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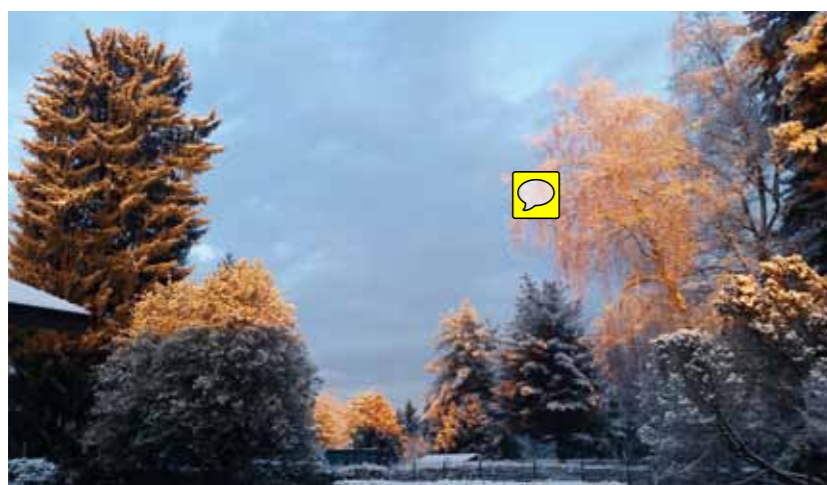
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Programming suite RDE *page 22*



headquarters, Castelletto S. Ticino NO



technical office, Genova

Company Profile

Robox S.p.A, a company started in 1975, designs and manufactures electronic controllers, programming languages, development environments for robotics and motion control systems.

Its broad range of products can be adapted to any application, from the simplest ones (1 or 2 controlled axes), to the most sophisticated ones (dozens of controlled axes) thanks to the availability of architectures which can be "modular", "compact" or even integrated in brushless drives.

Robox controllers communicate with the outside world through the main industrial communication protocols and fieldbuses (EtherCAT, Sercos, OPC server, ActiveX, TCP, UDP, TFTP, CANopen, Profibus-DP, DeviceNet, DF1, Profinet slave, Ethernet/IP, Modbus/TCP).

Robox controllers can support ROS. The Robot Operating System, ROS, is a set of software libraries and tools that help you to build robot applications.

Innovation and quality have been the main goals of Robox since the very beginning.

Innovation has always been pursued keeping in mind the global reliability (present and future) of the product.

Quality has always been ensured by appropriate design choices and an accurate selection of materials. Robox has been certified UNI EN ISO 9001 since 1997.

Robox is a highly specialized research laboratory authorized by the Italian Ministry of Research and Education.

Goals achieved:

- **1976** first micro-processor based controller for industrial robots (Intel 8080)
- **1984** first programming language for the "robot control" (Robox RHLL)
- **1986** first compact Motion controller RPM (Intel 80186)
- **1987** first programming language for the "Motion control" (Robox R)
- **1993** first integrated development environment for Windows (Robox RDE)
- **1997** first modular Motion controller RBXM (Intel 80486)
- **1999** Profibus DP, DeviceNet for Robox Motion controllers
- **2000** Master CANopen for Robox Motion controllers
- **2000** Positioning board for MOOG DACS Drive
- **2001** TCP/IP, UDP/IP protocol for Robox Motion controllers
- **2001** CANopen slave interface for SIEMENS SIMODRIVE
- **2002** RDE3 evolution of the Robox development environment
- **2003** CPU based on Freescale Power PC G2 for RBXM
- **2004** RTE operating system
- **2005** CANopen slave interface for SIEMENS SINAMICS
- **2006** Motion control board for PARKER Hannifin
- **2007** EtherCAT slave interface for PARKER Hannifin
- **2007** μ RMC based on Freescale Power PC G2
- **2008** SPIMD20 for STMicroelectronics
- **2008** EtherCAT master for Robox Motion controllers
- **2009** EtherCAT slave interface for PHASE
- **2009** μ RMC² based on Freescale Power PC G2
- **2009** SERCOS 2 interface
- **2010** CPU based on the Freescale Power PC P2020 for RBXM
- **2011** μ RMC³ based on Freescale Power PC P2020
- **2011** RID20 Robox Integrated Drive
- **2012** Profinet slave, Ethernet/IP, Modbus/TCP
- **2013** μ RIO, ROS (Robot Operating System)
- **2014** RFBCEd Ether Cat Net graphic configurator
- **2015** RP-1 based on Freescale Power Pc
- **2015** RID20-I
- **2016** RPL (Robot programming language)
- **2017** Integration of SAFETY Axioline modules
- **2017** RP-2 based on ARM Cortex A9

Application fields

The main application fields for Robox Motion controllers are:

- Beverage
- Packaging
- Palletizing/depalletizing devices
- Glass industry machines
- Food industry machines
- Wood industry machines
- Hygiene industry
- Tissue industry
- Paper industry machines
- Plastic industry machines
- Textiles industry machines
- Marble industry machines
- Automated guided vehicles (AGV's)
- Feeding devices
- Painting robots
- Measurement machines
- Machines for fibre optic handling
- Printing machines
- Winding machines
- Robots
- Spot welding robots
- Arc welding robots
- Assembly robots
- Plasma cutting robots
- Laser cutting robots
- Water jet cutting robots
- Glue application robots
- Pick & place robots
- Automatic warehouses
- Machine tools
- etc..



Application fields

Application fields

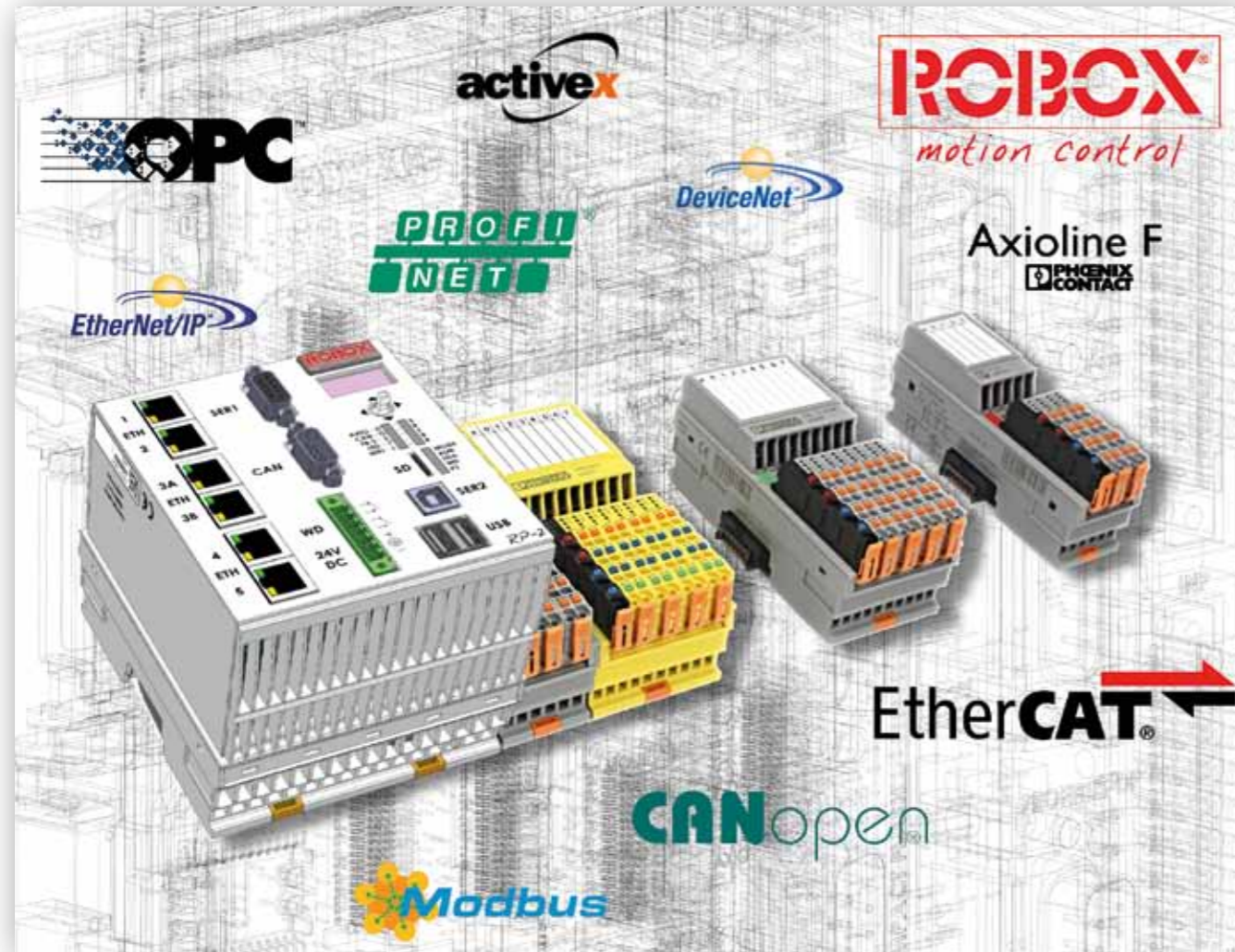




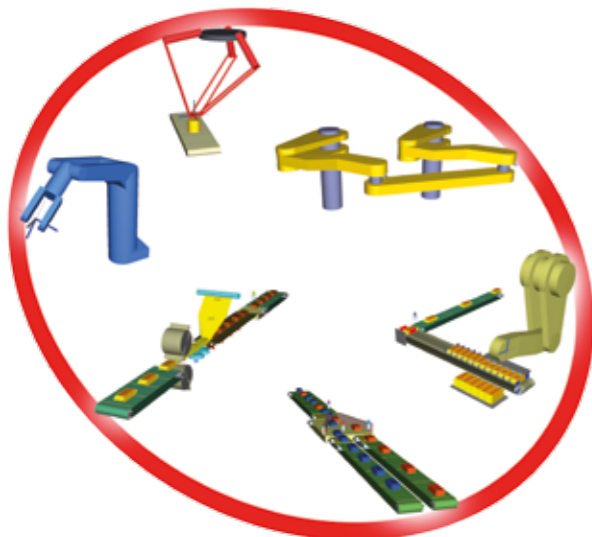
RP-2 *New*

Expandable Motion Controller

Master EtherCAT - Master CANopen - Master Axioline F



more power and more flexibility



- ARM Cortex A9 Dual Core (800MHz)
- Up to 250 interpolated axes, driven through EtherCAT or CANopen fieldbus.
- Suitable for installation on DIN guide (35mm) in accordance with EN60715 rule.
- External measures (l, h, p): 100 x 123 x 96 (mm)
- 0.5Kg
- Micro SD flash memory / 1GB DRAM / 512KB retentive RAM (for retentive parameters and alarm history storage)
- Real time clock calendar
- Watch dog relay

Communication

- 2 10/100 Mbits/s Ethernet channels dedicated for master fieldbus (CoE - Can Over EtherCAT, SoE - Servodrive Over EtherCAT, EoE - Ethernet over EtherCAT)
- 2 10/100 Mbits/s Ethernet channels dedicated for slave fieldbus (EtherCAT, PowerLink, ProfiNET, Modbus/TCP, Ethernet/IP)
- 2 10/100 Mbits/s Ethernet channels with internal switch for general purposes (TCP/IP, UDP, TFTP, Modbus/TCP, Ethernet/IP, Robox BCC/31/TCP)
- Axioline for communication with Axioline peripherals
- 1 Canbus channel (DS301, DS401 and DS402 protocols, Device Net, Robox Cnet) for axes control and/or remote I/O
- 1 USB type B - UART serial channel for general purposes (Robox BCC/31)
- 2 USB type A
- 1 RS232 serial channel for general purposes (Robox BCC/31, DF1)
- 1 Wi-Fi channel for remote diagnostics (internal Web Server)
- OPC Server, ActiveX and .NET Library are available for communication in Windows environment

