



PLC-HMI Bench Industrial Automation Technical Manual



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PLC-HMI Bench Industrial Automation

Technical Manual

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The equipment should not be operated without the supervision of a qualified trainer, should this not be upheld, SE shall be indemnified from all liability, damages and losses attached to non compliance of these instructions.

Safety Information Important Information

Notice

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

 The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

 This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which/ if not avoided, will result in death or serious injury.
⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE
NOTION is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

Multilingual Safety Labels And Literature

All language translations shall be coordinated through the Technical Publications Translation Coordinators and shall be reviewed in the country of use in accordance with the ProQ_94 "Safety Labels and Safety Messages." Refer to "Multilingual Safety Labels and Literature" on page 7 for details regarding which languages to use and the sequence of the languages.

Additional content is added to the Safety Information page when the manual concerns a Solution. An example of what this additional content may contain is shown in Figure 6. The additional information is used with the standard Safety Information page content (Fig. 5) and is never used alone.

Additional Safety Information Page Content for Solutions

Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

Safety Information

Important Information

⚠️ WARNING

UNGUARDED MACHINERY HAZARD

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only the user can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine; therefore, only the user can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control

equipment and related software for a particular application, the user should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

Safety Information

Important Information

Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

⚠️ CAUTION

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A., for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Perform all start-up tests recommended by the manufacturer.

Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-195 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorised changes in operating characteristics.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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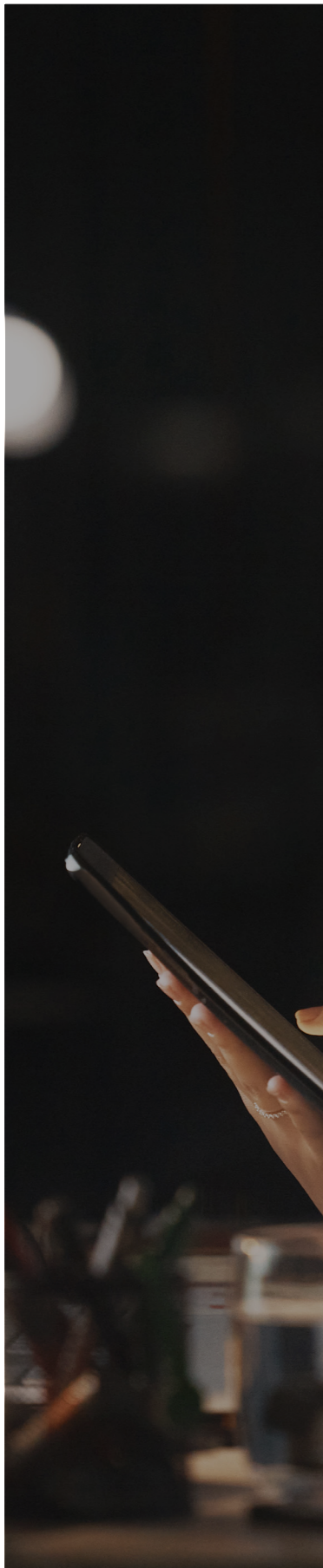
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Electrical Wiring Diagram

Technical characteristics of the constituents

PLC M340
Human Machine Interface
DC Power Supply

Declaration of Conformity





Presentation

A2

Equipment Overview

A3

Presentation of the pedagogy

Presentation

Equipment Overview

The PLC (Programmable Logic Controller) - HMI (Human Machine Interface) bench is designed to be able to help you safely perform the manipulations necessary for the programming and operation of a PLC & HMI.

The equipment is made of a white colored metal enclosure, supporting the following elements:

- An M340 PLC equipped with:
 - - a 16 pin Digital input module
 - - a 16 pin Digital output module
 - - a 4 analog input & 2 analog output module
- An HMI, color touch screen for Graphical user Interface with an Ethernet communication is connected to PLC & the extension brought out on the front panel for external world connections.
- One 24VDC 4.2A power supply on two safety sockets.

This pedagogical bench is designed to work internally with safety sockets provided for inputs and outputs provided on the equipment, which can be wired out to any external devices.



Presentation

Presentation of the pedagogy

Objectives of the pedagogy

- The PLC (Programmable Logic Controller) - HMI (Human Machine Interface) bench is a complete tool for carrying out practical work:
 - Programming M340 PLC using EcoStruxure Control expert software
 - Creation of the graphics for HMI using the Vijeo Designer software
 - Connection of digital and analog inputs & outputs of the PLC are wired out on the front panel using secure sockets

Pedagogical pathways

Level	Civil Engineering Building Equipment and Home Automation	Electrical Engineering Electronics, Electrical Engineering, Networks and Industrial Computing, Telecommunications	Mechanical Engineering Maintenance, Production, Automation and Design	Industrial technology Engineering Sciences and Industrial Techniques
Engineering (BACTEC & BACPRO)		•	•	•
IT/Diploma/Vocational Institutes (BTS & DUT)		•	•	•

Note: This cross-functional product is generally intended for all sectors requiring its audience to learn about PLC-HMI programming.



List of Equipment Items

Equipment provided

The PLC-HMI Bench equipment it includes:

- A PLC-HMI bench
- An USB cable to connect and configure the PLC
- Red and Black banana plugs for connecting sockets points
- Control station with potentiometer to simulate analog Inputs

Hardware not included

- The computer/laptop
- Measuring devices
- Any other item not mentioned in the "materials provided" paragraph

Documentation supplied

- A technical manual
- A USB key/Link containing, in particular, the technical instructions and the practical work manual in ".pdf" format, and any other document or computer file used with this teaching equipment



Condition of Use

C2

Warnings

C3

Symbols Used

C4

Environment

C5

Environment, Power Supply and
Technical Data

Conditions of Use

Warnings

Warnings

Schneider Electric accepts no liability in the event of any hardware or software modification of such equipment without our express consent.

- Review all equipment documentation and keep it carefully.
- Carefully follow the warnings and instructions in the documentation as well as on the equipment itself.
- All handling will be carried out in strict compliance with the safety instructions related to the operation of an electromechanical system.
- This equipment has been checked for conformity and is designed and manufactured in accordance with European directives. However, as it is powered by a single-phase 230V AC network, its handling requires a minimum of precautions to avoid the risk of accidents associated with the use of live equipment.
- The use of this equipment for purposes other than those intended by Schneider Electric is strictly prohibited.
- Practical work and manipulations must be done under the responsibility of a teacher, or any other person authorised and trained in the handling of live equipment.
- This teaching equipment is designed to be used simultaneously by up to two students.

⚠ Connection operations to the network may only be carried out by an authorised person or under the supervision of a teacher, having previously taken all the necessary precautions for the safety of persons. The connection to the electricity grid is only made after all the electrical connections of the various sub-assemblies have been made.

Conditions of Use

Symbols Used

Symbols Used

Symbol	Reference	Description
~		Alternating current
::		Direct current
⌚		Direct Current and Alternating
3~		Current Three-Phase Alternating
⊕		Current
⊕		Protective Ground Terminal
⏏		Chassis Ground Terminal
⚡		Equi-potential
I		On (power) Off
○		(power)
◻		Fully protected device with double insulation and reinforced insulation
⚠	ISO 7000 - 0434B	Warning, risk of electric shock
⚠		Caution, hot surface
⚠	ISO 7000 - 0434B	Warning, hazard risk (see note)
⚠		Warning, risk of entrapment
⚠		Be careful, risk of pinching
⏏		Active position of a bistable control
⏏		Rest position of a bistable control
☸		Ionizing radiation
☸		Warning, danger of laser radiation

When you see one of these symbols on the equipment, consult the technical instructions for more details.

Conditions of Use

Environment

Environment

The conditions of use and storage of the equipment must observe the following rules:

Temperature

In Operation

$1^{\circ}\text{C} < t < +50^{\circ}\text{C}$ ($33.8^{\circ}\text{F} < t < 122^{\circ}\text{F}$)

Storage

$-20^{\circ}\text{C} < t < +60^{\circ}\text{C}$ ($-4^{\circ}\text{F} < t < 140^{\circ}\text{F}$)

Hygrometry

- Use: relative humidity $< 50\%$ for $t = +40^{\circ}\text{C}$
- Storage: relative humidity $< 90\%$ for $t = +20^{\circ}\text{C}$

Altitude

Lower than 2000 m (6560 feet)

Ventilation

- ⚠ For optimal ventilation, the PLC has holes on its upper and lower parts. Never obstruct or cover these orifices. Do not introduce objects (especially metals) through these holes. There is a risk of touching voltage points or creating short circuits that are dangerous to people or equipment.

Pollution

This equipment is designed to be used in conditions where there is no pollution, only non-conductive dry pollution. Protect equipment from dust, corrosive gases, liquid projections, etc.

Noise: less than 70 dBA

The European Directive 89/391EC of 12/06/1989 lays down the methods and means of noise reduction.

The Labour Code R 4431-2 indicates the measures to be taken according to the thresholds reached:

- Lower Exposure Levels Triggering Action: $\text{Lex},8\text{h} = 80\text{dB(A)}$ and $\text{Lp},\text{c} = 135\text{dB(C)}$
- Upper exposure levels triggering action: $\text{Lex},8\text{h} = 85\text{dB(A)}$ and $\text{Lp},\text{c} = 137\text{dB(C)}$

Luminosity

- Decrees 83-721 and 83-723 of the Labour Code with regard to the lighting of workplaces.



Conditions of Use

Environment, Power Supply and Technical Data

Premises allocated to work and their dependencies	Minimum illumination values
Internal circulation routes	40 lux
Stairways and warehouses	60 lux
Working premises, cloakrooms, toilets	120 lux
Blind premises allocated to permanent wor	200 lux

External areas	Minimum illumination values
External circulation routes	10 lux
External areas where permanent works are performed	40 lux

Circular of 11 April 1984 on the types of activity

Types of activity	Minimum illumination values
Medium mechanics, typing, office work	200 lux
Work on small parts, drafting department mechanography	300 lux
Fine mechanics, etching, colour comparison, difficult drawings, clothing industry	400 lux
Precision mechanics, fine electronics, various inspectio	600 lux
Very difficult tasks in industry or laboratorie	800 lux

Power Source

The power source to which the equipment is connected must have the following characteristics:

- Tension: 230V single phase $\pm 10\%$
- Frequency: 50Hz / 60 Hz $\pm 5\%$
- Current: 16A

Reminder: The electrical network must have a sensitivity WILD (Residual Differential Device) circuit breaker upstream of the equipment 30 mA Class AC.

Electrical Characteristics

- Supply voltage: 230V single phase
- Frequency: 50Hz $\pm 5\%$
- Power consumption: 120VA

Mechanical Characteristics

Dimensions & Weight

- Height: 795mm
- Width: 690mm
- Depth: 360mm
- Weight: 25kg approximately



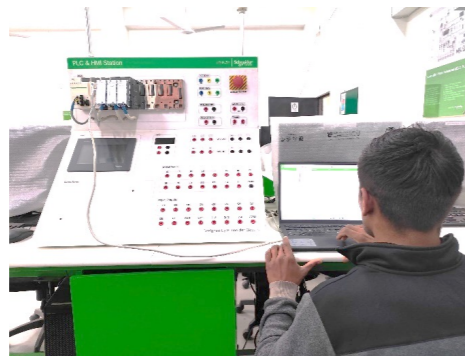
Installation & Commissioning

- D2 Set-up
- D5 Handling
- D Connection
- D Tower Lamp connection

Installation & Commissioning Set-up

Installing the PLC HMI bench on a table

- As soon as you receive the pedagogical bench, check the quantity and reference of the materials using the grouping list giving the details of the packing.
- Before setting up the pedagogical bench, it is necessary to ensure the mechanical strength of the support (table). Please refer the Mechanical data of the bench to determine size of the table required for the installation.
- The bench is designed to be used stably placed on a table or workbench with a height of 70 to 80cm.
- To connect an operating devices to the bench, it must be close enough to easily connect the I/O connection cables.
- Two handles, located on either side of the bench, make it easy to handle.
- The practical work around this equipment is carried out in the seated position facing the stand and close to a Operation panel



Installation & Commissioning Set-up

Article R4541-5

Created by Decree No. 2008-244 of 7 March 2008 - art. (V)
Where manual handling cannot be avoided, the employer shall:

1° Assesses the risks to the health and safety of workers arising from handling operations.

2° Organise workstations in such a way as to avoid or reduce risks, in particular back and lumbar risks, in particular by providing workers with mechanical aids or, if they cannot be used, gripping accessories to make their work safer and less strenuous than necessary.

Article R4541-9

Created by Decree No. 2008-244 of 7 March 2008 - art. (V)

When the use of manual handling is unavoidable and the mechanical aids provided for in paragraph 2 of Article R. 4541-5 cannot be used, a worker may be allowed to carry loads of more than 55 kilograms on a regular basis only if he or she has been recognized as fit to do so by the occupational physician, without these loads exceeding 105 kilograms.

However, women are not allowed to carry loads of more than 25 kilograms or to carry loads with a wheelbarrow of more than 40 kilograms, including the wheelbarrow.

Article D4152-12

Created by Decree No. 2008-244 of 7 March 2008 - art. (V)

The use of the devil for carrying loads is forbidden to pregnant women.

Article D4153-39

Created by Decree No. 2008-244 of 7 March 2008 - art. (V)

It is prohibited to allow young workers under the age of eighteen to carry, drag or push loads weighing more than:

- (1) 15 kg for a male worker of fourteen or fifteen years of age;
- (2) 20 kg for a male worker of sixteen or seventeen years of age;
- (3) 8 kg for a female worker of fourteen or fifteen years of age;
- (4) 10 kg for a female worker of sixteen or seventeen years of age.

Workers under the age of eighteen are also prohibited from transporting wheelbarrows for loads of more than 40 kg, including wheelbarrows.

Article D4153-40

Created by Decree No. 2008-244 of 7 March 2008 - art. (V)

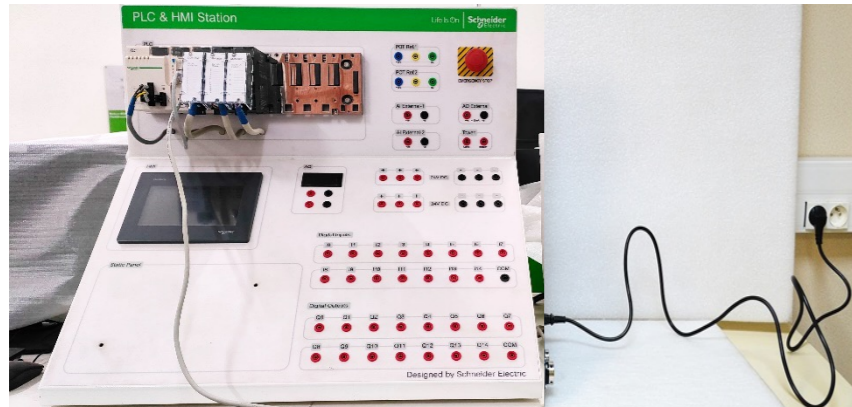
The use of the hand truck for transporting loads is forbidden to young workers under the age of eighteen.

Installation & Commissioning

Connection

Mains connection

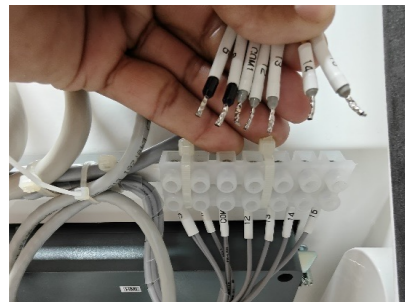
Connect the 2P+T power socket of the PLC-HMI bench to a mains socket equipped with a ground plug and protected by a RCD circuit breaker.



Tower Lamp Control



- Connect the cables of the tower lamp to the matching terminal details provided at the end of each core



Installation & Commissioning

Handling

Commissioning Preparation

Adjustment

The equipment is delivered ready-to-use and does not require any pre-use adjustments. However, its proper functioning requires the transfer of the respective Automaton and HMI programs.

It should be noted that the HMI and PLC bench comes with an application loaded in the PLC and an application in the HMI dialog terminal.

These applications made it possible to test the conformity of the wiring at the end of the production using a test bench.



Usage

E2 Equipment Description

E3 Operation

E4 Consignment

Usage

Equipment Description



The bench is made of a grey plastic sheet metal structure. It consists of the following elements:

On the front:

- An M340 PLC located at the top of the 90° face. It is equipped with:
 - a digital input card (16 entries)
 - a digital output card (16 outputs)
 - an analog board with analog inputs (4 multi-range inputs 0-10V, 0-20mA, etc., etc.) & analog outputs (2 outputs + or - 10V, 0-20mA or 4-20mA)
- Below, on a 45° inclined plane, on the left, is a HMI color tactile graphic display
- On the inclined plane on the right, a 24V DC 4.2A power supply with two + and - safety sockets for powering the outputs and the tower light to indicate the presence of voltage
- To the right side of the HMI are 16 red 4 mm safety sockets for the connection of the identified digital inputs I.0 to I.14
- Below these are 16 sockets wired out the digital outputs identified by Q.0 to Q.14
- On the vertical panel we have sockets of the Analog Inputs and Analog Outputs wired out in the form of sockets
- To the right of these is a 1P + N mains socket for the connection of the power cord. It is equipped with an on/off switch and a MCB to switch on the equipment

Usage

Operation

Connecting Digital Inputs

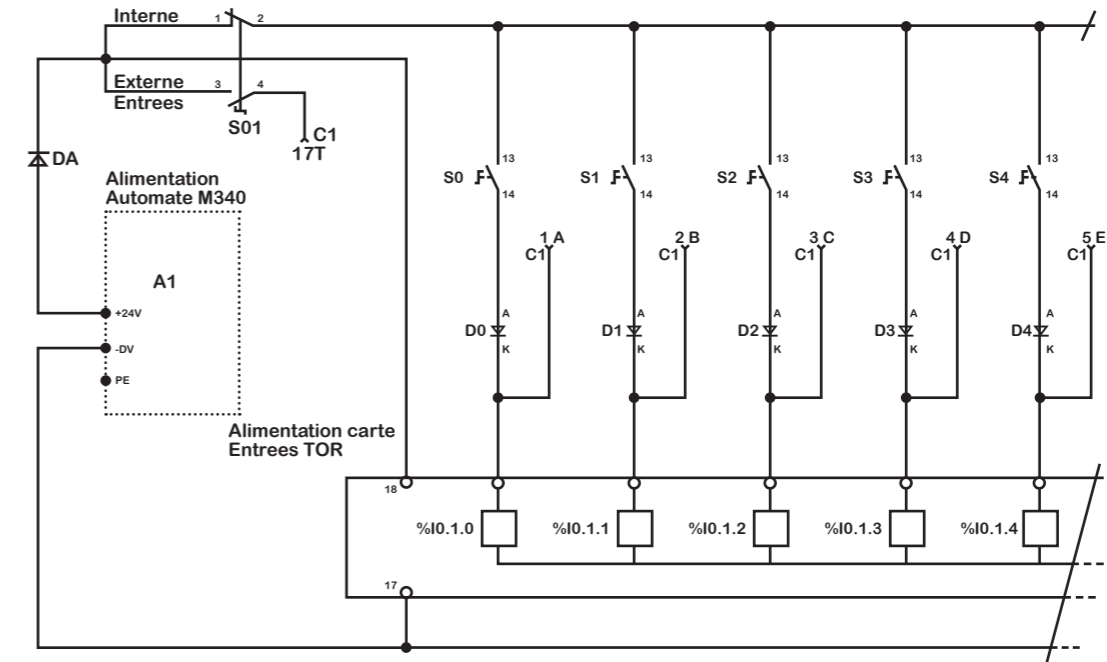


Diagram of digital inputs with the M340 controller

Note: To use the internal power supply of the TOR input card, do not connect wire No. 17 of the C1 cable (leave the insulated wire in reserve).

If the operating part has its own 24VDC power supply, connect the +24VDC to wire 17 of the C1 cable.

The 0V of the operating part must be connected to the 0V of the PLC console.

