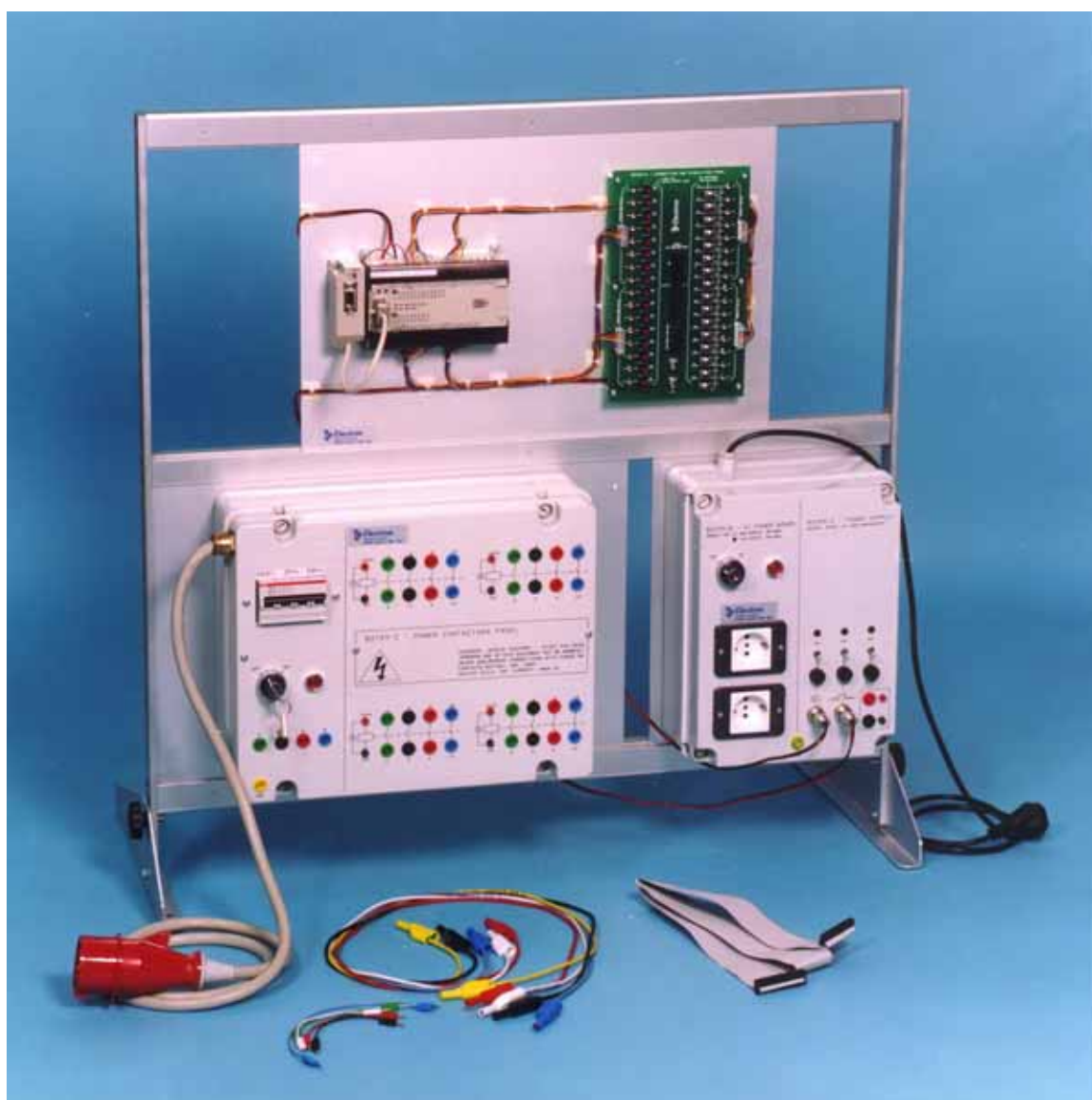


Electron S.R.L.

Design
Production &
Trading of
Educational
Equipment

B37 SERIES – PROGRAMMABLE CONTROLLERS



B3729 – PLC TRAINER SYSTEM

General:

The B3729 trainer consists of a PLC machine, and a complete and comprehensive series of industrial process simulation modules.

This trainer has been conceived to give the student a clear overview of the concepts involved in system automation.

The B3729 trainer includes a PLC machine of renown industrial make. This unit is of the ultimate generation, and allows the investigation of modern programming techniques.

The pre-cabled PLC machine is connected to an interface board, which allows the connection of the simulation modules using a single flat-cable.

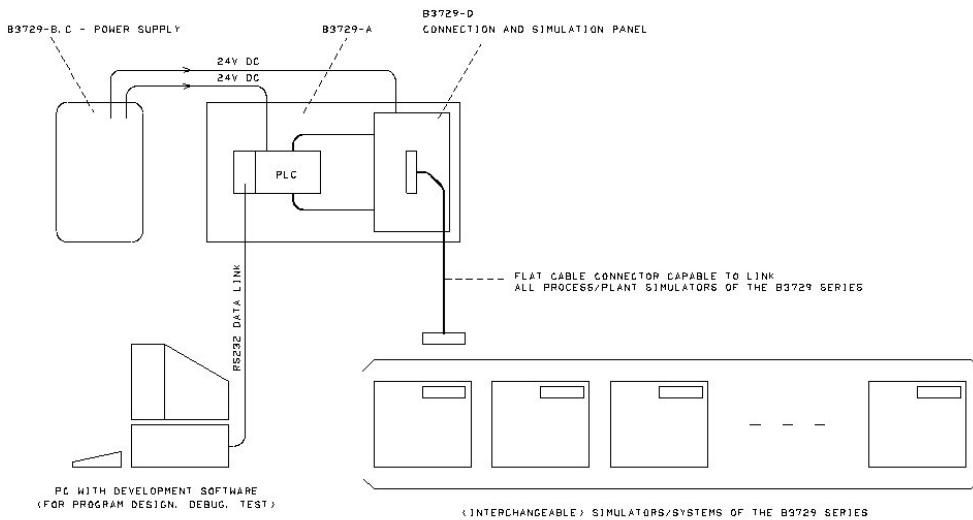
The compact design of the simulation modules, allows the study of a complete industrial process in a confined space, without the need for bulky and complex mechanical scale models.

An extensive instructions manual and a sample application program accompany each simulation module in the B3729 trainer.

All the simulators have a common design philosophy. They have a green fiberglass front face with clear white silk-screen printing indicating component position, and functional blocks.

Each module in the series can be clearly identified by its alphabetic suffix. The table below indicates the contents of the trainer.

The B3729 series simulator modules can also be used with any suitable PLC machine, PC or microcomputer, which may already be possessed by the teaching institute. The B3729-D module should be used as an interface board also with these alternative systems.