Expansion boards

See Section Expansion boards / Remote I/O

RTE Firmware (Real Time Extended)

It is installed in the removable Compact Flash and allows the correct execution of the different tasks. The available tasks are the following:

- On event (capture).....priority 1
- Programmed frequency (motion).....priority 2
- Programmed frequency (auxiliary functions).....priority 3,4,5,6
- Background.....priority 7
- OB hooked.....priority 2
- OB hooked.....priority 5

The user develops the application software using RDE (Robox Development Environment)

See Section Programming suite RDE



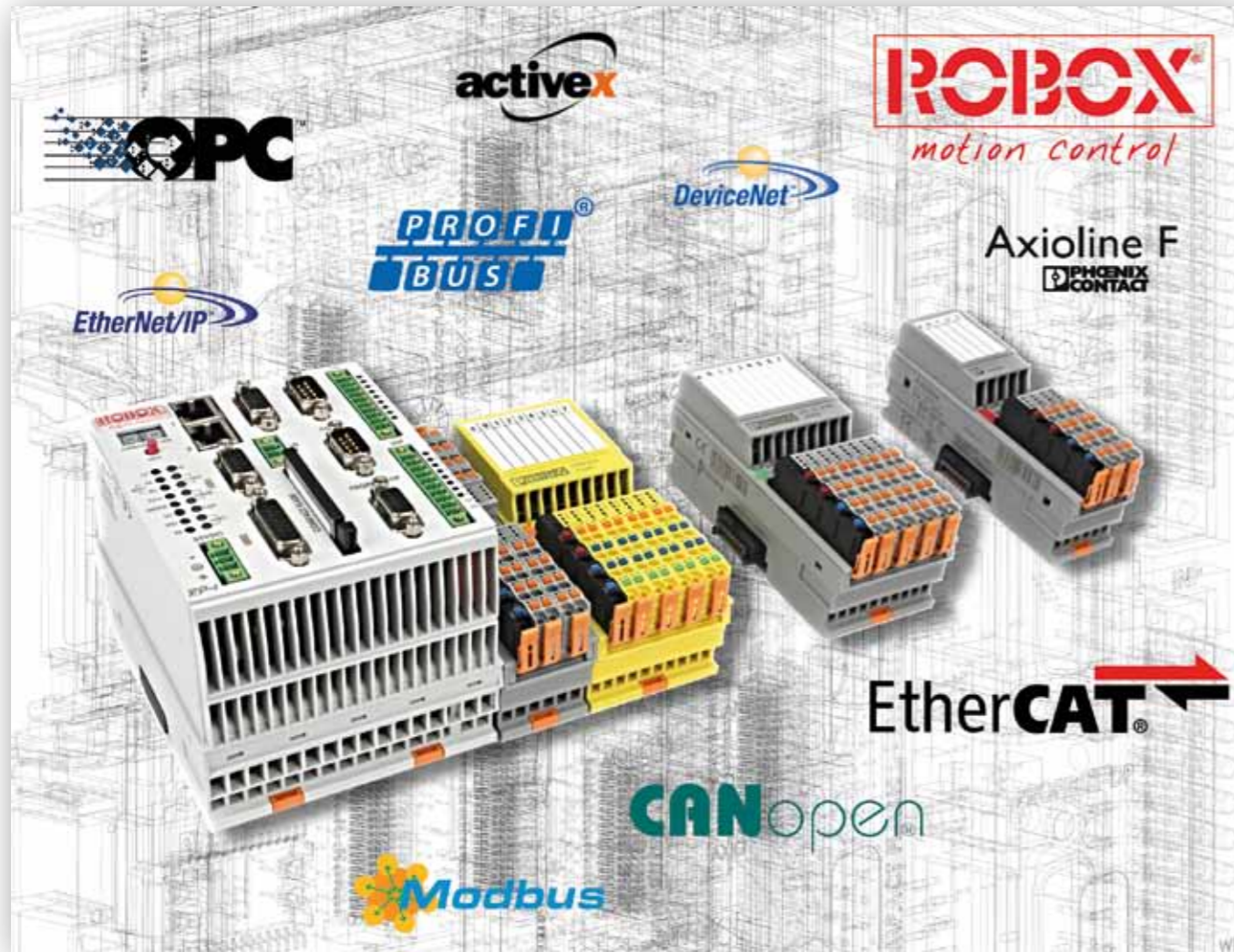
Product codes

- | | | |
|--------------------------|-----------------------------------|------------------------------------|
| Motion Controller | Compact flash | |
| • RP-2 - AS1018.002 | • μSD (<=3axes) RP-2 - AS3025.306 | • μSD (<=10axes) RP-2 - AS3025.310 |
| | • μSD (<=4axes) RP-2 - AS3025.308 | • μSD (<=12axes) RP-2 - AS3025.307 |
| | • μSD (<=5axes) RP-2 - AS3025.309 | • μSD (<=16axes) RP-2 - AS3025.304 |
| | • μSD (<=8axes) RP-2 - AS3025.305 | • μSD (<=32axes) RP-2 - AS3025.303 |

RP-1

Expandable Motion Controller

Master EtherCAT - Master CANopen - Master Axioline F



- Freescale Power PC MPC5200 (400MHz)
- Up to 32 interpolated axes, driven through CANopen or EtherCAT fieldbus.
- Suitable for installation on DIN guide (35mm) in accordance with EN60715 rule
- External measures (l,h,p): 100 x 123 x 96 (mm) 0,5 kg
- Compact flash memory Card / 64 MB DRAM / 128 Kb retentive RAM (for retentive parameters and alarm history storage)
- 8 digital, PNP, 24VDC opto-coupled inputs (3 with capture functions)
- 8 digital, PNP, 24VDC opto-coupled outputs (max 0.5A per channel)
- 1 incremental encoder input (RS422 line driver 5VDC) with dedicated homing input
- Real time clock calendar
- Watch dog relay

Communication

- 1 RS232 serial channel for general purposes (Robox BCC/31, DF1)
- 1 RS422/485 serial channel for general purposes (Robox BCC/31, DF1)
- 2 10/100 Mb/s Ethernet channels (CoE - Can Over EtherCAT, SoE - Servodrive Over EtherCAT, EoE - Ethernet over EtherCAT, TCP/IP, UDP, TFTP, Modbus/TCP, Ethernet/IP, Robox BCC/31/TCP)
- 2 Canbus channels (DS301, DS401 and DS402 protocols, Device Net, Robox Cnet) for axes control and/or remote I/O
- 1 Profibus channel (DP slave)
- Axioline for communication with Axioline peripherals
- OPC Server, ActiveX and .NET Library are available for communication in Windows environment

Expansion boards

See Section Expansion boards / Remote I/O

RTE Firmware (Real Time Extended)

It is installed in the removable Compact Flash and allows the correct execution of the different tasks. The available tasks are the following:

- On event (capture).....priority 1
- Programmed frequency (motion).....priority 2
- Programmed frequency (auxiliary functions).....priority 3,4,5,6
- Background.....priority 7
- OB hooked.....priority 2
- OB hooked.....priority 5

The user develops the application software using RDE (Robox Development Environment)

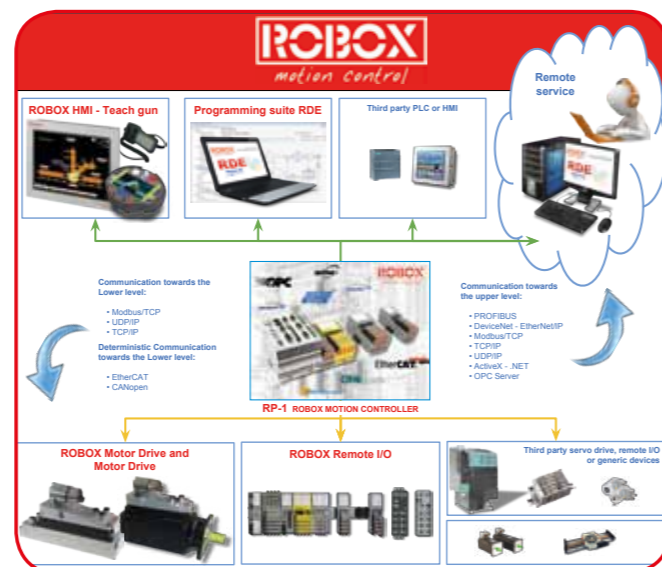
See Section Programming suite RDE



Product codes

- | | | |
|--------------------------|------------------------------------|-------------------------------------|
| Motion Controller | Compact flash | |
| • RP-1 - AS1017.004 | • C.F. (<=3axes) RP-1 - AS3023.306 | • C.F. (<=10axes) RP-1 - AS3023.310 |
| | • C.F. (<=4axes) RP-1 - AS3023.308 | • C.F. (<=12axes) RP-1 - AS3023.307 |
| | • C.F. (<=5axes) RP-1 - AS3023.309 | • C.F. (<=16axes) RP-1 - AS3023.304 |
| | • C.F. (<=8axes) RP-1 - AS3023.305 | • C.F. (<=32axes) RP-1 - AS3023.303 |

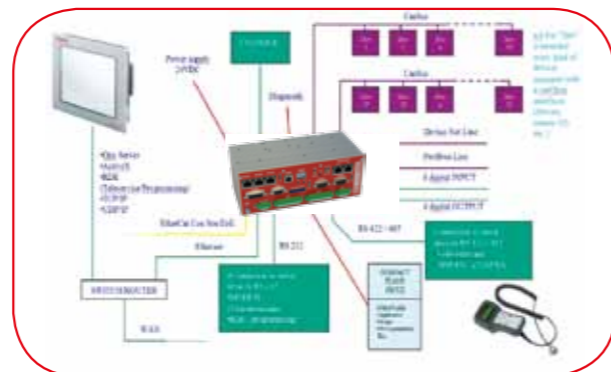
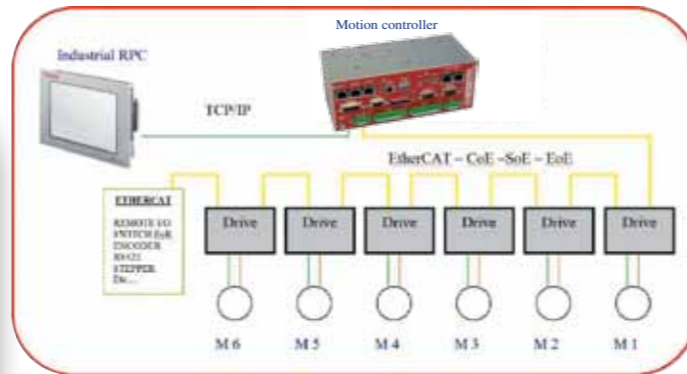
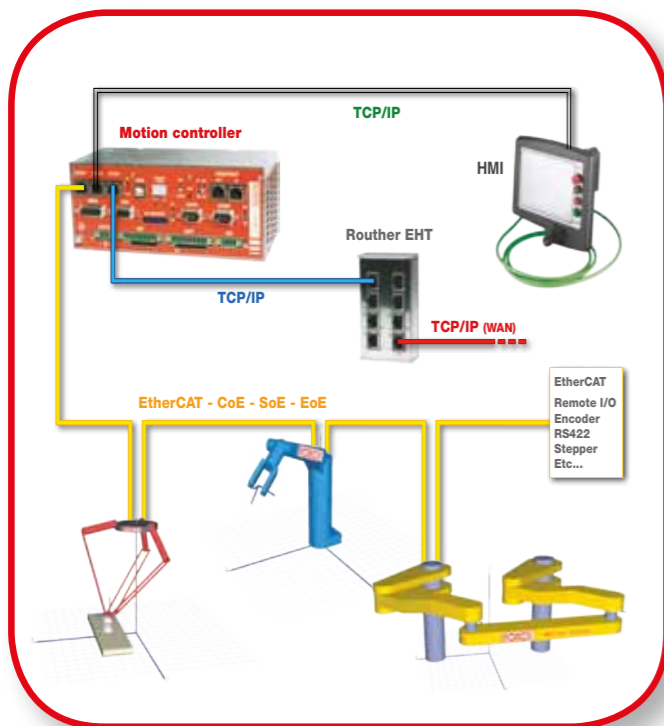
more and more flexibility



