Engino

CREATIVE™ engineering maker Pro

Bill of materials

x2 M010-04

x1 M012-04

x2 M013-04

x1 M006-04

x2 E004-06

x1 M009-04

x1 M011-04

tire L
x4 S017-06

x4 S018-04

x20 S003-03

x8 S001-06

x8 S002-06

x20 S004-04

x3 S014-06

x29 S005-03

x6 S015-28

x11 S013-28

x28 S009-28

x18 S012-28

x26 S007-06

x11 S011-06

x45 S010-06

x18 S006-03

x1 E011-27

x2 E012-27

x2 E013-27

x1 M008-04

x1 E015-28

x6 S016-28

x2 E003-06

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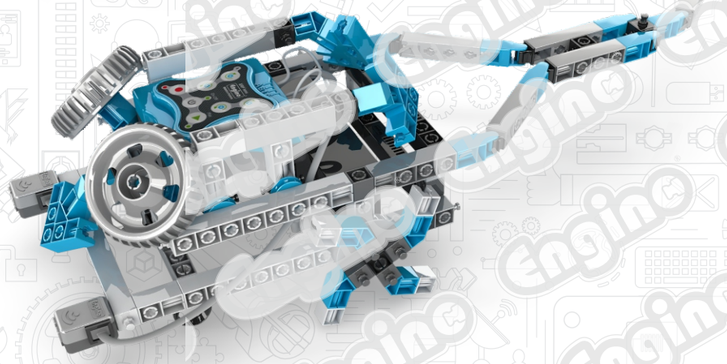
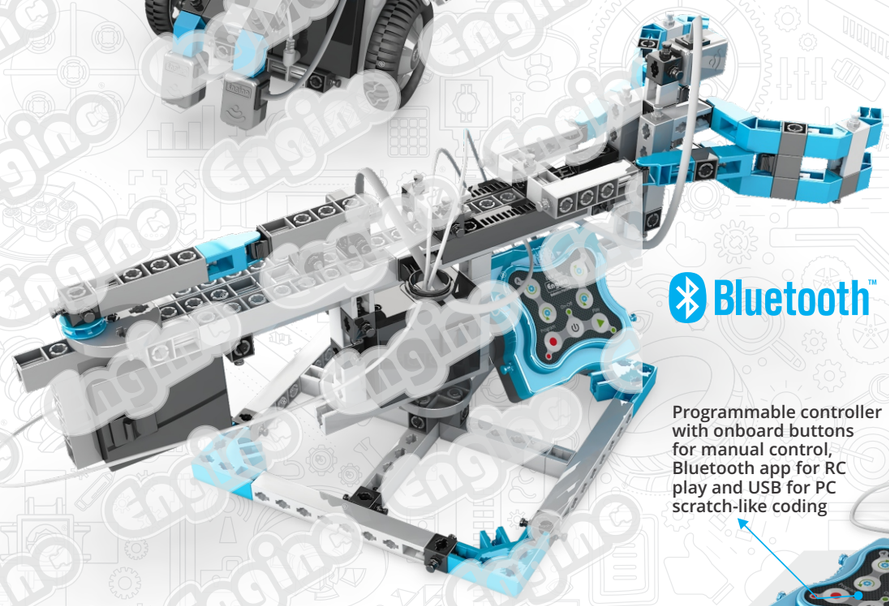
tire S
x4 S020-06

x1* A018-26





3D INTERACTIVE INSTRUCTIONS
BUILD
CODE
LEARN
INVENT
STEM ENABLED

100 IN 1 robotized MODELS

1 model — printed instructions (included)

99 models — online 3D instructions

Bluetooth™

Programmable controller with onboard buttons for manual control, Bluetooth app for RC play and USB for PC scratch-like coding

x2 High torque motors with built-in gearbox

x2 Dual Sensor: Obstacle & Color Detection

ELECTRONICS & MOTOR POWER

10+ Appropriate Ages

Building Instructions

3 Years Warranty

Extraction Tool For easy disassembly of small parts

Made in EUROPE

EU OFFICE & FACTORY:
ENGINO-NET LIMITED
P.O.BOX 72100, 4200
LIMASSOL, CYPRUS
Tel.: +357 25821960
Fax: +357 25821961
E-mail: info@engino.com
Web: www.engino.com

WARNING:
CHOKING HAZARD–Small parts.
Not for children under 3 yrs.

0-3

Product code:
CE101MP-A
Edition 3.0

***CAUTION:** This set contains a string longer than 30cm (12 inches). Keep away from children under the age of 36 months. Danger of strangulation.

CREATIVE engineering maker Pro

build a fan

The fan model will introduce you to the main programming notions and the innovative MINI 2.0 controller. It can also help you test different variables and programs created through the KEIRO™ software.

- What inputs and outputs are.
- How to manually program a robot.

build a robo

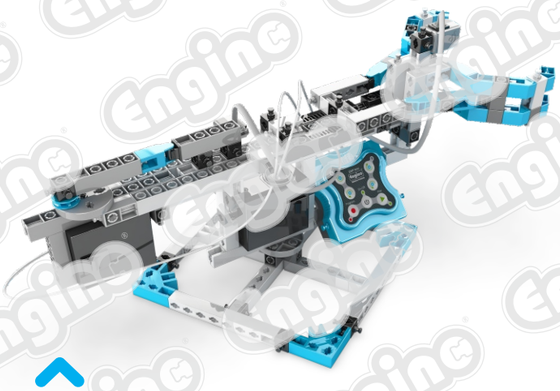
Build the robo model and make use of its dual capability! By using programmable sensors, the robot can distinguish between black and white colours to follow a line or detect objects in its path.

