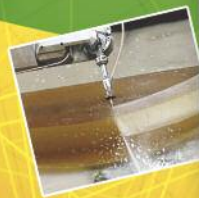




Didactique | Robotique | Fab&Test | Energies

Equipment and solutions for technical education and vocational training



About us

ERM provides technical systems and services in the fields of **education**, **robotics**, **manufacturing laboratories (FabLabs)**, **energy** and **industry**. Founded in 1990 in southern France, ERM first focused on industrial automation. Overtaken by its educational culture, ERM quickly became the precursor of introducing industrial production lines within technical training institutions. Upon request by these educational institutions, ERM then extended its offer to other areas, such as electronics, electrical engineering, power engineering and renewable energy.

Today, ERM has become **a market leader in didactic solutions and systems** for technological and vocational training in France, and is developing its export markets.

More than **1500 academic institutions** are equipped with ERM technical teaching equipment in **France**: Secondary schools for vocational training, Vocational training centers, Universities, Universities of Technology, Major engineering schools, etc.

Abroad, many vocational training institutions are using our systems:

- French overseas territories: Guadeloupe, Guyana, Reunion, Martinique, Mayotte, New Caledonia, French Polynesia, Wallis & Futuna
- Africa : Algeria, Burkina, Cameroun, Gabon, Ivory Coast, Morocco, Mauritania, Senegal, Tunisia, ...
- Asia : Vietnam, Korea...
- America : Mexico, Colombia...
- Europe : Belgium, Luxembourg, Romania, Hungary, Slovakia, Switzerland...



Robotics, Automation & Process Control

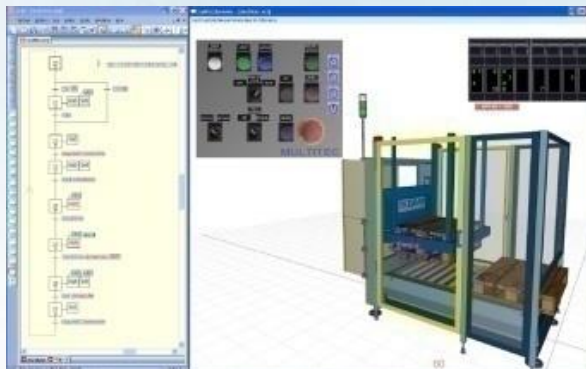


Regulflex – Modular didactic production line of carbonated drinks to study process control and associated instrumentation

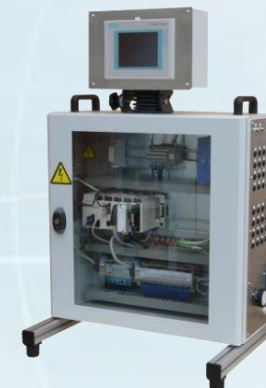


6-axis robotic training and development cell – Robotic cell designed for implementing and programming a KUKA 6-axis industrial robot

Instruments, tools and data acquisition : See pages I1 to I9



Ermaflex programmable 3D simulator - Dynamic 3D simulator for Ermaflex systems



Schneider & Siemens automation platforms

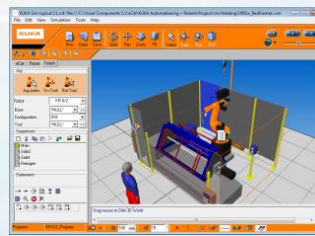
6-axis robotic training and development cell – Robotic cell designed for implementing and programming a KUKA 6-axis industrial robot



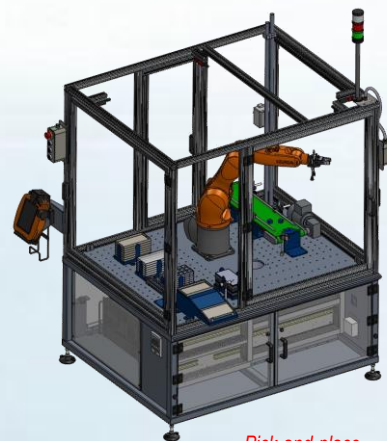
Gluing application



Pick-and-place scenario with on-the-fly pickup from the conveyor



Simulation & Virtual programming



Pick-and-place application



Machine-tool loading application



Pneumatic gripper



Calibration kit



Compact robotic initiation cell (RK10)



Assembly application



Kuka Agilus robot

KUKA

Topic coverage:

- 6-axis industrial robot (Kuka Agilus reaching 700 mm)
- PLC (software core) and HMI (color touchscreen panel)
- Industrial communication (Ethernet) and supervision
- Machine vision (camera, backlight system and associated software)
- Conveying (belt conveyor, robot synchronization encoder)
- Heads for the 6-axis robot (vacuum, gripper, etc.)