μRMC³ Compact Motion Controller Master EtherCAT Master CANopen



Even more power still
in the palm of your hand



- Freescale Power PC P2020 (1.2 GHz-Dual Core)
- Up to 32 interpolated axes, driven through EtherCAT or CANopen fieldbus.
- Suitable for installation on DIN guide (35mm) in accordance with EN60715 rule
- External measures (l,h,p): 210 x 82 x 105 (mm) 1,7 kg
- SD memory Card / 512 MB DDR3 RAM / 128 Kb retentive RAM (for retentive parameters and alarm history storage)
- 8 digital, PNP, 24VDC opto-coupled inputs (all with capture functions)
- 8 digital, PNP, 24VDC opto-coupled outputs (max 0.5A per channel)
- 1 incremental encoder input (RS422 line driver 5VDC)
- Real time clock calendar
- Watch dog relay

Communication

- USB-B channel (Robox BCC3) for PC communication
- 1 RS422/485 serial channel (Robox BCC3, DF1) for general purposes
- 3 Ethernet channels 10/100 Mb/s (CoE - Can over EtherCAT, SoE - Servodrive over EtherCAT, EoE Ethernet over - EtherCAT, TCP/IP, UDP, TFTP, Modbus/TCP, Ethernet/IP, Robox BCC31/TCP)
- 2 Canbus channels for axes and /or remoted I/O control (DS301, DS401, DS402, Device Net, RoboxCnet)
- 1 Profinet channel (Device), EtherCAT slave, Power Link
- OPC Server, ActiveX and .NET Library are available for communication in Windows environment

RTE Firmware (Real Time Extended)

It is installed in the removable SD card and allows the correct execution of the different tasks. The available tasks are the following:

- On event (capture) - priority 1
- Programmed frequency (motion) - priority 2
- Programmed frequency (auxiliary functions) priority 3,4,5,6
- Background - priority 7
- OB hooked - priority 2
- OB hooked - priority 5

The user develops the application software using RDE (Robox Development Environment)



Product codes

Motion Controller

- μRMC³ - AS1017.003

SD Card

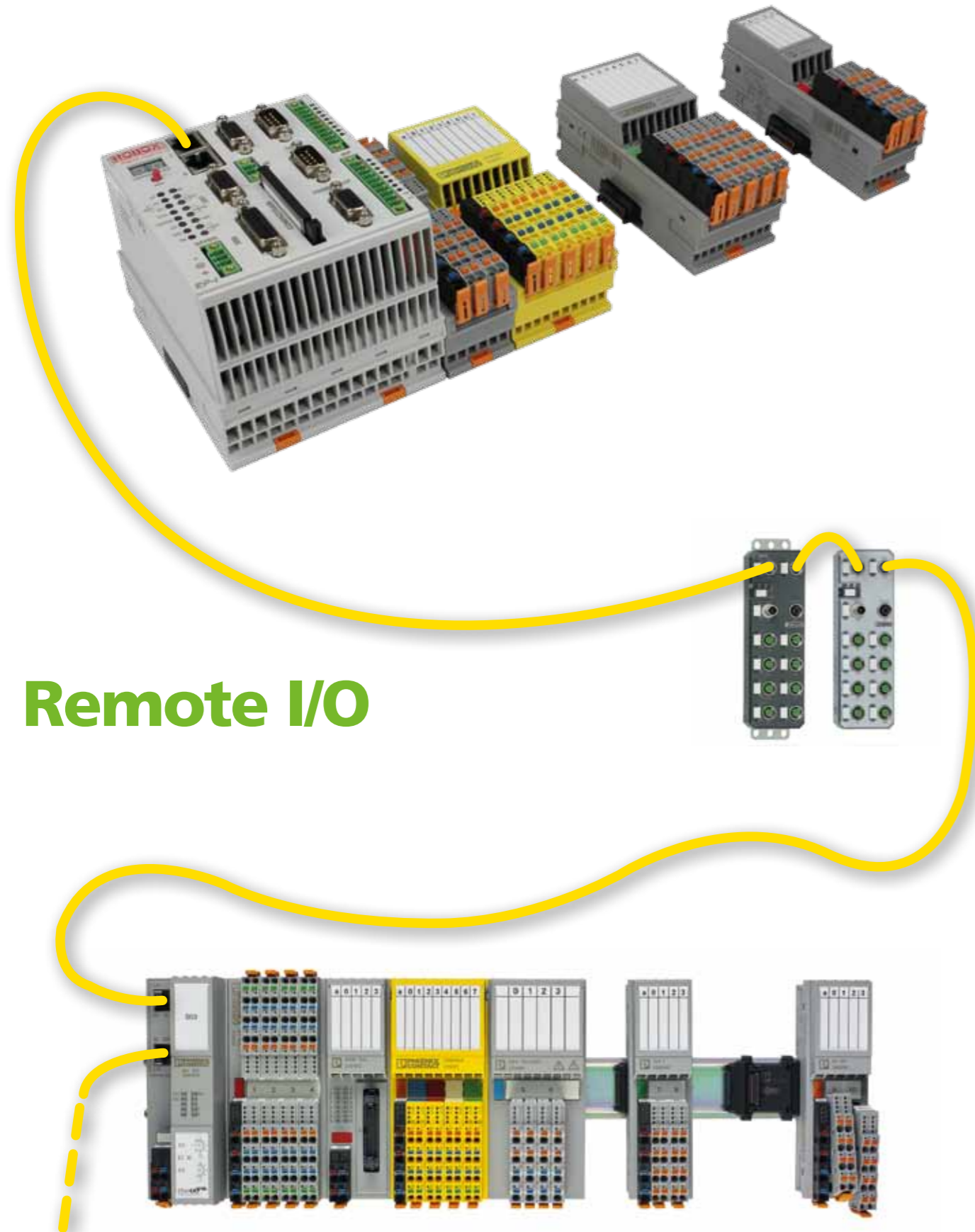
- SD (<=3axes) μRMC³ AS3024.306
- SD (<=4axes) μRMC³ AS3024.308
- SD (<=5axes) μRMC³ AS3024.309
- SD (<=8axes) μRMC³ AS3024.305

- SD (<=10axes) μRMC³ AS3024.310
- SD (<=12axes) μRMC³ AS3024.307
- SD (<=16axes) μRMC³ AS3024.304
- SD (<=32axes) μRMC³ AS3024.303

Expansion modules

Remote I/O

Remote I/O



Expansion modules / Remote I/O

I/O



AXC-BS
Bus connector for direct connection to RP-1, RP-2



AXL-F-BK-EC
Axioline F bus coupler for EtherCAT®

Digital input/output modules



AXL-F-DI16/1-1H
Axioline F digital input module, 16 inputs, 24 V DC, 1-wire connection method



AXL-F-DO16/1-1H
Axioline F digital output module, 16 outputs, 24 V DC, 500 mA, 1-wire connection method



AXL-F-DI16/1-HS-1H
Axioline F digital input module, 16 inputs, high speed, 24 V DC, 1-wire connection technology



AXL-F-DO32/1-1F
Axioline F digital output module, 32 outputs, 24 V DC, 500 mA, single-wire connection method



AXL-F-DI32/1-1F
Axioline F digital input module, 32 inputs, 24 V DC, single-wire connection method



AXL-F-DI8/1-DO8/1-1H
Axioline F digital input and output module, 8 inputs, 24 V DC, 8 outputs, 24 V DC, 500 mA, single-conductor connection technology



AXL-F-DI32/1-2H
Axioline F digital input module, 32 inputs, 24 V DC, single-wire connection method



AXL-F-DI16/1-DO16/1-2H
Axioline F digital input and output module, 16 inputs, 24 V DC, 16 outputs, 24 V DC, 500 mA, 1-wire connection technology



AXL-F-DO8/2-2A-1H
Axioline digital output terminal, 8 outputs, 24 V DC, 2 A, 2-wire connection method

Analog input/output modules



AXL-F-AI4-I-1H
Axioline F analog input module, 4 inputs: 0 - 20 mA, 4 - 20 mA, ± 20 mA, 2, 3, and 4-conductor connection technology, integrated sensor supply



AXL-F-AO4-1H
Axioline F analog output module, 4 outputs: 0 - 10 V, ± 10 V, 0 - 5 V, ± 5 V, 0 - 20 mA, 4 - 20 mA, 2-wire connection technology



AXL-F-AI4-U-1H
Axioline F analog input module, 4 inputs: 0 - 5 V, ± 5 V, 0 - 10 V, ± 10 V, 2, 3, and 4-conductor connection technology, integrated sensor supply



AXL-F-AO8-1F
Axioline F analog output module, 8 outputs: 0 - 10 V, ± 10 V, 0 - 5 V, ± 5 V, 0 - 20 mA, 4 - 20 mA, ± 20 mA, 2-wire connection technology



AXL-F-AI8-1F
Axioline F analog input module, 8 inputs: 0 - 10 V, ± 10 V, 0 - 20 mA, 4 - 20 mA, ± 20 mA, 2-wire connection method



AXL-F-AI2-AO2-1H
Axioline F analog input and output module, 2 inputs, 2 outputs, 0 - 10 V, ± 10 V, 0 - 5 V, ± 5 V, 0 - 20 mA, 4 - 20 mA, ± 20 mA, 2-conductor connection technology

Temperature modules



AXL-F-RTD4-1H
Axioline F temperature module, 4 inputs for connecting resistance temperature detectors



AXL-F-UTH4-1H
Axioline F temperature module, 4 inputs for connection of thermocouple sensors



AXL-F-RTD8-1F
Axioline F temperature module, 8 inputs for connecting temperature shunts



AXL-F-UTH8-1F
Axioline temperature module, 8 inputs for connection of thermocouple sensors

Special function modules



AXL-F-CNT2-INC2-1F
Axioline F special function module, 2 counter inputs, 2 incremental encoder inputs



AXL-F-RS-UNI-1H
Axioline F communication module for serial data transmission, 1 interface can be parameterized as RS.485/RS-422 or RS.232



AXL-F-PWR-1H
Axioline F power module for the communications power UBus, max. 4 A



AXL-F-SSI1-AO1-1H
Axioline F special function module, 1 SSI interface for absolute encoder, 1 analog output: 0-10 V, ± 10 V, 0-5 V, ± 5 V, 0-20 mA, 4-20 mA, ± 20 mA, 2-wire connection method

Safety modules



AXL-F-SSDI8/4-1F
Safety-related digital input module, IP20 protection, for the SafetyBridge system. The module has 4 safe digital inputs for two-channel assignment or 8 safe digital inputs for single-channel assignment.



