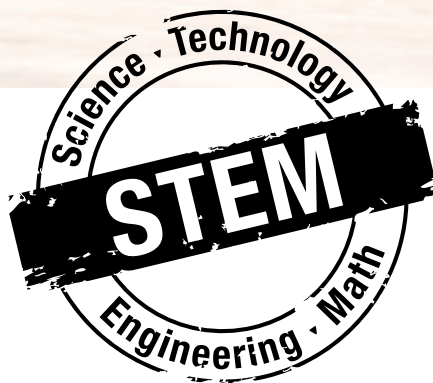




SCRATCH



2020

ENGLISH

The creative way to explore technology

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 – the building blocks to an engaging STEM education program

These days it seems everywhere you turn, leading educators are stressing the importance of STEM Education (Science, Technology, Engineering and Mathematics). 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 Maths 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.

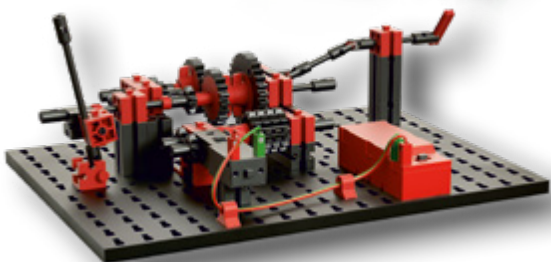
You need fischertechnik!



STEM KITS

Various Science and Technology Kits

Page 6–9



STEM ROBOTICS

State-of-the-art Robotics Sets from Elementary level up to College and University level

Page 10–16





fischertechnik's innovative instructional material teaches basic technical understanding and provides optimum preparation for technical occupations. The fischertechnik learning products are used extensively around the globe, to explore STEM concepts such as:

- **Simple Machines**
- **Mechanics**
- **Statics**
- **Hydraulics**
- **Pneumatics**
- **Renewable Energies**
- **Fuel Cell**
- **Optics & Lights**
- **Electronics**
- **Robotics**
- **Cybernetics**
- **Mechatronics**
- **Automation Control**
- **Data Logging**
- **Industry 4.0 / IoT**
- **Smart Home**

fischertechnik is also widely used in industry for vocational training, as well as simulation purposes for realistic representation and simulation of complex systems.

STEM SETS

Project based STEM SET,
aligned with the STEM curriculum

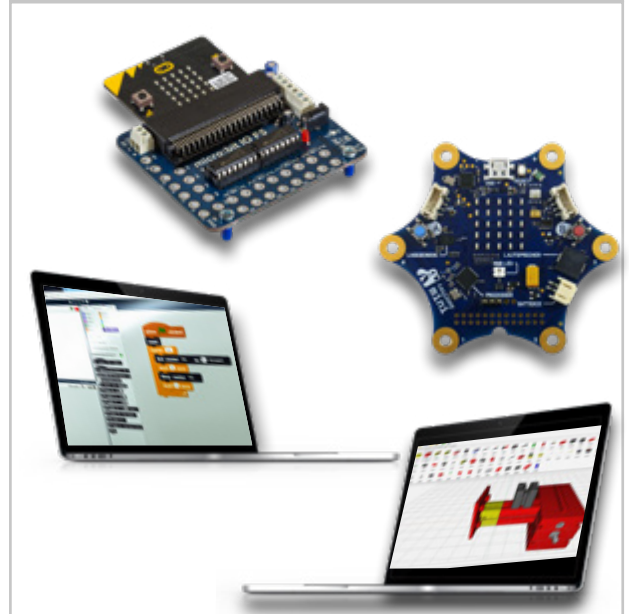
Page 18-19



ADDITIONS

Smart additions to current programs like
micro:bit, Calliope, Scratch, Arduino, Raspberry
PI and the design software ft-Designer

Page 20-23



➤ **TEACHING MATERIAL**

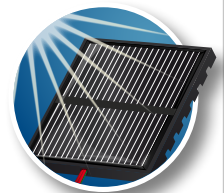
www.fischertechnik-elearning.com

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? These questions are answered in the instructional activity booklets in the sets, with illustrations and easy-to-understand information. The didactic information can be used in the classroom, vocational training or at university and can help support lesson preparation.



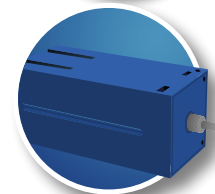
➤ **“GREEN“ COMPONENTS**

- Gold Cap (3.0V / 10F) – electrolytic capacitor for storing electrical energy
- Solar module (1V / 400mA) – generation of electrical power from solar energy
- Reversible fuel cell with integrated hydrogen storage tank
Operation as electrolyzer (2–3V / 8ml/min / 400–1500mA)
Operation as fuel cell (0.5–0.9V / 300mW / 600mA)



➤ **ACTUATORS**

- Motors – generation of motion and propulsion of fischertechnik models
 - XS Motor (9VDC / 5995rpm / 1.52mNm / 265mA)
 - S Motor (9VDC / 9500rpm / 4.8mNm / 650mA)
 - S Motor (24VDC / 10700rpm / 5mNm / 300mA)
 - XM Motor (9VDC / 338 rpm / 84.15mNm / 950mA)
 - Encoder motor 9V (9VDC / 105rpm / 90mNm / 510mA)
 - Encoder motor 24V (24VDC / 100rpm / 90mNm / 190mA)
 - Solar motor (2VDC)
- Compressor – generation of compressed air
 - 9V (9VDC / 0.7bar / 2l/min / 200mA)
 - 24V (24VDC / 0.7bar / 2l/min / 40mA)
- 3/2-way solenoid valve – control of pneumatic cylinder
 - 12V (12VDC / 0.133A)
 - 24V (24VDC / 70mA)
- White LED (9VDC / 10mA) and Rainbow LED (9VDC / 10mA)
- LED light barrier 9V (9VDC / 20mA)
- LED light barrier 24V (24VDC / 16mA)



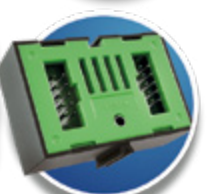
COMPATIBLE TO:

- Arduino
- BBC micro: bit
- Raspberry Pi

More information:
www.fischertechnik.de/third-party-compatibility

➤ **SENSORS**

- USB color camera (1MP) – recognition of color, motion, trail, sound and ball
- NTC resistor (1.5kΩ / 450mW) – temperature measurement
- IR trail sensor (2 digital outputs 9V) – trail recognition
- Color sensor (signal: analog 0–9VDC) – color recognition
- Ultrasonic distance sensor (9VDC / distance 3cm–3m) – distance measurement
- Photo resistor (RSW551) – for measuring brightness
- Push button (for use as NC (normally closed) and NO (normally open) switch) – touch sensor
- Phototransistor for light barrier (up to 35V)
- Reed contact – magnetic sensor
- Potentiometer (0–4.7kΩ) – rotating resistor
- Combi sensor – 3 sensors in one device: triaxial 16bit gyroscope, triaxial 12bit accelerometer, geomagnetic sensor, I2C-port (9VDC)
- Environmental sensor (9VDC / 0.12A max. / I2C-port) - for measuring air temperature, humidity, air pressure, air quality



➤ **BEGINNER LEVEL**

BT Smart Controller

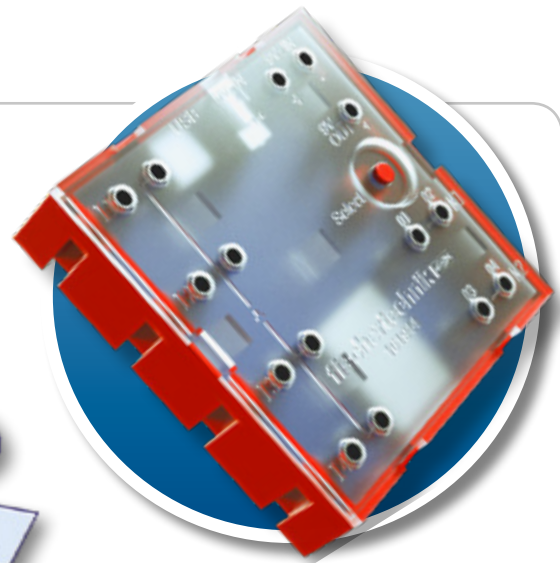
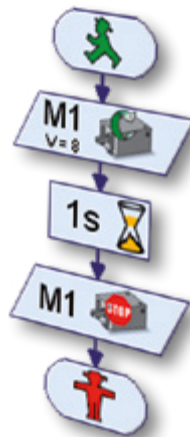
- Processor – 32-bit Cortex M0
- Control unit connecting the model to a PC/tablet
- 2 motor outputs
- 4 digital inputs for sensors
- USB port and Bluetooth 4.0 port

Software ROBO Pro Light

- Simple and easy-to-understand graphic programming (“drag & drop”) for Windows

Software ROBO Pro Smart

- Easy programming of the models with the Tablet (iOS/Android) by using the fischertechnik Robo Pro Smart App



Works with:
SCRATCH

➤ **ADVANCED LEVEL**

TXT Controller

- Dual Processor – 32bit / 600MHz
- 256MB RAM, 128MB flash
- Color 2.4" touch display
- Integrated loudspeaker
- Micro SD card reader – for expansion of storage capacity
- USB host port – for USB color camera, USB sticks etc.
- Bluetooth / WLAN connectivity
- Connection to Smartphone / Tablet PC
- 8 Universal inputs – digital / analog 0-9VDC, analog 0-5kΩ
- 4 high speed counter inputs – digital, frequency up to 1kHz
- 4 motor outputs – 9V / 250mA (max: 800mA): infinitely controllable speed

Software ROBO Pro

- Simple “drag & drop” programming with graphic flow charts
- Use of various software modules
- Creation of teach-in programs
- Interactive introduction to programming with ROBO Pro



Works with:
SCRATCH



▶ SIMPLE MACHINES

500


40
Models

Make everyday technology understandable and ensure lasting comprehension!