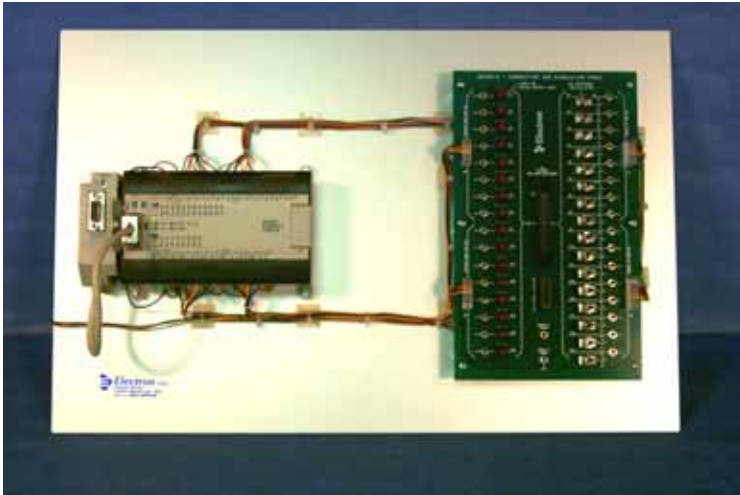
BLOCK REPRESENTATION OF THE ORGANIZATION OF THE B3729-PLC TRAINING SYSTEM

3729SY0R

B3729 – PLC MACHINE TRAINER CONTENTS:

BASIC EQUIPMENT	
B3729-A, AD	PLC MACHINES
B3729-B/C	POWER SUPPLY
B3729-D	CONNECTION AND SIMULATION PANEL
B3729-DX	UNIVERSAL PLC/SIMULATOR CONNECTION BOARD
B3729-DY	PC/MICROCONTROLLER INTERFACE FOR PROCESS SIMULATORS
B3729-E	POWER CONTACTORS PANEL
PROCESS SIMULATORS	
B3729-G1	XY POSITIONING SYSTEM
B3729-H	STAR-DELTA STARTER CIRCUIT
B3729-I	ROTOR RESISTANCE STARTER
B3729-J	SWITCHED POLE MOTOR CONTROL (DAHLANDER CIRCUIT)
B3729-K	TRAFFIC LIGHT SYSTEM
B3729-L	PARKING LOT
B3729-M	SILO SYSTEM
B3729-N	CONVEYER BELT CONTROL
B3729-O	ELEVATOR CONTROL (BASIC, 3-STOREYS)
B3729-P	ELEVATOR CONTROL (ADVANCED, 4-STOREYS)
B3729-Q	TANK LEVEL CONTROL
B3729-R	REACTOR VESSEL CONTROL
B3729-S	MIXER FOR LIQUIDS
B3729-T	RUNNING LIGHT SYSTEM
B3729-W	WASHING MACHINE
B3729-Y	ANTENNA POSITIONING SYSTEM

B3729-A – PLC MACHINE



Picture showing the B3729-A – PLC (left) and the B3729-D – Connection and Simulation panel (right), mounted on the aluminum support plate.

General:

B3729-A PLC machine is of a renowned quality industrial make, and allows the study and development of automated industrial systems. OMRON PLCs are a standard provision. PLCs from other manufacturers can be provided on customer's specifications (ex: Siemens, Hitachi, Télémécanique, Allen Bradley, etc.)

The PLC is supported by a PC-based software package for developing, debugging and testing programs.

Real-time monitoring of the PLC status assists the student in troubleshooting and program debugging.

The PLC is normally supplied mounted on a 340 x 520mm base plate and pre-wired to a B3729-D Connection and Simulation Panel.

The high quality and rugged construction of this trainer, renders the unit particularly suitable for the most demanding of classroom conditions.

Features of the standard equipment version with OMRON PLC:

- 16 logic input lines (expandable).
- 16 logic output lines, NPN-Open Collector type (expandable).

- One RS232 port to link the off-line PC for software development.
- One analog input/output line (optional).
- PLC support software package

The unit comes complete with an extensive instructions manual.

Study subjects:

- Use and function of a PLC
- Process simulation
- System automation
- Software development
- De-bugging

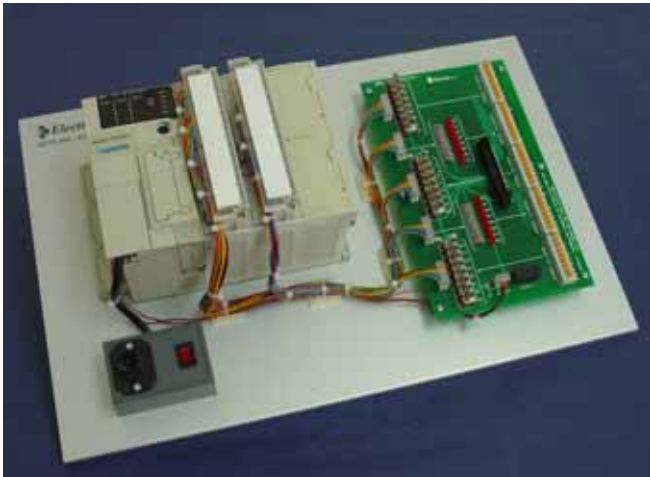
The B3729-A can be power-supplied from AC mains or from a 24V_{DC} source (to be specified)

Optional accessories:

- B3729-B/C – Metal frame and power supply
- B3729-D – Connection and simulation panel

Please note, that in the basic configuration, the B3729-A should be ordered pre-cabled to the B3729-D Connections and Simulation board, which acts as the interface for the process simulators, or the B3729-DX - Universal PLC/Simulator Connection Board. If the B3729-A is ordered alone, the user shall provide on his own the cabling to connect the process simulators.

B3729-AD – PLC WITH CONNECTION AND SIMULATION PANEL



Picture showing the B3729-AD with the Télémécanique PLC machine

General:

The B3729-AD is composed of a PLC (B3729-A) pre-wired to a Connection and Simulation panel (B3729-D); both are installed on a sturdy board for ease of use.

The brand and the type of PLC can be specified by the customer; generally the manufacturer is OMRON, SIEMENS, TELEMECANIQUE etc.

In the Connection and Simulation panel a row of toggle switches simulates the input states to the PLC while a row of LED lamps display the output levels of the PLC

The switches and the LEDs simplify the task of debugging during the program development.

The Connection and Simulation panel allows the connection of the process simulators of the B3729 and B3732 series by means of a connectorized ribbon cable.

Also, simulators designed by the user or real industrial processes can be connected by means of fast spring-type terminal blocks.

Connecting the wires to these terminals is quick and reliable and does not require special tools.

The Connection and Simulation panel is power-supplied by a source of 24V_{DC}, available at an auxiliary output of the PLC or a dedicated power supply, the B3729-B/C.

Ordering Codes:

B3729-AD1 – For Omron PLCs

B3729-AD1-AIO – Analog inputs and outputs option

B3729-AD2 – For Siemens PLCs

B3729-AD2-AIO – Analog inputs and outputs option

B3729-AD3 – Télémécanique PLCs

B3729-AD3-AIO – Analog inputs and outputs option

B3729-AD4 – Crouzet PLC

B3729-B/C – POWER SUPPLY



The picture shows the B3729-B/C power supply installed on the optional metal frame

General:

The power supply has two sections in a single unit. The first is an AC control and protection module (B3729-B), which has two power sockets to supply any auxiliary equipment used. The second section (B3729-C) is a protected 24V DC source. This has three switched outputs, which are suitable for all modules of the B3729 series.