AXL-F-LPSDO8/3-1F
Safety-related digital output module, IP20 protection, for the SafetyBridge system. The module has four safe digital outputs with two-channel occupancy or 8 safe digital outputs with single-channel occupancy



AXL-F-SSDO8/3-1F
Safety-related digital output module, IP20 protection, for the SafetyBridge system. The module has four safe digital outputs with two-channel occupancy or 8 safe digital outputs with single-channel occupancy

IP 67 modules



AXL-E-EC-DIO16-M12-6P
Axioline E-EtherCAT® device in a plastic housing with 16 configurable inputs or outputs, 24 V DC, M12 fast connection technology



AXL-E-EC-IOL8-DI4-M12-6P
Axioline E-EtherCAT® device in a plastic housing with 8 IO-Link ports and 4 digital inputs, 24 V DC, M12 fast connection technology

HMI



> RPC family



> RHMI family



> RIG family

RPC

RPC are a family of industrial PCs, based on a fanless INTEL processor suitable for producing sophisticated operator interfaces aimed to facilitate the use of the machine controlled by the end user. By using the RDT software, interaction is possible, through the BBC3 Protocol on support TCP / IP, with the motion controller connected both with variable exchange as well as with upload / download of files. The terminal is furthermore equipped with an integrated remote service software which renders its Internet access, particularly simple and quick. Being a PC, it can also be programmed with custom applications based on VB. NET etc. ...

Product specification:

- Display LCD TFT from 10 inches up to 15 inches
- CPU Intel Atom dual core 1,86 GHz
- 2 GB DDR3 dynamic ram
- SSD drive 32GB 2,5" SATA MLC
- CFast 2GB SATA 2 SLC
- 2 expansion slot MiniPCI
- 1 USB frontal port - 4 USB ports
- 1 serial port RS232
- 1 PS/2
- 2 Ethernet interface 10/100/1000 Mbps
- Power supply 24VDC
- Microsoft Windows 7 embedded 7E International 32

Programming:

- RTM run-time software to execute RDT projects
- REMOTE SERVICE software via VPN
- User friendly configurator

DISPAN - AS6005.102

Hand-held terminal, equipped with emergency and dead-man push-buttons, displaying the diagnostic messages issued by the operating system of the motion controller. Ideal as robot teach-gun.

Product specification:

- 1 Liquid crystal, back-lighted display 4x20
- 28 Alpha-numerical keys (8 of which are function keys)
- 4 Leds
- Emergency push-button
- Dead-man push button
- Power supply 24vdc, to connect, through as7005.001 Interface, to rbxm p.Gun or urmc2, urmc3 ser2
- Ext. Meas. Mm 210x110x25 - weight kg 0.5

Programming:

A range of menus is handled directly by the RTE firmware. The user can program the display to build his own menus.

RDT - Programming software to design your HMI

RDT is a software tool running on Windows platforms, allowing to design customized HMI's (Human Machine Interface).

It offers the user a set of controls such as:

- Customizable operating push-buttons
- ComboBox
- ListBox
- Static image
- Dynamic image
- Static text field
- Dynamic text field
- Edit field
- Slider
- Trend



RHMI

RHMI are a family of operator terminals, based on a fanless ARM processor suitable for producing simple but complete operator interfaces aimed to facilitate the use of the machine controlled by the end user. By using the RDT software, interaction is possible, through the BBC3 Protocol on support TCP / IP, with the motion controller connected both with variable exchange as well as with upload / download of files. The terminal is furthermore equipped with an integrated remote service software which renders its Internet access, particularly simple and quick.

Product specification:

- Display LCD TFT from 5.7 inches up to 15 inches
- CPU ARM Cortex A8 1 GHz fanless
- 512 MB Dynamic ram DDR3-800
- Removable SD card 1 GB hosting the application software
- 256 MB NAND internal flash hosting the operating system
- 2GB internal eMMC (Solid State Disk) hosting the system software
- 2 USB ports
- 1 RS232/422/485 serial port
- Possibility to connect to an external keyboard/mouse
- 1 Ethernet interface 100 Mb/s
- 1 Ethernet interface 10/100 Mb/s
- Supplied from the 24VDC
- Microsoft Windows Embedded Compact 7 Pro (C7P)

Programming:

- RTM run-time software to execute RDT projects
- REMOTE SERVICE software via VPN
- User friendly configurator

RIG10 Operator's Interface

Product specification:

- 512 MB not accessible compact flash, with operating system inside
- 512 MB removable compact flash with application software inside
- analog 3-axis joy-stick without sliding contacts (15 million operations expected) with push button for axes position storage
- feed-rate override selector
- 2-position mono-stable "operator present" push-button
- emergency push-button
- start/stop push-buttons
- connection cable max 10m
- hang up hook
- external meas.: mm. 310x140x270
- weight kg. 3.00

Programming:

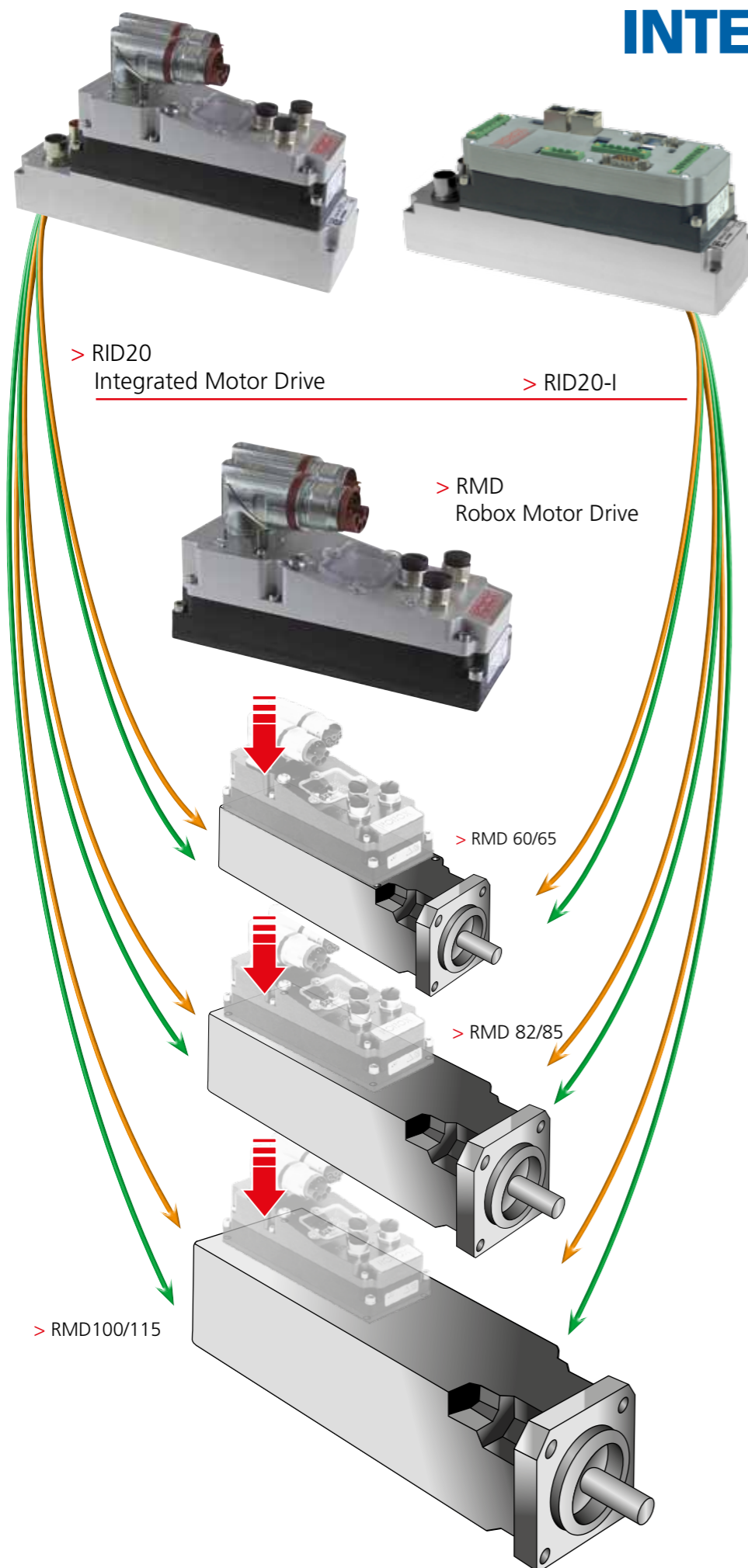
- RTM run-time software to execute RDT projects
- REMOTE SERVICE software via VPN
- User friendly configurator

Through these controls the user will be able to build the required project pages, to add actions, macros, help windows, to handle password levels, recipes, alarms history, multi-lingual facilities and many other utilities.

Each Robox motion controller can be associated to a serial device or a TCP/IP address thus allowing centralized diagnosis.

The resulting HMI application can run on any industrial PC, equipped with Windows or Linux operating system, through the RTM runtime software.

INTEGRATED DRIVES



RID20, RID20-I Robox Integrated Drive AS9201.003

Product specification:

- Extremely compact dimensions 220 x 60 x 124 (mm) 1,7 kg
- Current/speed and position loop closed by the IMD
- Up to 750 DC power supply
- Up to 2KW
- Auxiliary power supply 18-48 VDC
- Strong capability to support high temperatures and vibrations
- EtherCAT interface. Other Ethernet based real-time fieldbuses supportable
- CANopen interface
- Resolver or ENDAT 2.2 interface
- STO
- Internal 24VDC Holding brake control driving up to 0.7A
- Internal accelerometer for vibration analysis

Storage:

- Internal Flash memory 1MB

Communication:

- EtherCAT (CoE) (FoE) or CANopen DS402
- RS232 interface for developers

Transducers:

- Resolver
- Endat 2.1, 2.2
- Hiperface DSL (AS9201.004)

I/O's:

- 2 digital, PNP, 24VDC opto-coupled inputs (with capture functions)
- 2 digital, PNP, 24VDC opto-coupled outputs
Max current for single output 600 mA (by external supply)
Max total current for all outputs (by internal supply) 100 mA.