The Simple Machines Set offers topics relevant to STEM subject area curricula such as physics, technology, and the natural sciences, and helps students gain a basic knowledge of mechanical and technical principles. 40 different models are used to cover topics like pulleys and hoists, gears, steering, statics, and much more. Simple Machines can be used in supervised and unsupervised learning, and is already a popular and classic choice in many schools.

> **Ideal additions: Motor Set XS, Motor Set XM, Power Set**

Main subjects:
Transmissions / block and tackle / steering / centrifugal governor / cable winch / structural engineering

Item No.	533506	EAN	4048962223361
Models	40	Components	500
Dim. (mm)	440 x 315 x 150	Weight (g)	2832



▶ MECHANICS 2.0

500


30
Models

Principles of Mechanical and Structural Engineering

This educational building set is ideal for future mechanical engineers, technicians and engineers: How does a shaft drive or a gearbox work? What is a planetary gear? How do you build a stable bridge? This educational building set containing 30 different models helps you to answer these and other fundamental questions from the world of mechanics and structural engineering. The eLearning portal (fischertechnik-elearning.com) features interesting, educational information and videos about mechanics and structural engineering.

- > **Incl. instructional activity information (free download)**
- > **Incl. XS motor, battery tray for 9V block (battery not included)**
- > **Ideal addition: Accu Set**

Item No.	538423	EAN	4048962263350
Models	30	Components	500
Dim. (mm)	440 x 315 x 150	Weight (g)	2910

Main subjects:
Mechanical / structural engineering / effect of forces on bodies and objects, and much more



HYDRAULICS

500


5
Models


Fundamentals of Hydraulics

School and university students learn about hydraulic content with this realistic learning construction kit. The learning set offers hands-on technology for learning about the transfer of force using liquids. Five different models illustrate how signals and forces can be transferred with liquid media. Students can build a simple functional demonstration model, an excavator, and three other models. Combined with the accompanying pedagogical materials, the set teaches extensive skills and expertise on the topic of hydraulics. These accompanying materials are provided free of charge on the eLearning Portal to support teachers in preparing for and designing their curricula.

> Incl. instructional activity information (free download)

> Incl. 4x control cylinders, 4x working cylinders

Item No.	548896	EAN	4048962351057
Models	5	Components	500
Dim. (mm)	440 x 315 x 150	Weight (g)	2570



Main subjects:
Hydraulics -
Power transmission using fluid

PNEUMATICS

440


8
Models


Fundamentals of Pneumatics

This industry-oriented educational construction set teaches basic principles of pneumatics and uses true-to-life models to illustrate how compressors, pneumatic valves, and pneumatic cylinders work. The powerful, compact compressor guarantees the model has a reliable supply of compressed air. Students can build a total of eight learning models, providing them with extensive knowledge and skills on the topic of pneumatics in combination with the accompanying didactic information.

> Incl. instructional activity information (free download)

> Incl. compressor, 4x pneumatic cylinders, 4x 4/3-way manual valves, battery tray for 9V block (battery not included)

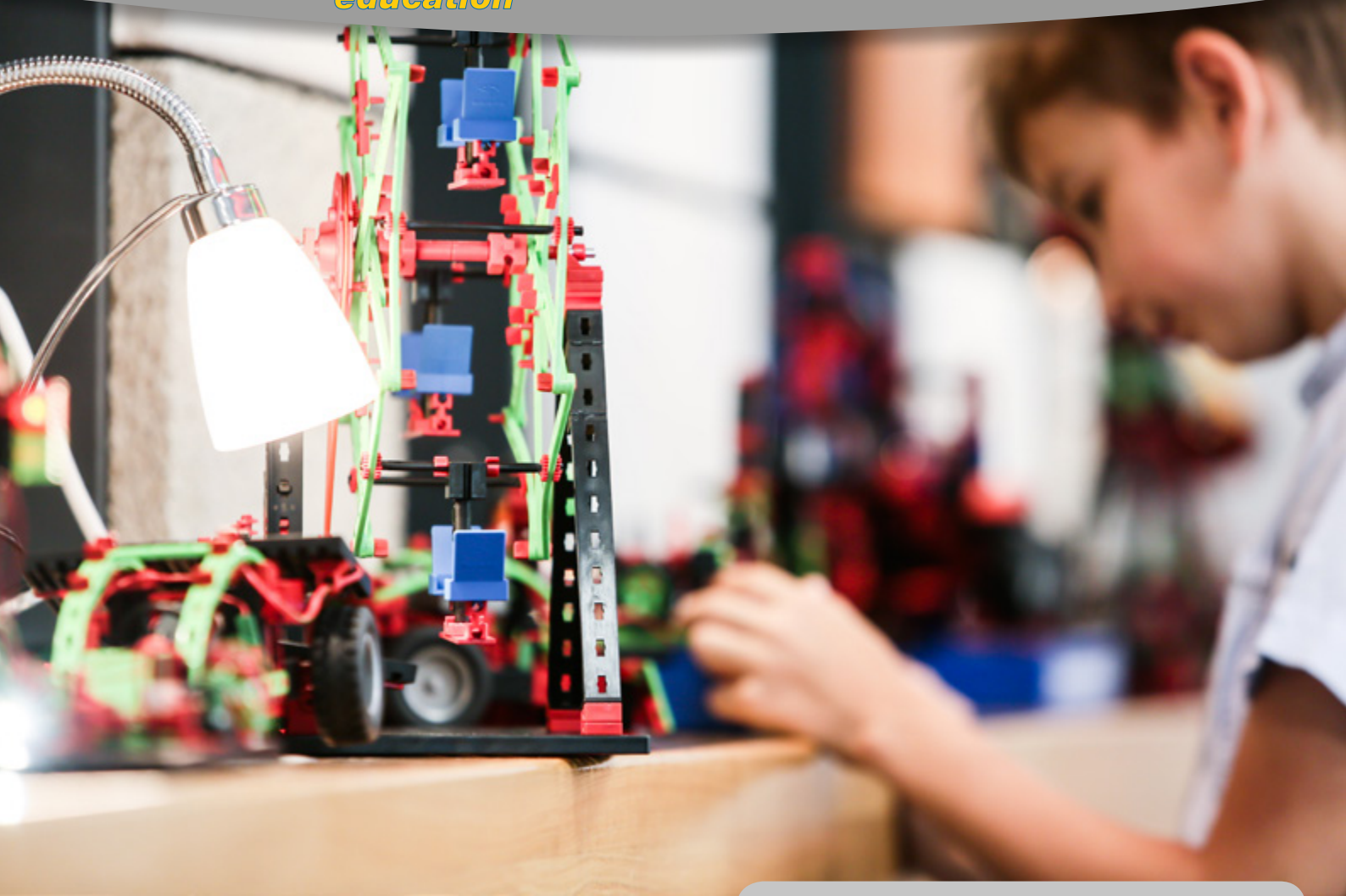
> Ideal addition: Accu Set

Item No.	533013	EAN	4048962220711
Models	8	Components	440
Dim. (mm)	440 x 315 x 150	Weight (g)	2560

Main subjects:

Generation and distribution of compressed air and control of pneumatic cylinders, and much more





GREEN ENERGY

390

19
Models

Principles of Regenerative Power

How can ecological electric power be produced? How does a fuel cell work and how does it generate hydrogen? "Renewable energy sources" will become our most important suppliers of energy in the future. Production, storage and use of electricity from natural energy sources such as water, wind and sun are graphically illustrated using various models and numerous experiments. The high performance solar modules open up many attachment possibilities for flexible use in models. The Gold Cap included for power storage releases the stored power slowly. The fuel cell clearly demonstrates how water can be split up into its two constituents: Hydrogen and oxygen. This helps students understand energy forms of the future.

> Incl. instructional activity information (free download)

> Incl. solar motor (2V_{DC}), 3x solar modules (1V; 400mA), Gold Cap power storage device, LED, ON / OFF switch

> Incl. reversible fuel cell with integrated hydrogen storage tank

Main subjects:
Generation, storage and use of electrical power from water, wind and sun / other energy sources:
Fuell cell

Item No.	533022	EAN	4048962220773
Models	19	Components	390
Dim. (mm)	440 x 315 x 150	Weight (g)	2800



▶ OPTICS & LIGHTS

270


15
Models

Principles of Optics and Light

Research optical phenomena and experiment with light! The planetary model provides a visual explanation of the phases of the moon as well as solar and lunar eclipses. Optical lenses with different focal lengths, mirrors, lens tip lamps, and a large number of parts allow students to build a microscope, magnifying glass, telescope, and periscope. The sundial can be used to tell the time. The model uses fiber optics to explain what a total reflection is, and how light can be used to transmit data. This educational construction set gives students an in-depth look at the world of optics and light.