- How infrared sensors work.
- What logic gates and WHILE statements are.

build a hexapod

Experiment with leg-type movement instead of wheels using this exciting hexapod model! Set the infrared sensors on either side to trigger when an obstacle is near, so that the robot can avoid it, by making use of its legs.

- How to work with leg-type motion.
- What an IF statement is.



build a twister

This amazing twister robot imitates real-life robotic arms, which are often used in industrial settings. Program the model to work with precision and move objects around using infrared sensing technology.

- How to work with stationary robots.
- What REPEAT UNTIL statement is.

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Theory

What we will learn

"*At bottom, robotics is about us. It is the discipline of emulating our lives, of wondering how we work*". This quote from the professor of Computer Science Rod Grupen best describes how scientists perceive robotics: a simulation of real life functions using mechanics and computers. But will humanity ever be able to create robots that have feelings and can truly take their own decisions in situations that are not predicted in a programming language? Whatever the future holds, young people of today must have a clear view of what robots are, starting from the basics of robotics and programming sciences and ending up building their own fully functional devices! The next pages are specially designed with this idea in mind!

Robotics cannot exist without computer programming

This booklet contains a comprehensive **theoretical section** with building challenges and interesting facts, so that you can learn all about robots and their applications in daily life. The booklet also contains a **User Manual**, explaining in detail all aspects of Engino's innovative robotic system. Discover all the scientific principles applied through **experimentation**, step-by-step guides and fascinating exercises. Follow the building instructions, contained in this booklet and also online, to build exciting robotic models such as **a scorpion**, **an ameoba**, **an automated house** , **a fan**, **a hexapod**, **a pointer**, **a shovel**, **a twister, a cube** and **a robo**. A lot more learning material is available online!

Automatic devices were found in hieroglyphics

Ancient inventors and craftsmen set out to build the early "robots". These ranged from simple to complex devices designed to perform various tasks in seemingly autonomous ways. Hence, they are called automatons, translated from Greek as "acting on one's own will", even though technically this was not actually the case. As early as the 4th century BC, Archytas had supposedly created a steam flying device called "pigeon". People of his time said that his machine could fly a distance of 200 meters! Heron of Alexandria (10 - 70 AD) was also an inventor who had many creative ideas such as the automatic opening of temple doors, wine purring statues and steam or wind powered machines such as his famous "aeolipile".

History of Robotics

The history of robotics has its origins in the ancient world. Since antiquity, people were thinking about artificial constructions that could replace humans by doing different tasks, as having minds of their own. A Greek myth tells the story of Talos, a gigantic bronze humanoid that was built by Hephaestus (the Greek God of blacksmiths), for protecting the island of Crete. Accounts of robot-like creatures are found all over the world from Norway to Middle East, India and China, in various forms: texts, drawings, paintings and even in ancient Egyptian hieroglyphics.

Modern replica of Heron's aeolipile device

Al-Jazari's drawing of a hydropowered chain pump

In 1898, the Serbian-American inventor Nikola Tesla demonstrated the first radio-controlled vessel. Real robots, meaning those that are able to receive feedback from their surroundings and react to it, only appeared in the 20th century. In 1948, Grey Walters created small robotic turtles with light and touch sensors that could search for "food". Some years later, George Devol patented his Unimate robot that was capable of doing industrial work. This was installed in 1961 in a factory to lift hot pieces of metal from a die casting machine and stack them up.

Did you know?

The science fiction writer Isaac Asimov devised the "**Three law of robotics**" in his short story "Runabout" published in 1942. These are: 1) a robot may not injure a human being or, through inaction, allow a human being to come to harm; 2) a robot must obey the orders given it by human beings, except where such orders would conflict with the First Law; 3) a robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Isaac Asimov (1920 - 1992)

In the middle ages, we can find many examples of automatons, usually in the form of animals or humans. People built fun machines that were programmed to do simple tasks like moving their feet or turning their heads, using precise clockwork technology. The Muslim engineer Al-Jazari (1136–1206) described 100 automated, mechanical devices in his book: "The Book of Knowledge of Ingenious Mechanical Devices". Later on, the french inventor and artist Jacques Vaucanson (1709 - 1782) played an important role in robotics' development as he tried to demonstrate how things work in nature. Some of his inventions included figures that play real instruments (flute and tambourine) and the famous "digesting duck", which imitated food digestion.

A Unimate robotic arm

In the 1960's, engineers were tackling the problem of robotic movement by creating robotic arms and legs inspired by nature. During 1970's and 1980's, advanced technology and small in size computer parts made it possible to put all the components on the robot itself rather than having them attached with wires on an external computer. Since the 1990s, robots became even more advanced, utilising multiple complex tasks. Nowadays, they are used in every aspect of the human life, from home entertainment and assistance (like AIBO the robotic dog, 1999 and Roomba the robotic vacuum cleaner, 2008) to industrial applications (like building cars) and explorations (like Epson the flying robot, 2004) even in outer space (like the Mars exploratory robots, 2004). The exciting part is that this is just the beginning as the future of robotics looks very promising!

Two types of Roomba vacuum cleaners

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