selection by pressing the push button (5) several times until the LEDs for the serial and the USB interface blink alternately again.

Assignment of the keys on the IR hand transmitter:

The motor outputs M1–M3 of the interface can be turned on and turned off with the corresponding keys on the transmitter. For M1–M3, the speed of the motor can also be switched to fast and slow.

The motor output M4 is activated with the keys 1))) and 2))), but these keys are normally used to switch between receiver 1 and receiver 2. The speed of M4 cannot be changed with the hand transmitter.

### Twenty-six Pin Strip (13)

Here all available inputs and outputs are provided again so that you, if desired, can connect a model through a ribbon cable and a single 26-pin plug with the interface (plug and ribbon cable are required additionally).

Pin Assignment					
Plug Assignment	Pin	Pin Assignment	Pin	Pin Assignment	
1	2	1	11	Supply voltage 9 V + for sensor supply	I1
3	4	2	12	Ground wire for analog connections, gap sensor, fast meter input. <b>Do not use as antipole for the power output 01 to 08.</b>	I2
5	6		13		I3
7	8		14		I4
9	10	3	15	AX	I5
11	12	4	16	AY	I6
13	14	5	17	A1	I7
15	16	6	18	A2	I8
17	18	7	19	Gap sensor D1	O1
19	20	8	20	Gap sensor D2	O2
21	22	9	21	Fast meter input	O3
23	24	10	22	Ground wire as antipole for the power output 01 to 08.	O4
25	26		23		O5
			24		O6
			25		O7
			26		O8

### Expansion Plug for ROBO I/O Extension (15)

Using the ROBO I/O extension (item No. 93294 required additionally), the number of the inputs and outputs can be expanded. It has four additional motor outputs with speed control, eight digital inputs and one analog resistance input for 0–5.5k $\Omega$ .

### Expansion Plug for ROBO RF Data Link (19)

The ROBO RF data link is an optional radio interface for the ROBO interface (item No. 93295 required additionally). With this, a cable connection between the PC and the interface is no longer needed! The RF data link is connected to the USB interface of the PC. Frequency 2.4 GHz, range about 10 m.

## Programming the Interface

► The standard programming software for the ROBO interface is the graphic programming language, ROBO Pro. The interface works in the following operating modes.

### Online Mode

The interface is continually connected to the PC (USB, serial cable or RF data link). The program runs on the PC and the monitor serves as the user interface.

### "Intelligent Interface Mode"

By pressing and holding the push button (5) down for at least three seconds, the interface switches to the "intelligent interface mode." You recognize this operating mode by the fast blinking of the serial interface LED (7). In this mode, only the serial interface with the parameters 9600,n,8,1 is active. The ROBO interface behaves then like an intelligent interface (item No. 30402). Thus, it can be controlled with the software, LLWin 3.0, in the online mode. Downloading LLWin programs is not possible! Press the key (5) quickly, and you return to the automatic interface selection of the ROBO interface.

### The Download Mode

In this operating mode, a program is loaded onto the interface and runs independent of the PC. Two different programs can be loaded into the FLASH memory. These are still retained even after the power supply is turned off. It is also possible to load a program into the RAM. This program is deleted as soon as the power supply is interrupted or a program is started, which is in the FLASH memory.

### Note!

The storage of programs in the RAM goes significantly faster than storing it in the FLASH because the FLASH must be erased first and this takes some seconds. In the test stage, the program can thus only be loaded into the RAM. Ideally, you first store the final version of a program in the FLASH. This also extends the service life of the FLASH, which is "limited" to about 100,000 writing cycles.

The instructions for use of the ROBO Pro software describe how to load a program into the particular memory of the interface.

Use push button (4) to select, start and stop programs, which are stored. To select a program, press and hold push button (4) down. If a program was stored in Prog1, then after about one second, the "Prog1" LED lights up. If you hold the push down for about one more second, then it switches to "Prog2," if a program is stored there. After one more second, the program 3 (both LEDs are illuminated) would be selected in the RAM, if anything is stored there. After one more second, then both LEDs are turned off. Then no program has been selected.