> Incl. instructional activity information (free download)

> Incl. 3x optical lenses (two focal lengths), rainbow LED, mirror, fiber-optic cable, 3x LED, battery tray for 9V block (battery not included)

> Ideal addition: Power Set or Accu Set

Main subjects:
Refraction / reflection of light / light and shadow / fiber-optic cable / optical illusions, and much more

Item No.	533037	EAN	4048962220803
Models	15	Components	270
Dim. (mm)	440 x 315 x 80	Weight (g)	1971



▶ ELECTRONICS

260


16
Models

Principles of Electronics

Simple circuits, series and parallel connections, electronic circuits with transistors, capacitors, resistors and LED's. Step by step, this educational construction set teaches the basic principles of electronics. The electronics module, a control with 16 fixed programs, has 2 motor outputs, 3 analog inputs for sensors and a potentiometer for controlling the speed of the motor.

From a simple flashlight to a swinging boat ride, a flashing blinker and a controllable fan, this construction set uses lots of exciting working models to teach students the basic principles of electronics in a competent, lasting way.

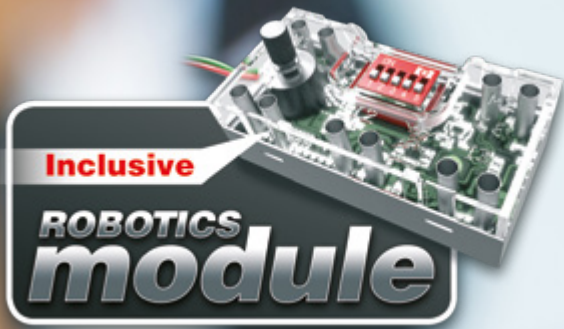
Main subjects:
Electrical circuits, series, parallel and three-way / four-way circuits / electronic components and circuits, and much more

> Incl. instructional activity information (free download)

> Incl. electronics module, XS motor, 2x transistors, 2x capacitors, 3x resistors, 2x push buttons, phototransistor, temperature sensor, 3x LED's, battery tray for 9V block (battery not included)

Item No.	533029	EAN	4048962220797
Models	16	Components	260
Dim. (mm)	440 x 315 x 80	Weight (g)	1906





Inclusive

**ROBOTICS
module**



▶ ROBOTICS MINI BOTS

145

5
Models

From Electronics to Robotics

Mini Bots are an ideal way to get started with the fischertechnik Education robotics line. Students can build five agile driving robots using actuators and sensors, like motor, IR trail sensors, and push buttons. The sophisticated model robots can follow lines and avoid obstacles. A parcours template lets students test their models directly. The Mini Bots' programs are permanently saved on the ROBOTICS module, and can simply be selected using the DIP switch. Selecting pre-set programs makes it easy to discover the world of robotics without having to understand programming.

Main subjects:
Electronic parts /
controlling and
regulating / use of
actuators and sensors

- > Incl. instructional activity information (free download)
- > Incl. ROBOTICS module, IR trail sensor, 2x push buttons (limit switch), 2x XS motors, battery tray for 9V block (battery not included)

Item No.	533923	EAN	4048962230000
Models	5	Components	145
Dim. (mm)	440 x 315 x 80	Weight (g)	1505





▶ ROBOTICS BT BEGINNER

380
Components

12
Models

Instrumentation and Control (I&C)

An easy way to get started with programming! Robotics BT Beginner explains the basic principles of programming to students based on the ROBO Pro Light graphical programming software, which is used to control stationary and mobile fischertechnik models. Students can use sensors and actuators to build and then control easy-to-understand models like hand dryers, a carousel, barriers, a conveyor belt with die-cutting machine, or mobile tracked vehicles. The »BT Smart Controller«, with 4 inputs for sensors and 2 outputs for motors or lights, has a USB interface and a Bluetooth 4.0 LE interface. The software »ROBO Pro Light« (available for free download) allows even young students to quickly and simply get a handle on easy-to-understand programming. In addition, all models can also be controlled and programmed with a tablet (iOS/Android) using a free app.

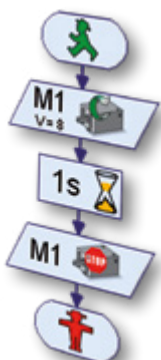
Main subjects:

Instrumentation and control / programming / interaction between hardware and software / use of actuators and sensors

- > Incl. instructional activity information (free download)
- > Incl. BT Smart Controller (see page 5) (USB port/ Bluetooth 4.0 LE port), control software ROBO Pro Light (System: Windows 7*, 8, 10/ tablet: Android and iOS), 2x XS motors, 2x LED light barriers, 2x photo transistors, 2x push buttons, battery tray for 9V block (battery not included)

* Selected Bluetooth 4.0 LE sticks are required for Windows 7

Item No.	540587	EAN	4048962280067
Models	12	Components	380
Dim. (mm)	440 x 315 x 80	Weight (g)	1960



Graphical Programming

Works with:
SCRATCH





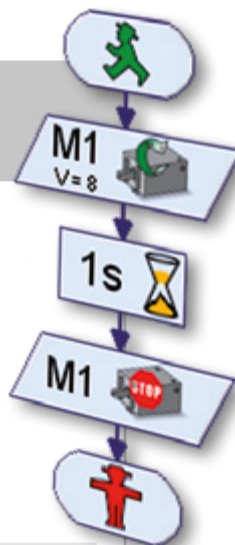
-  WLAN
-  Bluetooth®
-  IoT
-  CARD Slot
-  Speaker
-  APP
-  USB Host
-  Dual Processor
600 MHZ
-  Memory
256 MB RAM
128 MB FLASH



▶ ROBO PRO SOFTWARE

Graphical Programming

Graphic flow charts consisting of various software building blocks make it easy for beginners to get started programming. Data can be exchanged between software building blocks and subroutine using variables as well as graphical interfaces, allowing program functions to be demonstrated in an understandable manner. Teach-in features and data exchange with other Windows® software make it easy to create programs.



Item No.	93296	EAN	4006209932964
System	Windows® 7, 8, 10		
Dim. (mm)	210 x 25 x 150	Weight (g)	85