Training activities:

- Functional analysis and studying robotics technologies
- Constructive analysis of industrial robot systems
- Pick-and-place application development
- Gluing application development with trajectory tracking
- Assembly-by-clipping application development
- Machine-tool loading application development
- Machine vision integration in advanced scenarios
- Designing a robotic cell on Kuka.Sim 3D simulation software
- Operator interface and supervision programming
- Designing and manufacturing of single-handed heads

Key points:

- Reliable fully secured industrial system, adapted for training, implementing 4 usual robotics scenarios (pick and place, gluing, assembly by clipping, machine-tool loading)
- Students develop and apply increasingly widespread industrial robotics solutions (pick and place, vision, etc.) with a high added value, and acquire sought-after skills
- 6-axis robots are used more and more in industry, due to their precision and high flexibility
- KUKA robots are very popular in industry (Kuka is the European leader in industrial robotics)
- 10 licenses KukaSim (Kuka 3D simulation software) are supplied
- Strong partnership between Kuka and ERM in education: organization of builder trainings (3-week offered), etc.
- 5-year guarantee for the Kuka robot

- References: RK10: 6-axis robotic training and development cell with calibration kit for the axes of the Kuka Agilus robot – RQ05: 6-axis Kuka Agilus KR6 R700 robot and its software suite – RQ00: Materials kit for pick-and-place scenarios (Optional) – RQ01: Materials kit for gluing scenario (Optional) – RQ02: Materials kit for assembly-by-clipping scenario (Optional) – RQ03: Materials kit for machine-tool loading scenario (Optional) – RQ11: Machine vision for advanced scenarios (Optional), e.g. Pickup of bulk products from the conveyor – RQ12: Industrial supervision – RO00: "Industrial robot arm + wrist" mechanical system – RO01: "6-axis robot reduction gear" mechanical system.
- RK10: Compact robotic initiation cell, width 800mm (6-axis robot with Vision Pack, 15 KukaSim licenses and 1 Kuka VisionTech 3.0 license (camera and gripper not included))
- RK11: Compact robotic initiation cell, width 1100mm (6-axis robot with Vision Pack, 15 KukaSim licenses and 1 Kuka VisionTech 3.0 license (camera and gripper not included))

Schneider M340 Automation platform with ASi bus and touch screen operator panel



Features:

- ◆ PLC (Schneider M340)
- ◆ Touch screen operator panel (Siemens KTP400)
- ◆ Communication (**Ethernet**, **Modbus**, **ASi**)
- ◆ Industrial Supervision (WinCC Flexible)

Training activities:

- ◆ PLC and touch screen operator panel programming
- ◆ ASi bus configuration
- ◆ Ethernet and supervision configuration
- ◆ Wiring and **connection to operating parts**

➤ **Key points:** Ideal for fieldbus programming activities

➤ **Reference:** AE10: Schneider M340 Automation platform with ASi bus and touch screen control panel

Siemens S7 Automation platform with weighing gauge, digital weighing module and touch screen operator panel



Features:

- ◆ PLC (Siemens S7)
- ◆ Weighing (Siemens Siwarex **digital weighing module**)
- ◆ Touch screen operator panel (Siemens KTP400)
- ◆ Communication (**Ethernet**)
- ◆ Industrial supervision (WinCC Flexible)

Training activities:

- ◆ PLC and touch screen operator panel programming
- ◆ Digital weighing module configuration
- ◆ Ethernet and supervision configuration
- ◆ Wiring and **connection to operating parts**

➤ **Key points:** Ideal for weighing-based programming activities

➤ **Reference:** AE11: Siemens S7 Automation Platform with weighing gauge, digital weighing module and touch screen operator panel

Schneider M340 Automation platform with incremental encoder, high-speed counter card and touch screen operator panel



Features:

- ◆ PLC (**Schneider M340 with counter card**)
- ◆ Positioning (incremental encoder)
- ◆ Touch screen operator panel (Siemens KTP400)
- ◆ Communication (**Ethernet**)
- ◆ Industrial supervision (WinCC Flexible)

Training activities:

- ◆ PLC and touch screen operator panel programming
- ◆ High-speed counter card configuration
- ◆ Ethernet and supervision configuration
- ◆ Wiring and **connection to operating parts**

➤ **Key points:** Ideal for positioning-based programming activities

➤ **Reference:** AE12: Schneider M340 Automation platform with incremental encoder, high-speed counter card and touch screen operator panel

Logicom - Studying an automatic barrier control



Features:

- ◆ PLC and HMI (remote control, coded keyboard)
- ◆ **Motor start** (asynchronous motor with inverter)
- ◆ **Sensors** (photoelectric, limit switch)

Training activities:

