



**Building Blocks For Life**

**fischertechnik** 



# fischertechnik—the building blocks to an engaging STEM education program

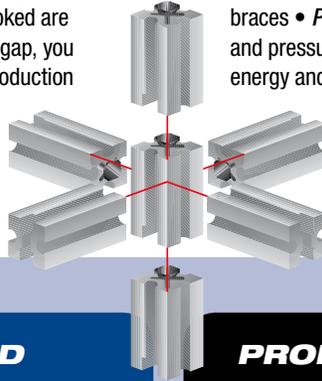
These days it seems everywhere you turn, leading educators are stressing the importance of STEM (Science, Technology, Engineering and Mathematics) Education, and the reason for this is simple. Demand for scientists and engineers is expected to grow at a rate far exceeding any other occupational field. At the same time fewer and fewer students are pursuing careers in these areas. When they are, they are often not performing at a sufficient level of academic achievement to be successful. While most schools do address the areas of Science and Math to varying degrees, the two aspects of the STEM education equation that are most often overlooked are the “T” and the “E”—technology and engineering. To help close this gap, you need materials that allow you to provide an engaging, hands-on introduction to technology and essential STEM related concepts. You need fischertechnik.

**What is fischertechnik?** fischertechnik is the flexible and innovative construction system built around the unique fischertechnik building block, which allows attachment to

all six sides. fischertechnik is used extensively in high schools and universities around the globe to explore STEM concepts such as: Mechanics • Statics • Pneumatics • Renewable Energies • Electronics • Robotics. fischertechnik is also widely used in industry for vocational training, as well as simulation purposes.

**STEM related topics addressed by fischertechnik:** With fischertechnik in your classroom, here are just some of the topics you can explore with your students:

**Mechanics**—gears, pulleys, and electrical motors • **Statics**—stability, struts and braces • **Pneumatics**—making things move with air, the relationship between force and pressure • **Renewable Energies**—the production, storage and use of electrical energy and the regenerative energies from wind, water and the sun • **Electrical Technology**—electrical circuits and electromechanical controls; circuit, series and parallel connection • **Robotics (aka Mechatronics and Computer Science)**—design machines and robot models, then use graphic software to program and control their actions.



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## JUNIOR



## BASIC + ADVANCED



## PROFI

Ideal for Middle School and up.



How does a gear box work? What is a planetary gear? How is the movement of a windshield wiper produced? How is the movement of a windshield wiper produced? How do you design a stable bridge? These questions are answered in the instructional activity booklets in the PROFI and COMPUTING construction sets with illustrations and easy-to-understand information.

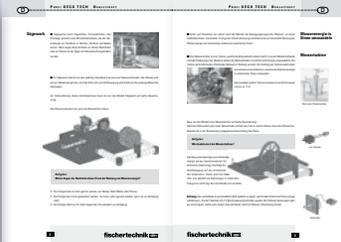
Assembly instructions



Worksheets



Activity Booklet



Every fischertechnik building block has its place in the very practical and systematic storage system, which is available as a separate item.



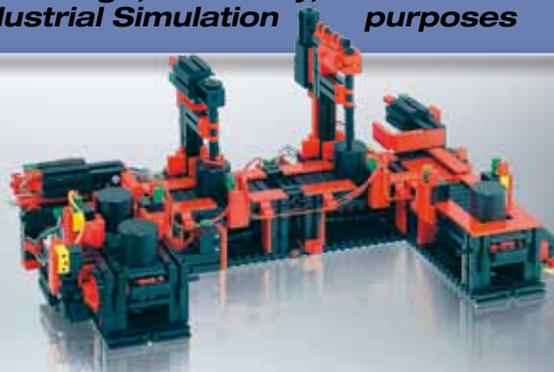
## COMPUTING

Ideal for Middle School, High School, College and University



## TRAINING MODELS

For College, University, Post-Secondary and Industrial Simulation purposes



# PROFI

How do pneumatics work? What are a differential gear, a planetary gear, a universal joint and a compressor? How do an electrical circuit and a solar cell work?