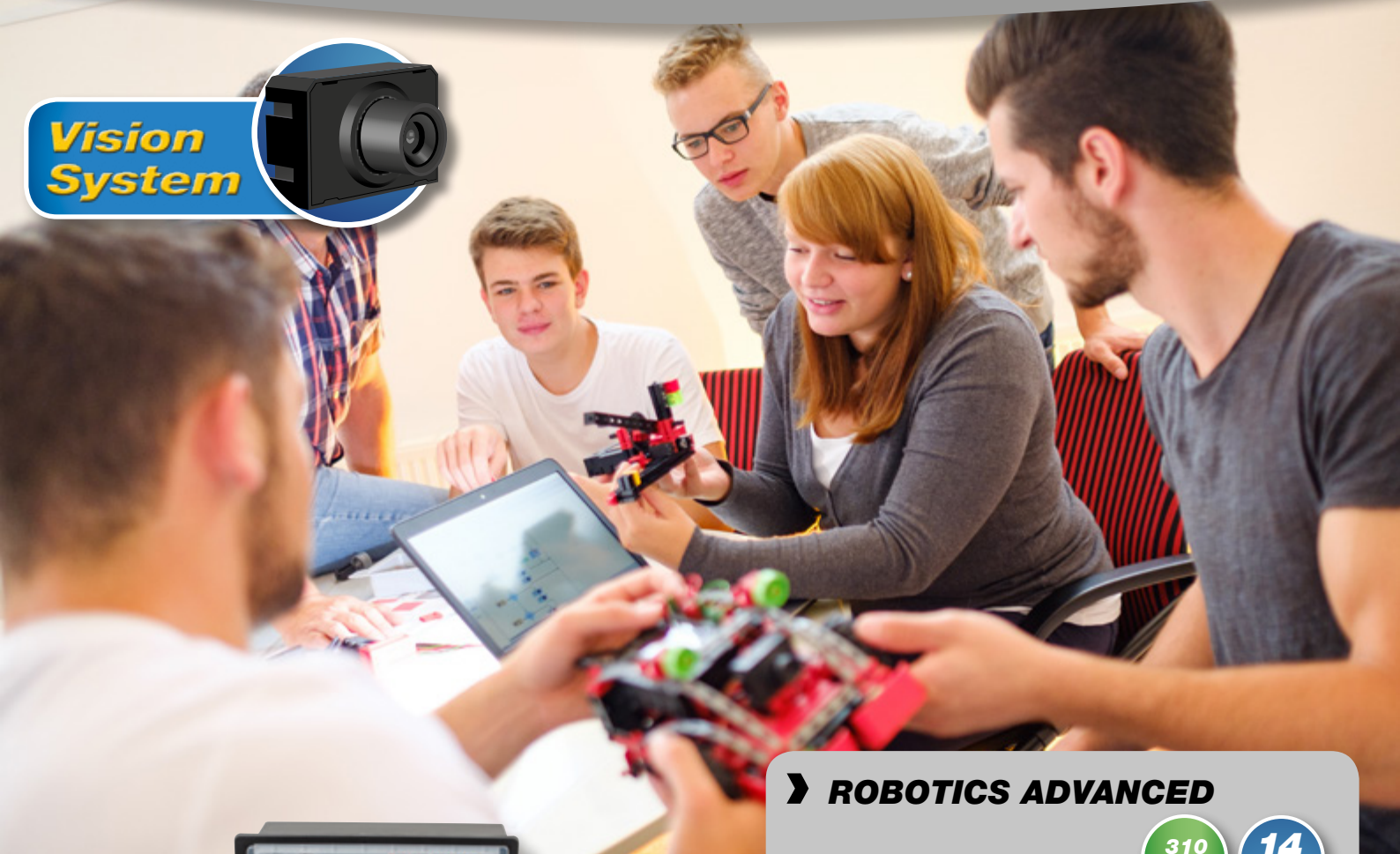
Works with:
SCRATCH

▶ ROBOTICS TXT CONTROLLER

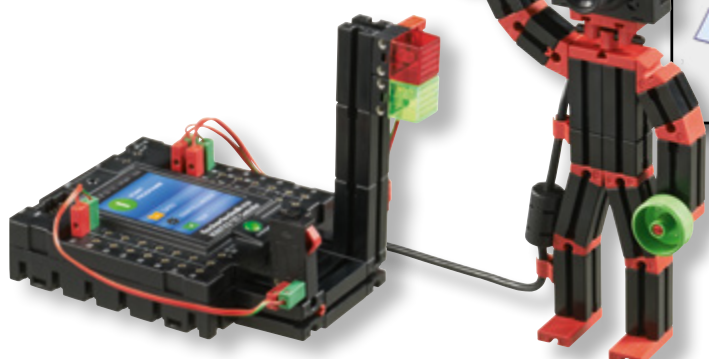
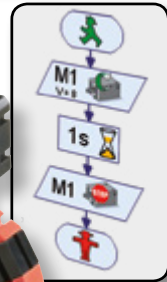
The compact ROBOTICS TXT Controller (90x90x25 mm) can be controlled easily with the color 2.4" touch display. The combined Bluetooth / WiFi RF module provides the perfect, wireless interface for numerous applications. The numerous interfaces also include a USB host port for USB sticks and other components such as the fischertechnik USB camera. Integrated Micro SD card slot allows expansion of memory capacity. Controllers can be coupled.

- > Dual processor ARM Cortex A8 (32bit/600MHz) + Cortex M3
- > Memory capacity: 256MB DDR3 RAM, 128MB Flash
- > 8 Universal inputs: Digital / analog 0-9VDC, analog 0-5kΩ
- > 4 High speed numerical inputs: Digital, frequency up to 1kHz
- > 4 Motor outputs 9V/250mA (max.: 800mA): speed infinitely controllable, short-circuit proof, alternative 8 single outputs for components such as lights, etc.
- > Combined Bluetooth / WiFi RF module: BT 2.1 EDR+ 4.0, WLAN 802.11
- > Infrared receiver diode: for fischertechnik Control Set transmitter
- > USB 2.0 Client: Mini USB port for connection to PC
- > Camera interface: over USB host, Linux camera driver integrated into operating system
- > 10-pin male connector for additional inputs and outputs as well as I2C interface
- > Integrated loudspeaker
- > Integrated real time clock with replaceable buffer battery: for capturing measured values within a defined period of time
- > Linux-based, open source operating system
- > Programming possible with ROBO Pro, C-Compiler, PC-Library etc.
- > Link to smartphones / tablet PC's via Bluetooth or WLAN, allowing use as terminals for controller. Programming using ROBO-Pro software.
- > Power supply: 9VDC socket 3.45 mm or fischertechnik 2.5 mm sockets (for set of rechargeable batteries), Accu Set or Power Set

Item No.	522429	EAN	4048962179828
Dim. (mm)	225 x 65 x 150	Weight (g)	350



Main subjects:
Instrumentation and control / programming / interaction between hardware and software / use of actuators and sensors



▶ ROBOTICS ADVANCED

310
Components

14
Models

Instrumentation and Control (I&C)

Professional introduction to the world of robots. Robotics set with over 300 components, high performance ROBOTICS TXT Controller, ROBO Pro graphic programming software for control of mobile and stationary robot models and camera for USB or WiFi image transfer, color recognition, line tracking and detection of motion. The TXT Controller has the following features: Dual processor ARM Cortex A8 (32bit / 600MHz) + Cortex M3, color 2.4" touch display, combined WLAN / Bluetooth module, Micro SD card slot for additional memory space, IR receiver diode, integrated loud speaker, 4 motor outputs, 8 digital / analog inputs for sensors and 4 high speed numerical inputs. Completed program modules are also provided for beginners. Including instructional information material for support of construction and programming. Additional sensors and actuators such as encoder motors, XS motor, push buttons, NTC resistors, phototransistors and LED's allow construction of mobile detection robot, soccer robot, temperature control and many other models! This set is compatible with other Robotics construction sets.

- > Incl. instructional activity information (free download)
- > Incl. ROBOTICS TXT Controller (see page 5), CD with ROBO Pro control software and related instructional (interactive) material, USB camera (1MP), 2x encoder motors, XS motor, 2x LED's, 2x push buttons, phototransistor, NTC resistor
- > Required: Accu Set

Item No.	533018	EAN	4048962220735
Models	14	Components	310
Dim. (mm)	440 x 315 x 150	Weight (g)	3050




▶ ROBOTICS & ELECTRO-PNEUMATICS

440  4  Models

Instrumentation and Control (I&C)

Ideal introduction to programming realistic electro-pneumatic machines and robots. The subjects of electro-pneumatics and vacuum technology are demonstrated clearly with the aid of fascinating models such as the pinball machine, compressed air motor, color sorting robot for colored parts and ball obstacle course robot. The powerful and compact compressor guarantees a reliable supply of compressed air for the models. The electro-magnetic valves included allow remote control of the models with a PC.

- > Incl. instructional activity information (free download)
- > Incl. compressor, mini motor, 2x solenoid valves, optical color sensor, vacuum suction device, 3x cylinders with spring, 2x phototransistors, 2x LED light barriers, 11x flex-rails 180
-  > Required: ROBOTICS TXT Controller, ROBO Pro software and 9V / 1A power pack (Accu Set or Power Set)

Main subjects:
Instrumentation and control / programming / interaction between hardware and software / use of actuators and sensors

Item No.	533019	EAN	4048962220742
Models	4	Components	440
Dim. (mm)	440 x 315 x 150	Weight (g)	3162




▶ ROBOTICS IN INDUSTRY

510  4  Models

Instrumentation and Control (I&C)

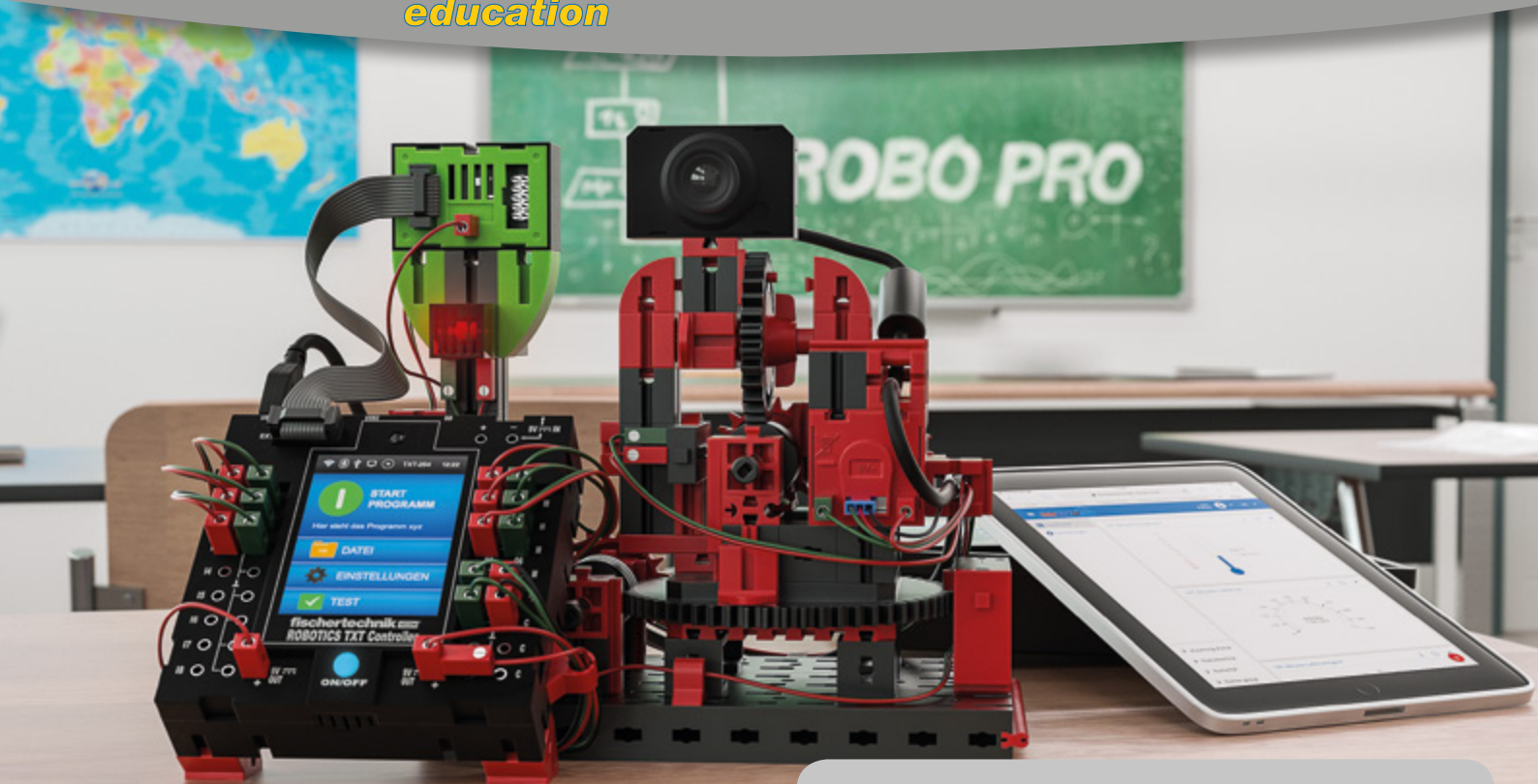
Ideal introduction to programming realistic industrial applications. Four realistic, fully functional industrial robots: High-bay storage rack, 3-axis robot and two additional gripper robots. Stable fischertechnik aluminum profiles used in all models. The didactic material provides support in the form of background information, projects and programming tips.