The high quality and rugged construction of this unit, renders the unit particularly suitable for the most demanding of classroom conditions

Features:

- Key operated On-Off switch
- Two AC mains power output sockets (fuse protected)
- Stabilized 24V DC power supply
- Two outputs dedicated to the B3729-A and D panels (fuse protected)

- Auxiliary switched 24V DC, 3A output (fuse protected)

The unit comes complete with an extensive instructions manual.

The B3729-B/C can be supplied for operation at 220V or 120V AC line operation. Please specify when ordering. Other power line voltages are available on request.

Optional:

B4195 – METAL FRAME

The frame is a metallic stand designed to house 6 modules of the basic 340 x 260 mm size or an equivalent mix of single, double and triple-size modules. The frame houses the equipment in an orderly and convenient manner, suitable for both storage and demonstration purposes.

B3729-D – CONNECTION AND SIMULATION PANEL

The B3729-D module is the interface board between the PLC and simulator modules. It is mounted on an aluminum base plate (340 X 520mm), and is pre-cabled for PLC connection.

Please refer to the section B3729-A of this document for the picture of this module.

The unit is sub-divided into two parts, respectively dedicated to the PLC inputs and outputs.

As for the input part, a row of toggle switches is provided, each switch tied to a PLC input. This section may be used to simulate input states to the PLC, if no simulator module is connected. The use of these switches simplifies the task of de-bugging during program development.

The second section is a row of LED lamps, tied to the PLC outputs. These indicate the condition of an output at all times. The use of these simplifies the task of de-bugging during program development.

The B3729-D is provided with a 40pole flat-cable connector, which is used to connect the interface the simulator modules. In addition to that, all PLC inputs and outputs are available on terminal blocks, which may be used to connect external equipment.

The B3729-D requires a 24V stabilized power supply. If the PLC does not provide this voltage as an aux output, use of the **B3729-B/C** power supply is recommended, as for all the B3729 series modules.

B3729-DX – UNIVERSAL PLC/SIMULATOR CONNECTION BOARD

This board, with its accessories, provides an easy means to connect PLC of any make and type to the whole series of simulators (B3729-H to Z).

The board has screw-type of terminal strips on the PLC side, for maximum flexibility, and on the other side a 40-pin flat cable matching the standard connector of the simulators.

Note that any PLC become usable with the aid of this universal adapter providing that its outputs are ACTIVE PULL-DOWN type (NPN) or relay type. At the same type the acceptable inputs must be ACTIVE-LOW type, since the standard signals provided by the B3729 simulators are of this type.

ORDERING CODE

B3729-DX (a 40-pin flat cable and clear PLC connecting instructions are included).

B3729-DY - PC/MICROCONTROLLER INTERFACE FOR PROCESS SIMULATORS

The B3729 and B3732 series of simulators for PLC can also be used under control of a Personal Computer or Microcontroller (e.g. B5140/B5142 and B5110/B5116 or equivalent). To achieve this, the B3729-DY1 board is available, performing as an interface board to translate bidirectionally the 24V level standard signals of the simulators into TTL compatible signals.

The B3729-DY1 includes the power supply.

For use with microcomputer trainers, no other facility is required. For use with a PC, in addition to B3729-DY1, the digital I/O card B3729-DY2 is required, with PCI interface. This card is to be inserted into a PC slot.

The PCI card is supplied with driver software for use under Windows operative system.

ORDERING CODES:

B3729-DY1 – Interface Card

B3729-DY2 – Digital I/O PCI Card

B3729-E – POWER CONTACTORS PANEL



General:

The B3729-E module contains industrial-type power contactors, which are typically used to interface PLC equipment to machinery and plant.

The contactors are suitable for switching 3-phase loads of up to 10A at 415V AC mains voltages.

The construction of this module is made in compliance with the highest standards.

The unit includes a thermo-magnetic circuit breaker on the power line, and a key operated power switch.

The input and output terminals of the contactors are available on the front panel on 4mm safety jacks.

The coil terminals of the power contactors are available on the front panel on 2mm jacks, and have fly-back diode protection. Clear silk-screen printing indicates the functional blocks of the module.

The high quality and rugged construction of this unit, renders it particularly suitable for the most demanding of classroom conditions

Features:

- Thermo-magnetic protection
- Key operated power switch
- Four, 3-phase contactors
- 4mm safety jacks on the high voltage side
- 2mm jacks for contactor coils
- Fly-back diode protection

The unit comes complete with an extensive instructions manual.

Study subjects:

- Use and function of a PLC
- Software development
- Outside plant interfacing

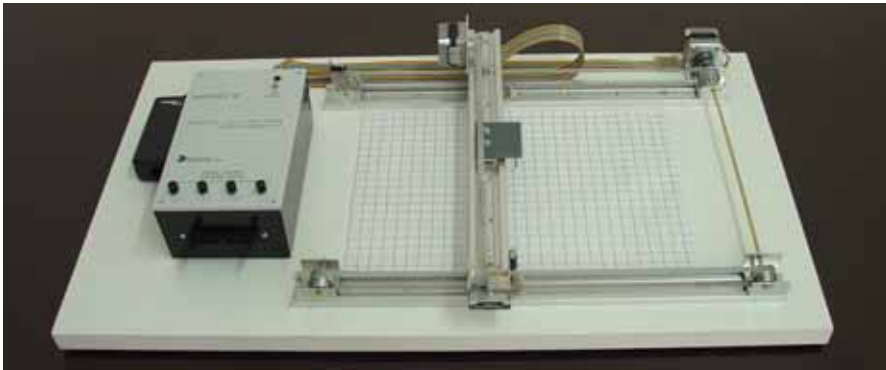
The B3729-E requires a 24V stabilized power supply. The **B3729-B/C** power supply is recommended, as for all the B3729 series modules.

Optional accessories:

- B3729-A – PLC machine
- B3729-B/C – Power supply

The B3729-E can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-G1 - XY POSITIONING SYSTEM



The B3729-G1 is a compact positioning system with two orthogonal axes (X,Y). The system is specially conceived for demonstration and experiments in courses of advanced PLC Programming and Automation.

The system has the following main specifications:

- Simple and rugged mechanical construction, easy to use and to maintain.
- The sliding cart is equipped with a pointer aiming to an indexed plan.
- X axis length: 360mm; Y axis length: 250mm (approx).
- Operation by stepper motors, 1.8°/step, operated in current-control mode by on-board drivers. This allows precise and repeatable positioning.
- End-of-run switches are provided for the two axes

- power supply at 24V_{DC}, from the B3729-BC when the system is used within the B3729 series of trainers, or from a separate power supply (to be ordered)

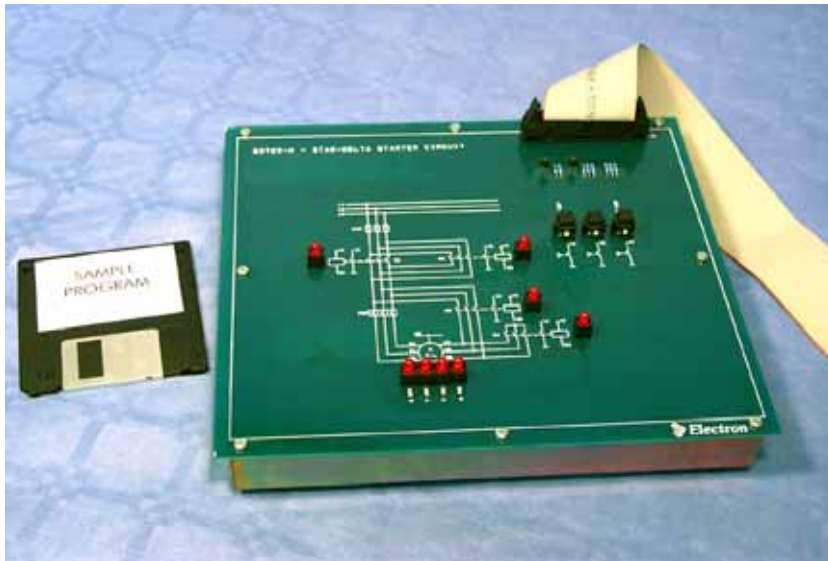
B3729-G1 is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-G1 can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

The unit comes complete with an extensive instructions manual.