What is a phototransistor?

The kits in the fischertechnik PROFI line will allow you to provide the answers to these

and many other STEM related

questions. Learning takes on a new dimension as students

get to experience technology up close and hands-on. Each PROFI set includes full color assembly instructions as well as a multi-language, black and white activity booklet with thematically related tasks and topics that can be covered in class and discussed.

Additional worksheets can even be downloaded right from the fischertechnik website.



Model: planetary gear



## MECHANIC + STATIC

The ideal technology construction set for all future mechanical engineers. This set will enable students to answer questions such as: How does a gear box work? What is a planetary gear? How is the movement of a windshield wiper

produced? How do you design a stable bridge? and many more. Includes 500 components for building 30 different models. Requires 9 V battery (not included).

Components: **500**  
Models: **30**  
Item No.: **93 291**



Components: **270**  
Models: **12**  
Item No.: **508 776**

## TECHNICAL REVOLUTIONS

Important moments in the history of technology are brought to life as students construct functional models based on the designs of James Watt, Michael Faraday, and other famous inventors. Build 12 different models, including an electric

motor, a cardan shaft, a perpetuum mobile, a Morse telegraph, and a generator. Includes an informative black & white teaching and activity guide. Requires 9 V battery (not included).



## DA VINCI MACHINES

This construction set allows students to re-create ten of the mechanical marvels originally conceived by Leonardo da Vinci. Set includes over 250 components for building such models as a pivoting bridge, a file-cutting machine, and a

chariot. Also includes a multi-language, black and white teaching and activity guide with background on da Vinci and his inventions, as well as various suggested tasks for students to interact with the models.

Components: **260**  
Models: **10**  
Item No.: **500 882**



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## DYNAMIC

Fun with physics - Balls race on the unique flex-rails through various obstacle courses. They accelerate, decelerate, cause chain reactions, shoot through the loop and run

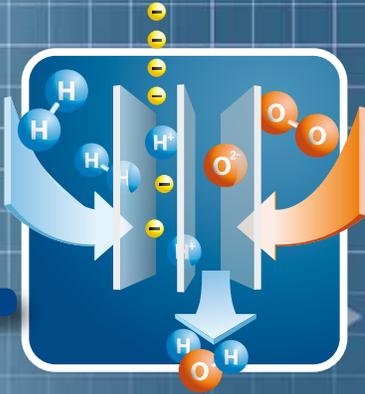
through obstacles such as teeter-totters and switches. An elevator powered by an XS motor conveys the balls to the top. The effects are based on various physical phenomena (acceleration, inertia of mass, centrifugal force, law of conservation of energy, principle of linear momentum, laws of motion). These are explained in the activity booklet and can be demonstrated clearly using various experimental set-ups. Shows how entertaining physics can be!

- Includes instructive activity booklet
- Includes XS motor and battery tray for 9V block (battery not included).

Components: **410**  
Models: **6**  
Item No.: **511 932**

# PROFI

## Fuell cell technology - energy from hydrogen



6

Overflow chamber  
hydrogen side

Accumulator chamber  
hydrogen side

Overflow chamber  
oxygen side

Positive sleeve

Protective diode

Negative sleeve

Accumulator chamber  
oxygen side





Components: **320**  
Models: **10**  
Item No.: **505 284**

## OECO TECH

The production, storage and use of electricity from natural energy sources such as water, wind, and the sun are graphically illustrated using various models and numerous experiments. The perfect set for providing students with

an understanding of these future energy forms. Set contains over 300 components for building 10 different models, as well as an informative black & white teaching and activity guide.



- Requires 9 V battery (not included)

Components: **400**  
Models: **8**  
Item No.: **77 791**

## PNEUMATIC II

The fischertechnik PROFII Pneumatic II set provides you with an engaging method for teaching students the basics of this air-based technology. Using numerous application examples, students will learn how pneumatic valves and cylinders work

in connection with a compressor and an air cell. The PROFII Pneumatics II set contains four double-acting pneumatic cylinders, three 4/3 way hand valves and one electrically operated compressor with air cell.