Main subjects:
Instrumentation and control / programming / interaction between hardware and software / use of actuators and sensors

- > Incl. instructional activity information (free download)
- > Incl. 2x encoder motors, 2x XS motors, 6x push buttons
-  > Required: ROBOTICS TXT Controller, ROBO Pro software and 9V / 1A power pack (Accu Set or Power Set)

Item No.	533020	EAN	4048962220759
Models	4	Components	510
Dim. (mm)	440 x 315 x 150	Weight (g)	3328





ROBOTICS SENSOR STATION IoT

220
Parts

6
Models

A professional introduction to data logging! The stationary sensor station with a moving camera, new environmental sensor and other sensors, enables the measurement of air temperature, humidity, air pressure, air quality, volume and brightness. The models can be programmed and controlled with the graphical programming software ROBO Pro and the ROBOTICS TXT controller, and are ideal for teaching topics such as (data logging, programming and the use of actuators and sensors. The sensors' data can be collected and plotted on a graph. In addition, the model can connect to a WiFi network, so that the camera can also be controlled from a distance. The TXT controller can also be connected to a cloud server, where the sensors' data is saved and can be retrieved. So using a user interface, a so-called "dashboard", the various sensor data can be permanently monitored, and the movement of the camera can be controlled. Further models and applications the pupil can first design and then control are: Barometer (measures air pressure), Damp monitor (measures humidity and air temperature), environmental wellness sensor (measures the air quality, temperature, humidity) with LED display, noise sensor (measures volume) and frost monitor (tests temperature against the freezing point). When the pre-set limit values are exceeded, the system alerts the user via an LED display or with an alarm tone. There are many more possible applications. The innovative teaching material from fischertechnik supports you in practically conveying technical understanding and giving them a real insight. The accompanying instructional booklet, with teaching and lesson materials, offers background information, projects, and programmer tips.

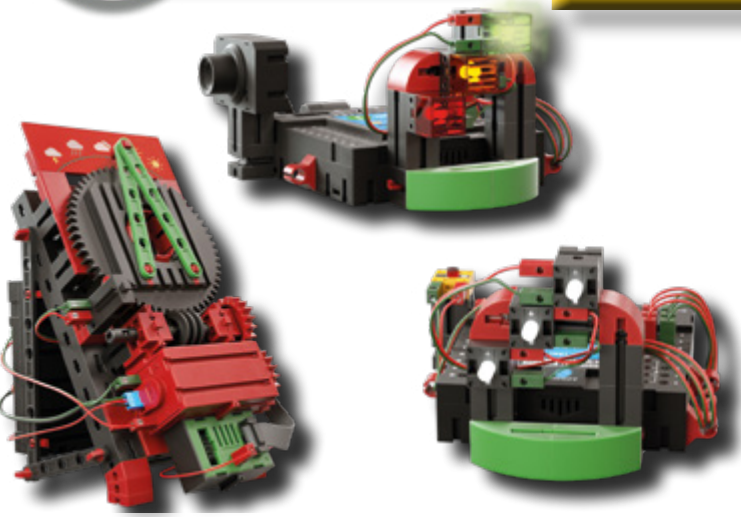
- > Incl. instructional activity information (free download)
- > Incl. environmental sensor, brightness sensor, USB camera (1 MP), 2x encoder motors, 2x push buttons, LEDs
- > **Additionally Required: ROBOTICS TXT Controller, ROBO Pro software, Accu Set or Power Set**

Item No.	544625	EAN	4048962316315
Dim. (mm)	440 x 315 x 80	Weight (g)	1826 / 2212
Item No. (complete set)	544937	EAN (complete set)	4048962319507
Models	6	Components	220



Environmental sensor:
Env/P/RH/Temp

Main subjects:
Data logging / Instrumentation and control / programming / use of actuators and sensors



The product Robotics Sensor Station IoT is also available as a complete set. Also included in this complete set (Item No.: 544937) are the ROBOTICS TXT Controller, the ROBO Pro software and a power supply unit (9V, 2.5A).



Vision System

▶ ROBOTICS COMPETITION SET

670


20
Models

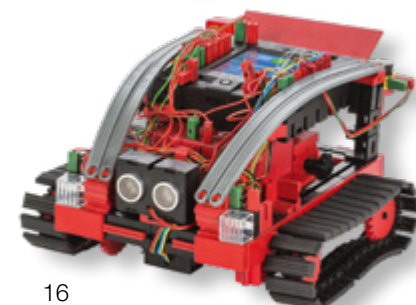
Focus on robotics competitions

The fischertechnik Robotics Competition Set has been developed for schools, universities and other education establishments seeking to enhance or improve their previous robotics competitions for their students. It contains robot models such as the trail searcher, detection robot, soccer robot, hindrance detector with camera and much more. The models are suitable for the RoboCup competition (junior category) and various other competitions all over the world. The fischertechnik Robotics Competition Set helps students with project-based learning for discovering robotics and the key STEM teaching principles. The set consists of 670 parts. These include static parts, gear-wheels, transmissions, wheels, DC motors, motors with integrated encoders, USB camera, combi sensor (gyro, accelerometer, compass) and other fischertechnik sensors. Incl. ROBO Pro software with possibilities for programming on five levels. From the beginner's level through to professional programming with objects, sub-programs, variables and user-defined commands. Furthermore, obstacle course templates are included for testing the models.

- > Incl. printed assembly instructions and instructional activity information on CD
- > Incl. ROBOTICS TXT Controller, CD with controller software ROBO Pro, USB camera, 2x encoder motors, XS motor, lens tip lamp, 3x LED's, combi sensor (gyro, accelerometer, compass), 3x ultrasonic distance sensors, IR trail sensor, optical color sensor, photo resistor, phototransistor, NTC resistor, magnetic sensor (reed contact), Accu Set (battery charger with rechargeable NiMH battery)

Main subjects:

Robotics competitions /
Robotics working groups /
Robotics projects

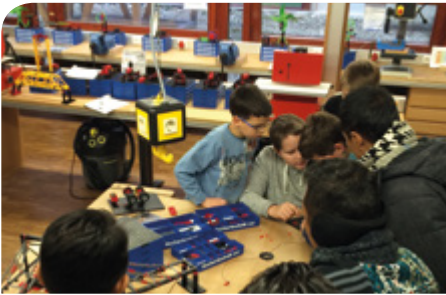


Item No.	519143	EAN	4048962159356
Models	20	Components	670
Dim. (mm)	440 x 315 x 150	Weight (g)	3760

➤ **After School Learning Center Mexico**



➤ **Primary and Secondary School Germany**



➤ **Robotics Cup Germany and Costa Rica**



➤ **Teacher's Training Saudi Arabia and STEM Camp**



➤ **University Competition China and Russia**





STEM PREP 2.0 PHYSICS, ROBOTICS, ENERGY & POWER

STEM Tutorial

2250

115 Models

Project-based learning with a focus on STEM standards

“The fischertechnik STEM program combines maths, reading and writing standards in the compulsory subjects with the National Science Education Standards and the Standards of ISTE and ITEEA. The STEM PREP Set easily fills several months of the school year and introduces the students to applied technology through a systematic approach to physics, robotics, energy and power.”