B3729-H – STAR/DELTA CIRCUIT



General:

The B3729-H simulator module replicates in a scaled and simplified manner the classic star-delta switching circuit. This system is often used in practice to start large AC electric motors with heavy loads.

The principle is to initially connect the motor 3-phase windings in STAR mode, thus reducing the starting current.

After a few seconds the connection is changed to DELTA and the motor can then accelerate the load to its full speed.

The panel includes three pushbutton switches, which are available as inputs to the PLC.

The simulated switching circuit consists of four power contactors, represented by the lighting of the four LED lamps positioned close to the symbol of the contactor on the front face of the unit.

The LEDs are controlled by four assigned outputs of the PLC.

The condition of the four contactors can be monitored by their respective auxiliary contacts indicated on the synoptic drawing. These contacts are available as inputs to the PLC.

The result of the various operations performed by the PLC is indicated by the

four LEDs situated in the lower part of the board.

B3729-H is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

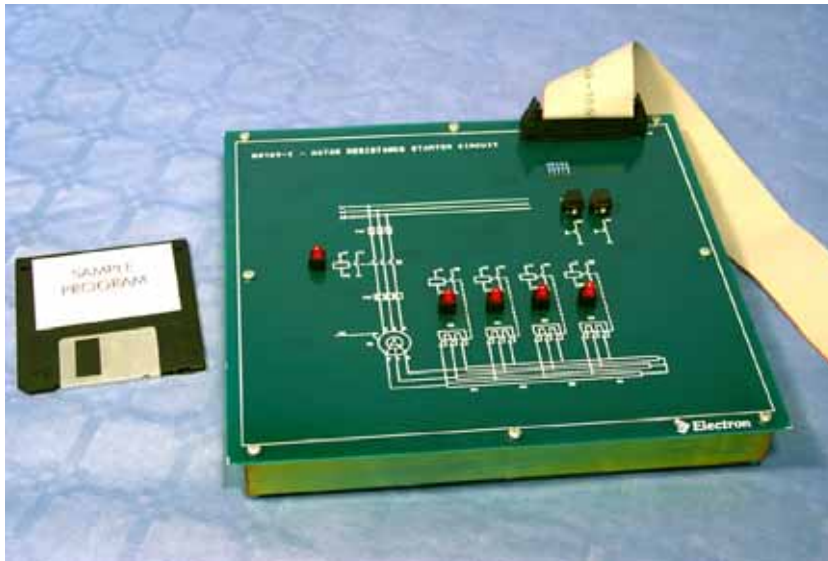
The unit comes complete with an extensive instructions manual.

B3729-H is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-H can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-I – ROTOR RESISTANCE STARTER CIRCUIT



General:

The B3729-I simulator module replicates in a scaled and simplified manner a rotor resistance starter circuit.

This system is often used in practice to reduce the overload while starting and launching large AC asynchronous electric motors.

These motors have the rotor made of a winding, creating a magnetic circuit.

The winding is initially connected to a (relatively) high resistance, which is progressively reduced in steps to a null value (short circuit). Due to the properties of the magnetic interaction between rotor and stator, this reduces the current required for starting.

The panel includes two pushbutton switches, which are available as inputs to the PLC.

The simulated starter circuit consists of five power contactors, represented by the lighting of the five LED lamps positioned close to the symbol of the contactor on the front face.

The LEDs are controlled by five assigned outputs of the PLC.

The condition of the five contactors can be monitored by their respective auxiliary

contacts indicated on the synoptic drawing. These contacts are available as inputs to the PLC.

B3729-I is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

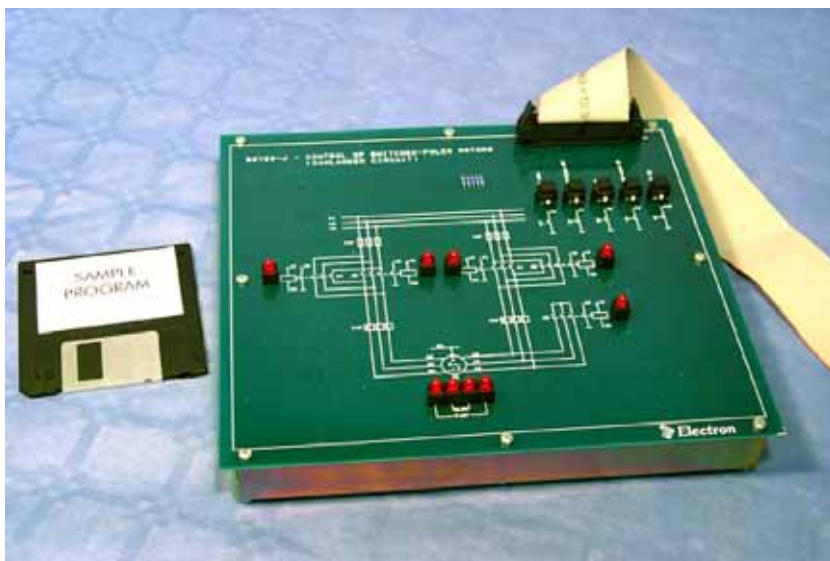
The unit comes complete with an extensive instructions manual.

B3729-I is simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-H can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-J – DAHLANDER CIRCUIT



General:

This simulator module replicates in a scaled and simplified manner the classic Dahlander circuit for the control of switched-poles motors. This arrangement allows to run the simulated motor at selectable speed and direction.

The simulator provides for the possibility to select 2 speeds (pole configurations) for the AC motor on both rotation senses.

The panel includes five pushbutton switches, which are available as inputs to the PLC.

The simulated switching circuit consists of five power contactors, represented by the lighting of the five LED lamps positioned close to the symbol of the contactor indicated on the front face. The LEDs are controlled by assigned outputs of the PLC.

The condition of the contactors can be monitored by their respective auxiliary contacts indicated on the synoptic drawing. These contacts are available as inputs to the PLC.

The results of the various operations performed by the PLC are indicated by the

four LEDs situated in the lower part of the board.

B3729-J is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

The unit comes complete with an extensive instructions manual.