Usage

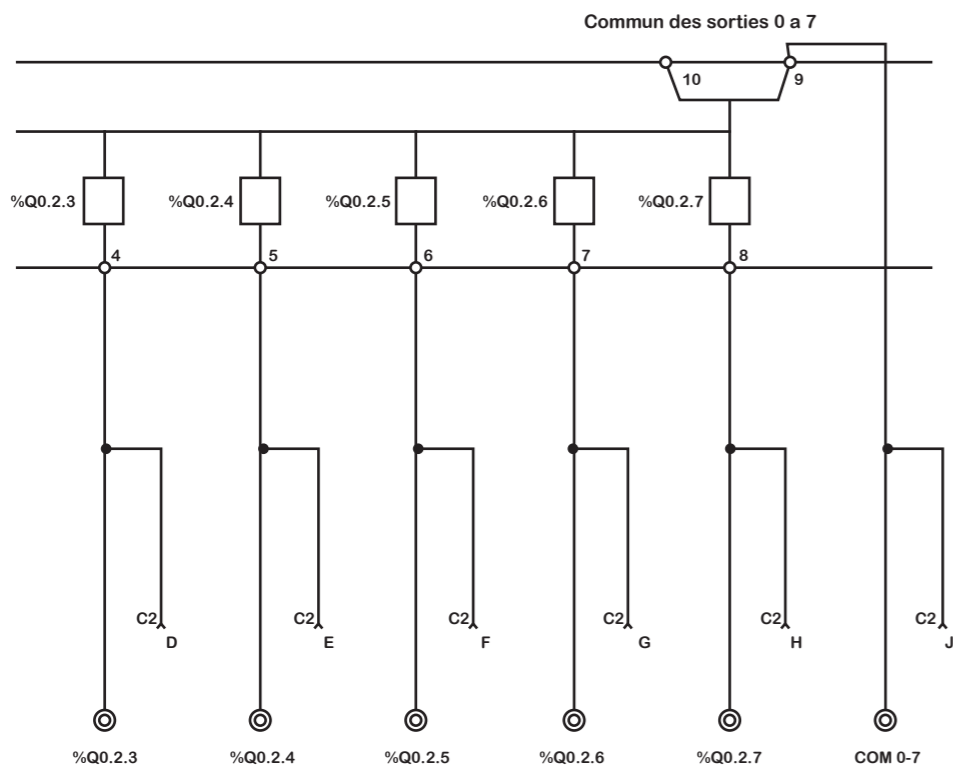
Operation

Connecting the Digital Outputs

- External digital outputs

To use the external outputs connect wire to the corresponding output of the bench to the external output applications. They are marked from 1 to 17.

Diagram of digital outputs with the M340 controller



Usage

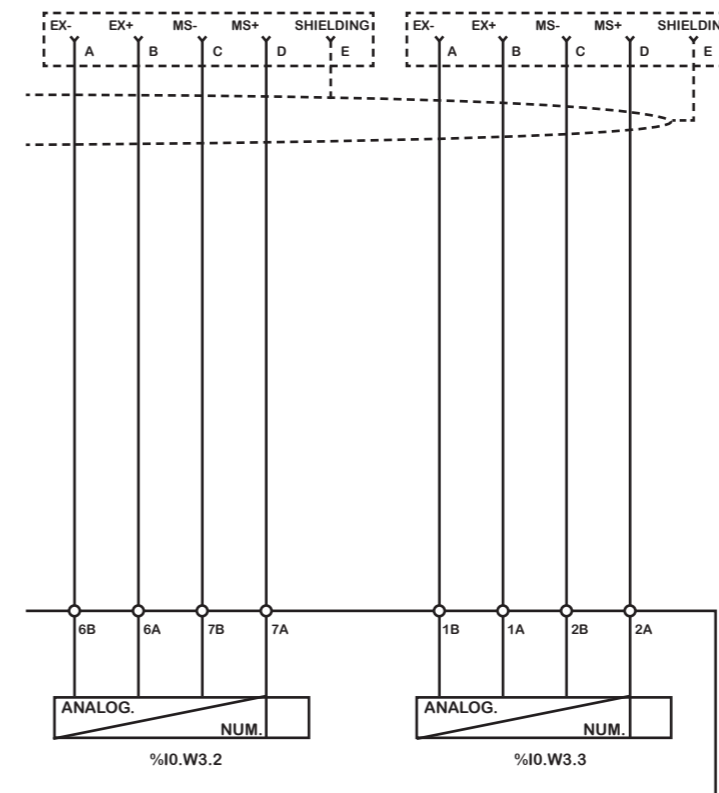
Operation

Connecting Analog Inputs

To connect the analog output on the bench connect the wires of Operating part (POT Ref -1/2) to the sockets marked AO External 1 on the bench

Following diagram shows the standard connection diagram for an analog input.

ANA Input Diagram with M340 PLC



Usage

Operation

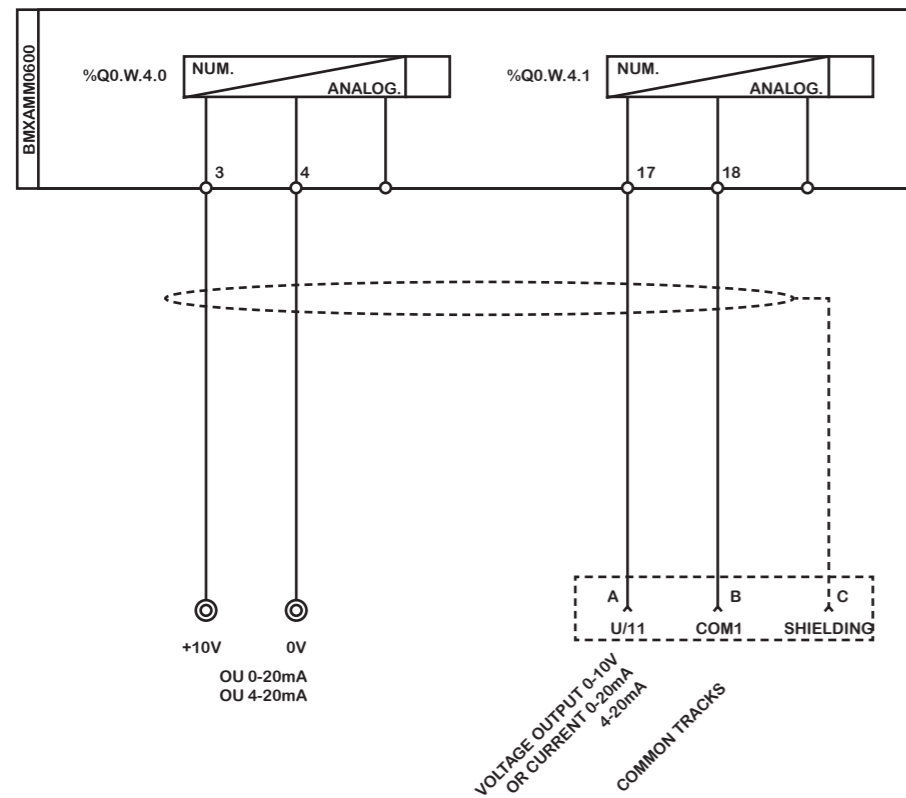
Connecting Analog Outputs

To connect the analog output marked AO External-1 on the bench (Operating Part), connect the wires of the external application.

Following diagram shows the standard connection diagram for an analog output.

- Configurable channel 0 output (voltage or current) Analog

Output Diagram with the M340 PLC



For the connection diagram of these inputs/outputs, refer to the electrical file of this manual.

⚠ Before any commissioning of the console with the operating part, it is imperative to check the connections between the different equipment. In addition, this can only be done by competent and authorised personnel.

Usage

Operation

Operation and Use

Once the I/O connection operations have been completed, connect the panel to the 230V AC network using the cord and flip the switch located at the mains receptacle.

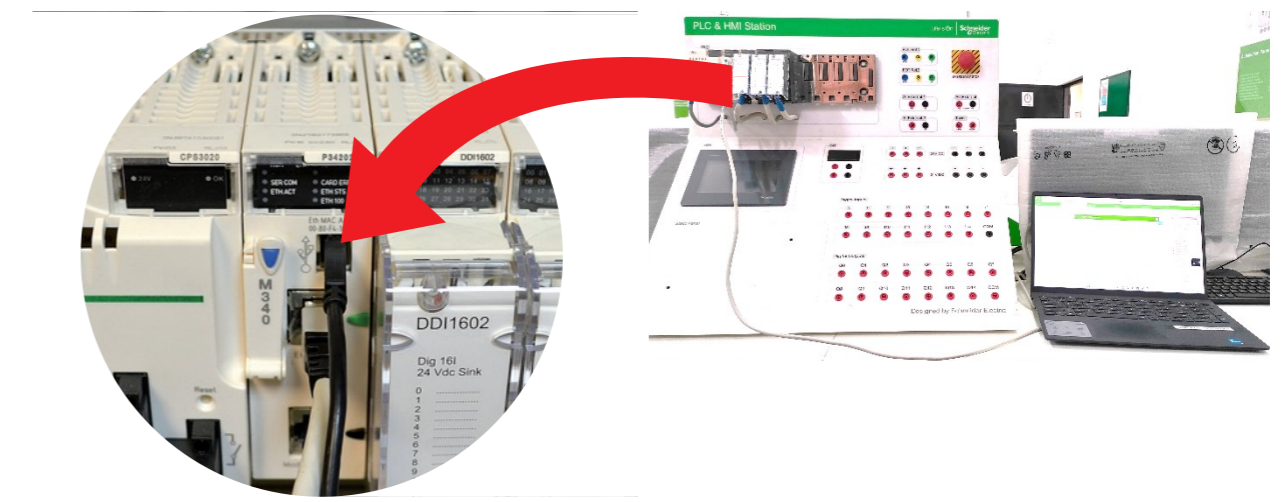
The equipment is energized, check that the PLC is in use. The green "Run/Stop" LED should be blinking (Stop) or be lit solidly (Run).

The Magelis terminal in operation should display a splash screen.



Connecting the bench to the PC

- PC Connection - PLC
 - To transfer the "Test" program or any other program to the M340 controller, connect the USB - MiniUSB cord: the USB socket to a USB port on the PC and the MiniUSB socket to the MiniUSB socket located at the top of the controller initially
 - Put the PLC in "RUN" from the PLC software
 - The "Run/Stop" light on the PLC will turn solid green
 - The PLC is operational, disconnect the cord



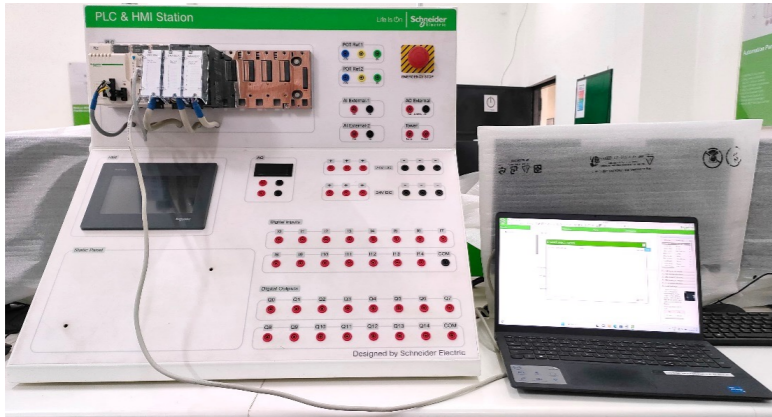
Usage

Operation

- PC Connection - HMI

To transfer the "Test" application or any other program to the HMI terminal, plug the USB cable into a USB port on the PC.

Plug the other end of the USB cable into the USB socket of the HMI to transfer project to HMI without Ethernet.



Usage

Consignment

⚠ Only authorised persons within the meaning of the publication. NFC 18-510 are authorised to perform the logging described below.

(NFC 18-510 Electrical General Safety Instruction Standard)

Log the equipment in the following order:

- Separation
 1. Stop the equipment by pressing the black switch on the back of the console above the power cable.
 2. Disconnect the 2P+T power cord from the 230V 50Hz mains.
 3. Disconnect connectors C1 to C7 connecting the HMI terminal panel to the operating part.

- Conviction

4. Store the bench and cords in a locked cabinet.

- VAT (Voltage Absence Check)

After the conviction, proceed systematically with VAT.

5. Give the key to the lock to the person responsible for the lockout.

Note: BC (consignment officer according to NFC 18510). The whole thing is now contained in energy.



Maintenance

Maintenance & Troubleshooting

Maintenance

- To clean the equipment, it is imperative to first disconnect it from the power grid
- Avoid splashing water or other liquids. Do not use a sponge soaked in water. To clean the equipment, use a slightly damp cloth (no chemically corrosive solvent type product)
- If necessary, use compressed air (blow gun) to dust the appliances

Troubleshooting

- Change components if necessary, Schneider Electric or other supplies, refer to the material nomenclature located in this leaflet.
- Any component replacement intervention requires first disconnect from the power grid
- The power will only be re-energized after the new parts, connectors and fasteners of the protective guards have been replaced.
- To replace the guards, use the original screws

These operations must only be carried out by competent personnel authorised in accordance with the NFC 18-510 standard.

- For more delicate repairs of equipment components, consult the Didactic Activity Schneider Electric France.
- Access to the inside of the bench
 - To have access to the constituents inside the "Terminal Console" - Magélis", remove the 16 CHC screws fixing the plate on the back of the device using a 2 mm Allen wrench
 - Once this is done, pull the plate outwards. Then place the plate on the table so that you can easily intervene in the equipment
 - After completing the necessary steps, replace the plate on the back of the appliance. Then fix it with their original fixing, CHC screws, screws with split heads being forbidden for fixing the protectors





Exercises

- G2 [Exercise 1 - Application to Schneider M340 pedagogic bench and wiring of input and output](#)
- G3 [Exercise 2 - Configuring the PLC](#)
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Exercise 1

Application to Schneider M340 pedagogic bench and wiring of input and output



Specifications

- Modicon X80 I/O platform BMXBP0800 rack
- CPU BMXP342020
- Power supply
- I/O modules
- Wired connection cables
- Communication cables
- Memory card

Procedure:

1. Check if the power is OFF
2. The power supply is mounted on the first slot, the CPU is mounted on the second slot
3. Remove the protective cover and position the locating pins present on the rear of the module in the corresponding slots in the rack. (as in number 2 in the figure)
4. Swivel the module towards the top of the rack such that the module fits tightly in the rack. (as in number 3 in the figure)

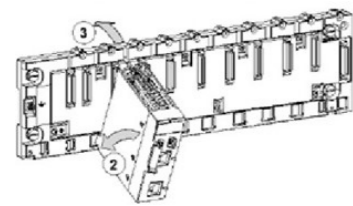


Fig 1.1: Mounting the CPU module on to the rack

5. Mount the I/O modules in the subsequent slots of the rack

Exercise 2

Configuring the PLC

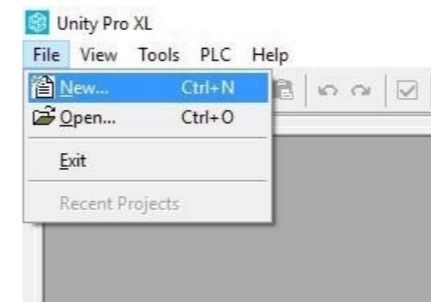
Create a project and configure the PLC

The first step of the PLC programming using EcoStruxure Control Expert Software consists in the configuration of the PLC's hardware regarding the real PLC configuration you'll use in your process.

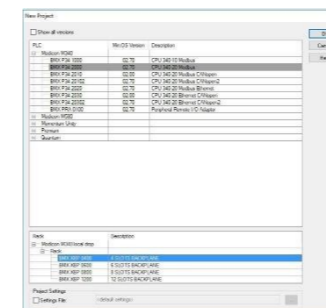
In this how-to, you'll find thereafter the procedure illustrated with screen views.

Follow the steps below to proceed:

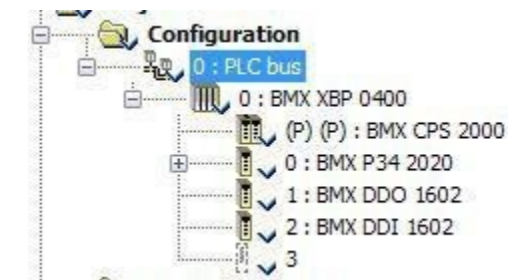
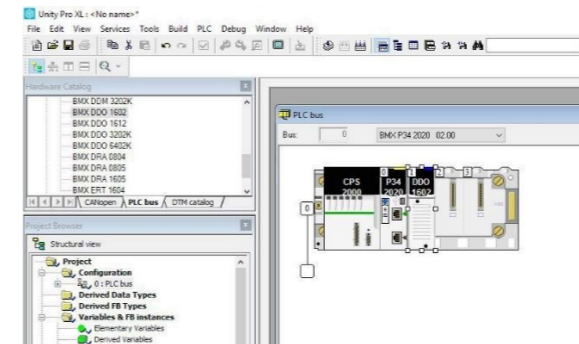
- Open a new project



- Select the CPU of the PLC device



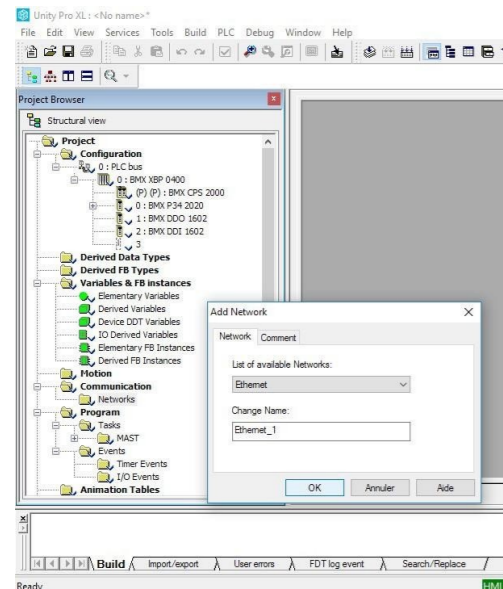
- Select the devices of your hardware configuration that will be used in your project. Once done, you'll obtain the list of the devices of your hardware configuration



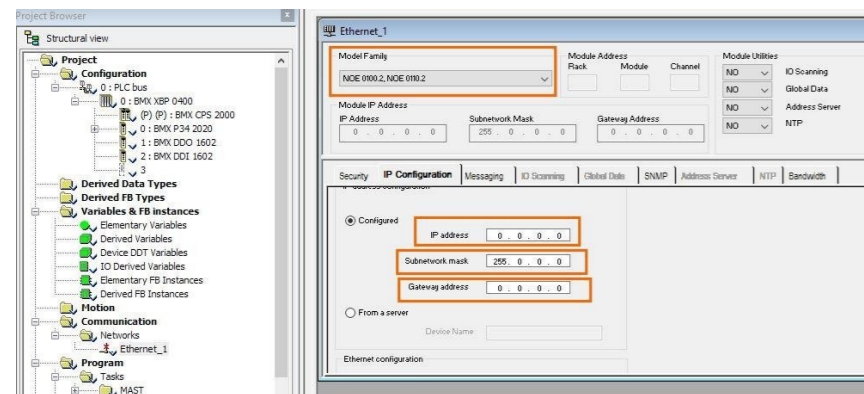
Exercise 2

Configuring the PLC

- Add the communication network. name is Ethernet 1



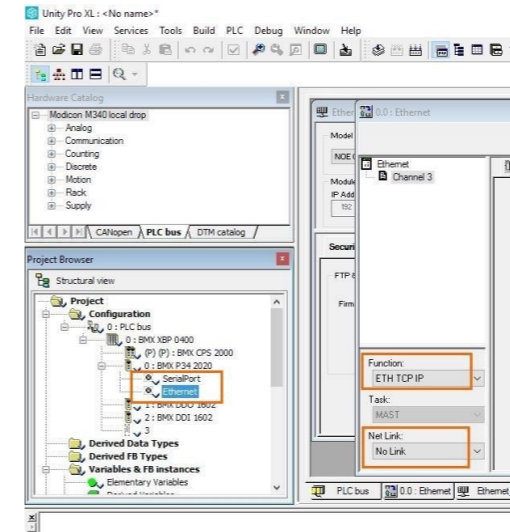
- Configure the communication parameters; take care to choose the right Model Family in the upper part of the window. Then you have to define:
 - The IP address of your device
 - The sub-network mask
 - The IP address of the gateway
 - Exit for validation



Exercise 2

Configuring the PLC

- Associate the network with the ethernet card of the PLC:
 - In the field Function, choose ETH TCP IP
 - In the field Net Link, choose the name of the Ethernet connection you created before
 - Exit for validation



Exercise 2

Do it by yourself?

Do it by yourself?

It's now time for you to set up the hardware configuration of your PLC to this:

- **First:** Collect the references of the several parts of the used PLC on the experimental bench
- **Second:** Use these references to perform the PLC configuration with EcoStruxure Control Expert software as you discovered in the previous activity

Exercise 3

Assigning variables to Physical PLC's Input and Output

Description of the assignation of the variables

A PLC is used in automated applications; it scans inputs and depending on their state and on the program that have been stored in its memory, PLC will change the state of outputs.

Various data are used in this process; these data's are called variables.

To help ensure a good running of the application, designer (you) have to create and declare the variables.

This declaration is done to allow the memory allocation regarding the type of a variable you are currently declaring. This process is called assignation and mapping.