- ◆ Functional analysis of the system
- ◆ Studying the Sequential Function Chart
- ◆ Connection of parts and configuration (drive)
- ◆ Programming an operating cycle

Key points:

- ◆ Automation basics (PLC, speed drive, sensors, motors) through a general public application

➤ **Reference:** LM30: Logicom automatic barrier

Automation Fundamentals

Schneider Zelio Automation platform

Studying and programming Schneider Zelio

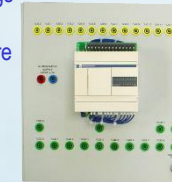
- Schneider Zelio PLC 12I/8O
- Inputs / Outputs on stackable plugs
- Zelio Soft programming software
- 24Vdc power supply
- PC/PLC cable
- Reference: **SC//MD1AE125**



Schneider Twido Automation Platform

Studying and programming Schneider Twido

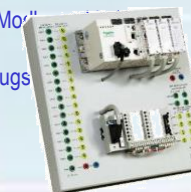
- Schneider Twido PLC, 14I/10O
- Inputs / Outputs on stackable plugs
- Input simulator
- Twido Suite Programming software
- 24Vdc power supply
- PC/PLC cable
- Reference: **SC//MD1AE120**



Schneider M340 Automation platform

Studying and programming Schneider M340

- Schneider M340 PLC Ethernet/Mo...
- ◆ digital, 4I/2O analog
- Inputs / Outputs on stackable plugs
- Input simulator
- 24Vdc power supply
- PC/PLC cable
- Reference: **SC//MD1AE150**



Siemens S7-1200 school package

6x Siemens S7-1200 programming pack

- 6 PLC Siemens S7-1200 with software and cables
- 6 modules I/O (14DI, 10 DO, 2AI, 1AO)
- 6 input simulators
- 6 power supplies
- Reference: **SI//PackS7-1200**



Siemens S7-1500 school package

Siemens S7-1500 programming pack

- 1 PLC Siemens S7-1513 PN
- 1 module 32DI and 1 module 32DO
- 1 power supply AC 120/230V to DC 24V, 8A
- 2 front connectors for 40 points module
- 1 Ethernet cable, 1 support 480mm
- 1 memory card MMC 24MB
- Reference: **SI//PackS7-1500**
- Reference TIA Portal 1 station: **SI//TIAPortal-1P**



Touch-screen KTP400 school package –

Touch-screen display Siemens KTP400

- 6 touch-screen display Siemens KTP400 4" LCD
- 6 Siemens switches 5 ports
- 12 RJ45 cables 6m.
- 6 WinCC Basic programming software
- Reference: **SI//PackKTP400**



Operating part: Traffic management

- Representation of a set of traffic lights at a crossroads
- PLC programming
- Reference: **SC//MD1AMP003**



Operating part: Temperature controller

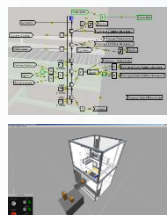
- Simulation of oven control with a PT100 temperature probe, a measurement transmitter and a heating element controlled over a range of 0-10V
- Study and programming of temperature control
- Reference: **SC/MD1AMP006**

Operating part: Automatic barrier

- Simulation of an access-control barrier
- PLC programming taking account of safety features
- Reference: **SC//MD1AMP005**

Virtual Universe Pro - 3D simulation of automated machines

- Creation of **3D models** by using an object library or by importing CAD files (Solidworks, etc.)
- Control of simulated models by a **PLC connected to the PC** or by a **virtual controller**
- Creation of **HMI consoles**
- Creation and **simulation of electrical, pneumatic and hydraulic diagrams** of models
- Reference: **IR/VirtualUniversePro**



Sensor test bench

➤ **Features:**

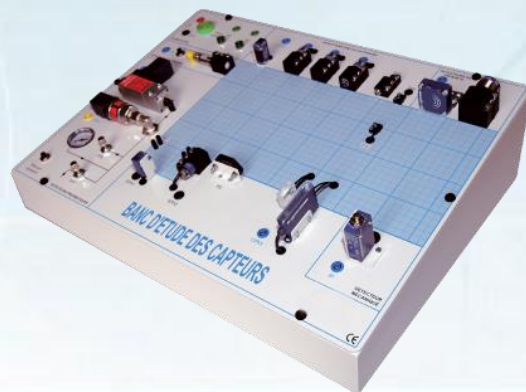
- ◆ **Photoelectric sensor** (thru beam, proximity, polarized reflection, fiber optic, programmable photoelectric)
- ◆ **Capacitive sensor** (cylindrical adjustable capacitive proximity sensor)
- ◆ **Inductive sensor** (rectangular inductive proximity sensor with self-learning feature)
- ◆ **Ultrasonic sensor** (cylindrical programmable on/off ultrasonic sensor)
- ◆ **Mechanical sensor** (by contact, with the possibility to change the head: pusher, lever or feeler)
- ◆ **Pressure sensor** (on/off pressure detection, with adjustable point, analog pressure sensor 4 - 20 mA)
- ◆ 24V power supply and air compressor included
- ◆ Retro reflector and parts of different materials for sensor characterization
- ◆ Millimeter graph on the top surface