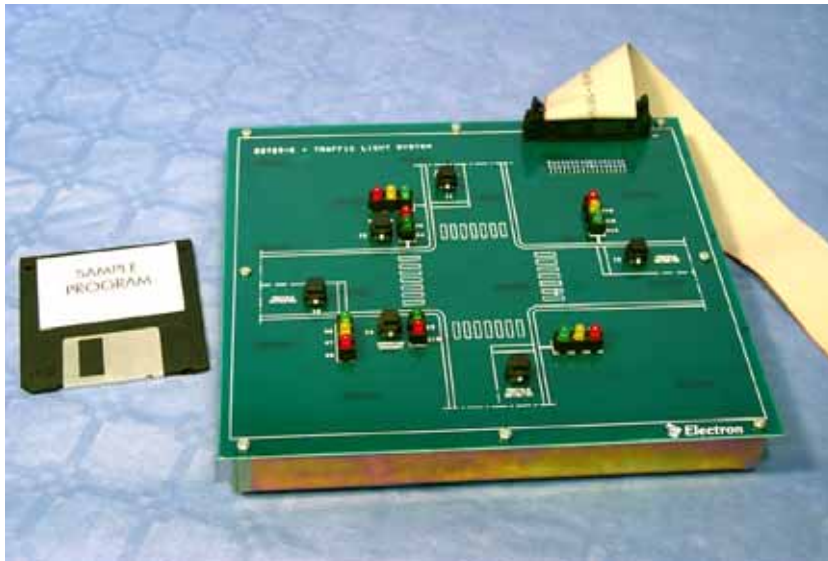
B3729-J is a simulator which forms part of the B3729 PLC system.

It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-J can also be used with, the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-K – TRAFFIC LIGHT



General:

The B3729-K module replicates in a scaled and simplified manner the layout of a complex road junction with traffic lights. The student can develop, implement and test controlling procedures for the crossroad.

The junction consists of four different traffic light positions, each one individually controllable, to permit the maximum flexibility in the possible cycle configurations to be studied.

Each traffic light is simulated by three different colored LED lamps, which are controlled by the associated PLC outputs. One crossing can be used to implement a pedestrian crossing control. The luminous signs are also simulated using LED lamps and are also connected to PLC outputs.

The booking of a request from a pedestrian can be performed by using one of the two pushbuttons supplied. These booking signals are used as inputs to the PLC.

Four vehicle detectors are simulated by pushbuttons, so that priority cycles can be

created. The detector signals are also inputs to the PLC.

B3729-K is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can develop their own programs using the software supplied with the PLC MACHINE.

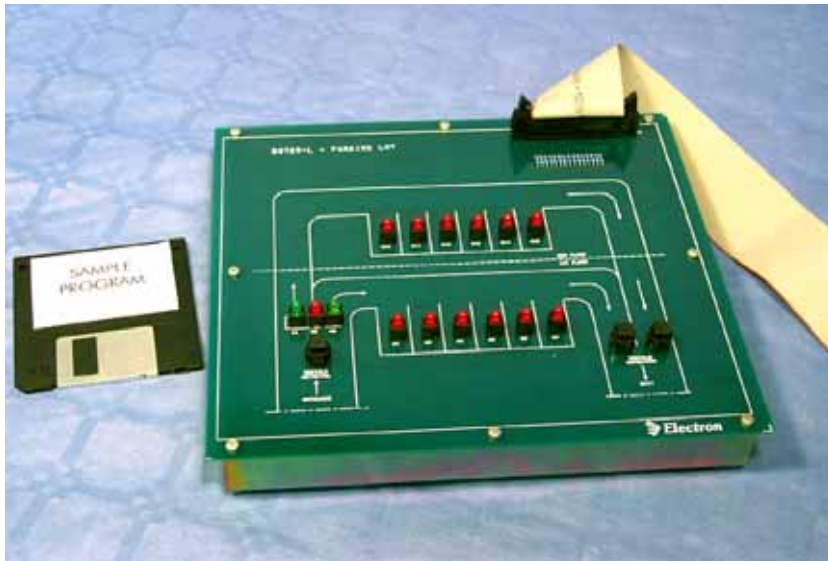
The unit comes complete with an extensive instructions manual.

B3729-K is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-K can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-L – PARKING LOT



General:

The B3729-L simulator module replicates in a scaled and simplified manner a two-floor parking lot, with access controls. Each floor has a maximum of six parking spaces.

The student can develop, implement and test various management strategies for this model.

LED lamps simulate the occupied parking spaces. Each LED which lights up is assumed to be one less space. The LEDs are controlled by outputs of the PLC.

The flow of vehicles to either the first or second floor levels can be controlled by a traffic light placed at the entrance of the lot. The traffic lights are also outputs of the PLC.

Three-vehicle detector simulation push buttons are supplied, one at the entrance and two at the exit points of the floor levels. These can be used to create different fill and empty procedures.

The detector signals are also inputs to the PLC.

B3729-L is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can develop their own programs using the software supplied with the PLC MACHINE.

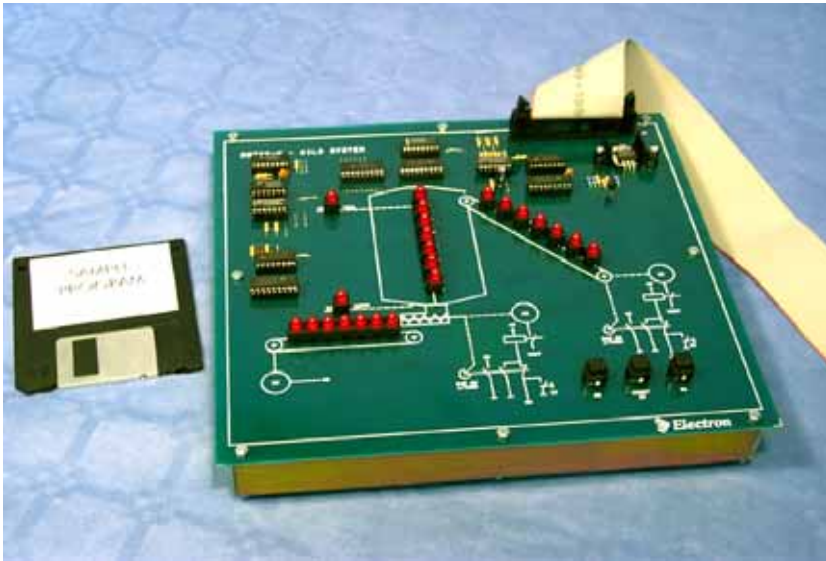
The unit comes complete with an extensive instructions manual.

B3729-L is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-L can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-M – SILO SYSTEM



General:

The B3729-M module replicates in a scaled and simplified manner a system consisting of a tank for incoherent solids and related systems for loading and retrieving the material. The student can develop, implement and test controlling procedures for the system.

The simulator includes a loading conveyer belt, a silo and an unloading conveyer belt. The system can work under manual control as well as under PLC control.

The internal circuits of the board create visual effects of the movement of packs in this simulator.

The tank of the silo system, represented by the box at the center of the synoptic, can receive packs of material delivered by the loading system and relative conveyer belt. The tank can contain up to 7 packs.

LED lights indicate the packs contained in the silo. Two further lights indicate when the silo is empty or full.

The loading system consists of motor, driving a conveyer belt. The motor is started by either a push of button or a command from the PLC.

The unloading system consists of a screw located at the bottom of the tank. The screw is ganged to a motor, which is also

controlled by manual operation of a button or from the PLC.