Connectors:

- Two hybrid connectors, receptacle angled rotatable, for power supply (750 V DC and auxiliary 18-48 V DC)
- Two M12 connectors, for input and output digital signals
- One M12 connector, for serial interface and torque off signals
- Two cable glands for motor and transducer cables

Connectors RID20-I

- Standard Wires / Connector

Product codes

- RID20 AS9201.003 (Degree of Protection: IP 67)
- RID20 AS9201.004 (Degree of Protection: IP 67)
- RID20-I AS9202.001 (Degree of Protection: IP 20)
- RID20-I AS9202.003 (Degree of Protection: IP 20)
- RID20-I AS9202.004 (Degree of Protection: IP 20)

RMD Robox Motor Drive

RMD is the Robox integrated Drive directly installed on the following motors of different sizes:

Product specification:

- 1 to 1,5 Nm
- Resolver/ENDAT 2.2 interface
- Brake

RMD 60/65

Product specification:

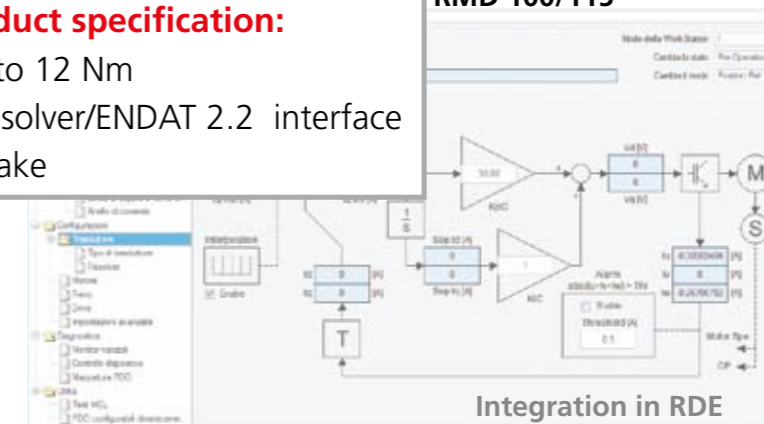
- 3 to 5.3 Nm
- Resolver/ENDAT 2.2 interface
- Brake

RMD 82/85

Product specification:

- 6 to 12 Nm
- Resolver/ENDAT 2.2 interface
- Brake

RMD 100/115



CUSTOMIZED PROJECTS



> RCB
Robox Control Board
for Siemens Sinamics S120



> SPIMD20
Integrated Motor Drive
for STMicroelectronics



> MCB
Motion Control Board
for Parker HiDrive



> Real Time Ethernet Interface

CANopen interface for Siemens S120 - AS3031.002

Product specification:

- It allows to interface Sinamics drives to a CANopen DS301, DS402 fieldbus as a slave device
- It is plugged in the Sinamics in the appropriate slot
- It allows multi-axis synchronous operation at sync frequency ranging from 20 to 500Hz
- Position, velocity, torque modes are provided
- When working in position control, it interpolates the reference at 1KHz regardless of the master frequency

SPIMD20 for STMicroelectronics

Product specification:

- Extremely compact dimensions 163,5 mm*60mm*26mm 0.5 kg
- Current/speed and position loop closed by the IMD
- Up to 750 DC power supply
- Up to 2KW
- Auxiliary power supply 18-48 VDC
- Strong capability to support high temperatures and vibrations
- EtherCAT interface. Other Ethernet based real-time fieldbuses supportable
- CANopen interface
- Resolver or ENDAT 2.2 interface
- Hardware/software architecture suitable to apply for the certification of the most important safety functions of Standard EN 51800-5-2: (STO, SS1, SS2, SOS, SLS, SLP, SBC)

- Internal 24VDC Holding brake control driving up to 0.7A
- Internal accelerometer for vibration analysis

Storage:

- Internal Flash memory 1MB
- Support for external removable Flash memory Card

Communication:

- EtherCAT (CoE) (FoE) or CANopen DS402 (other Ethernet Fieldbus under development)
- Safe CANBus hand-shaking channel
- RS232 interface for developers

I/O's:

- 2 digital, PNP, 24VDC opto-coupled inputs (with capture functions)
- 2 digital TTL outputs

Motion Control Board for Parker Hannifin HiDrive - AS1016.002

Product specification:

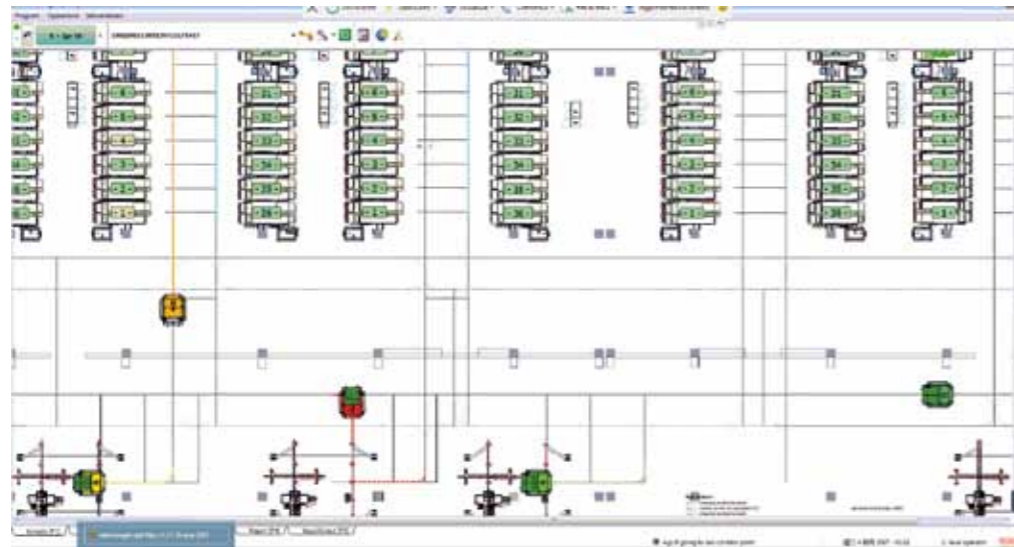
- Freescale Power PC MPC5200 (400MHz)
- Axes number: Up to 32 interpolated axes, controlled through CANopen or EtherCAT fieldbuses
- Memory: Compact-flash memory Card
64 MB DRAM
128 Kb CMOS back-up battery (for retentive parameters and alarm history storage)
- Communication: 1 RS232 serial channel (Robox BCC3, DF1) for general purposes
1 RS422/485 channel (Robox BCC3, DF1) for general purposes
2 Ethernet channel 10/100 Mbits/s (CoE - Can over EtherCAT, SoE - Servodrive over EtherCAT, EoE - Ethernet over EtherCAT, TCP/IP, UDP, TFTP, Modbus/TCP, Ethernet/IP, Robox BCC/31/TCP)
O.P.C. server and ActiveX available for communication in Windows environment
2 canbus channels for axes control and/or remoted I/O control (DS301, DS401, DS402, Device Net, RoboxCnet)
- I/O ports: 8 digital, PNP, 24VDC opto-coupled inputs (3 with capture functions)
8 digital, PNP, 24VDC opto-coupled outputs (max 0.5A per channel)
- Real time clock calendar
- Watch dog relay
- Firmware: RTE
- Programming: RDE development environment

Real Time Ethernet Interface - AS3030.nnn

Product specification:

- Extremely compact dimensions 65mm*40mm*8mm
- Designed to implement any real time Ethernet fieldbus (industrial ethernet)
- EtherCAT interface (COE)
- It requires only power supply and ethernet transformers
- Flexible connection to the host (26 lines fully configurable)
- NIOS II 32 bit soft core processor 116 MIPS
- SDRAM memory 8MByte, Flash memory 2MB, EEPROM memory 2Kb

AGV LINE



www.bertolottispa.com



www.tenax.net



www.mecfond.it

The vehicle is controlled by a gyroscope able to measure its rotations around its vertical axis. Communication with the supervisor PC is obtained via WIFI.
 The movement can be controlled by any Robox motion controller.
 By using the gyro information, the traction odometry and a precise detection of suitable magnets on the floor, the vehicle is driven, according to a map, inside the factory with a special algorithm implemented by using RDE development environment.

RGM - AS3008.003 Gyroscope

It installs a solid state gyro able to measure its rotations around its vertical axis.

Product specification:

- Electronics based on a DSP56F807 microcontroller
- Integration of the angular speed value to obtain an absolute rotation angle
- Communication with the Robox motion controller via multi-master RS485 line



RHAM - AS3009.003 magnet detector

Magnet detection device

Product specification:

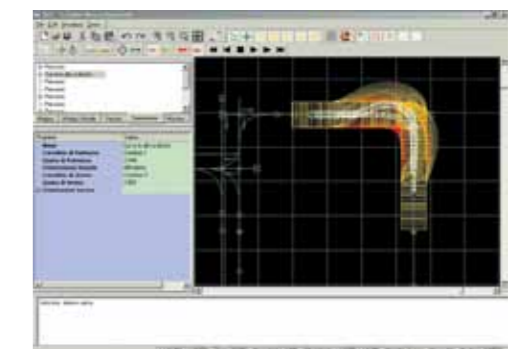
- Magnet presence on the floor detected through an 16x4 Hall sensor matrix
- Magnet position detected through a microcontroller integrated algorithm
- Communication with the Robox motion controller via multi-master RS485 line



AGV MANAGER

AGV MANAGER is a software tool running on Windows/Linux platforms, allowing to describe the plant operation for AGV's controlled by the Robox inertial guidance system.

- Communicates with the agv through:
 - Radio modem via serial link
 - wireless lan with protocol TCP/IP or UDP
- Communicates:
 - with general PLC, through RS232 serial
 - with PLC, through an OPC server
 - with PLC, in ethernet with protocol send/receive or fetch/write
 - In a generic manner, through the reading/writing of files
- Communicates with the database:
 - SQL Server
 - MySql
 - PostgreSQL
 - ODBC
- It is responsible for the movement of many AGVS simultaneously:
 - handles automatically algorithms of anticollision and priority among Agvs
 - Calculates automatically the best path to assign to each agv, by respecting the direction of the path and the Agv orientation, as defined in the plant map.
- it supplies an integrated development environment (x-script) to describe the Agvs movement behaviour
 - with great flexibility and adaptation to the peculiarities of each plant
 - without any need of external compiling tools
 - by processing the infos received through the AgvManager native interfaces or by exchanging information through other channels (socket,...)
 - it gives the possibility to integrate "plugin" specifically written for an application, to increase the specific functionality of AgvManager for the single plant