➤ *Training activities:*

- ◆ Introduction to proximity sensors
- ◆ Studying the main principles of detection
- ◆ **Sensor performance monitoring**
- ◆ PLC power supply and connection techniques
- ◆ Justification of the choice of a sensor technology
- ◆ **Selection of a sensor** according to requirements

➤ **Key points:** 11 different sensors

➤ **Reference:** SE//CAP11N Sensor test bench



AutomationXpert – Theoretical and practical knowledge base

➤ **Contents:**

- ◆ Theoretical and practical courses extensively covering topics in automation

Human/Machine interface	Pneumatic actuation chain
Air conditioning	Electrical actuation chain
Acquisition chain	Command part
Link Operation-Command	Hydraulics

- ◆ Speed drive simulator
- ◆ Circuits simulator in electrotechnics, pneumatics and Grafcet

➤ **Key points:**

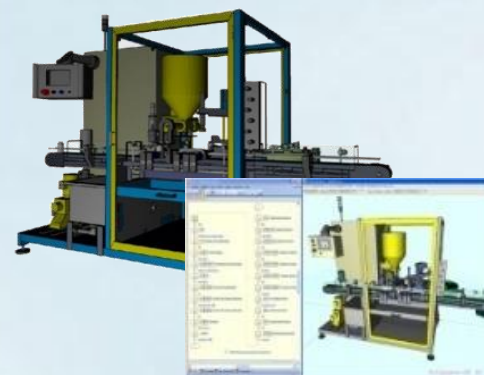
- ◆ 785 pages, 1080 pictures and images, 419 animations
- ◆ Guide meets the requirements of levels: technical and vocational training
- ◆ Site license (unlimited number of stations)
- ◆ e-learning sessions configurator and multiple choice quiz maker

➤ **References:** PO//GdST: AutomationXpert



Programmable 3D Simulators

Ermaflex programmable 3D simulator - Dynamic 3D simulator for Ermaflex systems



➤ *Training activities:*

- ◆ Designing **Grafset** (sequential function chart) and **GEMMA** with the integrated editor
- ◆ PLC programming (virtual or real)
- ◆ PLC program test, system control via the operator panel