Another conveyer belt, driven by motor carries away the pack unloaded from the silo.

B3729-M is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

B3729-M is a simulator which forms part of the B3729 PLC system.

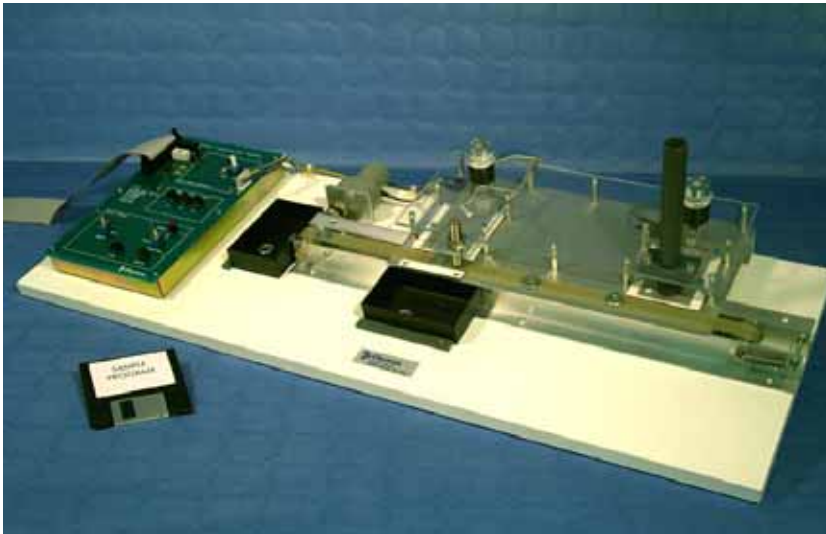
It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with an extensive instructions manual.

The B3729-M can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-N – CONVEYOR BELT



General:

The B3729-N module replicates in a scaled and simplified manner a conveyor belt and relevant loading/ unloading systems. Several operation modes are possible for this system, for which the student can develop, implement and test controlling procedures.

This module includes the mechanics and a control board allowing both control from the PLC or manually.

The loading position is capable of dispensing metal washers onto the belt. An unloading position is provided with a proximity sensor, which is used to identify the presence of the washers in the unloading area. The washers can be unloaded or not as programmed.

Two collecting bins are supplied, one at the output of the unloader and another at the end of the conveyor belt.

The control board provides the following:

- Manual/remote operation selector
Manual operation is provided to test locally the various operation phases. Remote operation is under control from the PLC.
- Pushbutton controls for the loader and unloader

- Programmable function keys, whose signals are inputs to the PLC and can be used to determine various operation modes for the system.
- Belt speed controller.
- Flat cable connector linking the unit to the PLC via the B3729-D Connector and Simulator panel.

B3729-N is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the conveyor belt system using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

B3729-N is a hardware simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with an extensive instructions manual.

The B3729-N can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-O – ELEVATOR (BASIC, 3-STOREYS)



General:

The B3729-O module replicates in a scaled and simplified manner a model of a 3-storey elevator, which includes features such as variable motor speeds, door switches, floor sensors, stop and alarm buttons.

This trainer has a structure similar to the B3729-P, 4-storeys elevator, but has simpler control procedures and is therefore more suitable for basic and medium-level courses

A mobile cart operated by a low voltage DC motor and pulley system simulates the elevator cabin.

All floor levels have control panels, which consist of programmable call to floor booking push buttons. LED lamps are provided to indicate that the elevator is present or occupied.

Toggle switches simulate open or closed-door conditions; LED lamps indicate that the door is unlocked.

The 1st floor control panel has an elevator position indicator and a LED lamp showing that the alarm button of the cabin has been pressed.

The in-cabin control panel has three LED lamps, which indicate the position of the elevator, while five pushbuttons are available for floor bookings, stop, and alarm functions.

Microswitches are used as limit switches, to avoid damage for the trainer if the system is out of control.

Additional microswitches at each floor level are used to command the slowing-down and the stop point of the elevator.

Three relays control the direction and speed of the elevator motor.

B3729-O is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

B3729-O is a hardware simulator which forms part of the B3729 PLC system.

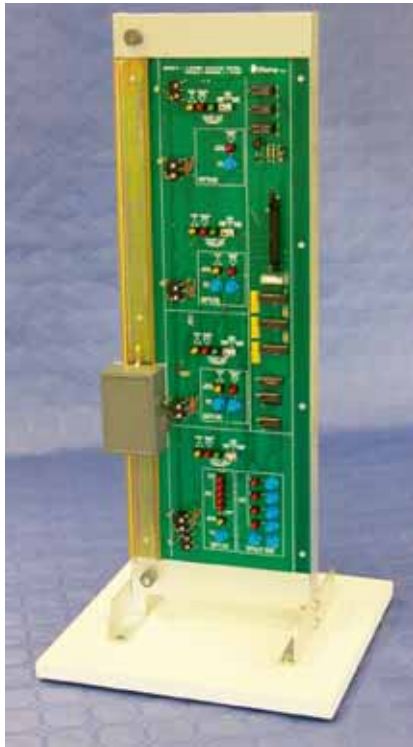
It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with an extensive instructions manual.

The B3729-O can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-P – ELEVATOR (ADVANCED, 4-STOREYS)



General:

The B3729-P module replicates in a scaled and simplified manner a model of a 4-storey elevator, which includes features such as variable motor speeds, door switches, floor sensors, stop and alarm buttons.

This trainer has a structure similar to the B3729-O, 3-storeys elevator, but allows to experiment more complex control procedures, and is therefore more suitable for advanced courses.

A mobile cart operated by a low voltage DC motor and pulley system simulates the elevator cabin.

All floor levels have control panels, which consist of programmable call to floor booking push buttons. LED lamps are provided to indicate that the elevator is present or occupied.

Toggle switches simulate open or closed-door conditions; LED lamps indicate that the door is unlocked.

The 1st floor control panel has an elevator position indicator and a LED lamp showing that the alarm button of the cabin has been pressed.

The in-cabin control panel has LED lamps, which indicate the position of the elevator, while pushbuttons are available for floor bookings, stop, and alarm functions.

Microswitches are used as limit switches, to avoid damage for the trainer if the system is out of control.

Additional microswitches at each floor level are used to command the slowing-down and the stop point of the elevator.

Three relays control the direction and speed of the elevator motor.

B3729-P is supplied with a Sample Program for use with the OMRON PLC machine. The students can investigate the functions of the simulator using this program, and can also develop their own programs using the software supplied with the PLC MACHINE.

B3729-P is a hardware simulator which forms part of the B3729 PLC system.