NOTE: The Oeco Tech item No. 505 284 is absolutely required for operation.



Components: **20**  
Models: **6**  
Item No.: **505 285**

## HYDRO CELL KIT

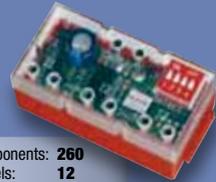
How does a fuel cell work? How can you produce Hydrogen with it? The fischertechnik PROFII Hydro Cell kit will help you to answer these questions and more. Used in conjunction with the Oeco Tech, this kit enables you to build 6 additional

models. **Requires Oeco Tech (#505284) for all operations.**



- Requires 9 V battery (not included)
- Included "E-Tech Module":

Components: **260**  
Models: **12**  
Item No.: **91 083**



## E-TECH

This set is specially designed to provide an introduction to the exciting subject of electrical engineering, with a focus on electrical circuits, electro-mechanics, and electronic controls. Using functional models, topics such as the principle of series and parallel connections, and

the control of a traffic light are explained step-by-step. Set includes the "E-Tech Module", a special interface with eight set programs to control various models, including a burglar alarm with buzzer, hand dryer with a light barrier, and a garage door with a magnetic sensor.

Ideal for Grade 3 and up!

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## ROBO LT BEGINNER LAB

The ROBO LT Beginner Lab is the perfect way to introduce grade school students (age 8 and above) to the exciting world of robotics and programming. Set contains 200 components—including sensors (phototransistor, push-button switch), and actuators (XS motor, indicator lights)—for building

8 easy to understand models, such as a lighthouse with a blinking light, a merry-go-round, and an automatic sliding door. Also included is the ROBO LT Controller which has 3 inputs for sensors, two outputs for motors or indicator lights, and a USB interface. In addition, you get the ROBO Pro Light

software, which allows students to quickly and easily begin programming their robotic creations. Includes the didactic activity booklet. **Requires Accu Set or Power Set for operation (not included).**

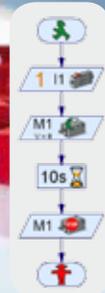
Included:



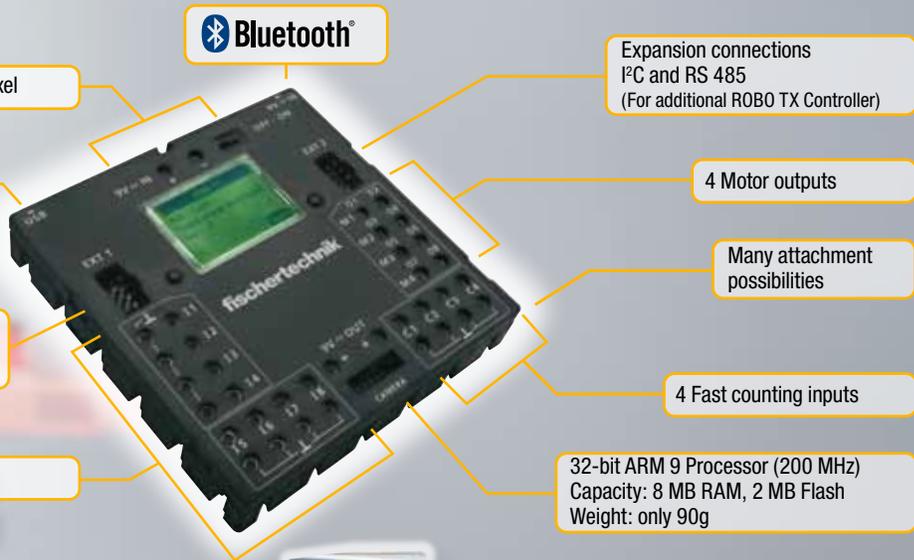
ROBO  
LT Controller



Software  
ROBO Pro Light



Components: **200**  
Models: **8**  
Item No.: **508 777**



## ROBO TX CONTROLLER

Item No.: **500 995**

The controller with 32-bit processor, display, high storage capacity, and compact casing (90x90x15mm) offers numerous attachment possibilities on five sides.