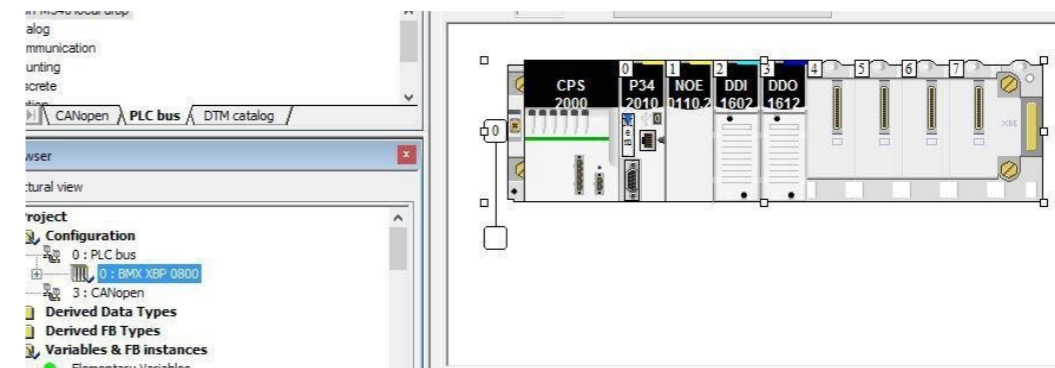
Each variable can have a name you choose, called mnemonic (a label), but it is also possible to use the IEC standard designation.

For example, in a PLC application, if the channel 1 of the input card located in slot 2 of the PLC 0 is used, then %I0.2.1 is the IEC name of the variable and it is also the topological address of the input. It is also possible to assign to this IEC designation a variable called LS_HIGH which is the mnemonic name of the variable %I0.2.1 and which is easier to understand.

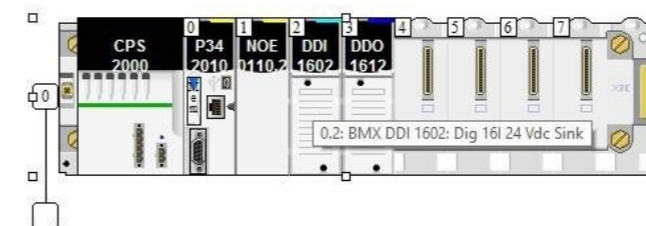
Note: The different types of variables are described in this Schneider resource. Each one of these types has its own memory allocation size.

Assigning the input/output variables

- Activate the PLC configuration view. Check the location number of the CPU.



- Double-click on the input/output module you want to select.



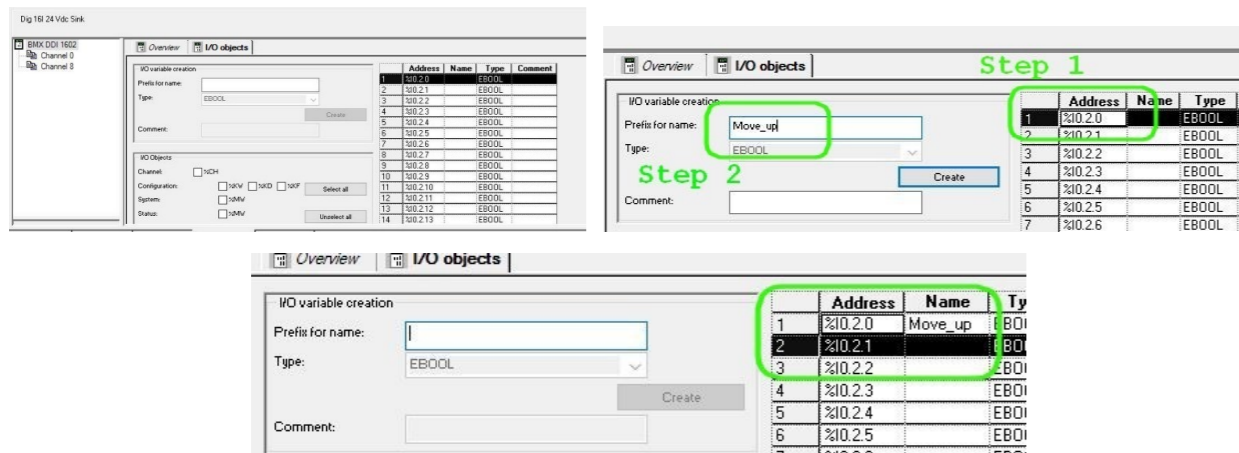
Exercise 3

Assigning variables to Physical PLC's Input and Output

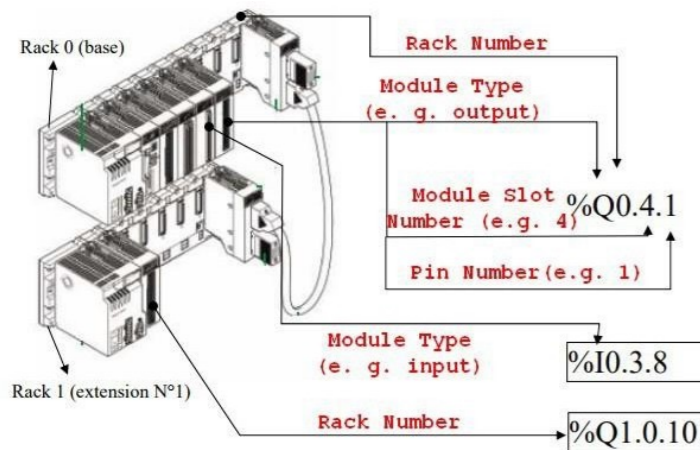
- In the opening window, select the type of the variable you want to assign. %I for input or %Q for output (regarding the type of module you are currently working on). Then click on Update Grid.



- In the appearing window, click on the address input/output you want to assign with your variable name and enter the name in the relevant input field. Click on create and that's done.



Details on the topological name of Input and Output

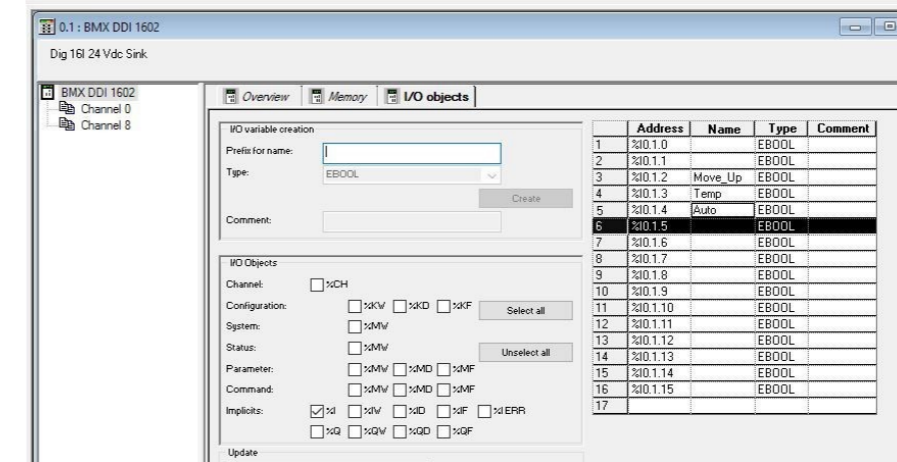


Exercise 3

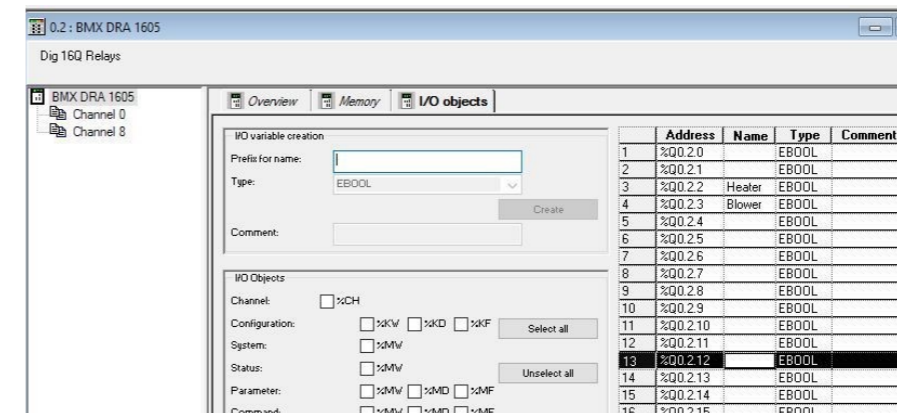
Do it by yourself!

Use the ladder application you create before and assign your inputs and outputs to variables. You have to obtain the following result:

- For Inputs:



- For Outputs:



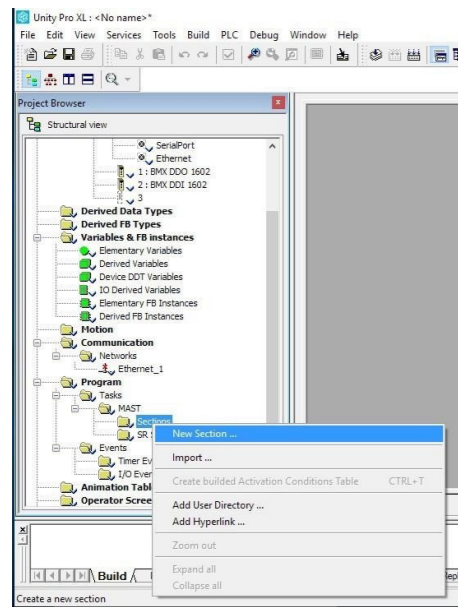
Exercise 4

Programming PLC with Ladder language using EcoStruxure Control Expert

Create a ladder diagram section:

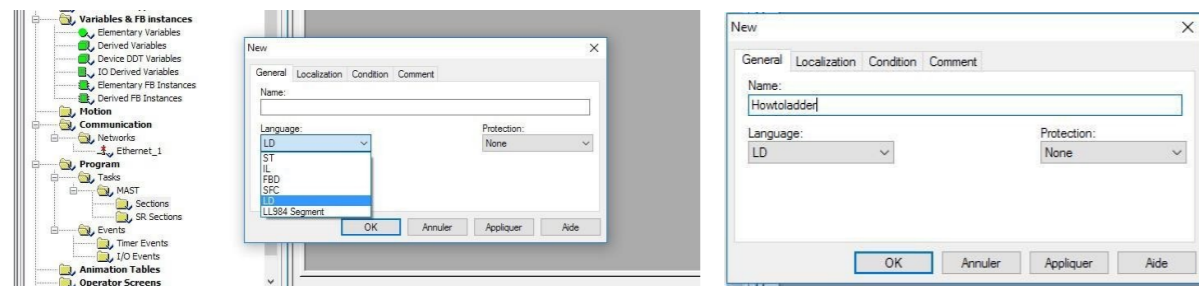
In this how-to, using EcoStruxure Control Expert, you'll discover how to create a section (a worksheet) in which you can enter the ladder diagram which is the application you designed. To do this:

- Create a new section which is the worksheet in which you will enter your program



- Declare this section as a ladder section

- Give it a name



You are now ready to enter your ladder diagram using the basics elements at your disposal in the LD editor bar menu.



Exercise 4

Programming PLC with Ladder language using EcoStruxure Control Expert

- You can move the mouse over to bubble information for each symbol



Ladder Diagram menu bar exploration

Question 1: Tick the symbol of a normally open contact.



Question 2: Tick the symbol of a coil.



Question 3: Tick the symbol of a compare block.



Question 4: Tick the symbol of a positive transition sensing contact.

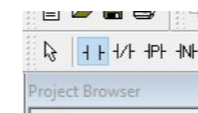


Question 5: Tick the symbol of a reset coil.

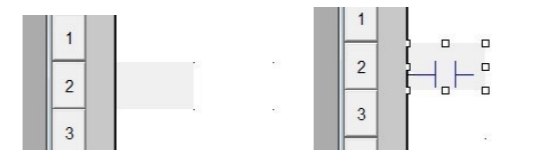


Enter the LD diagram in a section

- Click on the element you want to add



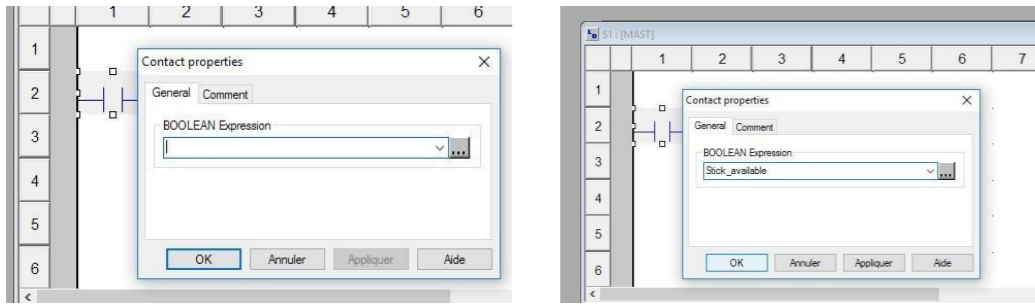
- In the work area, click where you want to drop the element and instantaneously, the element is added



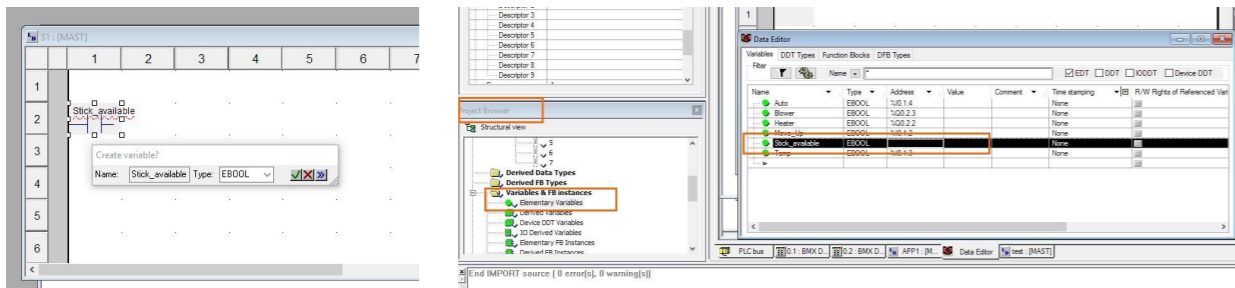
Exercise 4

Programming PLC with Ladder language using EcoStruxure Control Expert

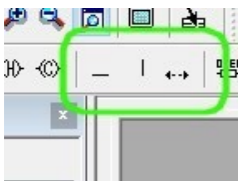
- Double-click on the element; a window with an entry field appears
- In this entry field, you have to enter the name of the element



- Click on OK and there are 2 options:
 - **Option 1:** You have already assigned the name before, then no issue,
 - **Option 2:** You forgot to assign this variable before. As it is a new variable, you must choose its type. If it is an input or an output then, you must choose EBOOL and confirm. The element is partially assigned because you must link it with the topological input or output. You can do that in the Project Browser. You must enter the topological address of the input or output you want to use for this variable.



- Add next elements of your LD diagram to your program and use the links to connect them



Exercise 4

Do it by yourself!

- Open the file in which you created the PLC's configuration your last name-LDU
- Give the logical expression of outputs Blower and Heater
- Using the previous elements, enter the ladder diagram below in a section called APP1



Exercise 5

Transfer, run and test an application

Once your application is entered in EcoStruxure Control Expert, you'll have to transfer it to PLC memory and run it. This is done as follows:

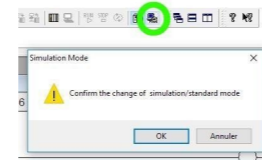
- Build your application
- Transfer the application in the simulated PLC or real PLC memory. After completing these two steps, you can Run the application and test it

Transfer an application in the simulated PLC or the real PLC memory.

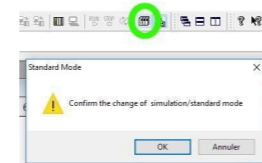
In this section, you'll discover how to transfer an application in the PLC memory depending on the type of mode you are using: simulation or standard.

- To transfer an application and test it, EcoStruxure Control Expert allows you to choose between 2 different modes

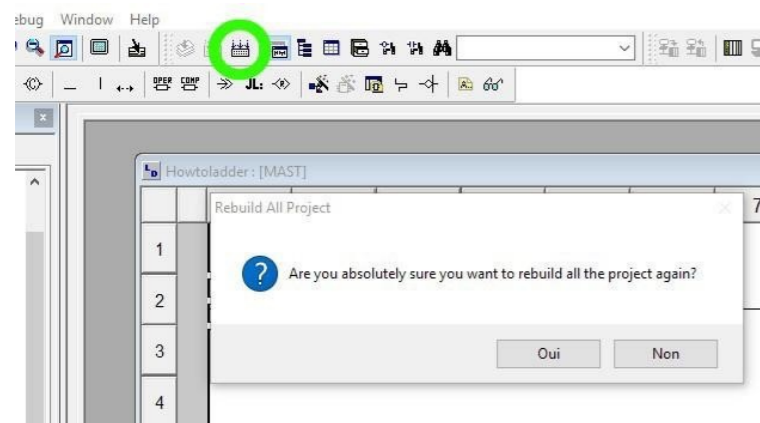
- **Simulation Mode:** Transfer your application in the virtual PLC for simulation



- **Standard Mode:** Transfer your application in the real PLC for real execution



- Build or rebuild your project before starting the transfer. If not done, you will not transfer the latest version of your application

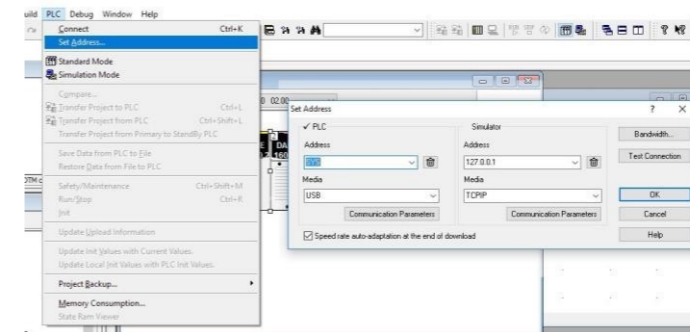


- Now you have to connect the PLC (whatever the chosen mode is). To this, you must first define the address of the PLC. You have to choose between 2 options:

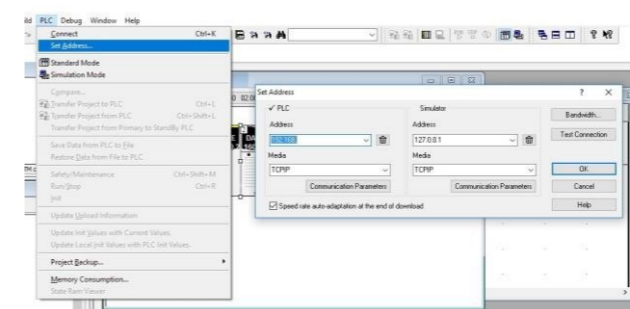
Exercise 5

Transfer, run and test an application

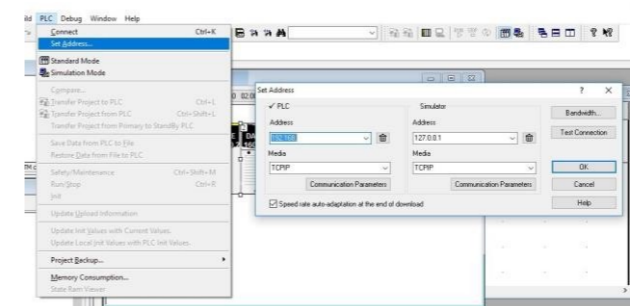
- **Option 1:** PLC is connected to USB port



- **Option 2:** PLC is connected to an Ethernet card then you have to configure the IP address of the PLC



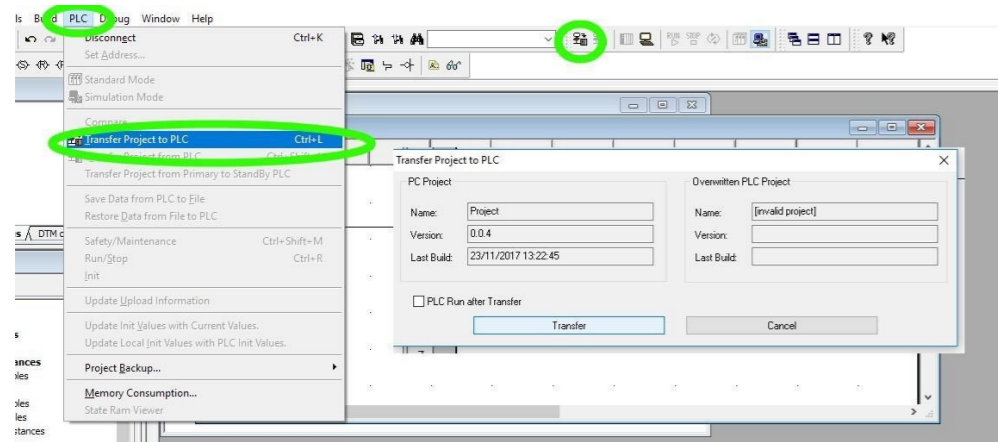
- Click Connect to the PLC (both options)



Exercise 5

Transfer, run and test an application

- Click on Upload and then your application is downloaded to the PLC memory: virtual for simulation mode or real for standard mode



The PLC is now ready to run your application.