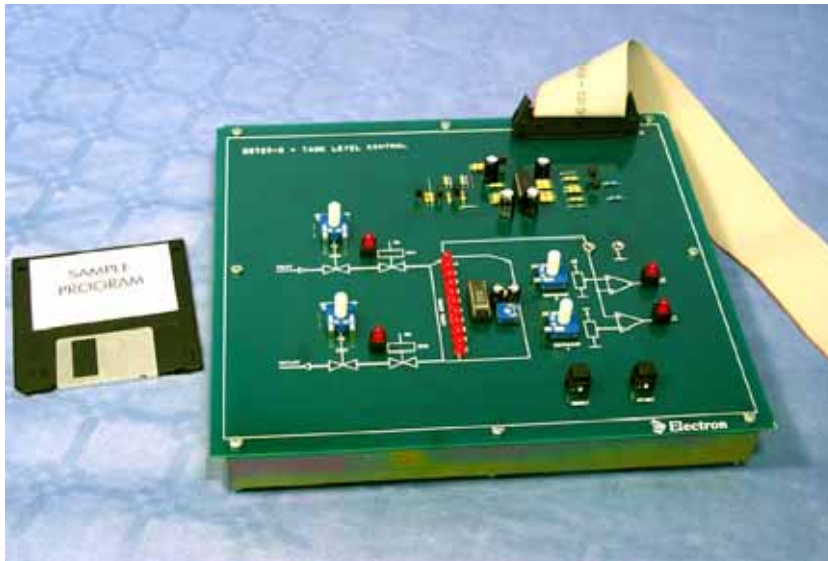
It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with an extensive instructions manual.

The B3729-P can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-Q – TANK LEVEL CONTROL



General:

The B3729-Q module replicates in a scaled and simplified manner a complete tank level control system.

The unit consists of a tank with a LED bar indication of the liquid level. Inlet and outlets ducts with are connected to the tank and have simulated electrovalves, represented by LED lamps.

The flow rate can be manually regulated by means of simulated taps (potentiometer).

An on-board integrator and A/D converter reproduces the resulting tank level.

The level meter of the tank generates an analog signal, which is fed to two comparators. Level set points can be obtained and adjusted by varying the threshold of these circuits. The resulting output signals are available as PLC inputs.

The module includes three programmable function keys whose signals are inputs to the PLC and can be used to determine various operation modes and configurations.

The student can use the system to experiment and develop various control procedures.

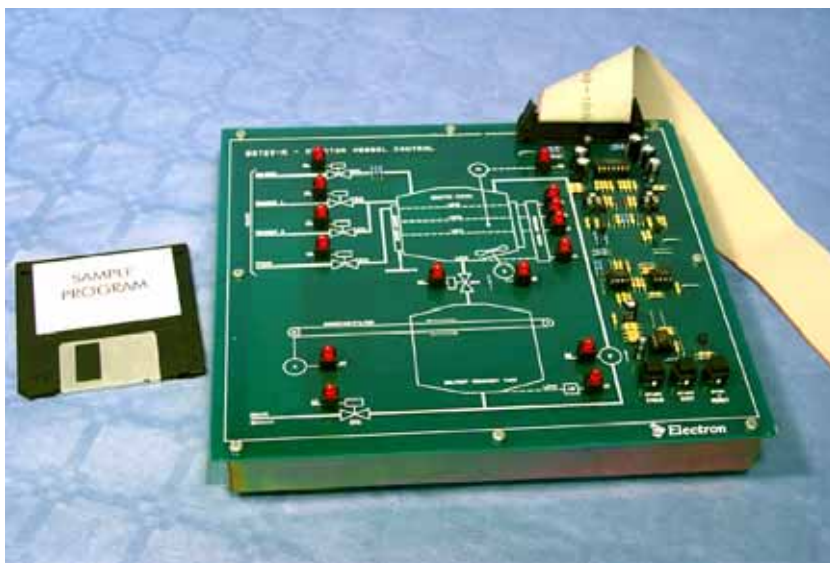
B3729-Q is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with a sample program for use with the OMRON PLC machine and an extensive instructions manual.

The B3729-Q can also be used with, the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-R – REACTOR VESSEL CONTROL



General:

The B3729-R module replicates in a scaled and simplified manner a complete reactor vessel control system.

Several reagents are mixed to a solvent into a vessel where the levels and temperature can be controlled.

Three inlet ducts are used to fill the vessel, they have simulated electrovalves represented by LED lamps, which operate in an ON/OFF manner.

The contents of the vessel can be mixed by means of a stirrer and heated by a water jacket, these items are again represented by LED lamps which are controlled by PLC outputs.

The reactor vessel has a LED bar indication of the liquid level. An on-board integrator and A/D converter reproduces the resulting tank levels, which are fed as logic level inputs to the PLC.

The module includes three programmable function keys whose signals are inputs to the PLC and can be used to determine various operation modes and configurations.

The panel also includes a simulation of a solid/liquid separation conveyer belt system, and the possibility of solvent recycling or drainage.

The student can develop, implement and test controlling procedures for the system.

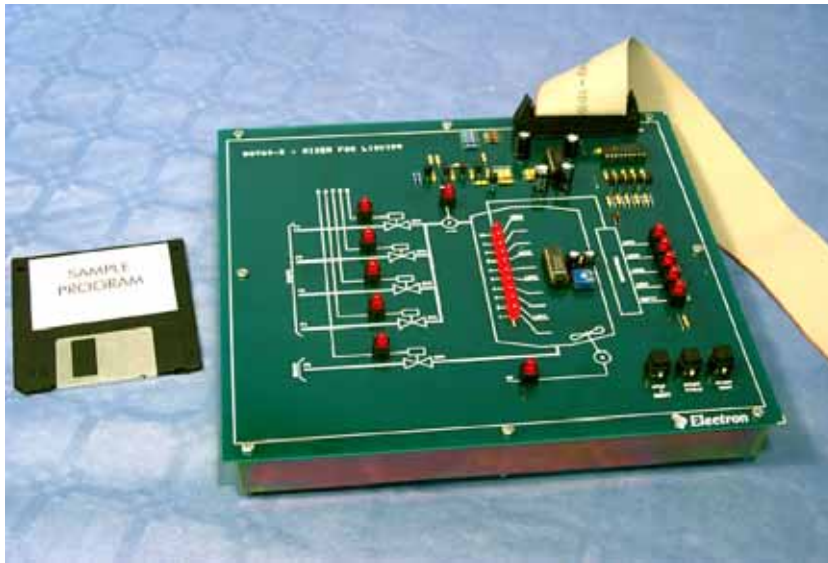
The B3729-R is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with a sample program for use with the OMRON PLC machine and an extensive instructions manual.

The B3729-R can also be used with, the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-S – MIXER FOR LIQUIDS



General:

The B3729-S module replicates in a scaled and simplified manner a complete mixer for liquids with its control system.

Several liquids are mixed in the tank where the levels can be controlled. The contents of the vessel can be mixed by means of a stirrer.

Four inlet ducts are used to fill the mixer tank, each of these has a simulated electro-valve represented by LED lamps, which operate in an ON/OFF manner.

The operation of the mixer motor is also depicted by the illumination a LED lamp.

The tank has a LED bar indication of the liquid level. Integrators and threshold circuits electronically generate the logic level signals which are fed to the PLC as inputs.

The student can develop, implement and test controlling procedures for the system.