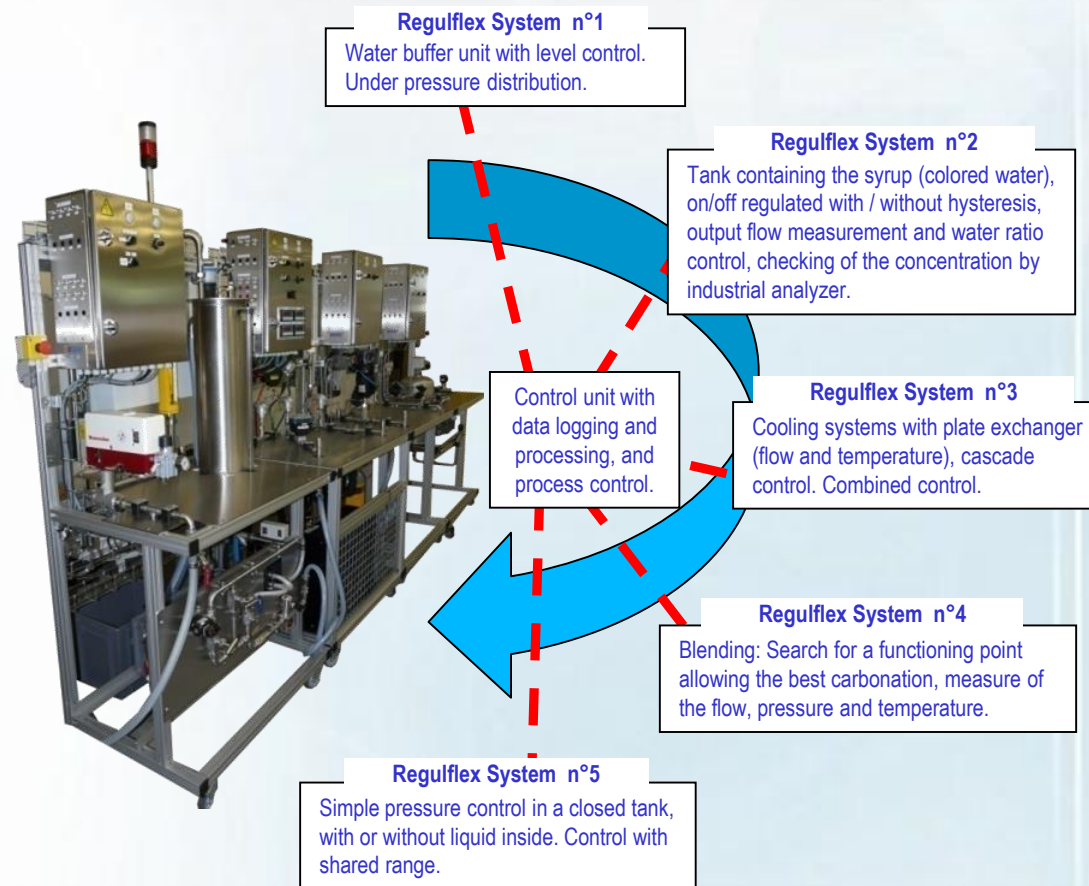
➤ **Key points:**

- ◆ Designed for learning PLC programming
- ◆ **Multiple workstations without damaging the equipment**
- ◆ Training resources manager, making the real system discovery easier
- ◆ **Programming with a virtual or real PLC, and simulation on a 3D operating part**

➤ References: **MN10:** Multitec programmable 3D simulator (Pallet stacking / unstacking) – **MN11:** Polyprod programmable 3D simulator (Dosing and capping) – **MN12:** Weight Control programmable 3D simulator – **MN13:** Collating and Case Packing programmable 3D simulator– **MN14:** Palletizer programmable 3D simulator - **MN15:** Process programmable 3D simulator

See Details on page C10

Regulflex – Modular didactic production line of carbonated drinks to study process control and associated instrumentation



> Key points:

- ♦ Modularity of the stations (operating parts): only one system is enough to start studying, several systems can be interconnected for different studies (production of cold water, dosing, carbonation and pressurized storage).
- ♦ **Modularity of the controllers** (3 different types of controllers: industrial process controller, PLC and Digital Control System DCS)
- ♦ The manufacturing process provides several benefits:
 - Edutainment approach (manufacturing your own soft drink)
 - Use of the main physical parameters (flow, temperature, level, pressure)
 - **Easy setting-up and configuration** (water, colored water, syrup, air, CO₂)
 - Use of simple (on/off, P, PI, PID...) and complex controls (cascade, ratio, split range...)
- ♦ **Reliable operating stations with industrial components** (stainless steel piping and tanks...)
- ♦ Possibility to be used simultaneously by 12 students.

> The Regulflex Process Control Line:

- ♦ **Regulflex1 Level & Flow:** Training system (Buffer tank) for level and flow control, and instrumentation
- ♦ **Regulflex2 Flow & Ratio:** Training system (Proportioning process) for flow & ratio control and instrumentation
- ♦ **Regulflex3 Flow & Temperature:** Training system (Food refrigeration) for temperature & flow control, and instrumentation
- ♦ **Regulflex4 Flow & Pressure:** Training system (Carbonation) for flow & pressure control and instrumentation
- ♦ **Regulflex5 Pressure & Level:** Training system (Keeping pressurized) for pressure & level control and instrumentation
- ♦ **Industrial process controllers:** Trainer for studying PID industrial process controllers
- ♦ **PLC:** Trainer for PID control with PLC
- ♦ **DCS:** Trainer for Distributed Control System
- ♦ **Supervision software for PLC and DCS** (with Regulflex application)

> Features:

- ♦ **Level** measurements (ultrasonic, capacitive, hydrostatic)
- ♦ **Flow** measurements (vortex, finned, flowmeter, electromagnetic, thermal mass)
- ♦ **Pressure** measurements (differential, relative)
- ♦ **Temperature** measurements (PT100, PT1000, Thermocouple J, Thermocouple K, displays/transmitters)
- ♦ Other measurements (Brix degree, density, dissolved CO₂)
- ♦ **Valves** (with analog positioner, solenoid valve, thermal mass flow controller for Air/CO₂)
- ♦ **Pumps** (volumetric dosing, volumetric rotary vane pump)
- ♦ **Converters** (frequency inverters, current-to-current, current-to-voltage)
- ♦ **Storage** (atmospheric and pressurized stainless steel tanks)
- ♦ **Processing components** (plate exchanger, static mixer)
- ♦ **Industrial refrigeration** (condensing unit, pressure reducer, filter-drier, control valve, thermostats)
- ♦ **Communication & Fieldbus** (Ethernet, Profibus, Hart)
- ♦ **Process Control** (controller, PLC, DCS)
- ♦ **Calibration tools** (power generator, mV generator, decade counter, manometer with pump)

> Training Activities:

Many training activities have been developed around 4 main activities:

- 1 **Analysis** (measuring the controlled parameter, signal conditioning, transmitting information, identifying the process order)
- 2 **Design** (piping & instrumentation diagram, electrical diagram, control loops, programming)
- 3 **Control** (production, process control, monitoring, alarm management, supervision on the Ethernet network)
- 4 **Maintenance** (calibration control and tests, actuator control, diagnosis, prevention, improvement...)