Exercise 6

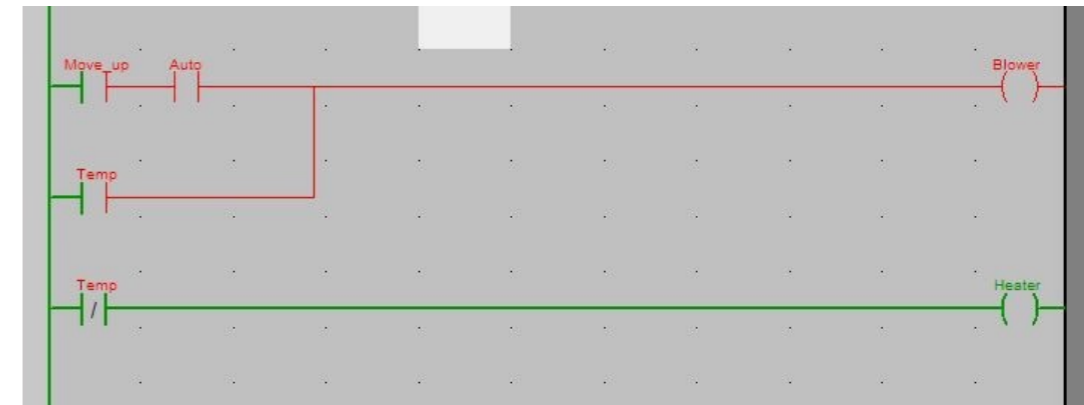
Run and test an application

In this section, you'll discover how-to run an application and basics simulation tool.

- Once your application has been downloaded to the PLC's memory, you can run it by clicking Run and confirm with OK

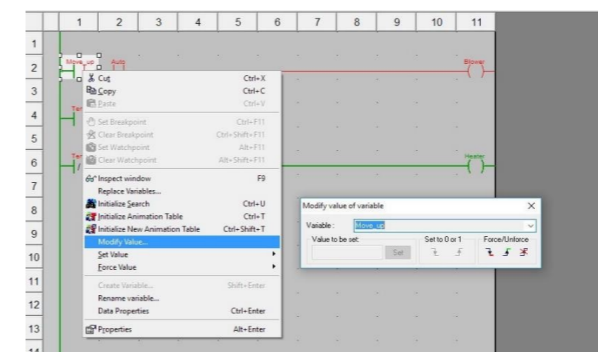


Then wiring is coloring with green for high logic level and red for low logic level.

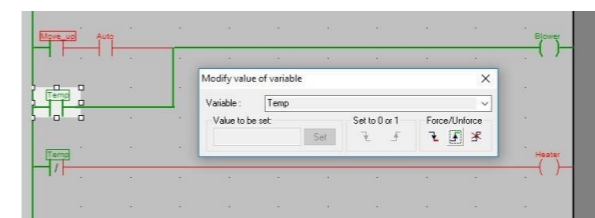


- To test your application:

- In the simulation mode, you can change the state of an input with a right click on it to change its state by forcing. Then, drawing is modified regarding to your application contents. To release all the forcing you've done, click on it in the PLC menu.



- In the standard mode, you can act on the real component (push-buttons ...) of the operative part to test your application. You can also use the forcing mode but you have to take very care because any forcing, has a real effect on the device on which the PLC is managing the behavior.



Exercise 6

Do it by yourself!

- Open the LD application you created before
- Transfer and test it in the simulation mode by changing state of the input and output. To this click right on one element of the diagram and select Modify value of variable. You can force to 1 and 0 each variable
- Transfer and test it in the standard mode using the PLC kit. Don't forget to connect the input and output to switches and lamps

Exercise 7

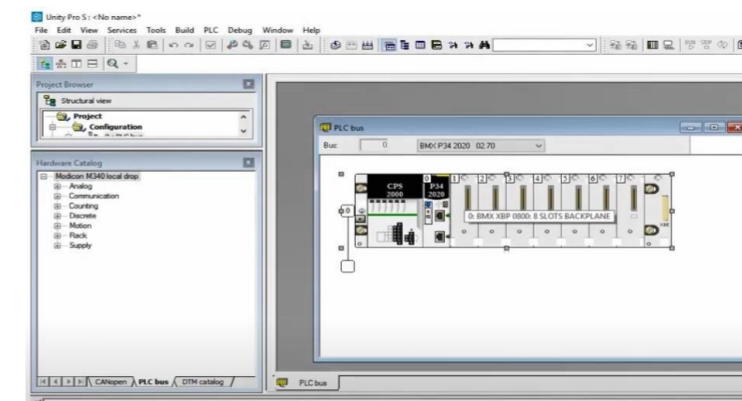
Ladder Logic using On delay timer and Off delay time in in EcoStruxure Control Expert Environment

Requirements:

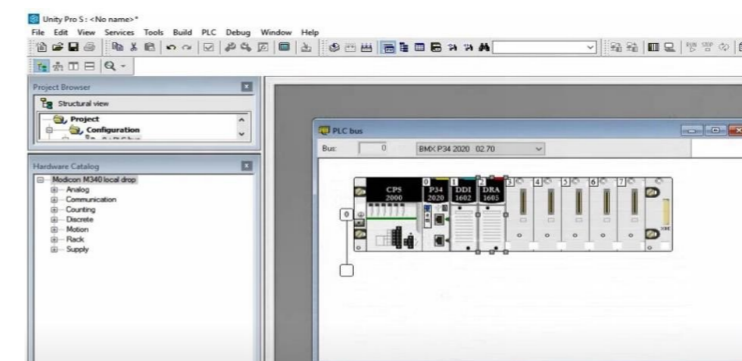
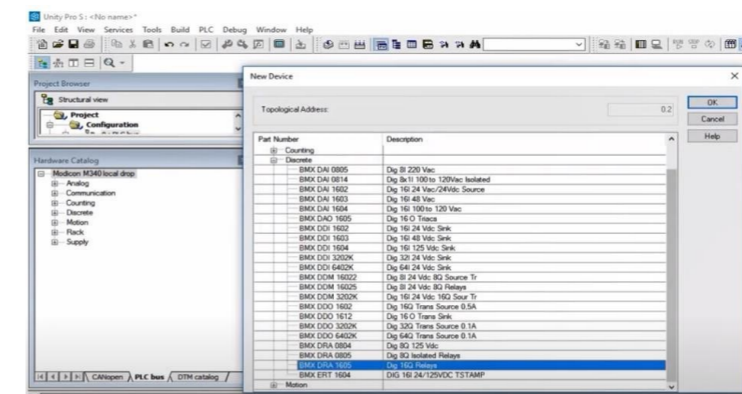
- EcoStruxure Control Expert
- M340 PLC bench
- Ladder logic software

Procedure:

1. Launch EcoStruxure Control Expert software
2. Create New Project
3. In the PLC bus, add power supply and CPU



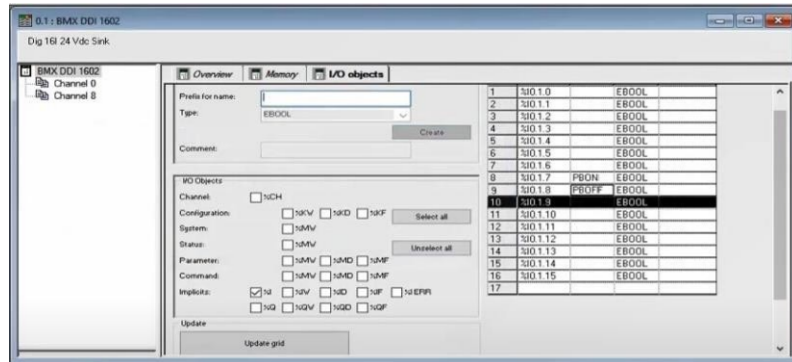
4. Click on input slot to add input output modules. Select Discrete
5. Select the appropriate digital input and output modules



Exercise 7

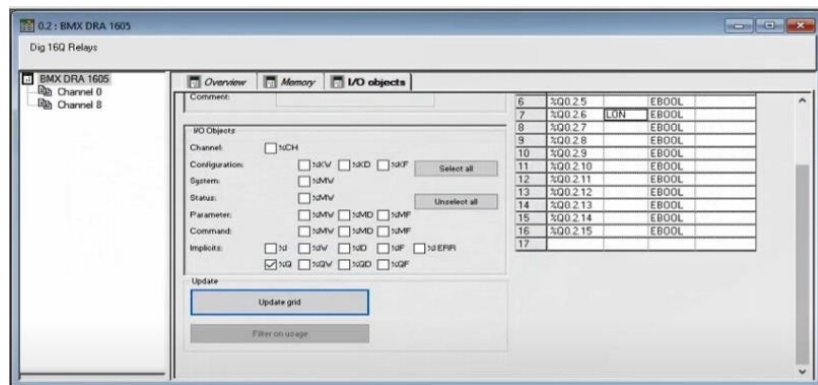
Ladder Logic using On delay timer and Off delay time in in EcoStructure Control Expert Environment

6. Set the input addresses from 0 to 15

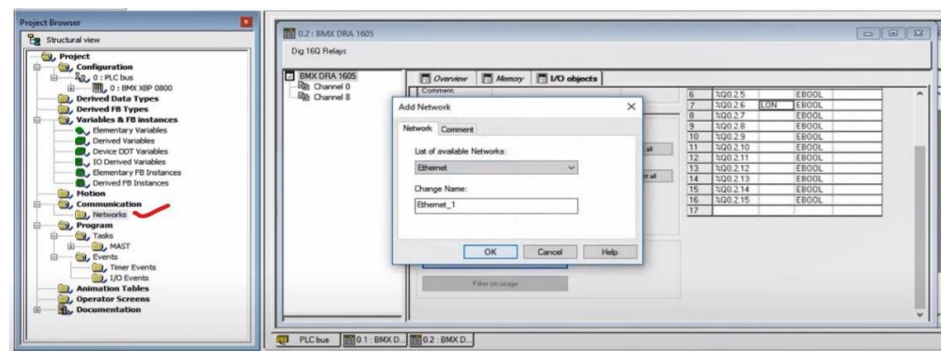


For any two addresses, name them as PBOFF (pushbutton off) and PBOFF (pushbutton off). Click Update Grid.

7. Similarly, set the output addresses and name any one address as LON (lamp on)



8. Click on the left panel, Communication>Network>New Network

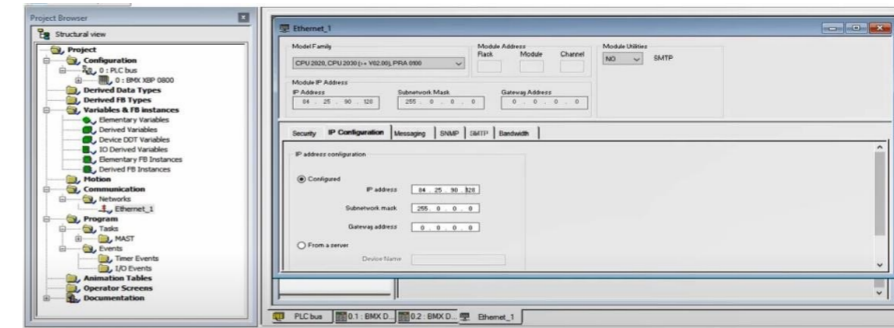


Select Ethernet.

Exercise 7

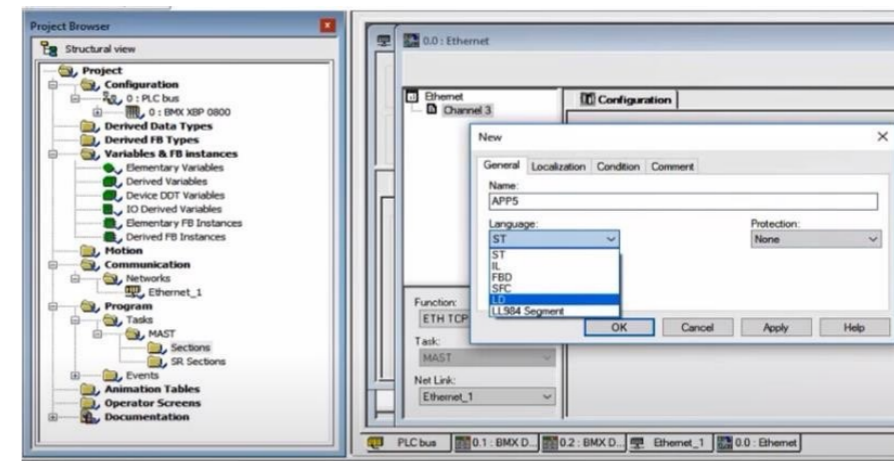
Ladder Logic using On delay timer and Off delay time in in EcoStructure Control Expert Environment

9. Change IP configuration and validate in the PLC desk

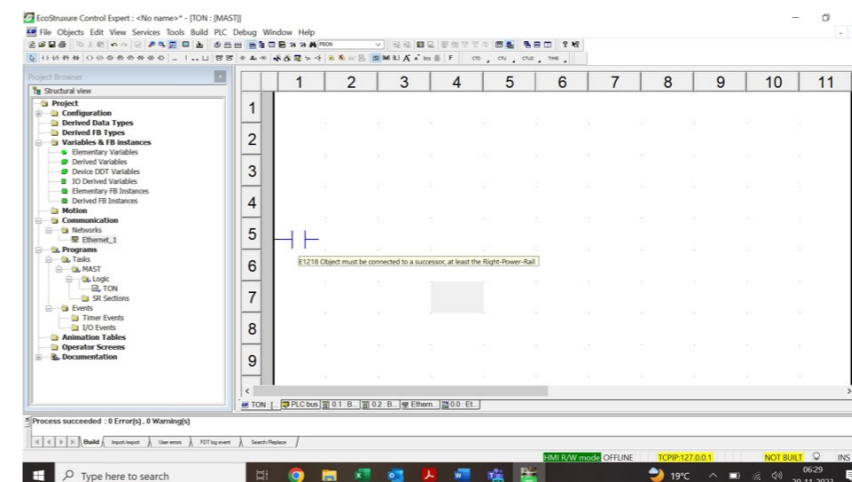


10. To write the program, in the left panel- Program>Tasks>MAST>Sections

Select LD for Ladder programming



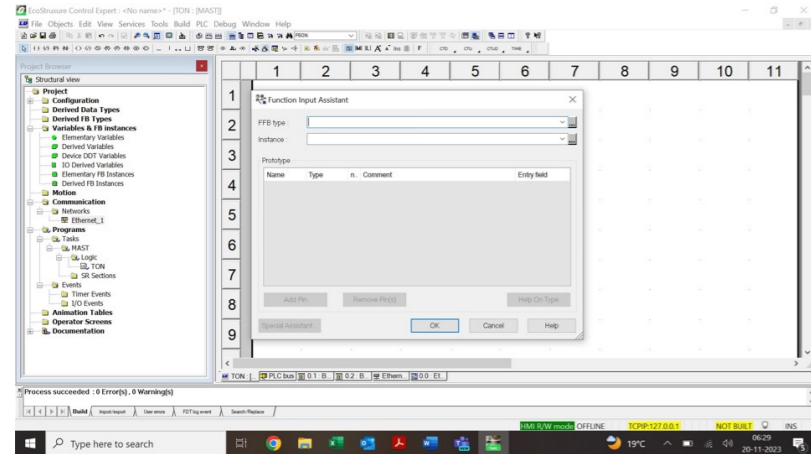
11. Click on the normally open contact



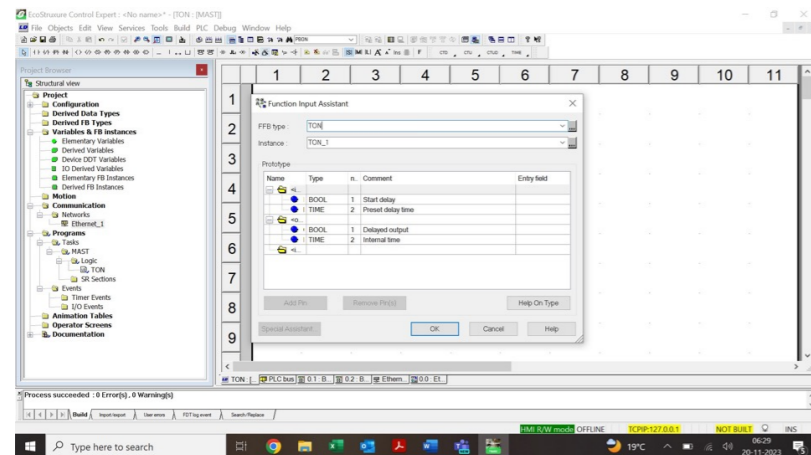
Exercise 7

Ladder Logic using On delay timer and Off delay time in in EcoStructure Control Expert Environment

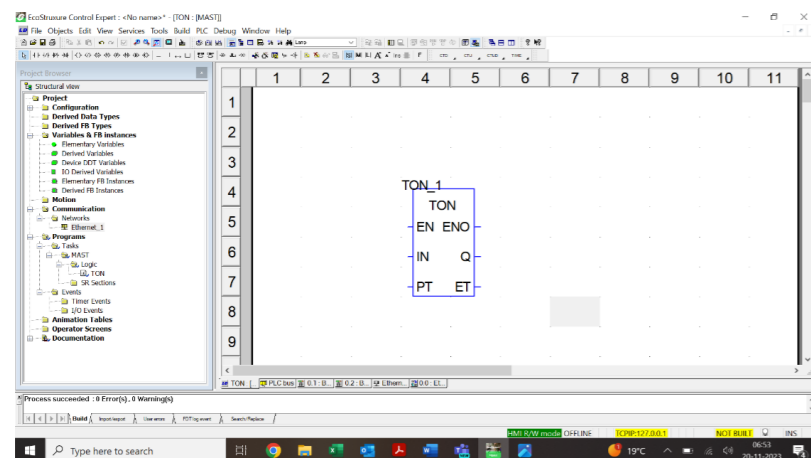
12. Click on the FFB input Assistant to select the on delay timer



13. Type the TON in the Function input Assistant FFB type



14. Place the TON in the Programming page by clicking in the Program page

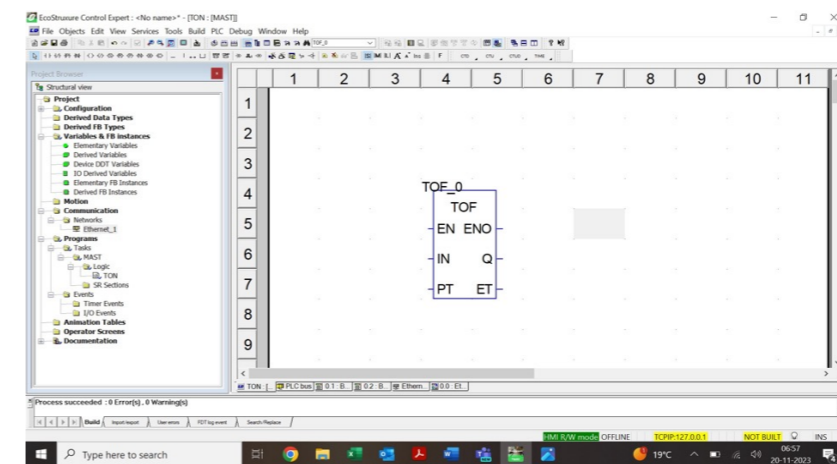
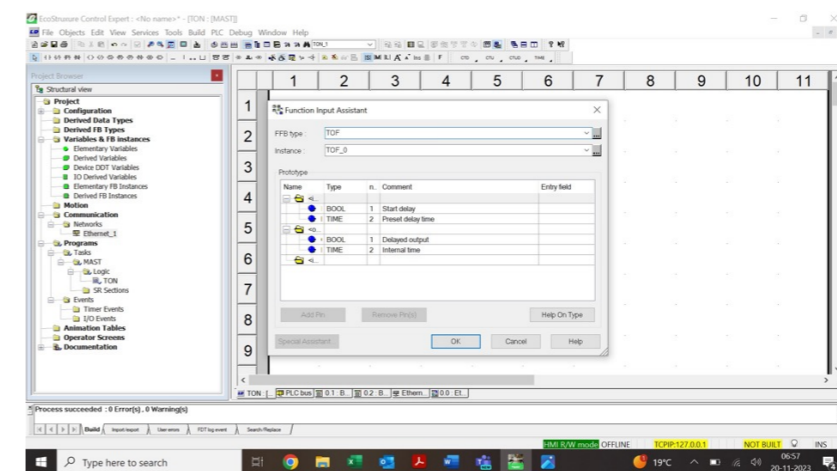


Exercise 7

Ladder Logic using On delay timer and Off delay time in in EcoStructure Control Expert Environment

Timer Pin Details: EN-Enable the Timer
IN-Connection for input
ENO-Next Block connection
Q- Timer Output
PT-Time Delay