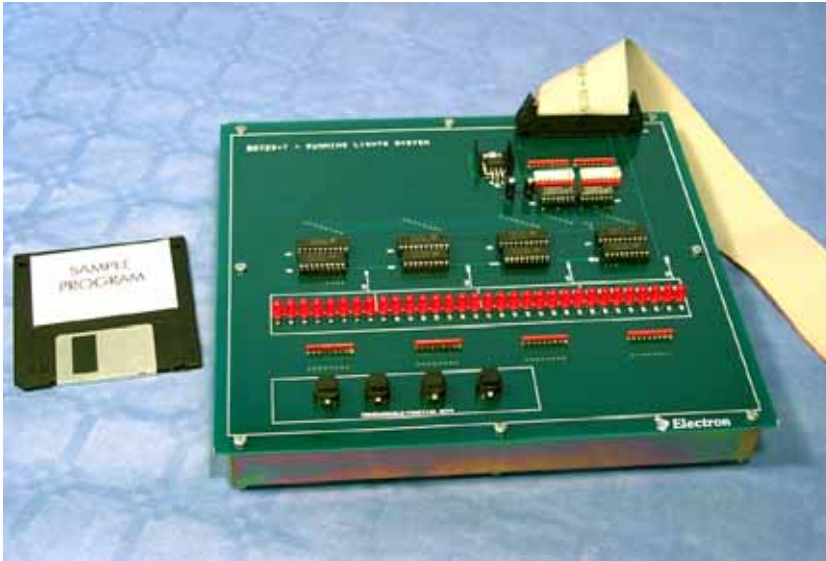
The B3729-S is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with a sample program for use with the OMRON PLC machine and an extensive instructions manual.

The B3729-S can also be used with, the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-T – RUNNING LIGHTS SYSTEM



General:

The B3729-T module replicates in a scaled and simplified manner a complete running lights control system.

The module consists of an array of 32 LED lamps driven by four identical groups of shift registers and associated electronic circuits. Data inputs and latch enable commands are all connected to PLC outputs.

The programming various combinations of these commands allows the creation of an infinite number of visual effects.

Four programmable function keys are also included as inputs to the PLC and can be used to determine various operation modes for the system.

The student can develop, implement and test controlling procedures for the system.

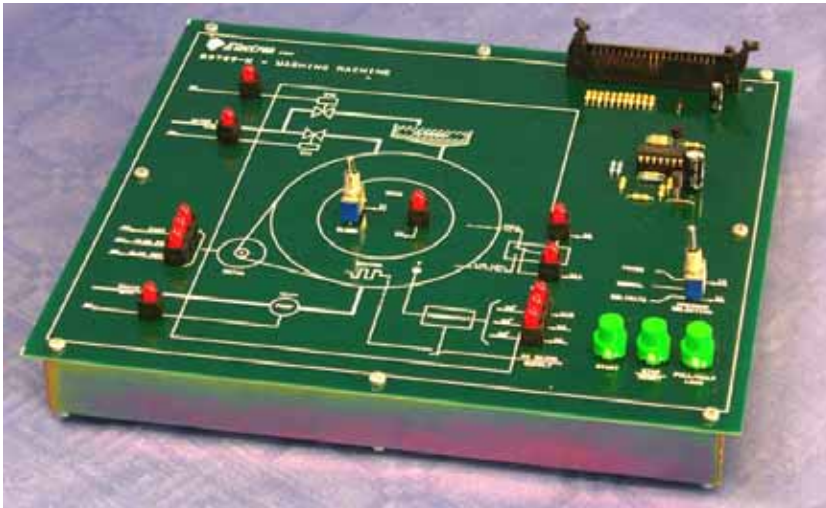
B3729-T is a simulator which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The unit comes complete with a sample program for use with the OMRON PLC machine and an extensive instructions manual.

The B3729-T can also be used with, the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3729-W – WASHING MACHINE SYSTEM



This is a model for the simulation of a washing machine.

The module follows the design philosophy of the other modules, and consists in the simulation of water supply and drainage, temperature control, motor speed control and sequential cycling according to different operation programs.

The unit comes complete with a sample program for use with the OMRON PLC machine and an extensive instructions manual.

B3729-W is a simulator, which forms part of the B3729 PLC system. It is intended to work with the following basic equipment:

- B3729-A PLC MACHINE
- B3729-B/C METAL FRAME WITH POWER SUPPLY
- B3729-D CONNECTION AND SIMULATION PANEL

The B3729-W can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases

B3729-Y – ANTENNA POSITIONING SYSTEM



The B3729-Y simulates in an efficient manner an antenna positioning system for which the student can develop and experiment several control strategies.

The system includes:

- step by step motor with angular position indicator
- motor driver capable to operate the motor in clockwise/counterclockwise sense, Half/full step mode, in step-by-step or continuous mode under control of an on-board clock generator
- zero position microswitch
- on-board relative step counter whose output can be read and reset by the PLC

The B3729-Y is implemented as an open board with components in view and clear silk print indications.

As all the process simulators of the B3729 series the board is provided of a flat cable connector for convenient linking with the B3729-A, B3729-AA, B3729-AD PLC machines

The B3729-Y requires a +24 power supply, provided via the flat cable from the auxiliary output of the PLC or from the B3729-BC if provided

The trainer is supplied complete with accessories and instruction manual.

The B3729-Y can also be used with the PC trainer B5140 and the Microcomputer trainer B5110. It can also be used with any suitable PLC machine, which may already be possessed by the teaching institute. The B3729-D or B3729-DX should be used as an interface in all cases.

B3732 – PID/FUZZY LOGIC PROCESS CONTROL TRAINER



The B3732 is a comprehensive trainer for the experimentation of PID controls techniques with Fuzzy Logic.

The trainer consists in a rugged enclosure suitable for desk use containing the controller and the power supply. A set of experiments boards are provided, to set up experiment control systems:

- B3732 – PID/FUZZY LOGIC CONTROLLER
- B3732-A – FLAME (BRIGHTNESS) CONTROL SYSTEM SIMULATOR
- B3732-B – OVEN (TEMPERATURE) CONTROL SYSTEM SIMULATOR
- B3732-C – PRESSURE CONTROL SYSTEM SIMULATOR
- B3732-IOK – INPUT/OUTPUT KIT

Note that all the experiments boards of the B3732 series are process simulators compatible also with the B3729 series. They can be used with any PLC providing this has analog inputs/outputs.

The outstanding features of the controller are:

- Universal input for thermocouples, RTD's, mA and Volt (pre-wired for Volt)
- 3 logic inputs

- Relay, SSR drive, analog mA or V and valve control main output (pre-wired for Volt)
- PID or PID + Fuzzy (XF) algorithm
- Auto-tune and Expert-tune
- Auto/Man
- auxiliary relay outputs
- 2 memorized setpoints
- Capability of Serial communications with Modbus/Jbus protocol
- Switching power supply 100...240Vac with low voltage (24V) output for simulator boards
- Protected parameter access

The trainer comes complete with all the necessary accessories and extensive instruction manual.

ORDERING CODES:

- B3732 PID/FUZZY LOGIC CONTROLLER
- B3732-A FLAME CONTROL SYSTEM SIMULATOR
- B3732-B OVEN CONTROL SYSTEM SIMULATOR
- B3732-C PRESSURE CONTROL SYSTEM SIMULATOR
- B3732-IOK – INPUT/OUTPUT KIT

B3732-IOK – INPUT/OUTPUT KIT

This is a collection of functional modules with 12 different sensors (luminosity, temperature, position, presence) and relevant signal interface/converters.

The Kit also includes output devices capable to drive loads: contactor and dimmer. The B3732-IOK is to be used to implement process system models designed by the user.