Tom White, Program Creator

Project Themes:

Simple machines / mechanical systems / statics / forces / pneumatics / potential and kinetic energy / energy preservation/ energy conversion and storage / electricity / electronics / optics/ digital communication and programming of simple robots



Main subjects:
Physics / Robotics / Energy / Power

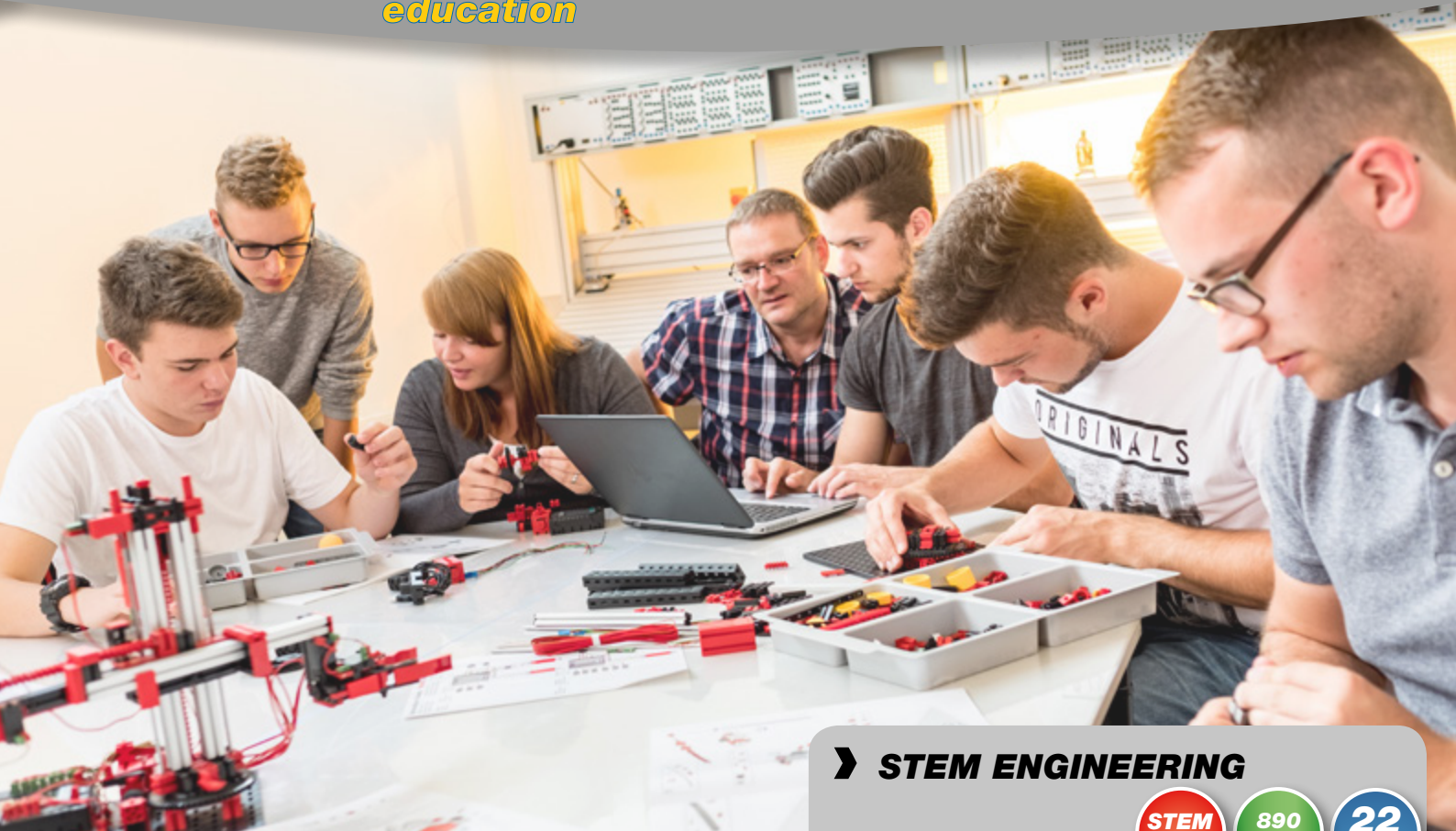
- > Incl. BT Smart Controller (see page 5), (USB port/ Bluetooth 4.0 LE port), control software ROBO Pro Light/ Smart (System: Windows 7*, 8, 10/ tablet; Android and iOS), electronics module, XS motor, mini motor, solar motor, compressor, 2x solar modules, „Gold Cap“ energy storage device, LED, 2x rainbow LED's, 2x phototransistor, NTC resistor, 2x push buttons, resistor, 6x push buttons (limit switch)

- > Available on eLearning portal: Comprehensive English STEM tutorials for teachers and students including detailed assembly instructions for 115 model examples from Robotics BT Beginner and 8 STEM Kits (Mechanics, Drive Systems, Optics&Lights, Pneumatics, Electronics, Green Energy, PhysicsI+II)

* Selected Bluetooth 4.0 LE sticks are required for Windows 7

Item No.	548904	EAN	4048962351125
Models	115	Components	2250
Dim. (mm)	440 x 315 x 230	Weight (g)	6480





STEM ENGINEERING

STEM Tutorial

890

22 Models

Project-based learning with a focus on STEM standards

“The fischertechnik STEM program combines maths, reading and writing standards in the compulsory subjects with the National Science Education Standards and the Standards of ISTE and ITEEA. The STEM Engineering Set easily fills several months of the school year and introduces the students to applied engineering through a systematic approach to robotics, mechatronics and automation control.”

Tom White, Program Creator

Project Themes:

Mechatronics / cybernetics / design and documentation / structures / mechanical systems / control systems / sensor systems / motors and other actuators / automation / principles of robotics / mobile robots



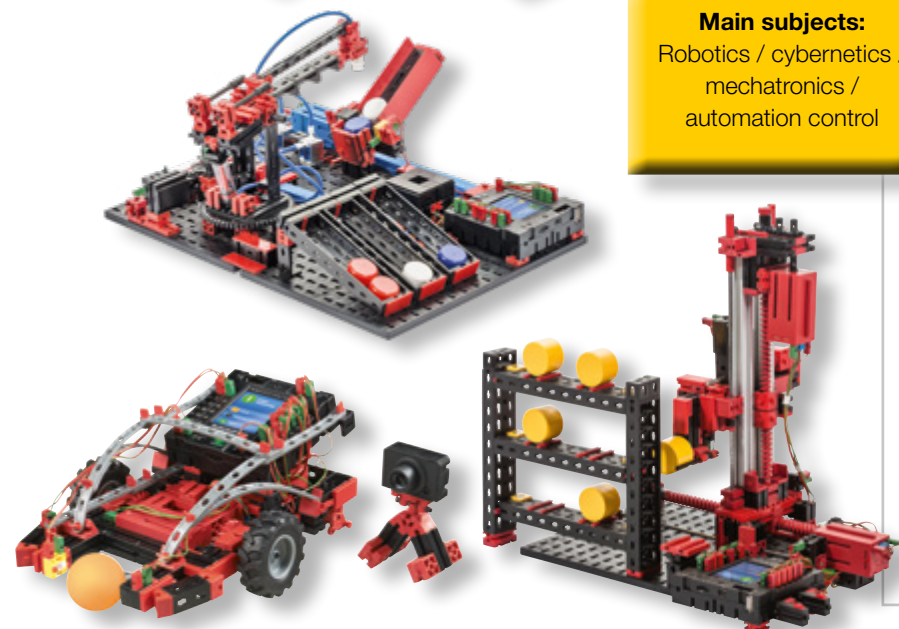
Main subjects:

Robotics / cybernetics / mechatronics / automation control

> Incl. **ROBOTICS TXT Controller, controller software ROBO Pro, USB camera, 2x encoder motors, 2x XS motors, mini motor, compressor, 2x LEDs, 2x solenoid valves, vacuum suction device, optical color sensor, 2x phototransistors, NTC resistor, 6x push buttons (limit switch), Accu Set (battery charger with rechargeable NiMH battery)**

> Available on eLearning portal: Comprehensive english STEM tutorials for teachers and students including detailed assembly instructions for 22 model examples from 3 STEM Robotics Sets (Robotics Advanced, Robotics in Industry, Robotics & Electropneumatics)

Item No.	519341	EAN	4048962160871
Models	22	Components	890
Dim. (mm)	440 x 315 x 150	Weight (g)	5450



STARTER SET FOR MICRO:BIT

90  3 
Models

Programming in elementary school

The "Starter Set for micro:bit" by fischertechnik teaches the basic principles of programming with micro:bit single board computers for students grades three and up in an easy to understand way. This complete set includes a fischertechnik part set for building three stationary models and the fischertechnik "micro:bit IO F5 adapter". The adapter board has 8 outputs and 6 inputs. It can be used to control simple, easy to understand demonstration models (a pedestrian walk sign, hand dryer, barrier) equipped with actuators and sensors using the "micro:bit board".

The additional pedagogical manual offers help in starting up the models, a variety of exciting tasks, and is available free of charge as a download from the eLearning portal.