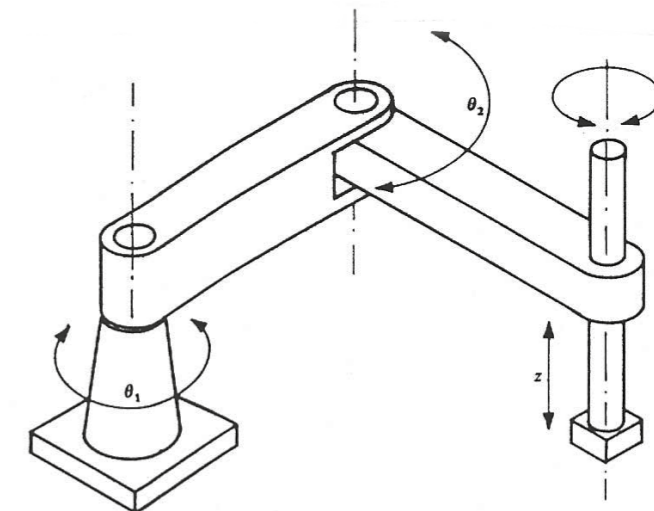
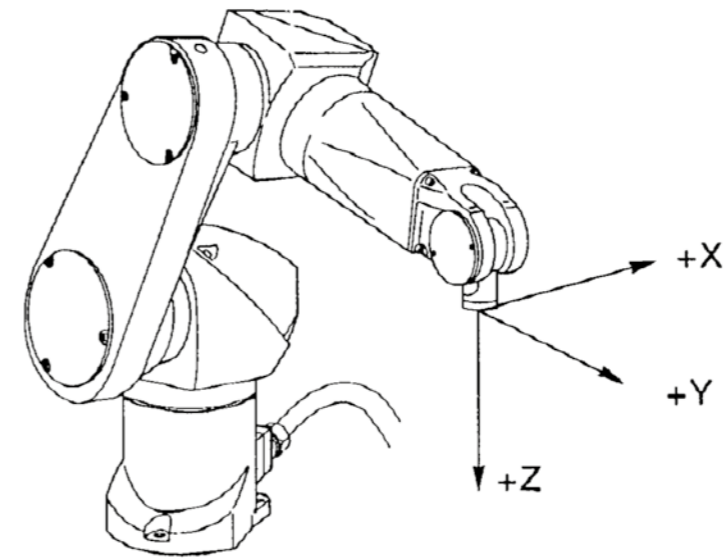
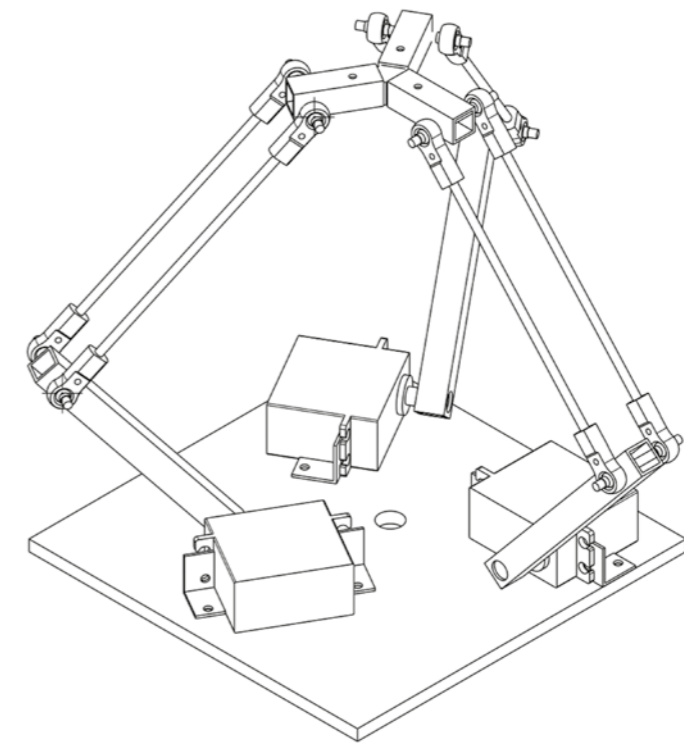
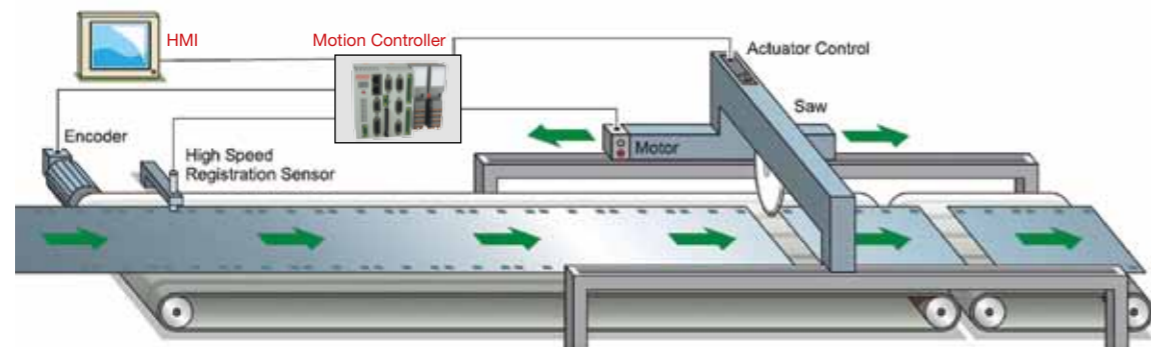
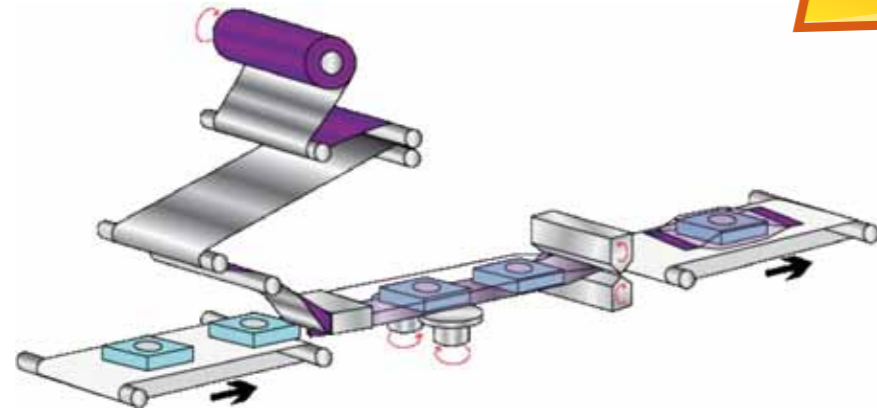


RAT is a software tool running on Windows/Linux platforms, allowing to describe the plant map for AGV's

Exploiting the possibility to import lay-outs in DXF format (both of the plant and of the vehicle) the user will draw the routes, customize their crossings, speeds, behaviour (bends, radius, speed or clockwise - counter-clockwise rotation), start and load/unload points, etc. RAT also allows to simulate the mission length or the dimension of the space occupied, in order to optimize the AGV operation.

RDE development environment

RDE III



RDE basic functions:

- Allows to write, compile and debug the application software
- Permits to evaluate the behaviour of the controlled machine and therefore to choose the best solution to optimize it
- Allows to describe the controlled machine in a graphic form configuring the axes, the powersets and the robots geometrical structures
- Allows to describe the devices present on fieldbuses
- Runs on personal computers with Microsoft Windows Vista, 7, 8.1 and 10
- Communicates with the Motion Controllers via Ethernet (TCP/IP) or serial link
- "On Line" Electronic documentation

RDE offers the programmer the following languages to write the application software:

- Structured text with motion libraries (suitable for motion control applications) for ex. electric shafts, electronic cams, flying shears, axes tracking and gearing. Possibility to monitor and make "live" modifications of the program
- Structured text with robotics libraries (suitable to describe palletizing cycles, pick&place and paths in general, for ex: cutting, drawing, glueing etc...). Possibility to monitor and make "live" modifications of the program
- Ladder IEC1131 (suitable for plc programming)
Possibility to monitor and make "live" modifications of the rungs
- ISO (interpreter of ISO sources generated by external CAD/CAM)
- PLCopen function blocks library
- OB, Object Blocks (extended concept of Function Block). They are available in the other Robox languages
- C++ allows the programmer to design his own OB in order to create his own libraries
- RPL Robot programming language

RDE offers the programmer the X/script language to personalize it (e.g. to create his own forms/tools)

- X/script structured text

RDE offers the programmer, for a user friendly debugging, the following tools:

- Oscilloscope (synchronous with the motion task)
- Monitor (to watch the variables values)
- Graphical panels (to realize cock-pits to debug the controlled machine)
- Breakpoints: on the execution of an instruction (stopping the execution or just counting the event occurrences), on a variable read operation, on a variable write operation
- Trace on tasks
- Step by step instructions (to follow the program flow)
- "live" modification (to modify LD/ST tasks without re-booting the system)
- 3D Graphical panels (for a virtual simulation of the controlled machine)
- Graphical panels to interact (display and edit) with the devices (drives) connected to the fieldbus

Structured text with MOTION libraries

It allows to easily approach the following problems:

- Solving synchronization problems for any number of rotating and/or translating axes
- Programming even sophisticated motion laws by simply writing their equations
- Building electronic cams
- Live modifications

List of some motion libraries

MV_CAM	Execute a CAM
MV_CRIMPER	Suitable for packaging machine
MV_FOLLOW	Flying shear
MV_PHASE_ADJ	Phasing between two axes
MV_REACH_TARGET	Axes tracking
MV_TO_N_CJ	Interpolated mission up to 32 axes with controlled jerk
etc...	

**Structured text with ROBOTICS libraries**

- Fly move for pick&place applications etc...
- Continuous path control for cutting/glueing etc..
- Linear, circular, spline interpolation at the "tool point"
- Built-in coordinate transformation for the main robotics structures (anthropomorphous, scara, cilindric, delta, ect...)
- ISO (interpreter of ISO sources generated by external CAD/CAM)

List of some Robotic libraries

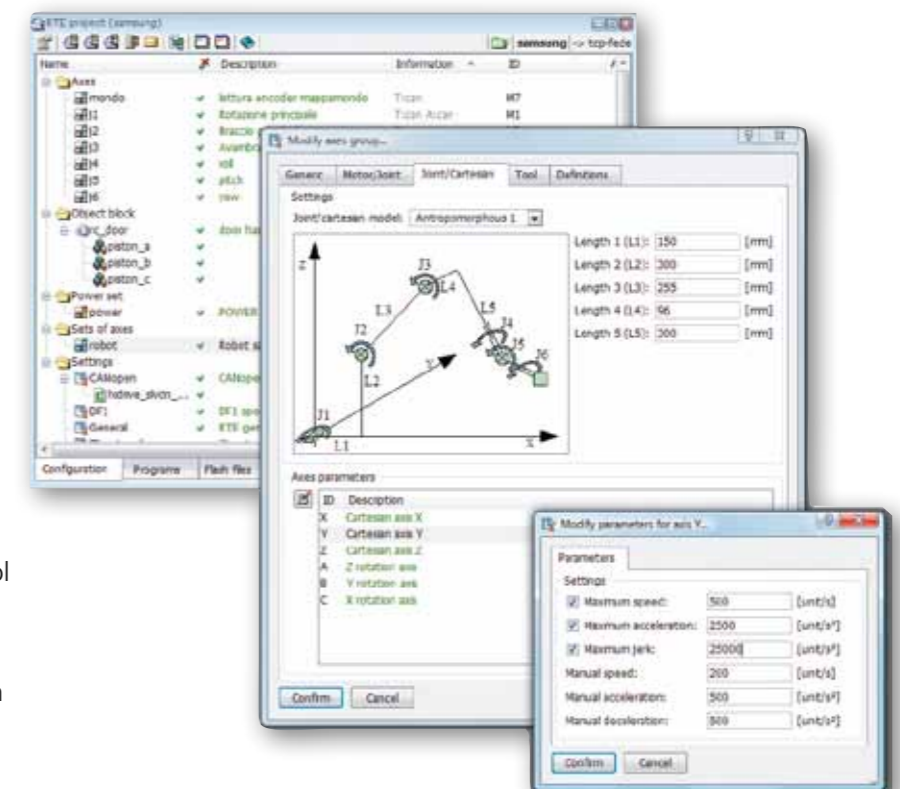
MV_FLY_JOINT
MV_FLY_CART
MV_LINEAR
MV_SPLINE
MV_CIRC
PE_EXEC_PATH

In the menu:

project ⇨ configurator
the user can easily:

- Parameterize the structure and the most relevant variables
- Parameterize the power handling using the power set configuration tool
- Parameterize the alarms handling

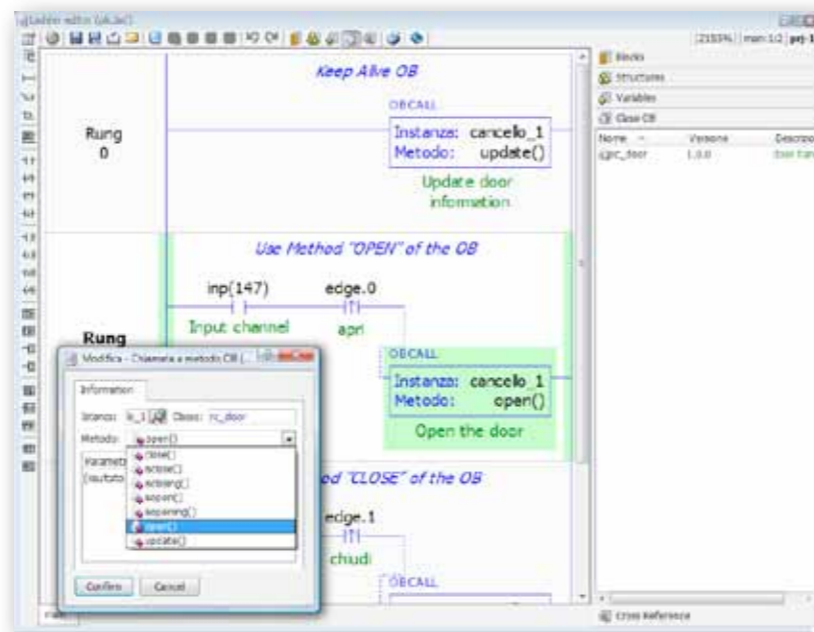
The system is able to handle more than one axes group simultaneously etc...