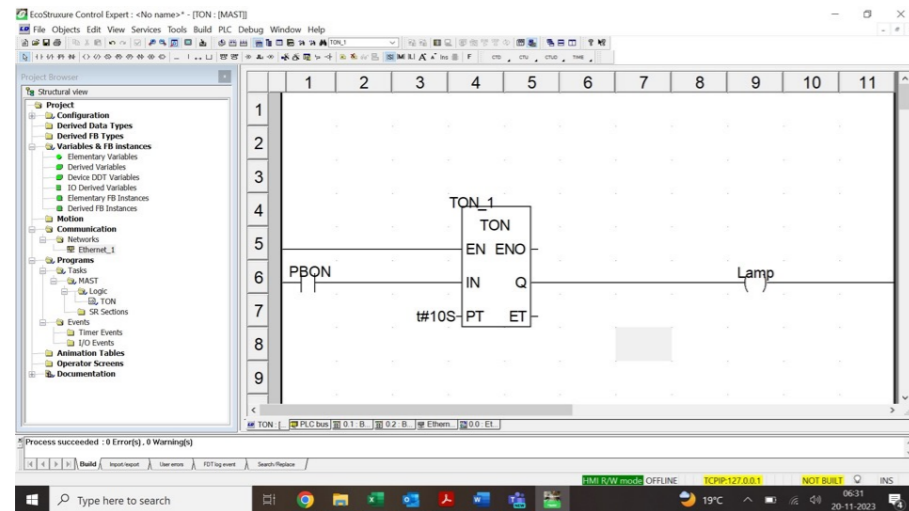
15. Similarly, TOF- Off Delay timer Can be inserted from FFB input assistant wherever it is necessary



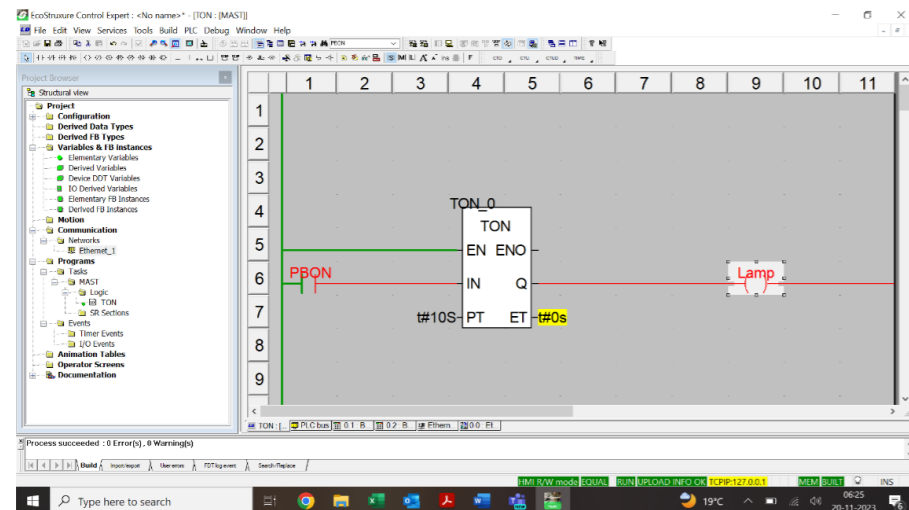
Exercise 7

Ladder Logic using On delay timer and Off delay time in in EcoStruxure Control Expert Environment

16. Input and output can be connected to the input and output terminals of the timer blocks



17. Follow the steps build, transfer and run of exercise 4 and 5



Exercise 8

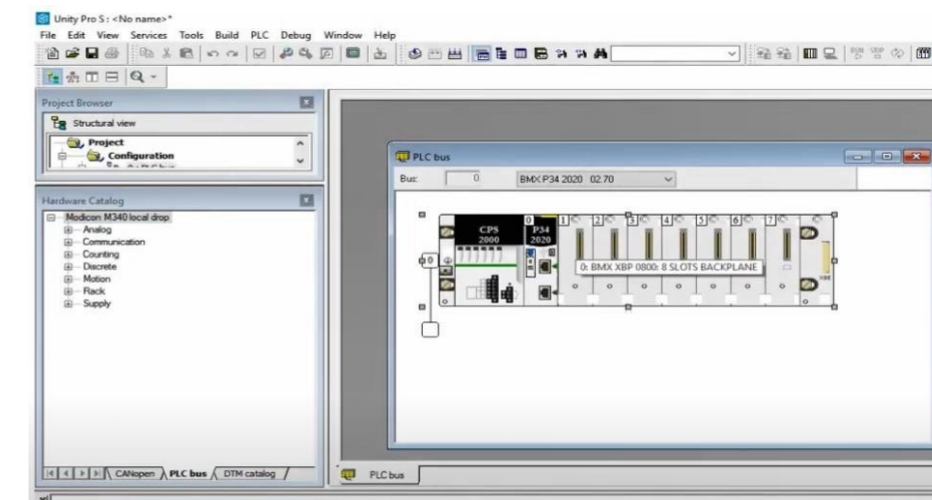
Ladder Logic using Up Counter in EcoStruxure Control Expert Environment

Requirements:

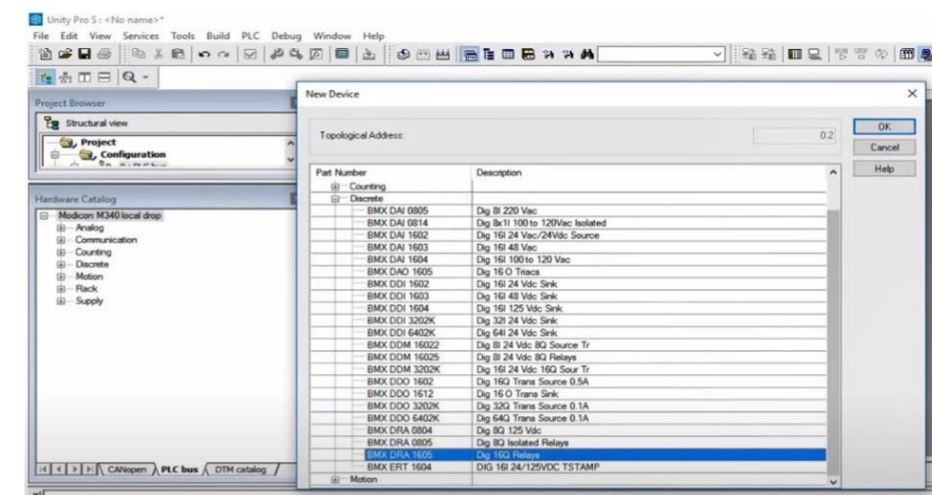
- EcoStruxure Control Expert
- M340 PLC bench
- Ladder logic software

Procedure:

1. Launch EcoStruxure Control Expert software
2. Create New Project
3. In the PLC bus, add power supply and CPU

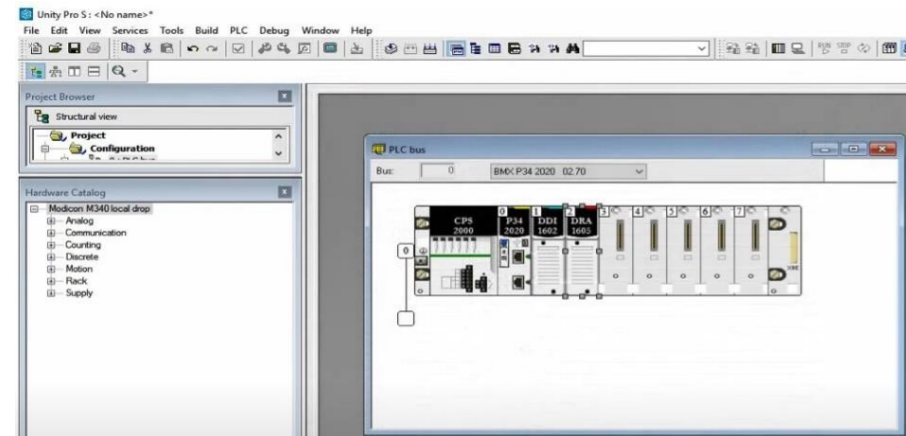


4. Click on input slot to add input output modules. Select Discrete
5. Select the appropriate digital input and output modules

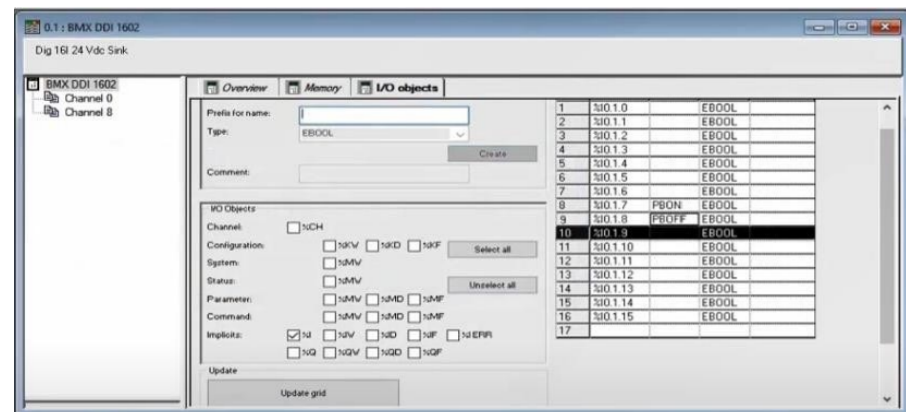


Exercise 8

Ladder Logic using Up Counter in EcoStructure Control Expert

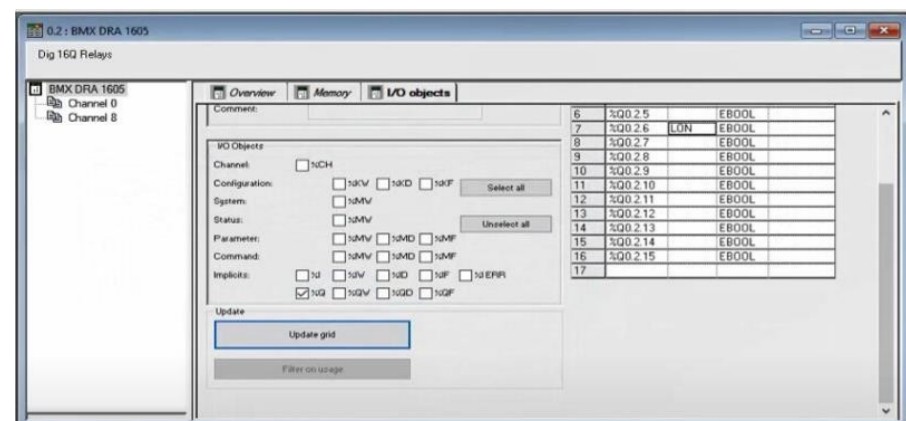


6. Set the input addresses from 0 to 15



For any two addresses, name them as PBON (pushbutton on) and PBOFF (pushbutton off). Click Update Grid.

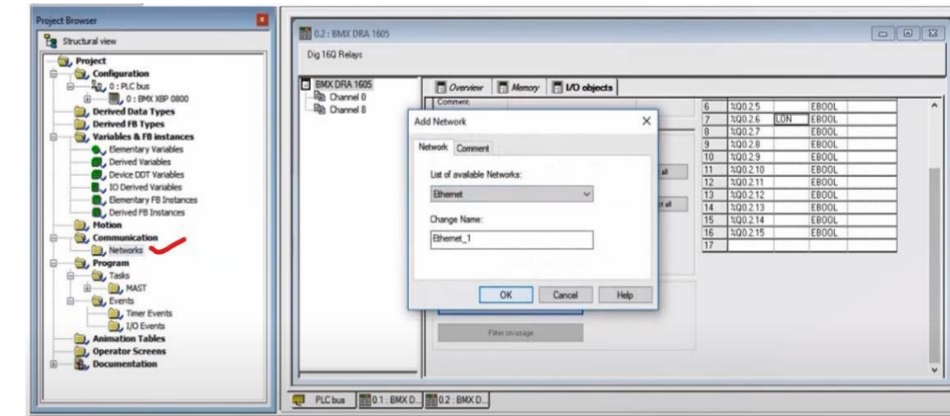
7. Similarly, set the output addresses and name any one address as LON (lamp on)



Exercise 8

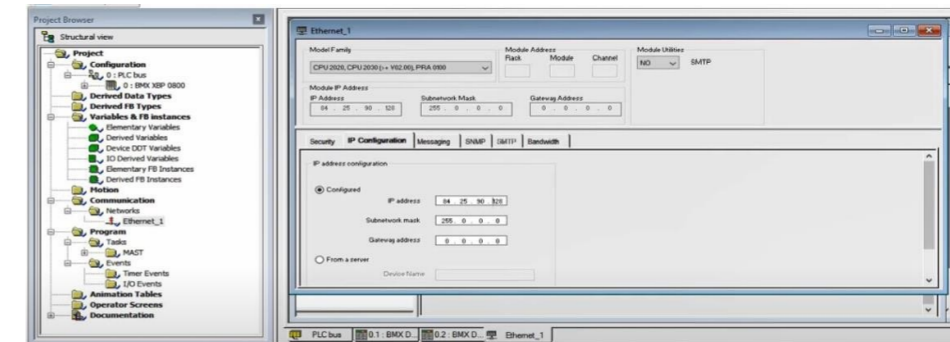
Ladder Logic using Up Counter in EcoStructure Control Expert

8. Click on the left panel, Communication>Network>New Network



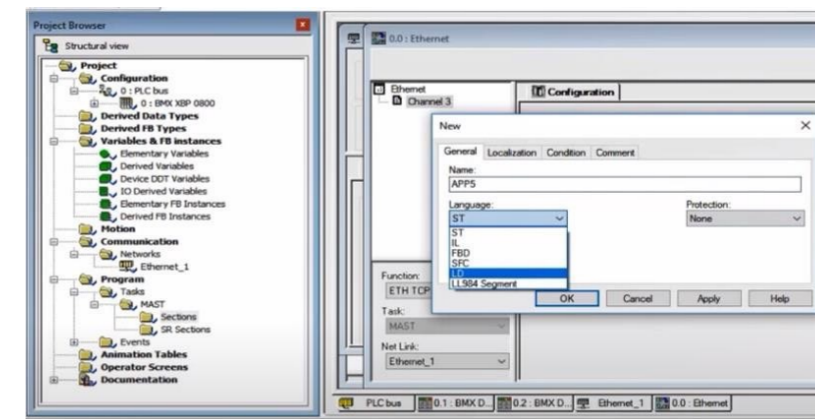
Select Ethernet.

9. Change IP configuration and validate in the PLC desk



10. To write the program, in the left panel- Program>Tasks>MAST>Sections

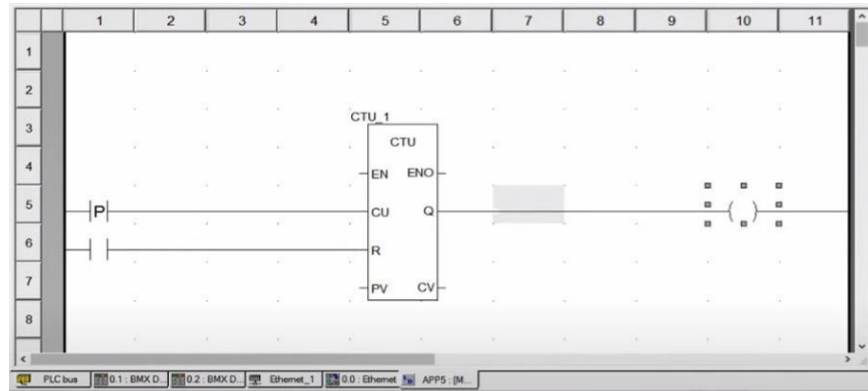
Select LD for Ladder programming.



Exercise 8

Ladder Logic using Up Counter in EcoStructure Control Expert

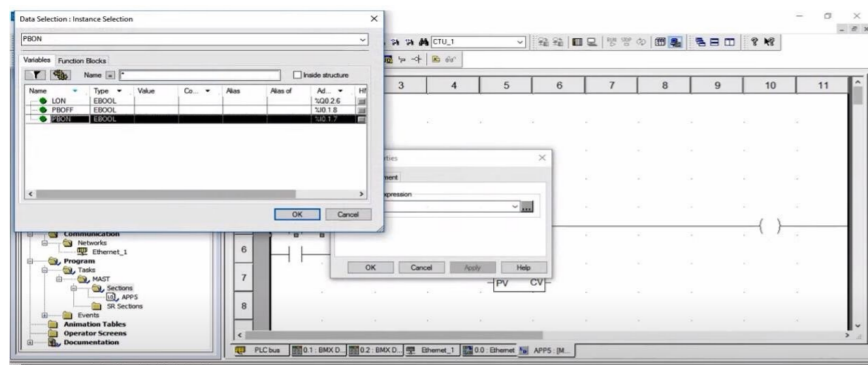
11. In the LD program panel, drag Up counter block and connect the inputs and output



Counter Block Pin Details

- CU – Count up
- R – Reset
- EN – Enable
- Q – Output
- ENO – Enable out
- CV – Count value

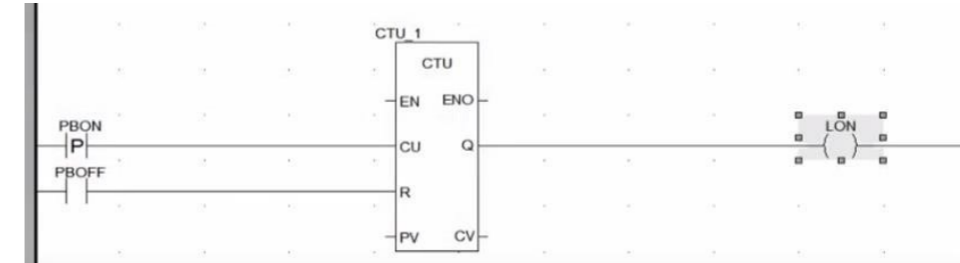
12. Add the addresses for the inputs and output



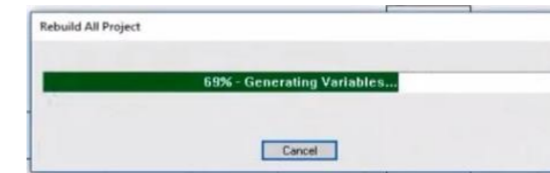
Exercise 8

Ladder Logic using Up Counter in EcoStructure Control Expert

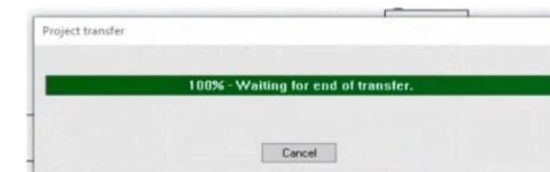
13. The addresses and labels are added to the inputs and output



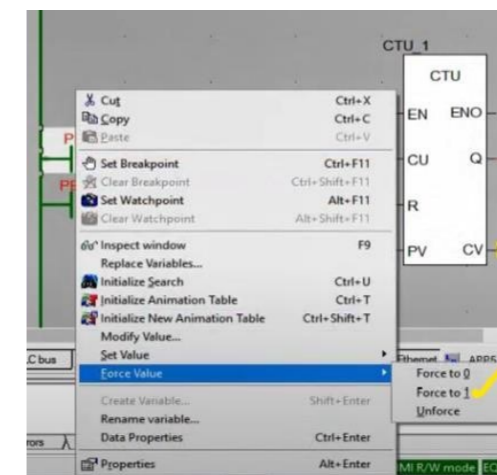
14. To count 5 pulses, set preset value to 5, by double clicking on PV
15. Rebuild the program



16. Connect PLC>Connect
17. Click PLC>Transfer Project



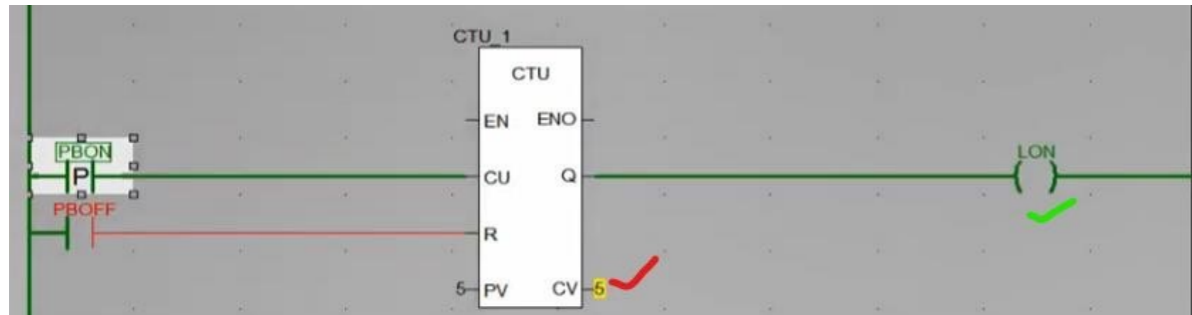
18. Once the project is built and transferred, it is ready for operation
19. Right click on PBON>Force Value>Force to 1