Buffer tank (level & flow control) - Training system (buffer tank) for level & flow control and instrumentation

Regulflex 1



Features:

- ◆ **Level** measurements (capacitive, hydrostatic)
- ◆ **Flow** measurements (rotary vanes, ultrasound)
- ◆ **Valves** (control valve with integrated electro-pneumatic positioner, position feedback, time delay solenoid valve)
- ◆ **Pumps** (volumetric with rotary vanes, controlled by a speed drive with analog control and feedback)
- ◆ **Converter** (speed drive, current-to-voltage)
- ◆ **Storage** (atmospheric stainless-steel tank)
- ◆ **Communication & Fieldbus** (Ethernet, Profibus, Hart)
- ◆ **Process control** (industrial controller, PLC, DCS)

Training activities:

- ◆ Analysis of different principles of measurement (physical laws, sensors, transmitters..)
- ◆ Calibrating sensors (level, flow)
- ◆ Study of the control valve (valve action, flow coefficient Cv, characteristics)
- ◆ Identification of an Open-Loop and Closed-Loop system
- ◆ Analysis of a naturally unstable OL and CL system
- ◆ **Simple level control with/without delay, feed-forward, cascade...**
- ◆ **Simple flow control, split range**
- ◆ Programming of different process controllers (process controller, PLC, DCS)

Key points

- ◆ **3 different controllers may be used**
- ◆ Ideal for the study of industrial instrumentation and level / flow controls
- ◆ Training system based on a real application (**buffer tank** in a soft drinks production line)

➤ **References:** **RL10:** Power supply & security cabinet (for one or several Regulflex sub-systems) - **RN10:** Buffer tank (level & flow control) - **RN11:** (Optional) Process circulator pump -- **RN12:** (Optional) Capacitive level transmitter -- **RM10:** (Optional) Flow restrictor (diaphragm) -- **RM11:** (Optional) Differential pressure sensor (4-20mA / Hart) -- **RM12:** (Optional) Profibus PA for differential pressure sensor

Variant

Drinking water control and distribution – Test bench for level, flow and pressure control in drinking water systems and tanks

- **Level / flow / pressure controls, simple and complex controls**
- System based on a real application, ideal for practice activities
- Control on a PC with **Labview interface**, with an Industrial Process Controller or a PLC with PID
- References: See page H11



Page H10

Dosing unit (flow & ratio control) - Training system for flow and ratio control with a dosing pump

Regulflex 2



Features:

- ◆ **Level** detection (ultrasound)
- ◆ **Flow** measurements (rotameter, electromagnetic)
- ◆ Other measurements (degree Brix, density)
- ◆ **Valves** (**by-pass valve** with digital positioner, solenoid valve)
- ◆ **Pumps** (volumetric metering pump)
- ◆ **Storage** (atmospheric stainless-steel tank)
- ◆ Communication & Fieldbus (Ethernet, Profibus, Hart)
- ◆ Process control (industrial controller, PLC, DCS)

Training activities:

- ◆ Analysis of principles of measurement (physical laws, sensors, transmitters..)
- ◆ Sensor calibration (level, flow, degree Brix)
- ◆ **Flow control** (analysis of PID actions)
- ◆ **Ratio Control** (water/syrup)
- ◆ OL and CL system identification
- ◆ Analysis of the control valve (direction, flow coefficient Cv, characteristics)
- ◆ Programming different process controllers (controller, PLC, DCS)

Key points

- ◆ **3 different controllers may be used**
- ◆ Ideal for studying industrial instrumentation and flow / ratio controls
- ◆ Training system based on a real application (**syrup dosing** in a soft drinks production line)

➤ **References:** **RL10:** Power supply & security cabinet (for one or several Regulflex sub-systems) – **RD10:** Dosing unit (flow & ratio control) – **RD11:** (Optional) Control valve (for complex controls) – **RD12:** (Optional) Density (degree Brix measurement) and temperature indicator-transmitter – **RM10:** (Optional) Flow restrictor (diaphragm) – **RM11:** (Optional) Differential pressure sensor (4-20mA / Hart) – **RM12:** (Optional) Profibus PA for differential pressure sensor