- 32-bit ARM 9 processor (200 MHz)
- Storage capacity: 8 MB RAM, 2 MB flash
- Weight only 90g
- 8 Universal inputs: Digital, analog 0-9V DC, analog 0-5kΩ
- 4 fast counting inputs: Digital, frequency up to 1kHz

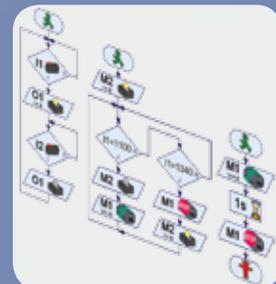
- 4 motor outputs, 9V, 250mA: Speed infinitely variable, short circuit proof, alternatively 8 individual outputs
- 2 expansion connections: I²C and RS 485 for coupling of additional "ROBO TX Controller"
- Display: 128x64 pixel, monochrome
- USB interface: USB 2.0 (1.1 compatible), max. 12 MB, including mini-USB socket connector
- Programmable with "ROBO Pro" or C compiler (not included)
- Includes USB connection cable.
- **Additionally required is Accu Set or Power Set**



## ROBO PRO SOFTWARE

System: **Windows® XP, Vista, 7**  
Item No.: **93 298**

Simple entry for beginners through programming of flow charts consisting of various software building blocks. The exchange of the data between the software building blocks and the subprograms can be done through variables and graphical



connections as well. This allows the program functions to be shown in an understandable manner. There are no problems with the preparation of teach-in programs or data exchange with other Windows® software.



Components: **310**  
Models: **11**  
Item No.: **505 286**

## ROBO TX TRAINING LAB

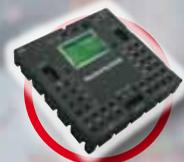
The fischertechnik ROBO TX Training Lab provides students with the tools needed to construct and program eleven fully-functional robotic models, including six mobile robots, such as a driverless transport system, an obstacle detector, and a trail searcher. Included are two encoder motors to allow for exact positioning, as well as a XS Motor, infrared trail sensor, and 2 additional sensing devices. This special set also includes the compact and powerful ROBO TX Controller with Bluetooth radio interface, 32-bit processor (200 MHz), 8 universal inputs and 8 MB RAM (2 MB flash), as well as a copy of the ROBO Pro programming software. Includes the didactic activity booklet.

**Requires Accu Set for operation (not included).**

Included:



Software  
ROBO Pro



ROBO TX  
Controller



Encoder motor  
for exact  
positioning





## ROBO TX EXPLORER

Explore unknown areas, measure distances, follow trails, recognize colors, measure temperatures, avoid obstacles without touching them, recognize day and night, turn headlights on and off automatically, trigger an alarm, and more. Set comes with the NTC resistor, the

photo-resistor, the ultrasonic distance sensor, the infrared color sensor and the IR trail sensor, to enable your models to perform these functions. And thanks to two encoder motors, the tracks of your robotic creations can be controlled precisely and steered synchronically.

Components: **400**  
Models: **6**  
Item No.: **508 778**



Model: 3-axis-roboter

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## ROBO PNEUVAC

This set allows students to explore the subjects of pneumatics and vacuum technology. The electro-magnetic valves (included), allow the control of the models with a PC. Set also includes vacuum

suction apparatus, three pneumatic cylinders, compressor, two lights, two phototransistors, optical color sensor, conveyor belt and a 2x Mini Motor.

Components: **490**  
Models: **5**  
Item No.: **500 883**

- Includes the didactic activity booklet.
- Requires ROBO TX Controller (#500 995), ROBO Pro Software and either Accu Set or Power Set for operation (not included).