Exercise 8

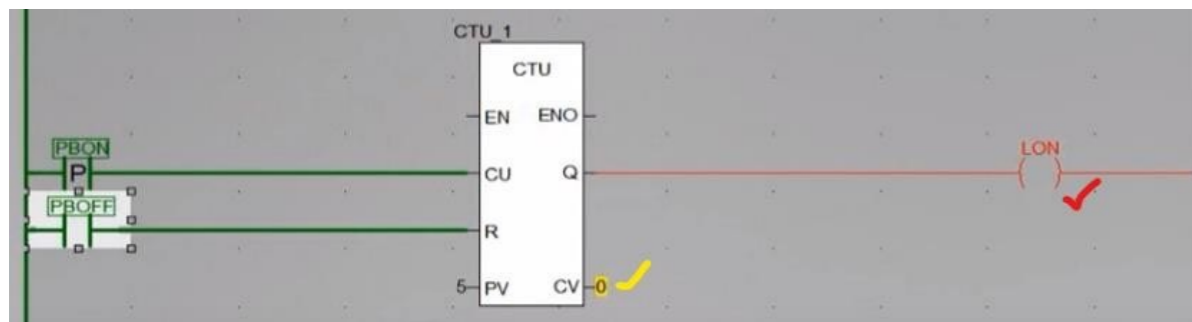
Ladder Logic using Up Counter in EcoStructure Control Expert

20. The CV becomes 1. As each time P value is set to 1, count value increments by 1



21. After 5 pulses, the lamp glows, indicated by the green line

22. To reset, right click on PBOFF>Force Value>Force to 1. The count value resets to 0, and the output line turns red, indicating there is no output

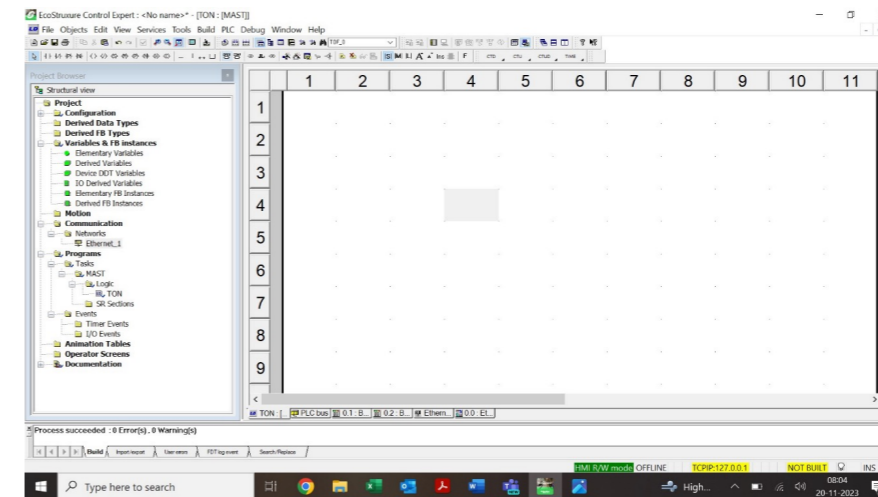


Exercise 9

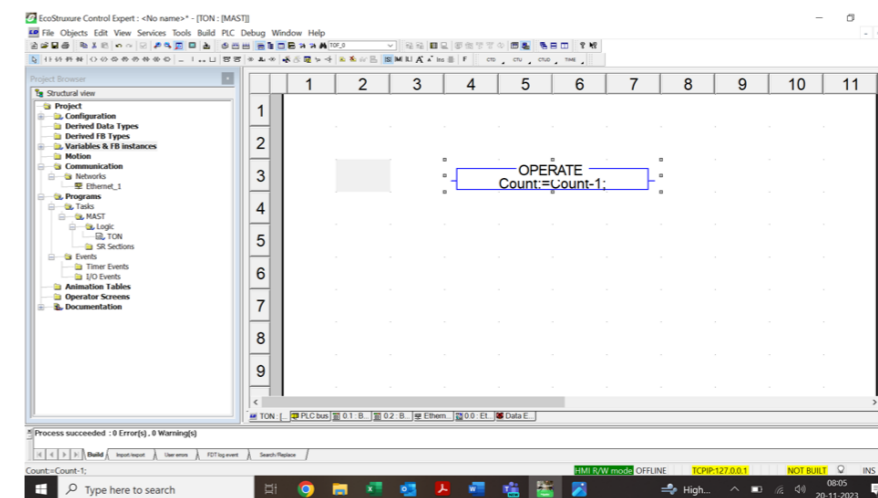
Ladder logic using Operate and Compare block in EcoStruxure Control Expert Environment

Procedure:

1. From the program page select the Operate block



2. Click on the operate block and place on the programming page

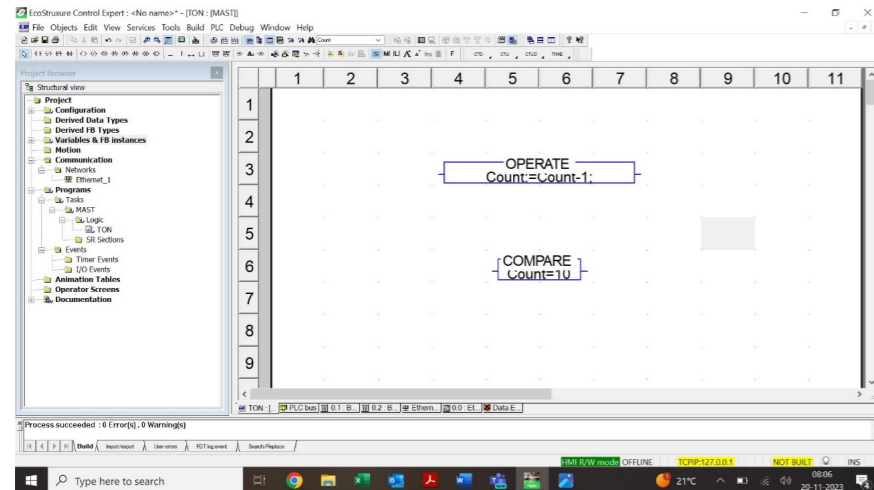


Note: Follow the Syntax: value:=Value XYZ

Exercise 9

Ladder logic using Operate and Compare block in EcoStruxure Control Expert Environment

3. Similarly the compare block can be included



4. Connect the input and output as per the application requirement
5. Follow the steps build, transfer and run of exercise 4 and 5

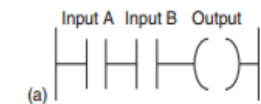
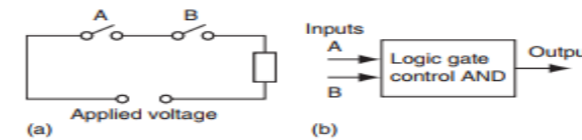
Exercise 10

Realisation of Logic Gates using Ladder Diagram

AND Gate

The below figure shows a situation where an output is not energized unless two, normally open, switches are both closed. Switch A and switch B have both to be closed, which thus gives an AND logic situation. We can think of this as representing a control system with two inputs A and B. Only when A and B are both on is there an output. Thus if we use 1 to indicate an on signal and 0 to represent an off signal, then for there to be a 1 output we must have A and B both 1. Such an operation is said to be controlled by a logic gate and the relationship between the inputs to a logic gate and the outputs is tabulated in a form known as a truth table. Thus for the AND gate we have:

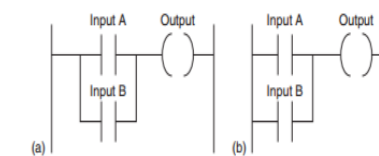
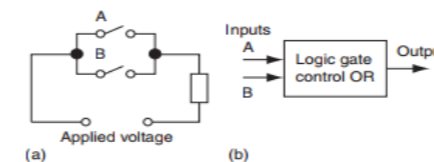
Inputs		Output
A	B	
0	0	0
0	1	0
1	0	0
1	1	1



OR Gate

The below figure shows an electrical circuit where an output is energized when switch A or B, both normally open, are closed. This describes an OR logic gate in that input A or input B must be on for there to be an output. The truth table is:

Inputs		Output
A	B	
0	0	0
0	1	1
1	0	1
1	1	1

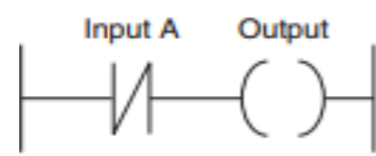
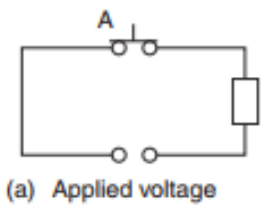


Exercise 10

Realisation of Logic Gates using Ladder Diagram

NOT Gate

The below figure shows an electrical circuit controlled by a switch that is normally closed. When there is an input to the switch, it opens and there is then no current in the circuit. This illustrates a NOT gate in that there is an output when there is no input and no output when there is an input. The gate is sometimes referred to as an inverter. The truth table is:

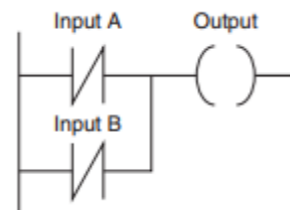
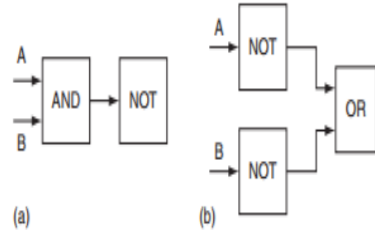


Input A	Output
0	1
1	0

NAND Gate

Suppose we follow an AND gate with a NOT gate in the below figure. The consequence of having the NOT gate is to invert all the outputs from the AND gate. An alternative, which gives exactly the same results, is to put a NOT gate on each input and then follow that with OR. The same truth table occurs, namely Both the inputs A and B have to be 0 for there to be a 1 output. There is an output when input A and input B are not 1. The combination of these gates is termed a NAND gate.

Inputs		Output
A	B	
0	0	1
0	1	1
1	0	1
1	1	0



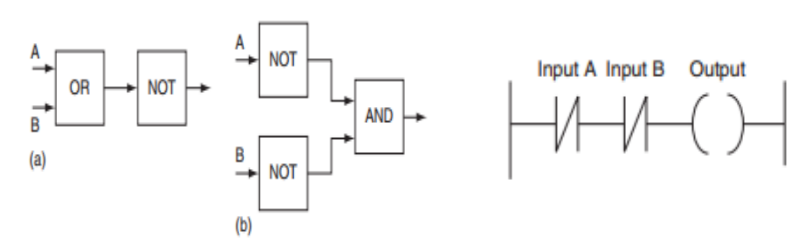
Exercise 10

Realisation of Logic Gates using Ladder Diagram

NOR Gate

Suppose we follow an OR gate by a NOT gate in the below figure. The consequence of having the NOT gate is to invert the outputs of the OR gate. An alternative, which gives exactly the same results, is to put a NOT gate on each input and then an AND gate for the resulting inverted inputs. The following is the resulting truth table:

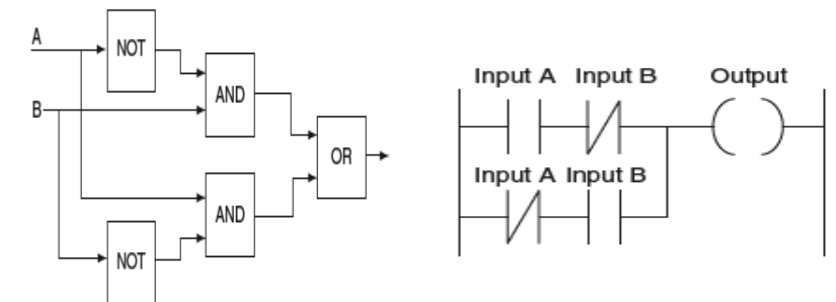
Inputs		Output
A	B	
0	0	1
0	1	0
1	0	0
1	1	0



Exclusive OR (XOR) Gate

The OR gate gives an output when either or both of the inputs are 1. Sometimes there is, however, a need for a gate that gives an output when either of the inputs is 1 but not when both are 1, i.e., has the truth table:

Inputs		Output
A	B	
0	0	0
0	1	1
1	0	1
1	1	0



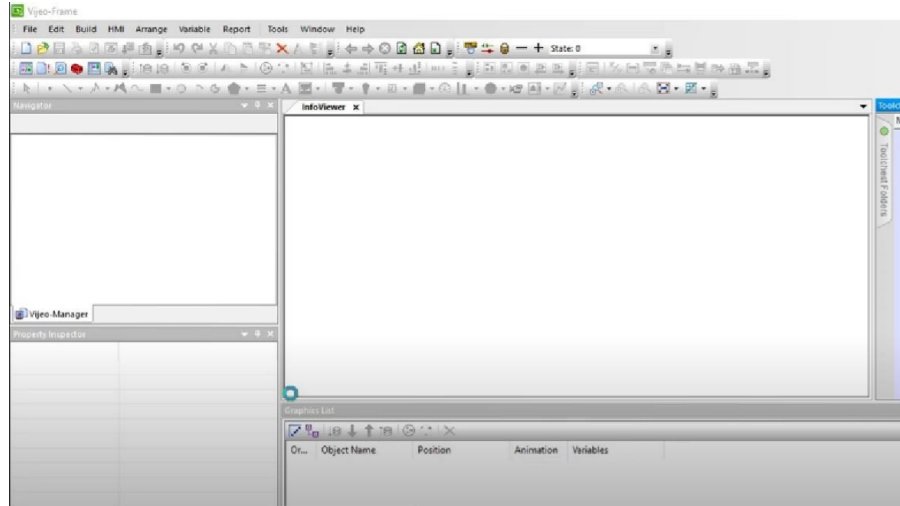
Such a gate is called an Exclusive OR or XOR gate. One way of obtaining such a gate is by using NOT, AND and OR gates as shown in Figure shows a ladder diagram for an XOR gate system. When input A and input B are not activated then there is 0 output. When just input A is activated, then the upper branch results in the output being 1. When just input B is activated, then the lower branch results in the output being 1. When both input A and input B are activated, there is no output. In this example of a logic gate, input A and input B have two sets of contacts in the circuits, one set being normally open and the other normally closed. With PLC programming, each input may have as many sets of contacts as necessary.

Exercise 11

Creating HMI Application using Vijeo Designer

Procedure

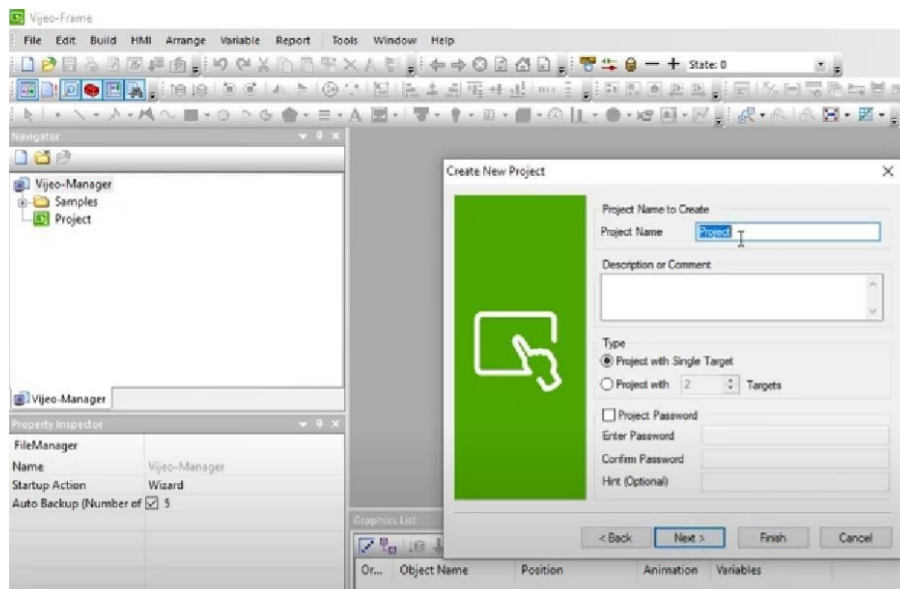
1. Launch Vijeo Designer software



Vijeo Designer interface

2. Create New Project and give a name

Type: Project with Single Target



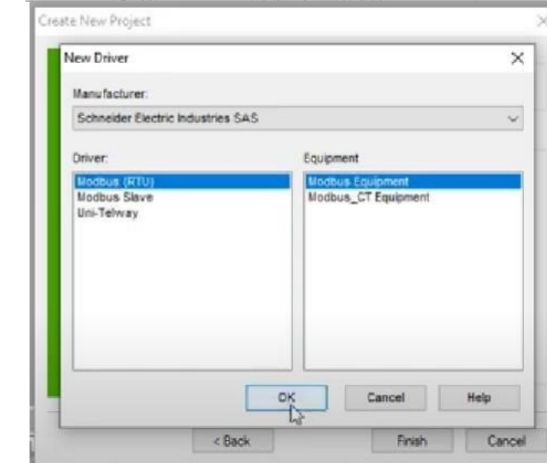
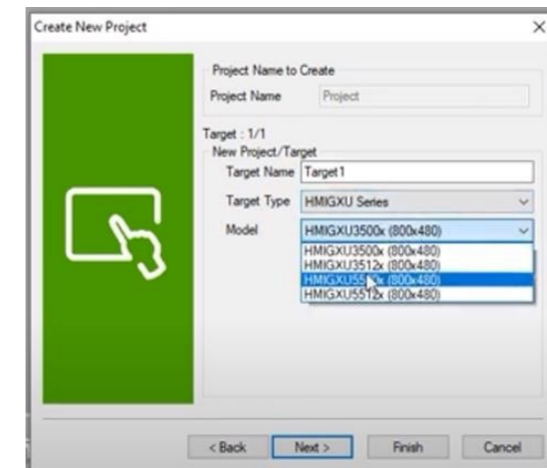
Create new project

Exercise 11

Creating HMI Application using Vijeo Designer

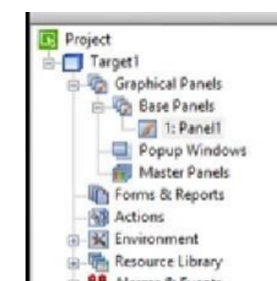
3. Give target name, type, and model

Set the driver.



Setting target parameters

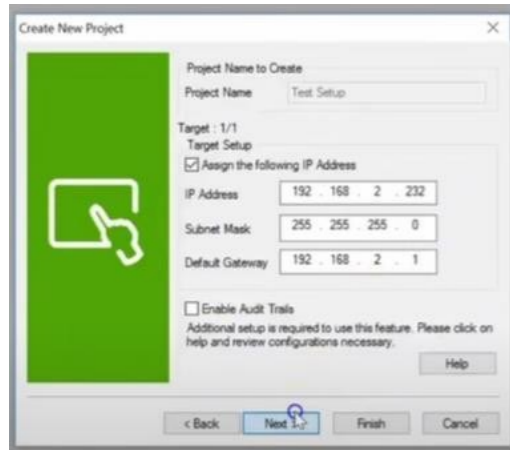
4. Project and targets are created as shown in the left panel



Exercise 11

Creating HMI Application using Vijeo Designer

5. Set the IP address

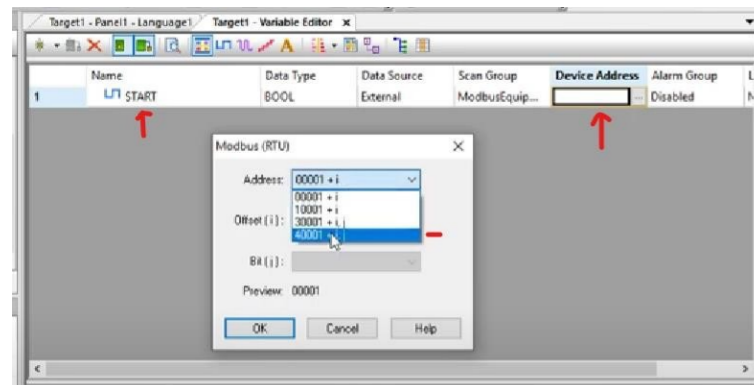
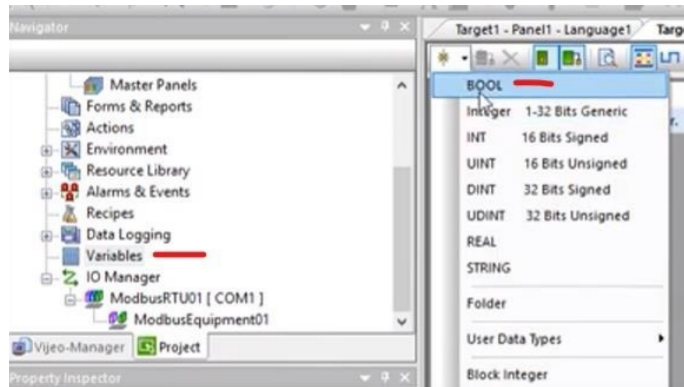


Setting the IP address of the PLC

6. Set the Modbus address in the Variable Editor

In the left panel, click Variables.