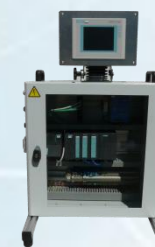
Available controllers

Industrial Process Controller (RC10)



Page D8

PLC with PID (RC11)



Page D8

DCS (RC12)



Page D8

Refrigerating unit (flow & temperature control) - Training system (food refrigeration) for temperature & flow control and instrumentation

Regulflex 3



Features:

- ♦ Flow measurements (vortex, thermal mass)
- ♦ Temperature measurements (PT100, PT1000, Thermocouple J, Thermocouple K, displays/transmitters)
- ♦ Valves (control valve with electro-pneumatic positioner and back to position)
- ♦ Pumps (volumetric with rotary vanes controlled by a speed drive, analog control and information feedback)
- ♦ Converter (voltage-to-current, current-to-current)
- ♦ Process components (plate exchanger, automatic air valve)
- ♦ Industrial refrigeration (condensing unit, pressure reducer, filter-drier, HP/LP pressure switch...)
- ♦ Communication & Fieldbus (Ethernet, Profibus, Hart)
- ♦ Process control (controller, PLC, DCS)

Training activities:

- ♦ Studying the main principles of measurement (physical laws, sensors, transmitters...)
- ♦ Calibrating sensors (flow, temperature)
- ♦ Open-Loop and Closed-Loop systems identification
- ♦ Analysis of the control valve (direction, flow coefficient C_v , characteristics)
- ♦ Analysis of a naturally unstable OL and CL system
- ♦ Flow and/or temperature control in closed-loop (study of PID actions)
- ♦ Combined / trend control, cascade, self-selective,...
- ♦ Thermal balance, exchanger power
- ♦ Study of the refrigeration cycle
- ♦ Programming different process controllers (controller, PLC, DCS)

Key points:

- ♦ 3 different controllers may be used
- ♦ Ideal for studying industrial instrumentation and temperature / flow
- ♦ Studying a refrigeration cycle system for chilled water production
- ♦ Training system based on a real application (chilled water production in a soft drinks production line)

References: RL10: Power supply & security cabinet (for one or several Regulflex sub-systems) – RT10: Refrigerating unit (flow & temperature control) – RT11: (Optional) Temperature measurements (PT1000, TC J, TC K) – RT12: (Optional) Flow sensor predictive control – RM10: (Optional) Flow restrictor (diaphragm) – RM11: (Optional) Differential pressure sensor (4-20mA / Hart) – RM12: (Optional) Profibus PA for differential pressure sensor

Carbonation unit (flow & pressure control) - Training system (carbonation) for flow & pressure control and instrumentation

Regulflex 4



Features:

- ♦ Gas measurement and control (thermal mass flow controller/transmitter, relative pressure controller/transmitter)
- ♦ Measurement of liquid (temperature with PT100, electro-magnetic flowmeter, relative pressure transmitter, rotameter)
- ♦ Other measurements (dissolved CO2)
- ♦ Valves (control with electro-magnetic positioner and back to position, thermal mass controller of CO2 and relative pressure controller)
- ♦ Process components (static mixer, heater and gas pressure reducer)
- ♦ Communication & fieldbus (Ethernet, Profibus, Hart)
- ♦ Process controls (controller, PLC, DCS)

Training activities:

- ♦ Studying the main principles of measurement (physical laws, sensors, transmitters, controller...)
- ♦ Calibrating sensors (pressure, flow, temperature, CO2)
- ♦ Study of the control valve (valve action, flow coefficient C_v , characteristics)
- ♦ Gas flow and pressure control in closed-loop (study of PID actions)
- ♦ Liquid flow and pressure control in closed-loop (study of PID actions)
- ♦ Ratio control (liquid/gas)
- ♦ Flow and/or pressure (liquid/gas) cascade control
- ♦ Programming different process controllers (Controller, PLC, DCS)

Key points:

- ♦ 3 different controllers may be used
- ♦ Ideal for studying industrial instrumentation and Flow / Pressure controls
- ♦ Training system based on a real application (carbonation of a water+syrup mixture in a soft drinks production line)

References: RL10: Power supply & security cabinet (for one or several Regulflex sub-systems) – RG10: Carbonation unit (flow & pressure control) – RG11: (Optional) Control valve (for complex controls) – RG12: (Optional) Dissolved CO2 transmitter – RM10: (Optional) Flow restrictor (diaphragm) – RM11: (Optional) Differential pressure sensor (4-20mA / Hart) – RM12: (Optional) Profibus PA for differential pressure sensor

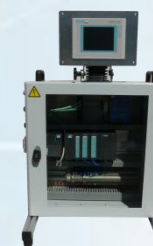
Available controllers

Industrial Process Controller (RC10)