Ladder diagram

Suitable for PLC programming

- Complete list of elements (IEC61131)
- Monitor
- Live modifications (off-line and on-line)
- Mathematical blocks
- OB full integration
- PLCopen Function Blocks Library



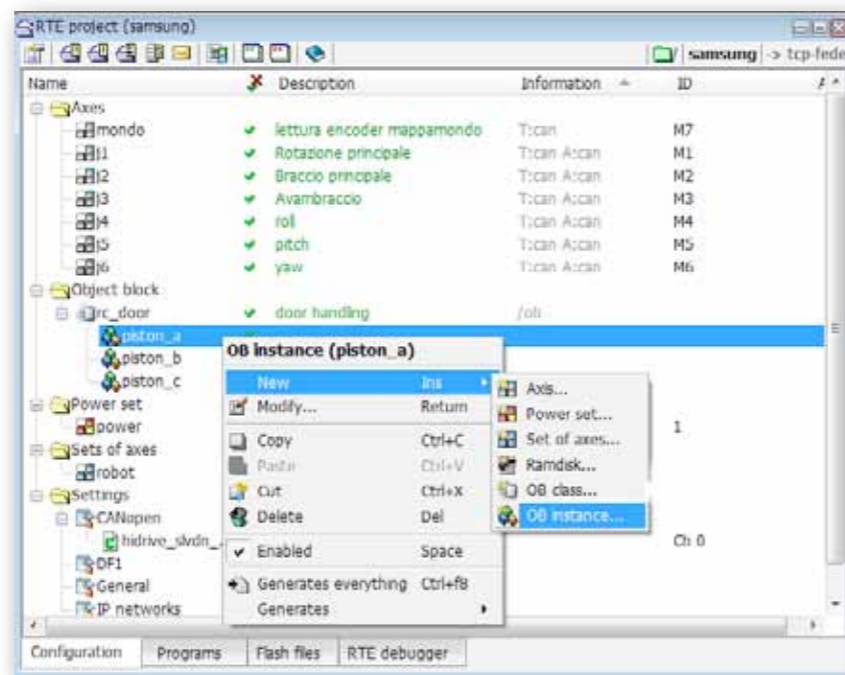
OB use from LD

OB

Object Blocks (extended concept of Function Block) are predefined CLASSES (ex: PID , MUX, BELT, PLC OPEN etc) which the user can instance in his project.

It is possible to use the methods offered by the class, invoking them from the other languages.

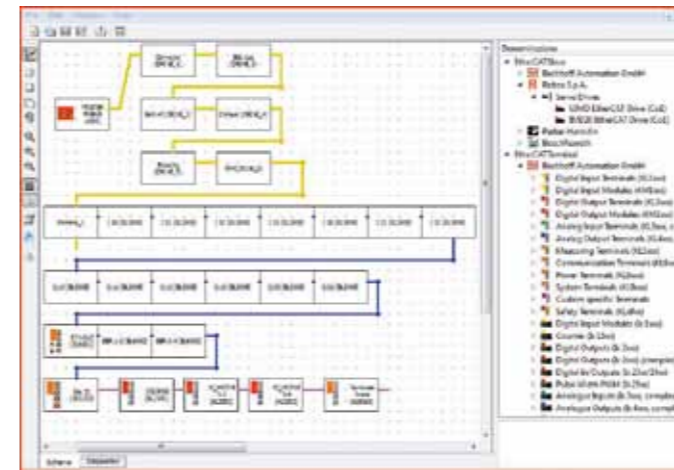
In the menu:
project ⇨ configurator
the user can easily define the predefined OB that he prefers to use, make instances, and configure its parameters.



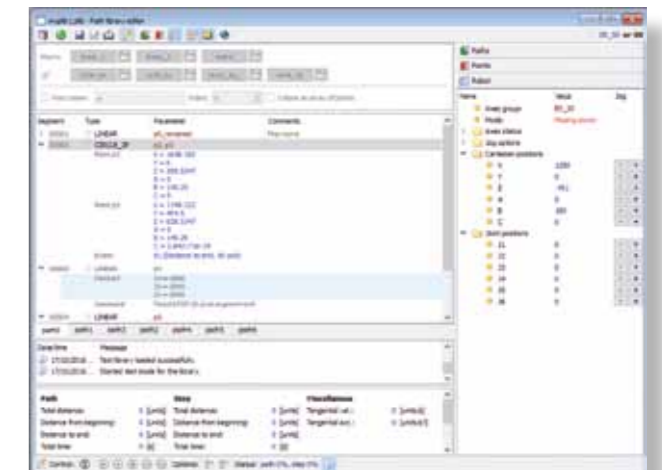
Object Block (extended concept of Function Block) can be developed by the user to build his own classes of libraries
Starting with the definition of the interface (parameter and methods) it is possible to write any kind of software in C++, exploiting the power of the object oriented philosophy (a low level Interface is available with the operative system)

The OB developer can also modify an existing OB to add new features (properties, methods etc..) or use other existing OB's

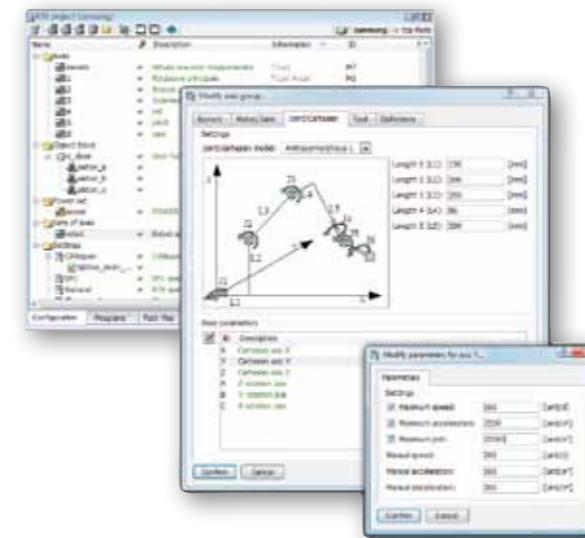
The graphical configurator allows to describe both hardware and software, easily and rapidly.



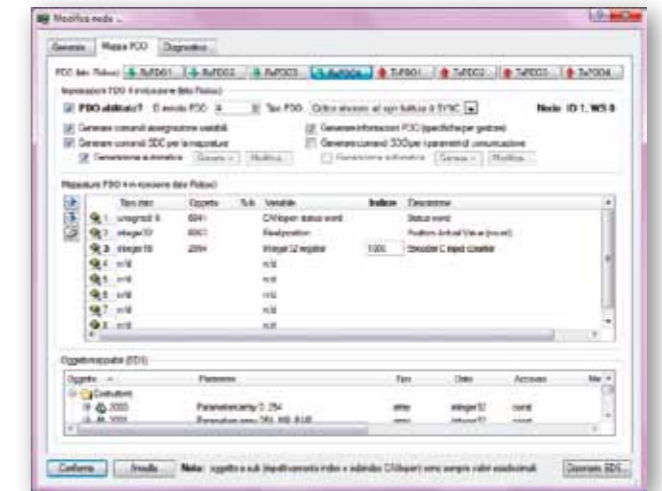
↑ **RFBCED (Robox Fieldbus editor configurator)**
It allows to describe the EtherCAT net (PDO contents etc..)



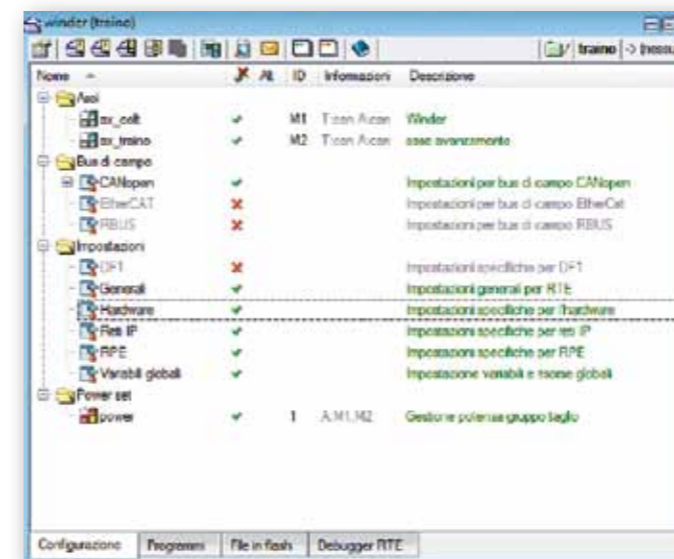
↑ **PLIBED – Path Library Editor**
It allows to edit and test the paths and points libraries



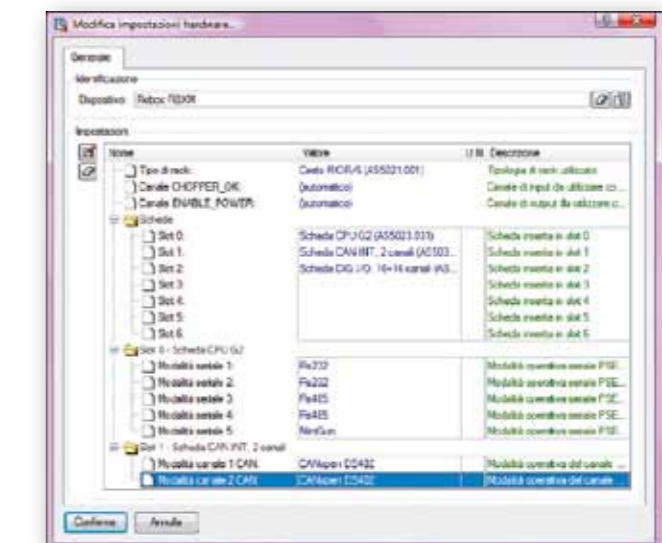
↑ **Axes group configurator**
It allows to group the axes and make a selection from different kinematics etc.