## ROBO TX AUTOMATION ROBOTS

Four reality-based and fully functional industrial robots: High-rack storage, 3-axis robot and 2 other grappler robots. Stable fischer technik aluminum channels used in all models. The instructional activity booklet

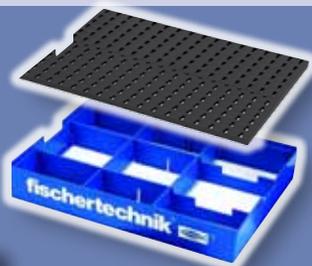
provides support in the form of background information, projects and programming tips. For programmers and designers from age 10.

Components: **470**  
Models: **4**  
Item No.: **511 933**

- Including instructional activity booklet on CD
- Incl. assembly instruction booklet
- incl. 2x »Encoder Motors«, 2x »XS Motors«, 6x Sensors
- Requires ROBO TX Controller (#500 995), ROBO Pro Software and either Accu Set or Power Set for operation (not included).

# PLUS

The fischertechnik PLUS line provides you with options for adding power, movement, light, and sound to your models, as well as organizing and storing your fischertechnik parts.



## PLATE 500

Item No.: **32 985**

258 x 186 mm

## BOX 500

Item No.: **94 828**

258 x 186 x 42 mm



## BOX 1000

Item No.: **30 383**

Practical storage box with eight sorting boxes and 32 sorting partitions. The cover also serves as the big building board 390x270 mm.



## CREATIVE BOX 1000

Components: **720**  
Item No.: **91 082**

More than 700 components from the current fischertechnik assortment. Packed in BOX 1000 with building board 390x270 mm as cover.



## MOTOR SET XS

Components: **45**  
Item No.: **505 281**

Small, compact geared motor in plastic casing with numerous attachment and connection possibilities. Includes many toothed gears, axles, driving gears, and safety battery tray (for 9V block battery—battery NOT included) with pole-reversing switch. Technical data: 9V max. output 1.0 W at 6000 rpm.



## MOTOR SET XM

Components: **40**  
Item No.: **505 282**

High performance geared motor in compact plastic casing with numerous possibilities for attachments. With many toothed gears, axles, and gearbox parts. Technical data: 9V max 3.0 W at 340 rpm. Requires Accu Set or Power Set for operation—Does NOT use 9V battery.



## POWER SET

Item No.: **505 283**

Power pack and infinite Power Controller. The power supply from the electrical socket for all fischertechnik models.

- Power Pack Performance Data: Voltage 9V  $\approx$  /2.5 A.
- Power Controller Performance Data: Regulated output 1A max., additional output with 9V  $\approx$  /1 A max. (not regulated), both outputs short-circuit-proof with overload protection

(Also available: #91 087:  
Input AC 120 V, 60 Hz, 150mA. Output: DC 9V 1A.)



## ACCU SET

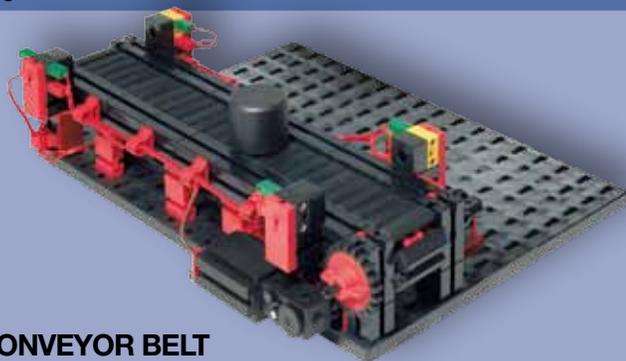
Item No.: **34 969**

Battery charger with microcontroller for reliable protection from overcharge. Very short recharging time, max. 2 hours. Powerful NiMH rechargeable battery pack with fuse for short-circuit protection, 8.4V, 1500 mAh., 220V~/60Hz.

(Also available: #57 487: 120 V-version)  
(Also available: #79 833: 230 V-version/UK)

## TRAINING MODELS

Compact function models, which are already assembled, provide ideal training and demonstration models for training and in-service training and industrial automation. Available in the 9V standard voltage and in the worldwide 24V industrial standard.