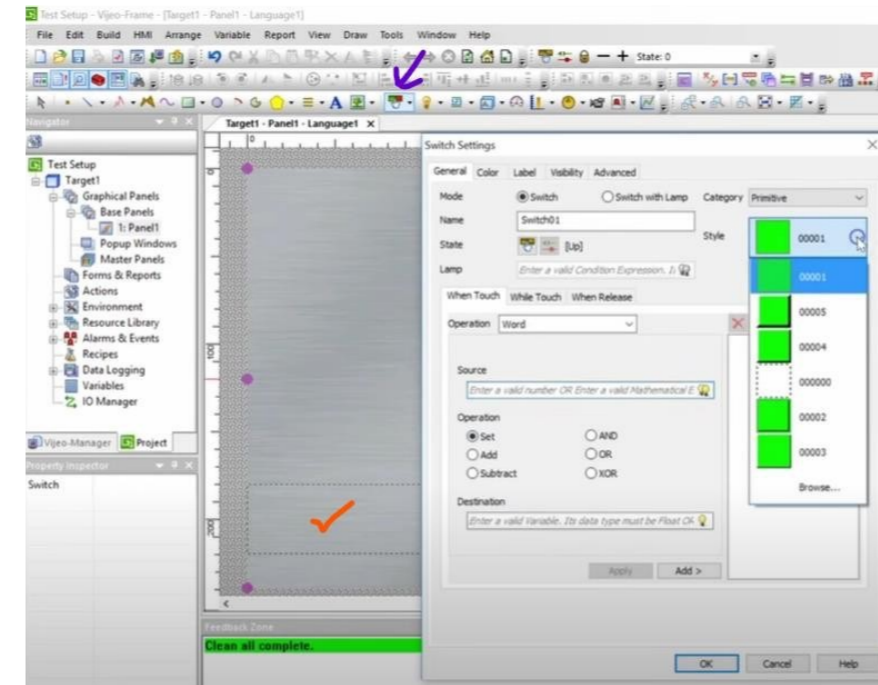
Select BOOL for Boolean variable.



Exercise 11

Creating HMI Application using Vijeo Designer

7. Click on Switch (blue arrow) and drag a rectangle (orange tick) to create a button

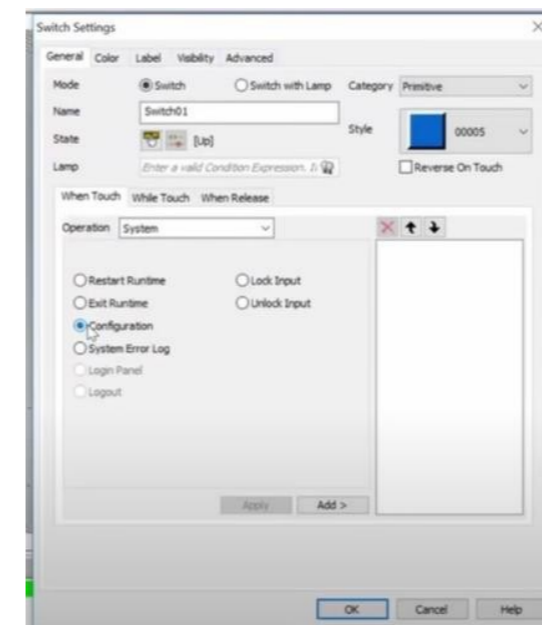


Creating buttons and setting parameters.

8. This is a system configuration button to change IP address using the HMI interface

Operation: System Select

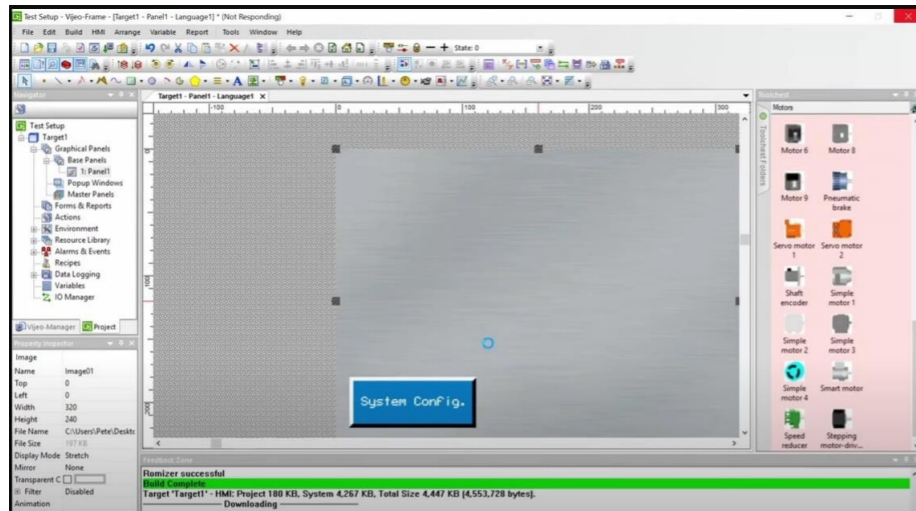
Configuration.



Exercise 11

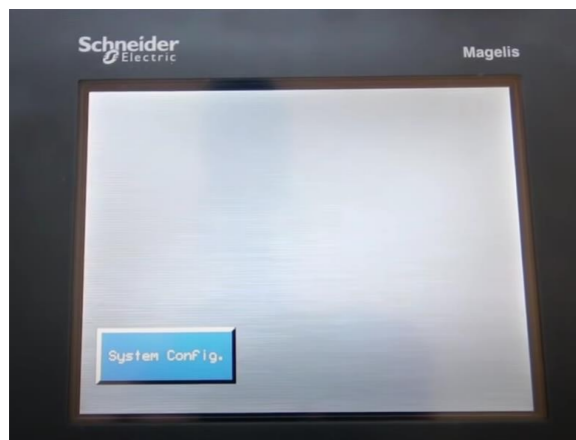
Creating HMI Application using Vijeo Designer

9. In Label tab, set the label type and display name for the button



Interface after creating a button

10. After saving and downloading the project to the system, it is displayed as follows:

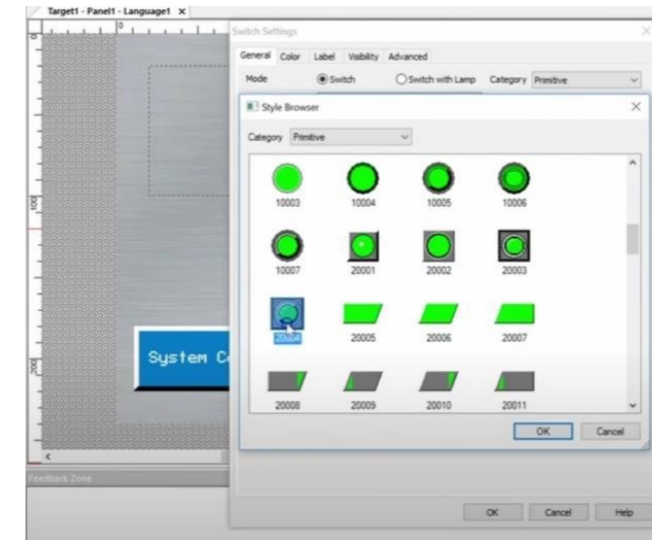


The HMI interface

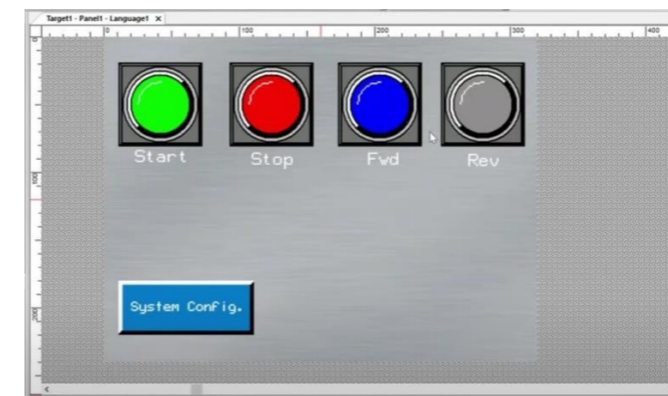
Exercise 11

Creating HMI Application using Vijeo Designer

11. Create more buttons by clicking on Switch icon. The styles can be changed in the style window



12. Duplicate to create copies. Right click on each button to change their properties. Text buttons can be used to give external labels to the buttons

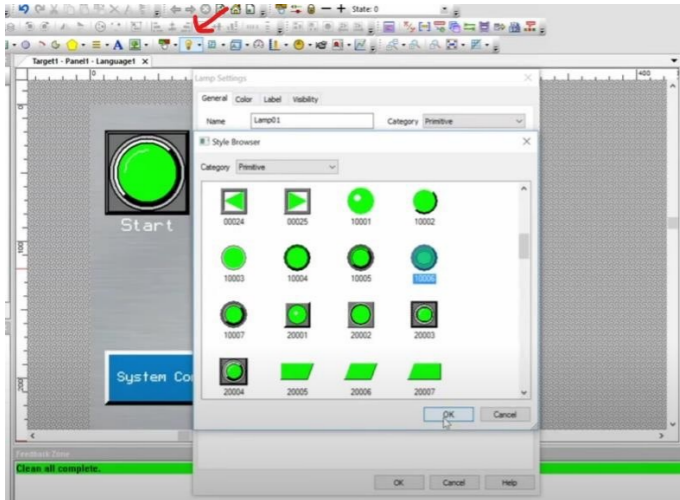


Properties such as colour of each button can be changed

Exercise 11

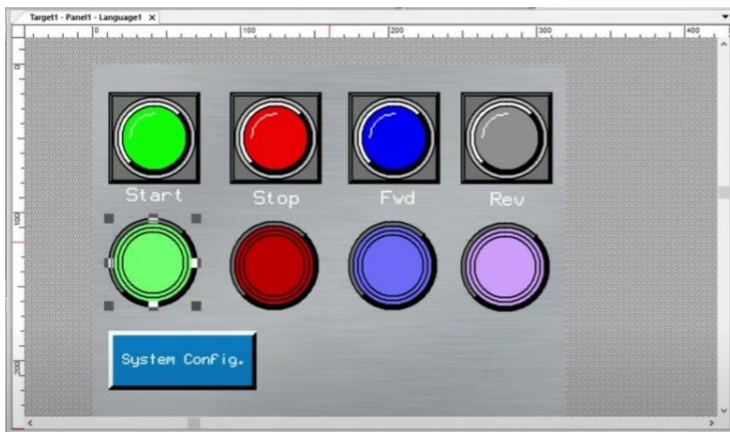
Creating HMI Application using Vijeo Designer