> Incl. instructional activity information (free download)

> Incl. micro:bit iO F5 adapter board, XS motor, 2x LED light barriers, phototransistor, 2x push buttons, printed assembly instructions

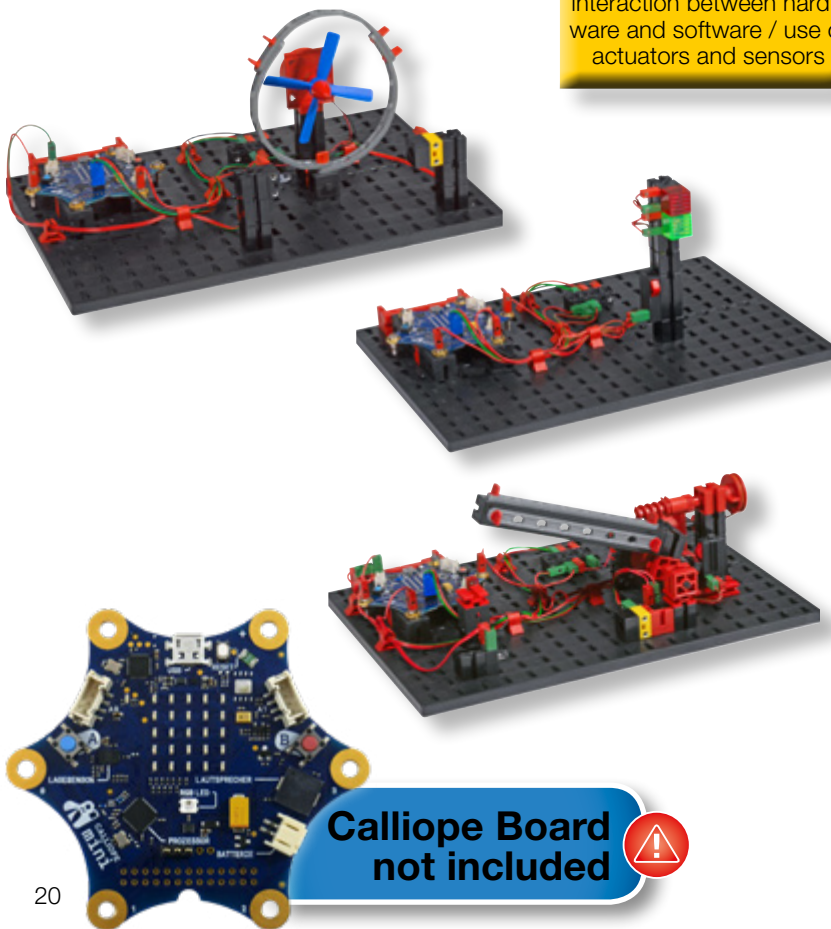
 > Required: micro:bit board, software and power supply

Item No.	548884	EAN	4048962350944
Models	3	Components	90
Dim. (mm)	440 x 315 x 80	Weight (g)	1451

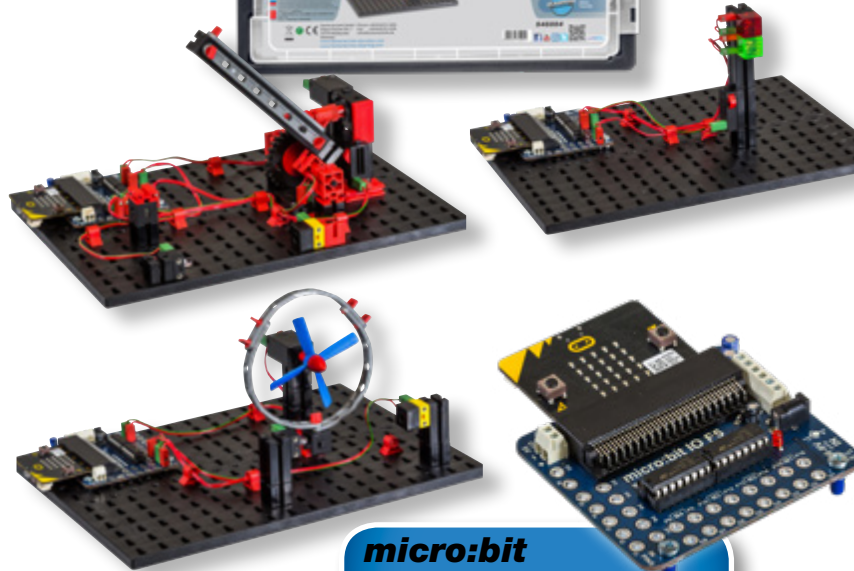


Main subjects:

Instrumentation and control / programming / interaction between hardware and software / use of actuators and sensors



Calliope Board not included 



micro:bit Adapter included
Board not included 

FISCHERTECHNIK CALLIOPE

125  3 
Models

Programming in primary school


fischertechnik Calliope teaches pupils, from Year 3 and older, about the basic principles of programming, in an easy-to-understand format. The set includes fischertechnik pieces, with which three stationary models can be built. With the help of sensors and actuators, pupils can, firstly, follow building instructions to construct easy-to-understand models, such as hand dryers, lights and gates, and then control them using the Calliope board.

The fischertechnik Calliope can be integrated into both guided and free teaching and offers young pupils an easy-to-understand introduction to the world of programming. The accompanying instructional booklet, with teaching and lesson materials, provides step by step instructions for activation and various projects. The lesson materials are free and available to download in the eLearning portal.

> Incl. instructional activity information (free download)

> Incl. solar motor, 2x LED light barriers, photo transistor, 2x push buttons, printed assembly instructions

> Packaged in a sturdy box 500

 > Additionally Required: Calliope Board as well as Open Roberta software

> Power supply: via USB

Item No.	544626	EAN	4048962316322
Models	3	Components	125
Dim. (mm)	260 x 190 x 42	Weight (g)	635



➤ SCRATCH

Combine fischertechnik Robotics Sets with the visual, easy to learn programming language Scratch. Scratch is free and easy to integrate into fischertechnik Robotics. **ScratchX for TXT Controller** and **ScratchX for BT Smart Controller** make it possible to use both fischertechnik controllers on PCs or laptops along with the easy to learn programming language Scratch. Short applications for controlling motors and lights via buttons, light barriers and many other sensors can be created in a flash. Much larger programmes can also be created thanks to the diverse options the Scratch programming language offers.

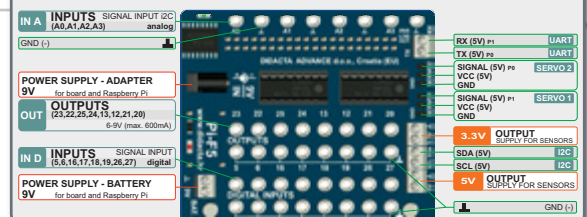


➤ ARDUINO & RASPBERRY PI

The new fischertechnik adapters bridge the gap between the popular controllers Arduino UNO, Arduino MEGA and Raspberry Pi and the versatile fischertechnik construction kit system. Advanced users can use the fischertechnik system to create complex mechanical models.

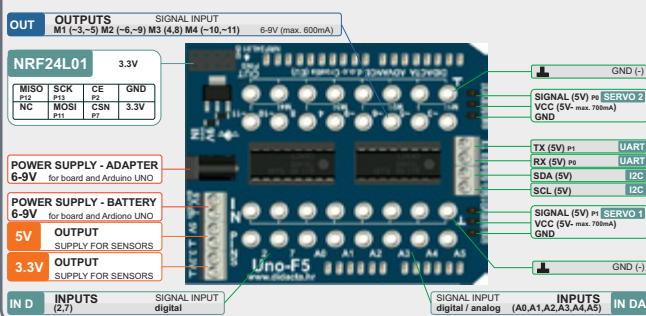
Raspberry Pi - Pi-F5 board

fischertechnik compatible



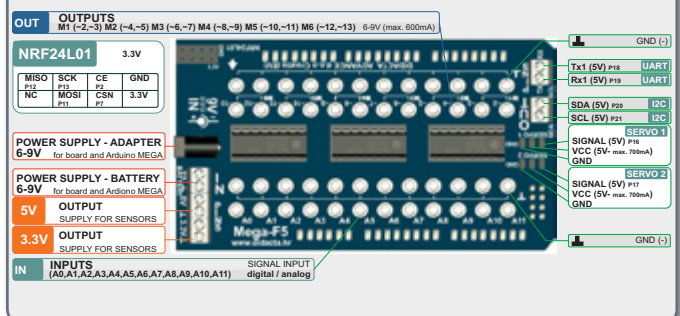
Arduino UNO - Uno-F5 board

fischertechnik compatible



Arduino MEGA - Mega-F5 board

fischertechnik compatible



➤ ft DESIGNER

fischertechnik design software

The perfect software to plan, develop, and implement fischertechnik models. They are child's play to operate, with a huge range of functions. Ideal for schools, training and universities, for visualising technical processes

- About 1000 components from all fields incl. pneumatics, motors/drives, aluminium bars and stickers
- Model animation in real time incl. tracking shots, zoom
- Possible to install elastic pneumatic hoses, as well as a power supply and wiring
- All models can be divided into as many construction phases as necessary to create easy to understand operating manuals
Construction phases can be hidden, or individual components can be coloured white
- For large models (or slow computers), the animation can also be calculated as an AVI file
- Supports the free Raytracer »POV-Ray« and »Blender« for realistic pictures with shadows, reflections and radiosity
- Export 3D-CAD data: RAW, VRML, POV and X3D. The VRML format allows models to be processed with almost any professional CAD system



System requirements

Microsoft Windows 7,8,8.1 and 10 / Intel processor with min. 1GHz / min. 1GByte main memory / graphic card with OpenGL support / free hard drive space of min. 250MByte / Internet connection for updates / mouse or track pad

Item No.	14851	EAN	4006209148518
----------	-------	-----	---------------

➤ **BOX 1000**

Perfect for storing fischertechnik parts
Practical storage box with eight sorting trays and 32 sorting partitions. The cover also serves as a large building board, 390 x 270 mm.