### CONVEYOR BELT

Item No. 50461 (construction set ROBO conveyor belt 9V... without ROBO TX Controller)

Item No. 50463 (training model conveyor belt 9V... with ROBO TX Controller)

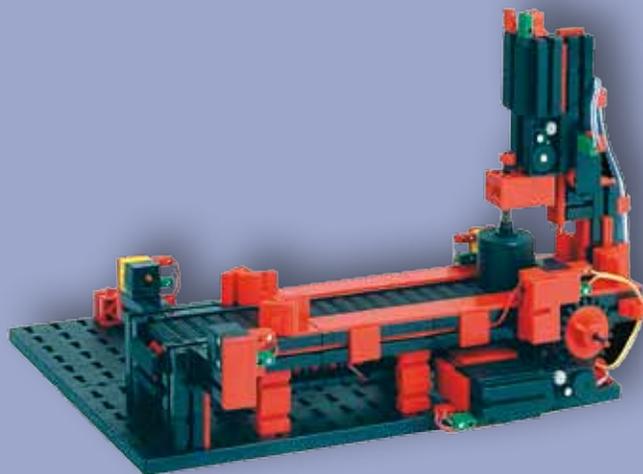
Item No. 50464 (training model conveyor belt 24V... without PLC)

Length 275 mm, transports workpieces with a diameter of up to 29 mm.

Several conveyor belts can be connected to each other to form a conveyor belt of any length.

#### Scope of Delivery

- 1 DC motor, 1 sensing device (potential-free), choice as pulse counter, can be used for distance traveled or as an activation button; 2 light barriers consisting of phototransistor and lens tip bulb, which can be connected together to an output for the control or directly to the power supply.
- 1 workpiece diameter 29 mm, h = 25 mm.
- Large model: about 275x210x70 mm (LxWxH).
- 3 digital inputs
- 1 output, 9V.../24V... (1 motor for drive for conveyor belt)



### PUNCHING MACHINE WITH CONVEYOR BELT

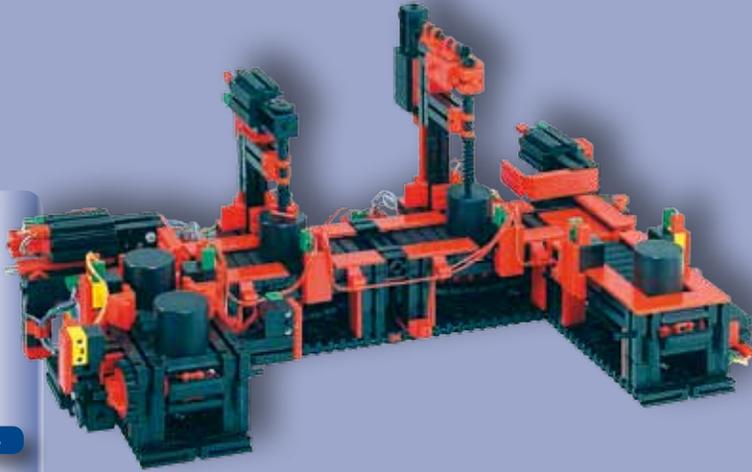
Item No. 51 663 (9V... with ROBO TX Controller)

Item No. 96 785 (24V... without PLC)

Conveyor belt with two light barriers, one machining station and one workpiece.

#### Scope of Delivery

- 2 DC motors, 2 limit switches (potential free), 2 light barriers consisting of phototransistor and lens tip bulb.
- Model is mounted on fischertechnik base plate. Carton packaging.
- Large model: about 280x215x185 mm (LxWxH).
- 4 digital inputs
- 4 outputs, 9V.../24V... (2 motors counter-clockwise, clockwise rotation)
- Ribbon cable, 14-pin and color coded with 14-pin pin connector, only for 24V...
- Model can be ideally combined with 3-D Robot.