Page D8

PLC with PID (RC11)



Page D8

DCS (RC12)



Page D7

Pressurized storage unit (pressure & level control) - Training system (pressurized tank)

Regulflex 5

for pressure & level control and instrumentation



Features:

- ◆ Level measurements (capacitive)
- ◆ Pressure measurements (relative pressure transmitter)
- ◆ 2 control electro-valves for gas intake / exhaust with electric positioner
- ◆ 3 on/off electro-valves (liquid filling/drainage, leakage)
- ◆ Storage (pressurized stainless-steel tank)
- ◆ Communication & Fieldbus (Ethernet, Profibus, Hart)
- ◆ Process control (controller, PLC, DCS)

Training activities:

- ◆ Study of the main principles of measurement (physical laws, sensors, transmitters..)
- ◆ Calibrating different sensors (pressure, Level)
- ◆ OL and CL system analysis
- ◆ Level control on/off
- ◆ Pressure control in closed-loop (study of PID actions)
- ◆ Split-range control (gas admission/exhaust)
- ◆ Study of a sequential operation (filling, draining)
- ◆ Programming different process controllers (controller, PLC, DCS)

Key points:

- ◆ 3 different controllers may be used
- ◆ Ideal for studying industrial instrumentation and pressure / level controls
- ◆ Training system based on a real application (pressurized tank before bottling in a soft drinks production line)

➤ **References:** RL10: Power supply & security cabinet (for one or several Regulflex sub-systems) – RP10: Pressurized storage unit (pressure / level) – RM10: (Optional) Flow restrictor (diaphragm) – RM11: (Optional) Differential pressure sensor (4-20mA / Hart) – RM12: (Optional) Profibus PA for differential pressure sensor

Available controllers for Regulflex systems

DCS – Trainer for Distributed Control System

Features:

- ◆ Process control and supervision (Digital system DCS)
- ◆ Communication (Ethernet, Modbus, Profibus)

Training activities:

- ◆ Programming and research of control parameters
- ◆ Data display and storage
- ◆ Wiring and connection to process parts
- ◆ Configuration and programming of simple / complex control strategies
- ◆ Communication and Supervision configuration

Key points:

- ◆ Communication (Ethernet)
- ◆ Integrations of several PID loops, motor controls...
- ◆ Graphic function with high sampling for drawing curves and collecting data
- ◆ Auto-adjustment functions to search for P, I, D parameters

➤ **Reference:** RC12: DCS



Industrial process controller – Trainer for PID controllers



Features:

- ◆ Process control (industrial controller)
- ◆ Communication (Ethernet, Modbus) & Supervision

Training activities:

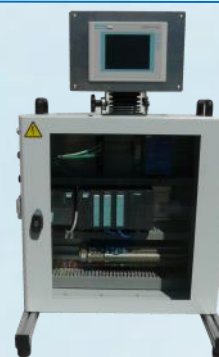
- ◆ Programming and research of control parameters (itools)
- ◆ Data display and storage (itools)
- ◆ Wiring and connection to process parts
- ◆ Communication configuration

Key points:

- ◆ Manual programming of the controller via the front panel or with a PC (itools)

- ◆ Parameter change (P, TI, Td, SP,...) on the front panel, Auto/Manu switch, measurement display and settings.
- ◆ Graphic function to draw curves and data collection
- ◆ Auto-adjustment functions to search for P, I, D parameters

➤ **Reference:** RC10: Industrial Process Controller



PLC – Trainer for PID control with PLC

Features:

- ◆ Process control (PLC with PID)
- ◆ Communication (Ethernet, Hart, Profibus DP/PA, ASi) & Supervision

Training activities:

- ◆ Programming and research of control parameters
- ◆ Wiring and connection to process parts
- ◆ Communication configuration and supervision

Key points:

- ◆ Programmable by PC through Ethernet connection
- ◆ Graphic function to draw curves and collect data

➤ **References:** RC11: PLC (Siemens S7-300) – RC13: Touch screen operator panel & Supervision software for PLC – RC14: (Optional) additional analog 8I/8O – RC15: (Optional) AS-i for RC11 – RC16: (Optional) additional 8I/8O 4-20mA Hart – RC18: PLC (Schneider TSX37) – RC19: Control box with stackable connectors – RC21: PLC (Schneider M340) – RC23: Touch screen operator panel XBT GT for RC21 – RC24: (Optional) additional analog 16I/16O – RC25: (Optional) ASi for RC21



RTD Temperature sensors calibrator (Pt100, Pt1000...)
(RC41)



Thermocouple temperature sensors calibrator (TC)
(RC42)



Pressure calibrator with pneumatic pump
(RC40)



4-way digital paperless recorder (RC17)



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