↑ **COC (CANopen configurator)**
It allows to describe the CANopen net (PDO contents etc..)

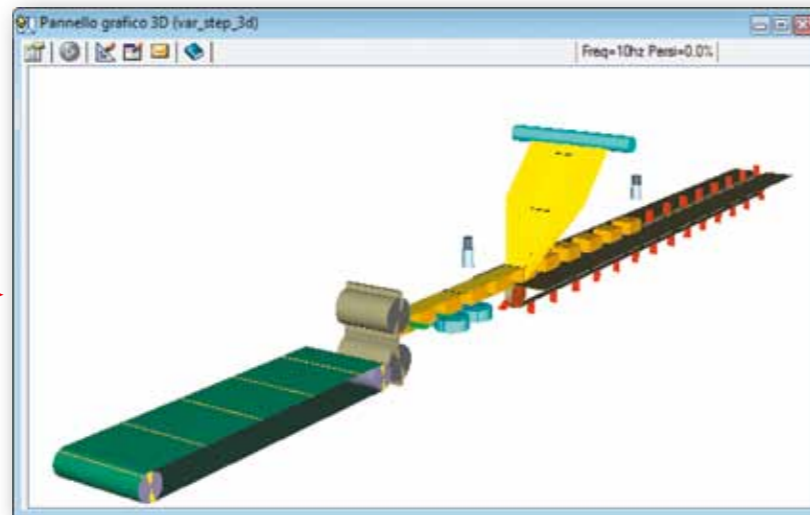


↑ **Machine Configurator**
It allows to describe an axis, a group of axes, kinematics, a power set etc.

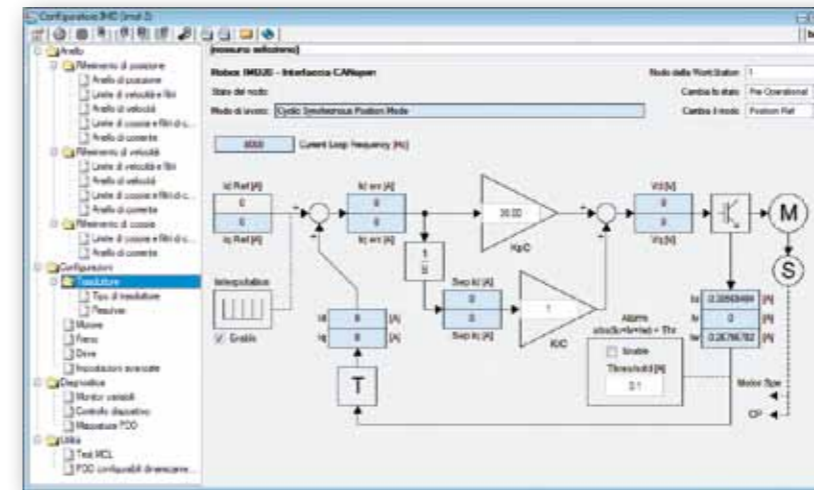


↑ **Hardware configurator**
It allows to select the Robox motion controller where the application will run.

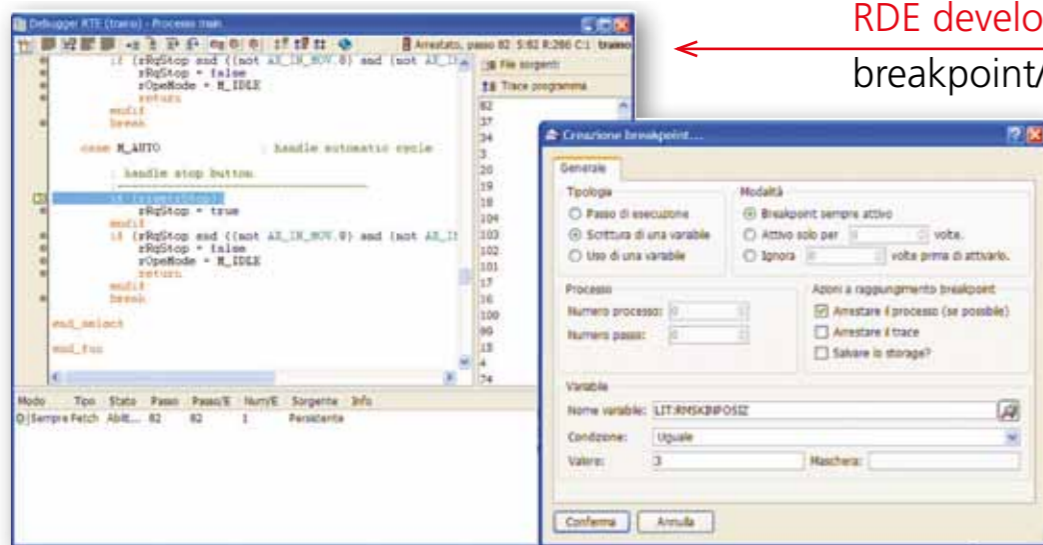
RDE development environment
3D graphic panel



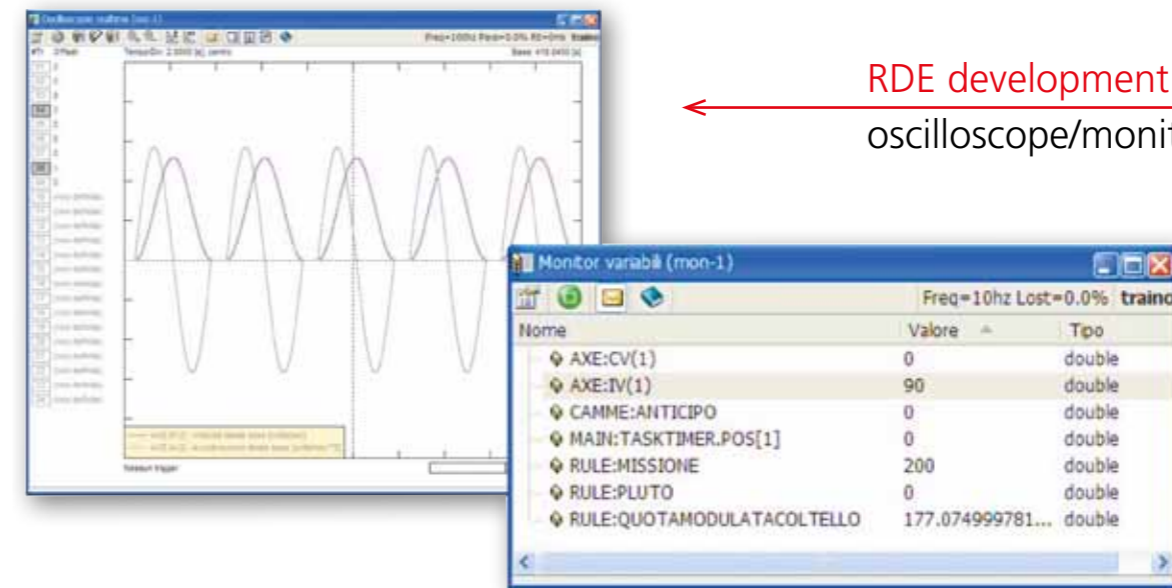
RDE development environment
graphic IMD configurator



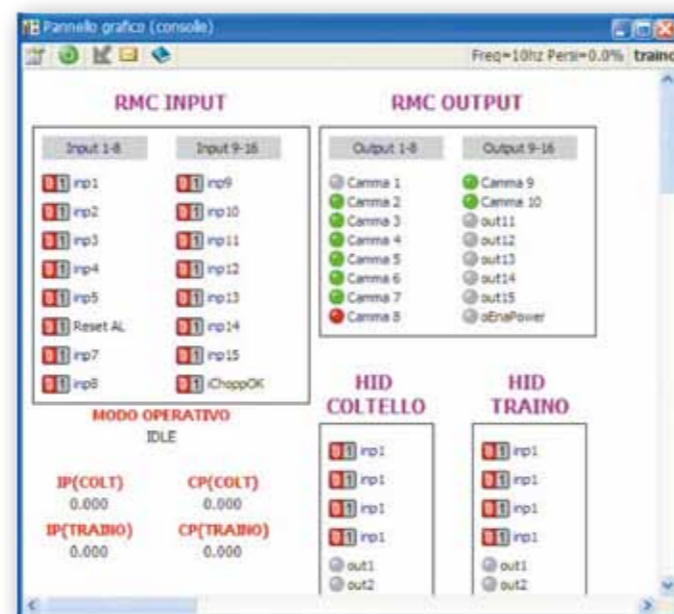
RDE development environment
breakpoint/trace



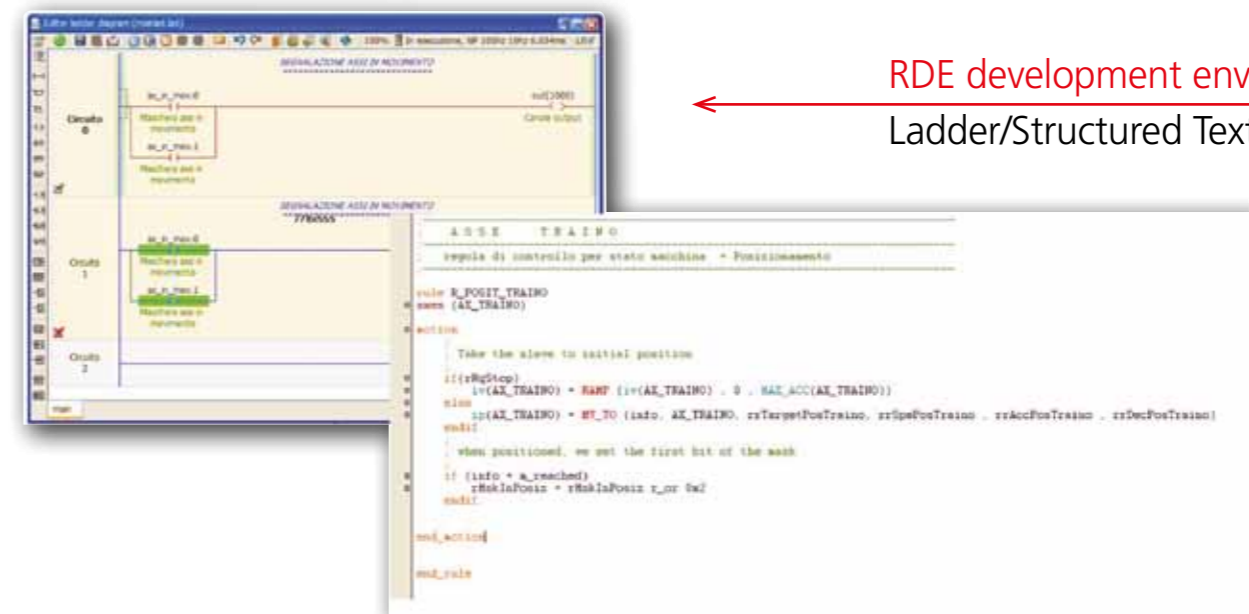
RDE development environment
oscilloscope/monitor



RDE development environment
graphic panel



RDE development environment
Ladder/Structured Text editor







motion control



How to reach us

GPS COORDINATES: LATITUDE 45° 43' 15" North-longitude 8° 37' 6" East

It's very simple both from Milano, Torino and Genova directions. Leave the A8/A26 highway at Castelletto Ticino.



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