### Selection and Start of a Program in the FLASH Memory

- Press and hold push button (4), the green LED beside the push button indicates the selected program (1 or 2, continuously illuminated indicator lights) the LED is only illuminated if a program is stored in the FLASH memory. When the desired program has been selected, release the push button.
- To start the program, press push button (4) again. As long as the program is running, the LED blinks.
- To end the program, press push button (4) again. The LED is then continuously illuminated.

#### Autostart Information

When programs are stored with ROBO Pro, then instructions can be given so that program 1 in the FLASH memory is started directly after the interface is turned on. You can recognize this because the LED, "Prog 1," blinks. To stop the program, press the push button (4). If you want to prevent the program from starting automatically, then you must push button (4) during the LED test, which is done directly after the power supply is turned on, and hold this button down until the interface LEDs, 6 and 7 blink. Then, you can release button (4).

### Selection and Start of a Program, which is in the RAM

Press and hold push button (4) down until both green LEDs beside the push button are illuminated at the same time. Then release the push button. Both LEDs are illuminated only if a program is in the RAM.

- To start the program, press push button (4) again. As long as the program is running, both LEDs blink.
- To end the program, press push button (4) again. The LEDs are then continuously illuminated.

### Programming in C

The ROBO interface processor can also be programmed with a C compiler. For this purpose, there are separate instruction at [www.fischertechnik.de](http://www.fischertechnik.de) that can be downloaded.

### Additional Programing Languages

In the online mode, the interface can be activated through the USB or the serial interface with any desired programming language. A description of the interface and the driver software are also available at [www.fischertechnik.de](http://www.fischertechnik.de).

### Troubleshooting

► The red error LED (20) indicates an error in the interface.

- If it is continually illuminated, then the supply voltage is far outside of the nominal voltage of 9 V $\pm$  (<5 V $\pm$ , for example, because the battery is dead or >15 V $\pm$  for example, due to an incorrect power supply unit. The interface then shuts off automatically until the supply voltage is within the indicated range.
- If the LED blinks continually after the power supply is turned on, the processor has discovered an error and the green LEDs, Prog1, Prog2, USB (6), COM (7) and IR (8) show an error code. If this rare case should occur, then a table with the current error description codes can be downloaded at [www.fischertechnik.de](http://www.fischertechnik.de). Help is also available from the fischertechnik service.

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**Email: [info@fischertechnik.de](mailto:info@fischertechnik.de) <http://www.fischertechnik.de>**

### Important Information

#### Power Supply

For the interface, only 9 V $\pm$  power supplies from fischertechnik may be used, for example, energy set item No. 30182 or Accu Set item No. 34969.

#### Electromagnetic Interference

If the interface should be affected by extreme electromagnetic influences, then once the interference is ended, the interface can be used for the purpose intended. It may be necessary to interrupt the power supply for a short time and then restart the program.

#### Warranty

The fischertechnik GmbH guarantees the freedom from errors of the interface according to the existing state of the technology. The fischertechnik GmbH reserves the right to make changes to the design or model, which neither impair functioning nor the value of the interface and such changes shall not constitute a reason for a complaint.

Obvious defects must be submitted in writing within 14 (fourteen) days after delivery, otherwise any warranty claims due to obvious defects are excluded.

Immaterial defects of the interface shall not constitute a reason for a warranty claim. In addition, the customer may only demand subsequent fulfillment meaning the remedying of the defect(s) or a replacement delivery. The customer may, according to his choice, withdraw from the contract or demand a reduction of the purchase price if the subsequent fulfillment is not successful and in particular if the subsequent fulfillment is impossible or if we do not succeed with this in a reasonable time period, or we refuse this or it is culpably delayed by us. The warranty period is 24 (twenty-four) months after delivery. For defects in quality of the interface, which are due to improper handling, normal wear, improper or negligent treatment, we shall not provide any warranty and the same applies to the consequences of improper changes or changes made without our approval or repair by the customer or a third party. The warranty shall be governed by and construed under German law.

#### Liability

The fischertechnik GmbH shall not be liable for any damage, which results from use for purposes, for which the interface was not intended.