Item No.	30383	EAN	4006209303832
Components	–	Weight (g)	1889
Dim. (mm)	390 x 95 x 270		

➤ **ACCU SET**

Charger with micro-controller for reliable protection against overcharging. Extremely short charging times, max. 2hrs., heavy duty battery pack with short-circuit protection, 8.4V / 1800mAh.



Item No. 220V	34969	EAN	4006209349694
Item No. 120V	57487	EAN	4006209574874
Item No. 240V UK	79833	EAN	4006209798331
Item No. 240V AUS	52091	EAN	4006209520918
Components	–	Weight (g)	490
Dim. (mm)	225 x 65 x 150		

➤ **POWER SET**

Power supply and infinite speed controller all in one. The plug-in power pack for all fischertechnik models. Power supply performance data: Voltage 9V~, 2.5A. Power controller performance data: Controllable output 1A max., additional output with 9V~, 1A max. (not controllable), both outputs short-circuit-proof with overload protection.

Item No. 220V	505283	EAN	4048962069440
Item No. 120V	91087	EAN	4006209910870
Components	–	Weight (g)	431
Dim. (mm)	225 x 65 x 150		

➤ **MOTOR SET XS**

Thanks to the compact measurements, this motor can be installed almost anywhere. In addition to the building blocks, gearbox parts and toothed gears, the set also contains a safety battery tray with integrated pole-reversing switch for 9V block batteries (battery not included).

> Performance data: Voltage 9V, max. output 1.0W at 6000RPM

Item No.	505281	EAN	4048962069426
Components	45	Weight (g)	201
Dim. (mm)	225 x 65 x 150		



➤ **MOTOR SET XM**

High performance geared motor in compact plastic casing with numerous possibilities for attachments. With many toothed gears, axles and gearbox parts.

> Performance data: Voltage 9V, max. output 3.0W about 340RPM

⚠ > Required: Accu Set or Power Set

Item No.	505282	EAN	4048962069433
Components	40	Weight (g)	278
Dim. (mm)	225 x 65 x 150		



➤ **BT CONTROL SET**

The Bluetooth Control Set makes it possible to control fischertechnik models remotely using the included remote control or a smartphone or tablet. Bluetooth low energy technology offers a long range of up to 10 meters. Control up to three motors and one servo motor. Steering angle and speed control are infinitely variable.

Remote control can be operated with up to two receivers, allowing for numerous applications.

⚠ > Required: Accu Set and 9V block (battery not included)

Item No.	540585	EAN	4048962280043
Components	–	Weight (g)	410
Dim. (mm)	225 x 65 x 150		



► CREATIVE BOX BASIC

630


The Creative Box Basic allows pupils to unleash their creativity!
Equipped with many basic building blocks, angle brackets and other „basics“, this set is perfectly suited to create something great: It allows freestyle building, reconstructing an existing theme and expanding an existing project. The simple and flexible functionality of the building blocks is explained in brief instructions, so that every pupil can get started immediately! In order to stow away everything neat and tidy when the job is done, the Creative Box Basic is supplied in a sorting box which effectively prevents building block chaos and minimises searching time. The large fischertechnik base plate, which simultaneously serves as the lid for the sorting box, can be used as the foundation for the models.

> Packaged in a sturdy “Box 1000“

Kit key points:
Building blocks / corner blocks / building plates / static elements / large base construction plate

Item No.	554195	EAN	4048962390490
Models	-	Components	630
Dim. (mm)	393 x 273 x 103,5	Weight (g)	2817

NEW



NEW



► CREATIVE BOX MECHANICS

290


The fischertechnik Creative Box Mechanics is perfect for the implementation of technical themes! Be it a worm drive, chain transmission, a winch or any other technical theme: they can simply be reconstructed with this box! Based on the model, it is then easy to recognise and understand the functions, while the building itself promotes constructive thinking. The functionality and the interaction of the included fischertechnik building blocks are briefly explained, allowing an easy and quick start.

In order to prevent chaos after the completion of the construction, the Creative Box Mechanics is delivered in two sorting boxes - ideal to avoid searching times for individual building blocks. The sorting boxes are closed by a large fischertechnik base plate which is ideally suited as a basis plate for creative building.

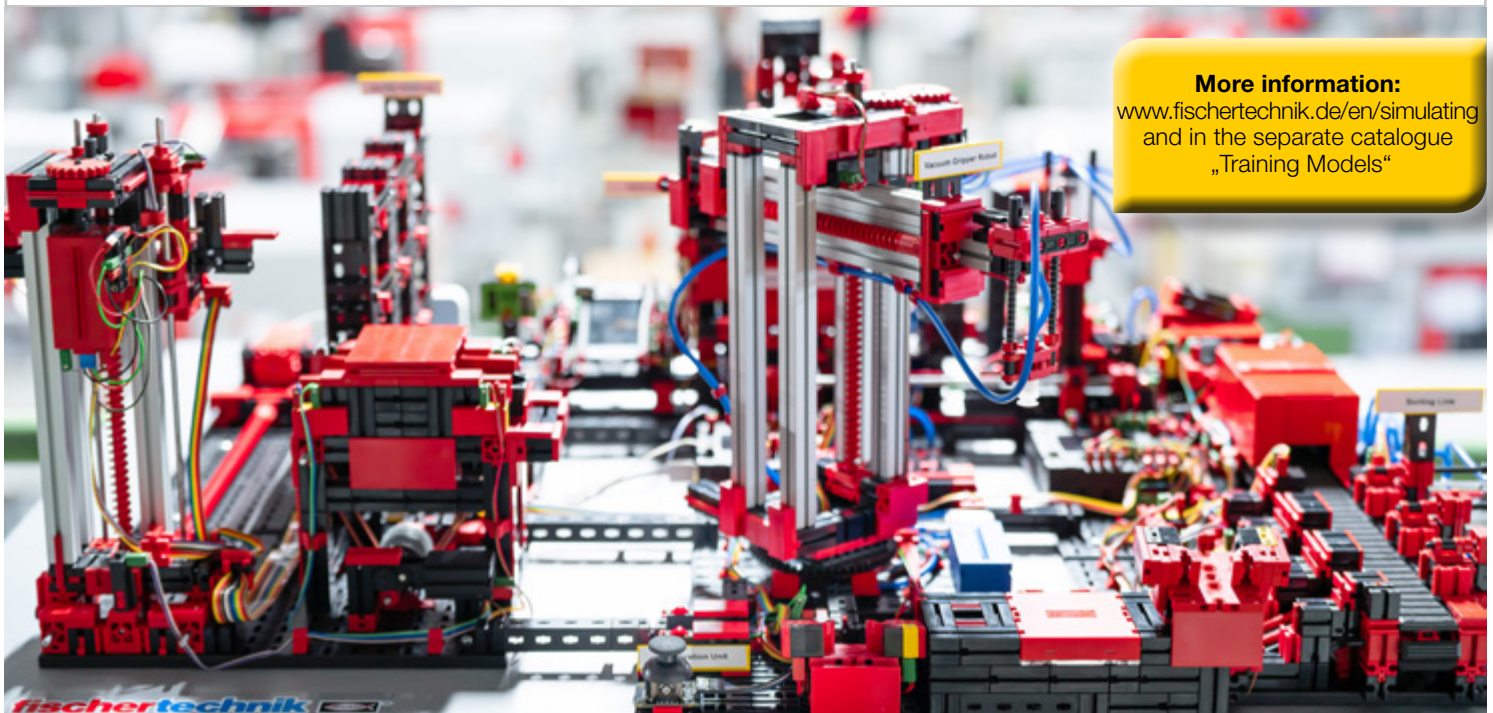
Kit key points:
Gear wheels / pinions / axles / worms and other drive components

> Packaged in two sturdy “Box 500“

Item No.	554196	EAN	4048962390506
Models	-	Components	290
Dim. (mm)	269 x 193 x 79	Weight (g)	1041

» **TRAINING & SIMULATION**

fischertechnik is widely used in industry for vocational training, as well as simulation purposes for realistic representation and simulation of complex systems. The function models are a proven and inexpensive means to plan and to develop industrial applications. They are employed worldwide in the areas of training, development and presentation. The flexibility and the modularity of the fischertechnik system in connection with the industrially adapted sensors and actuators as well as PLC's from leading manufacturers open up almost unlimited possibilities for hardware simulation. Complicated technical systems are presented realistically and thus perfectly simulated so that they are understandable for everyone. This makes investment decisions easier and reduces the costs for the correction of planning mistakes. The Factory Simulation (is a combination of the models Sorting Line With Color Detection, Multi Processing Station With Oven, Automated High-Bay Warehouse and Vacuum Gripper Robot. It is available in both 9V and 24V version.



More information:
www.fischertechnik.de/en/simulating
 and in the separate catalogue
 „Training Models“

» **INDUSTRY 4.0
INTERNET OF THINGS**

fischertechnik factory simulations are already prepared for Industry 4.0 today. Core topics in digitally networked production can be visualized physically and demonstrated in an easy to understand way, enriched with sensors and combined with a cloud. These include preventative maintenance, production quality predictions, human-machine interactions, remote control, data exchange via dashboard. The SAP UCC has developed a teaching scenario with case studies that helps both teachers and students alike to understand the opportunities offered by Industry 4.0. Further information available at: www.fischertechnik.de/industry40

SAP
University
Alliances



SAP UCC
 Magdeburg