## INDEXED LINE WITH TWO MACHINING STATIONS

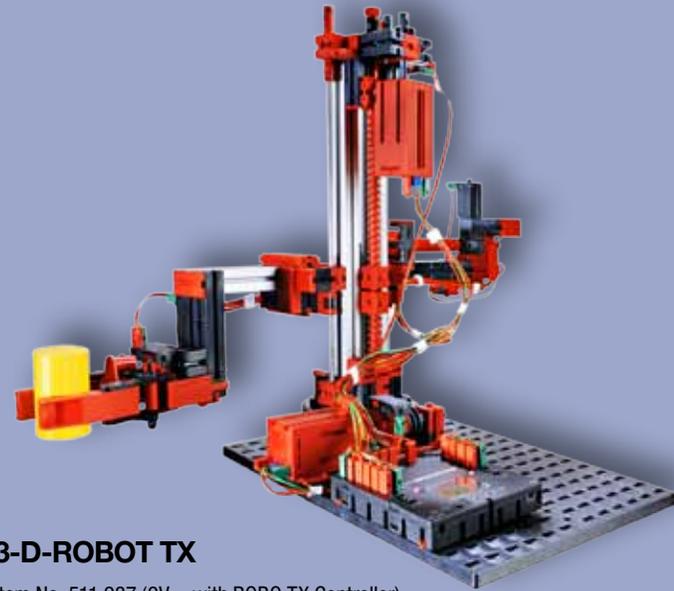
Item No.: 51 664 (9V ... with two ROBO TX Controller)

Item No.: 96 790 (24V ... without PLC)

Conveyor belt, arranged in U-shape, for intermittent transport and for the machining of several workpieces.

### Scope of Delivery

- 2 machining stations, 4 conveyor belts, 8 DC motors, 4 limit switches (potential free), 5 light barriers consisting of phototransistor and lens tip bulb.
- Model is mounted on a stable wooden board. Packed in wooden crate.
- Large model: about 450x410x190 mm (LxWxH).
- 9 digital inputs
- 10 outputs, 9V .../24V ... (6 motors with one direction of rotation, 2 motors counter-clockwise, clockwise rotation)
- 2 ribbon cables, each 18-pin and color coded with 18-pin pin connector, only for 24V



## 3-D-ROBOT TX

Item No. 511 937 (9V ... with ROBO TX Controller)

Item No. 511 938 (24V ... without PLC)

3-axis robot with gripping device

Degrees of freedom:

Shaft 1: Rotation 180°; Shaft 2: Forward/back 90 mm; Shaft 3: Up/down 150 mm

### Scope of Delivery

- 4 DC motors, including 2 with integrated magnetic encoder (Max. pulse frequency: 1 kHz)
- 4 Limit switches, 2 pulse sensors for path measurement
- 8 Digital inputs
- 8 Outputs, 9V .../24V ... (4 Motors clockwise/counterclockwise rotation, 24V version incl. relay board for motor polarity reversal)
- Large model: approx. 390x200x30 mm (LxWxH).
- Model mounted on stable wooden board.
- Interface. Screw terminals (on 24V version only)
- Model can be ideally combined with conveyor belt, punch press and intermittent assembly line.

# ***DIDACTIC***

## ***The construction sets from fischertechnik***

- ... promote eye and hand coordination;
- ... promote gross and fine motor functions;
- ... promote the spatial powers of imagination;
- ... promote fantasy and creativity;
- ... promote logical thought; and
- ... provide basic technical understanding.

The products from fischertechnik are learning toys “made in Germany“ and are produced at the location in Salztetten in the Black Forest. All construction sets can be ideally combined with one another. The high acceptance by parents, teachers and engineers makes fischertechnik a successful educational material for schools and universities.

The function models from fischertechnik simulation are a proven and inexpensive means to plan, develop and test industrial applications with the help of industrial controls and software. They are employed worldwide in the areas of training, development and presentation.



fischertechnik 



fischerTip   
creativ

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environmentally friendly.  
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