13. Create a lamp by clicking on lamp icon (red arrow). Change its style and other properties by right clicking on it



Adding lamp and changing its properties

14. Add more lamps and change their properties

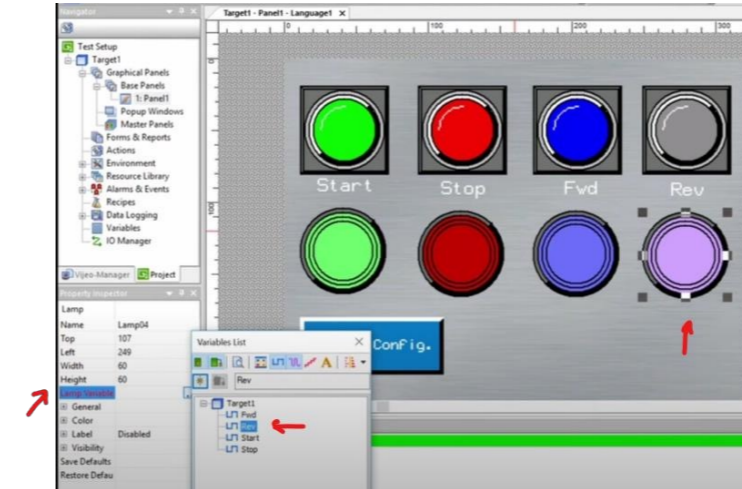


Interface with multiple buttons and lamps

Exercise 11

Creating HMI Application using Vijeo Designer

15. Set the variables for each lamp in the Variables panel.

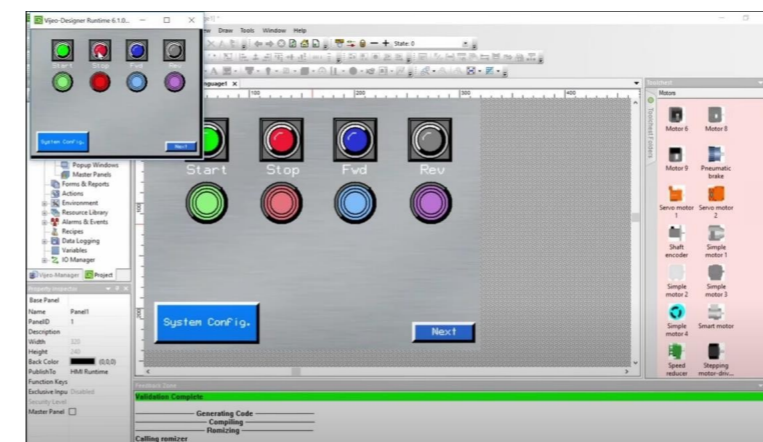


Changing the variables of each lamp

16. Build>Validate All Build>Build All



17. File>Simulation



Simulated model

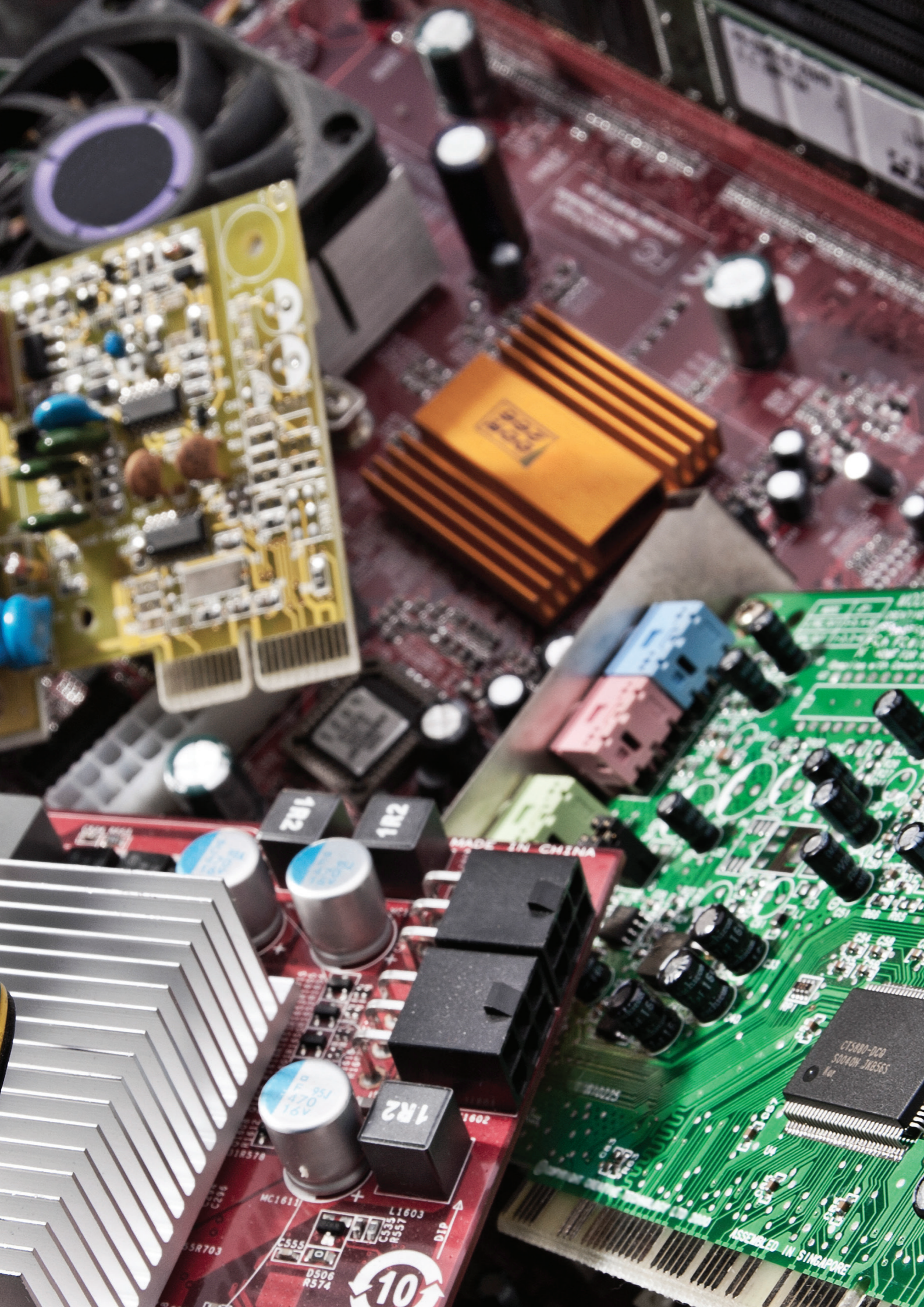
Exercise 11

Creating HMI Application using Vijeo Designer

18. Build>Download All

19. Display on the HMI screen






Electrical Wiring Diagram

Electrical Diagram File HMI and PLC Bench AET-P01-HPL

SCHNEIDER-22-23-128 PLC & HMI TRAINING KIT

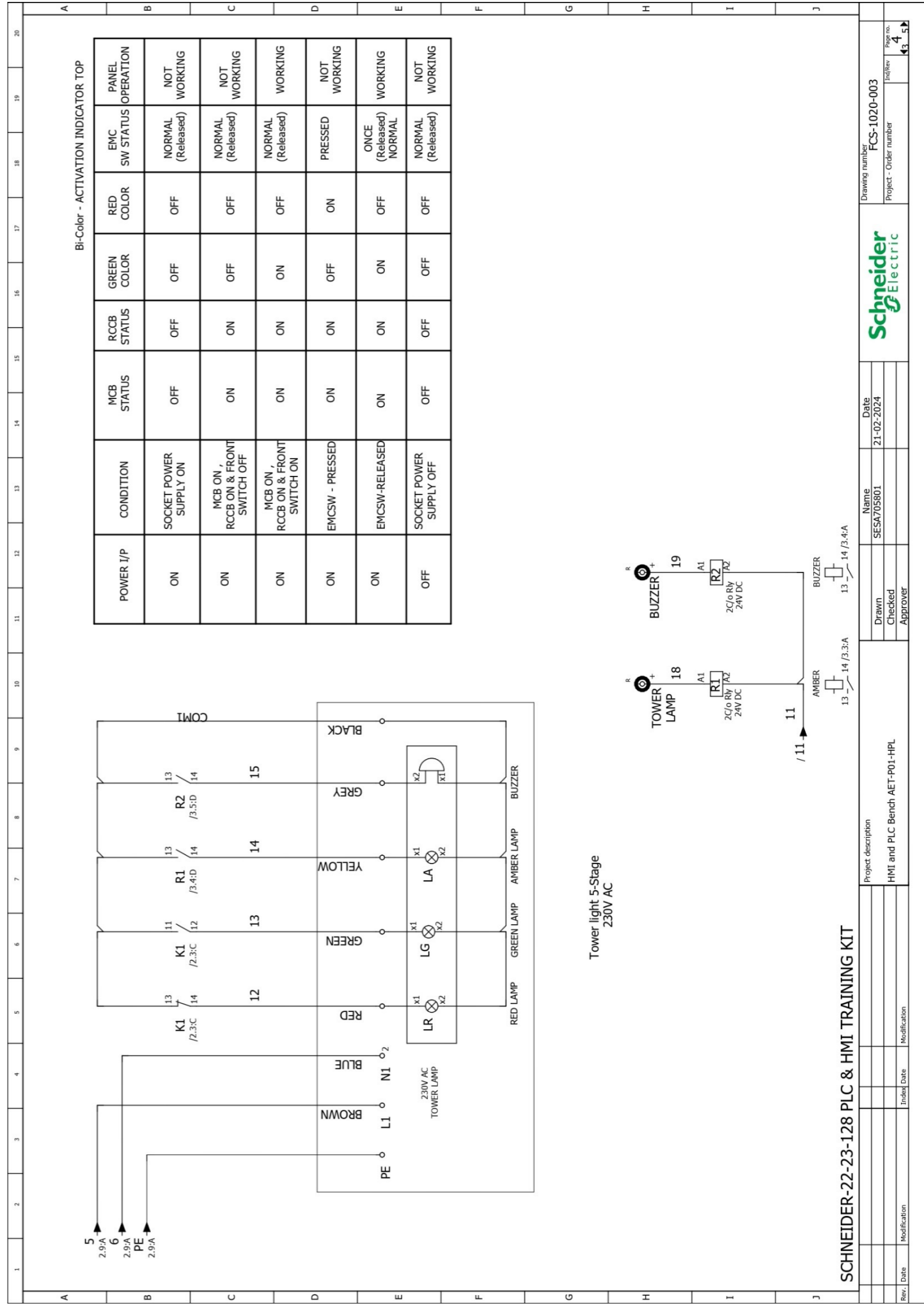
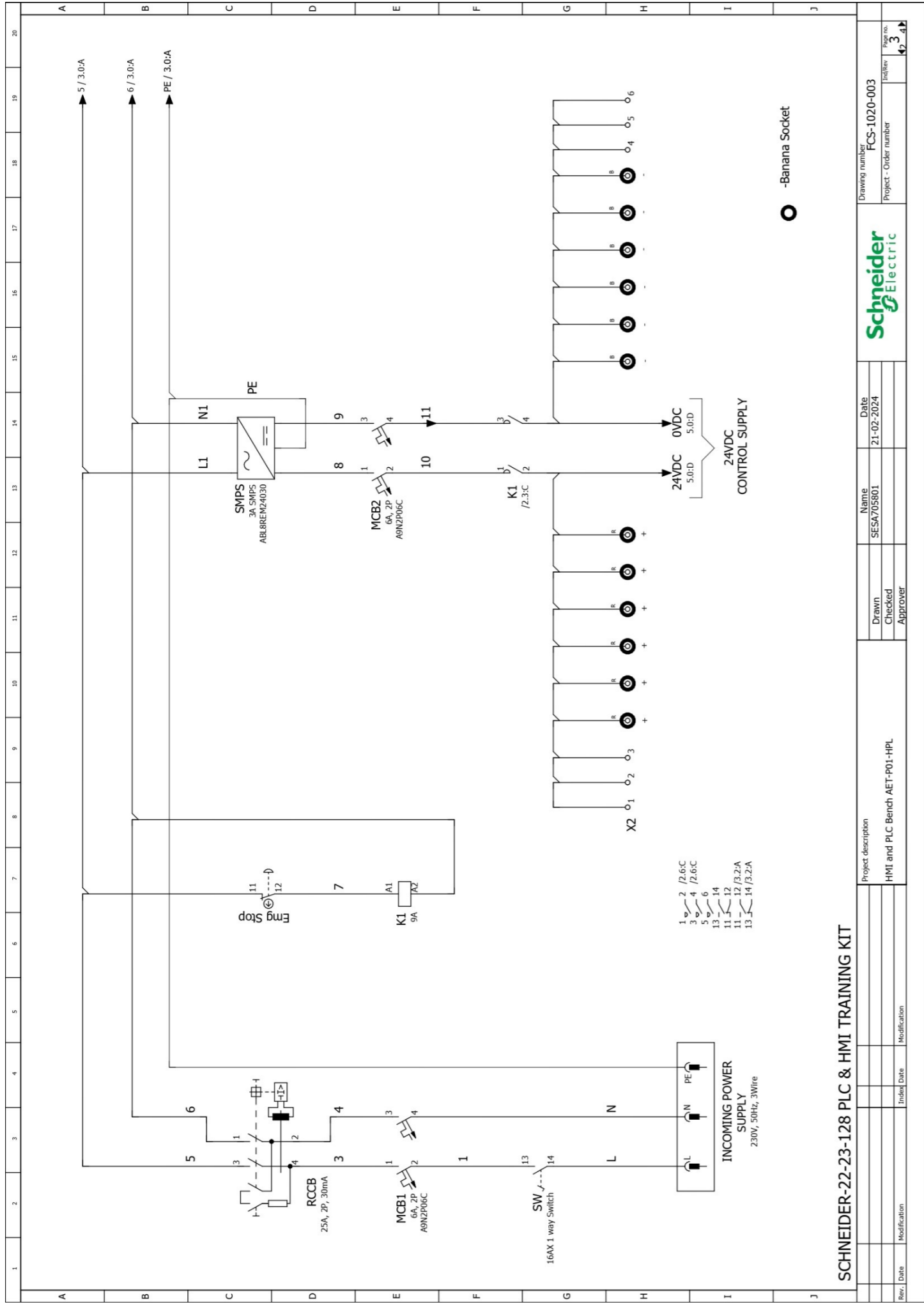
	Project	
Scale 1 : 1		Drawing number FCS-1020-003
Department	Project - Order N HMI and PLC Bench	Page no 1/10
Distribution code	Archivage Microfilm	
Name Drawn	Name Checked	Name Approver
55A705801		
Project revision description	Date	Date

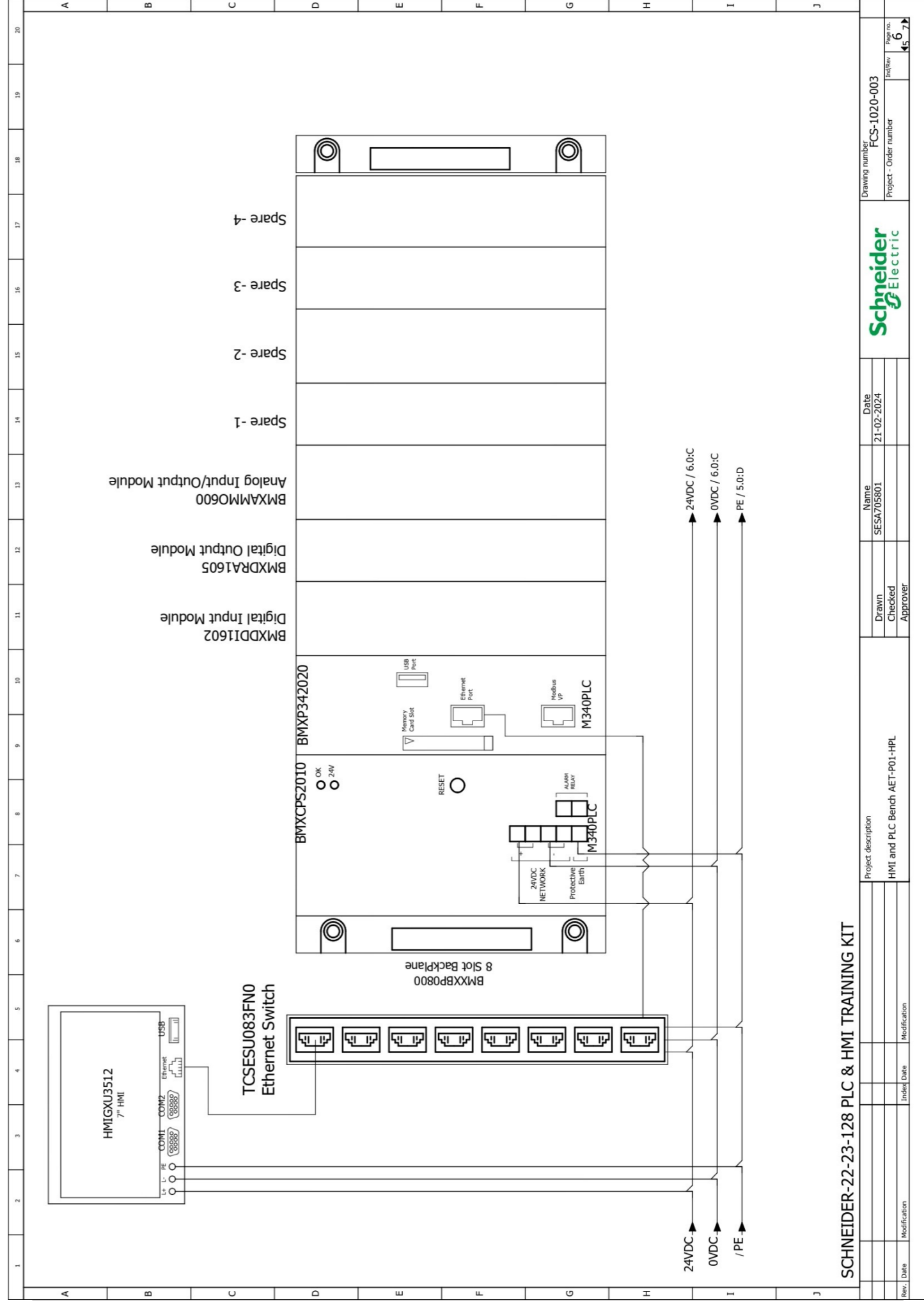
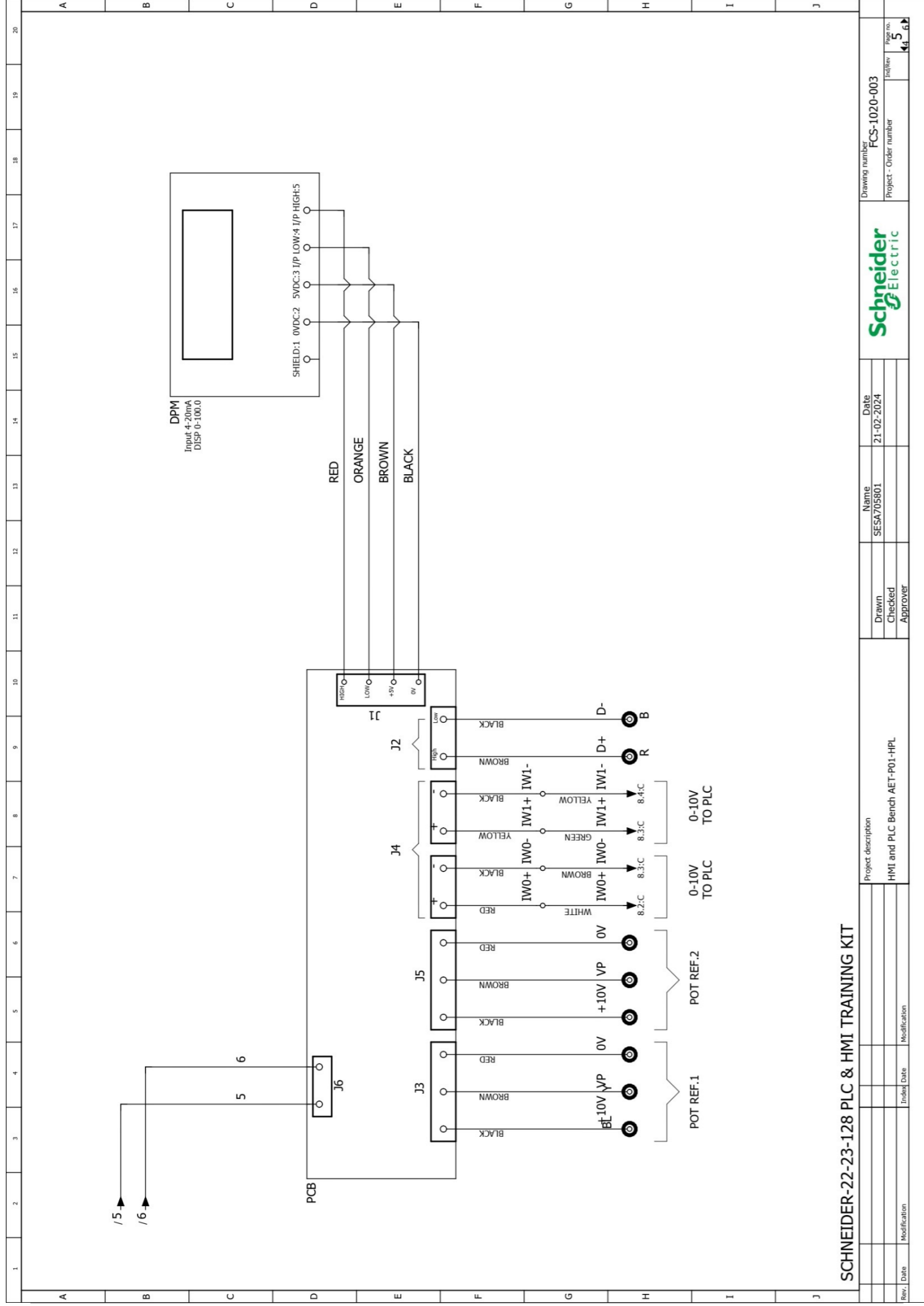
Parts list

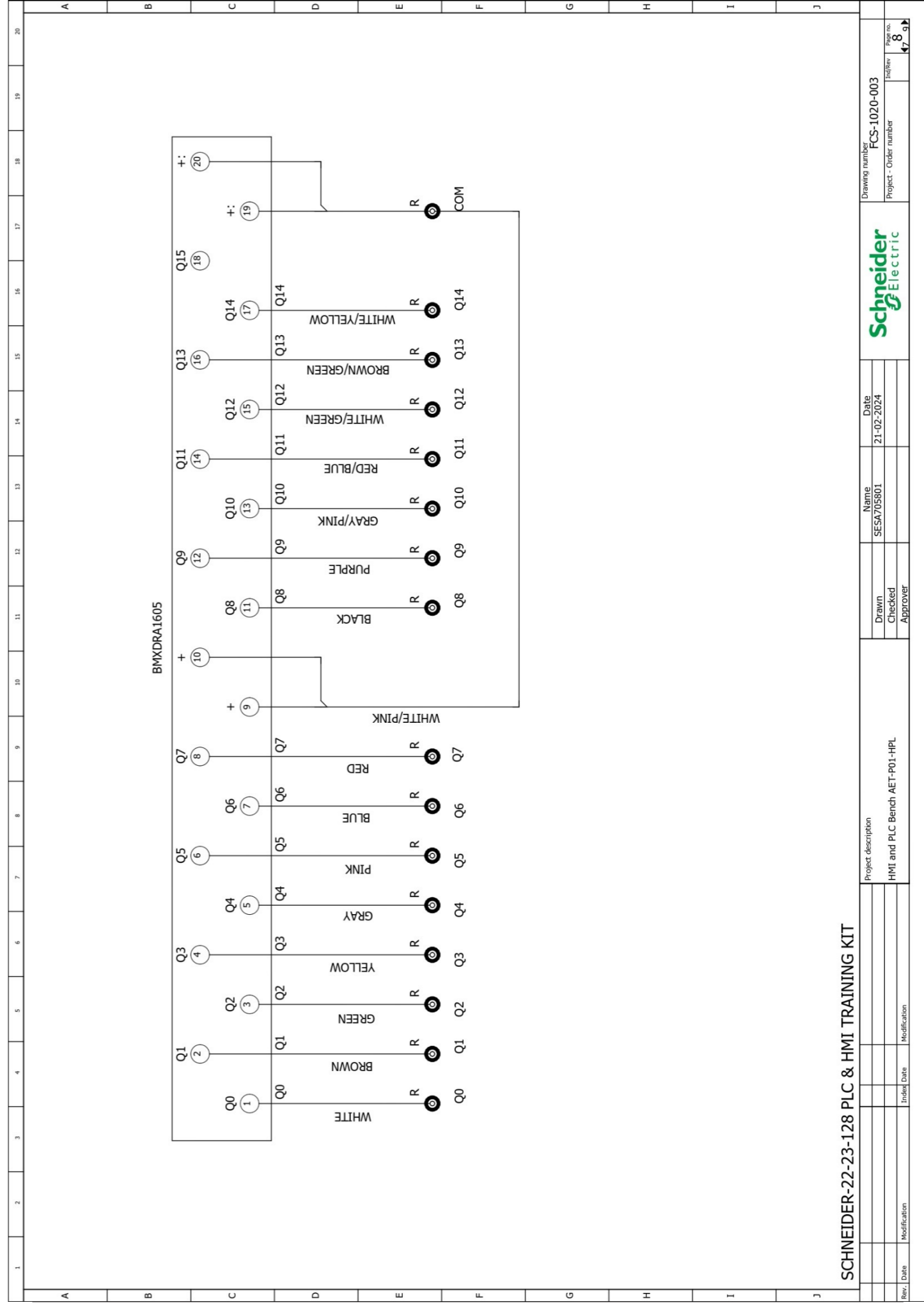
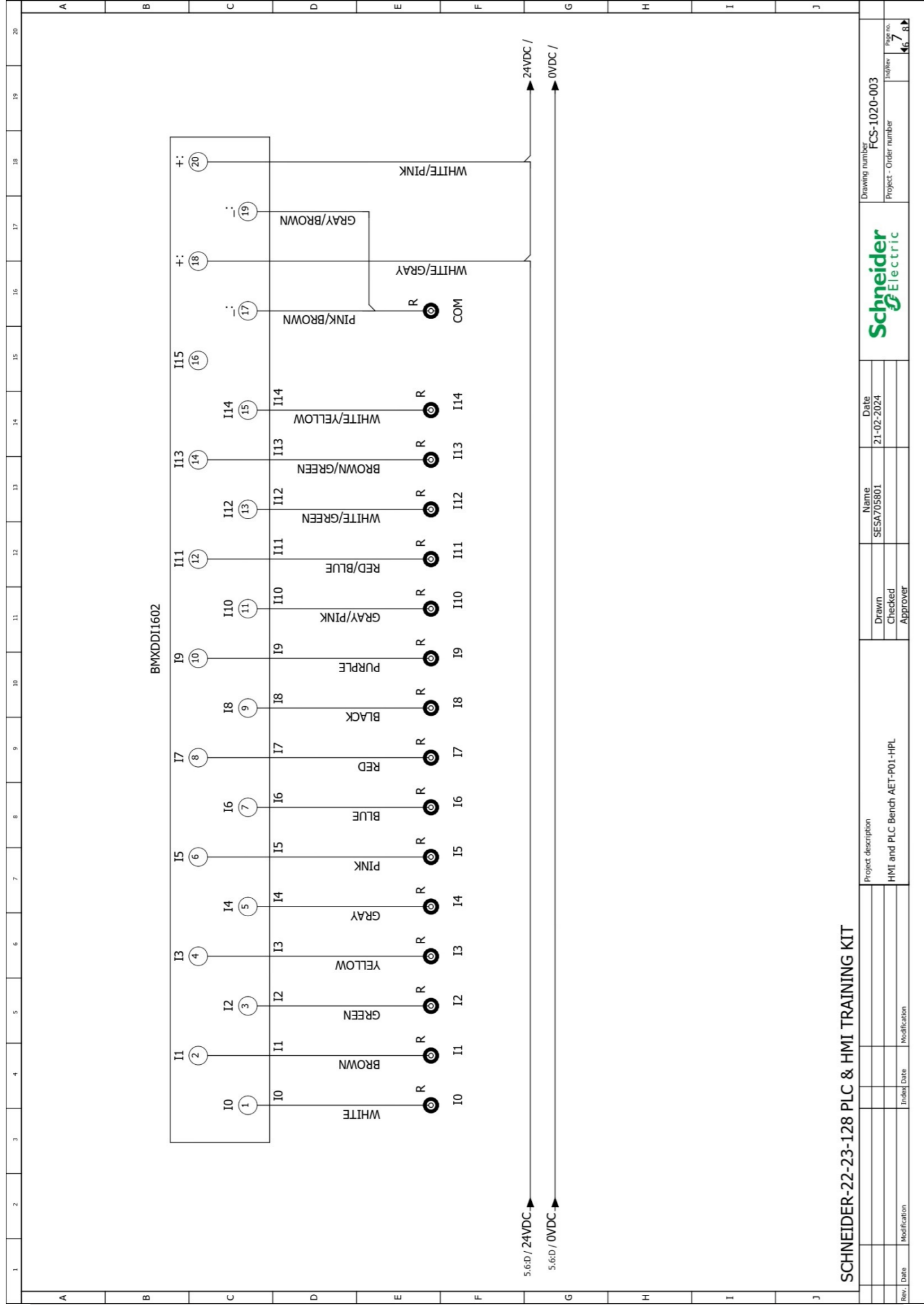
SI no	REFERENCES	DESIGNATION	POSITIONS	QUANTITY	PAGE NUM
1	Blue Banana Socket		/3.0:A	2	3
2	Green Banana Socket		/3.0:A	2	3
3	Red Banana Socket		/3.0:A	43	3
4	Yellow Banana Socket		/3.0:A	2	3
6	Black Banana Socket		/3.0:A	13	3
7	4 AI & 2 AO Module		/7.6:B	1	3
8	Terminal Block for AI & AO Module		/7.5:B;/7.6:B	3	3
9	Rack Power Supply Unit		/7.2:B	1	3
10	Processor module M340 - max 1024 discrete + 256 analog I/O - Modbus - Ethernet		/7.4:B	1	3
11	16 Channel DI Module		/7.5:B	1	3
12	16 Channel DO Module		/7.5:B	1	3
14	8 Slot BackPlane		/7.2:B	1	3
15	Emg.Stop Pushbutton, NC		/3.3:B	1	3
16	Touch Panel Screen 7" HMI		/7.0:A	1	3
17	9 Amps,Power Contactor 3P, Coil Supply : 220V AC		/3.3:B	1	3
18	6 Amps, 2 Pole MCB		/3.6:C	2	3
19	25 Amps ELCB		/3.1:C	1	3
20	3 Amps, SMPS		/3.6:B	1	3
21	32A,2P on/off switch		/3.1:B	1	3
22	Ethernet Switch- 8 Port		/7.1:B	1	3

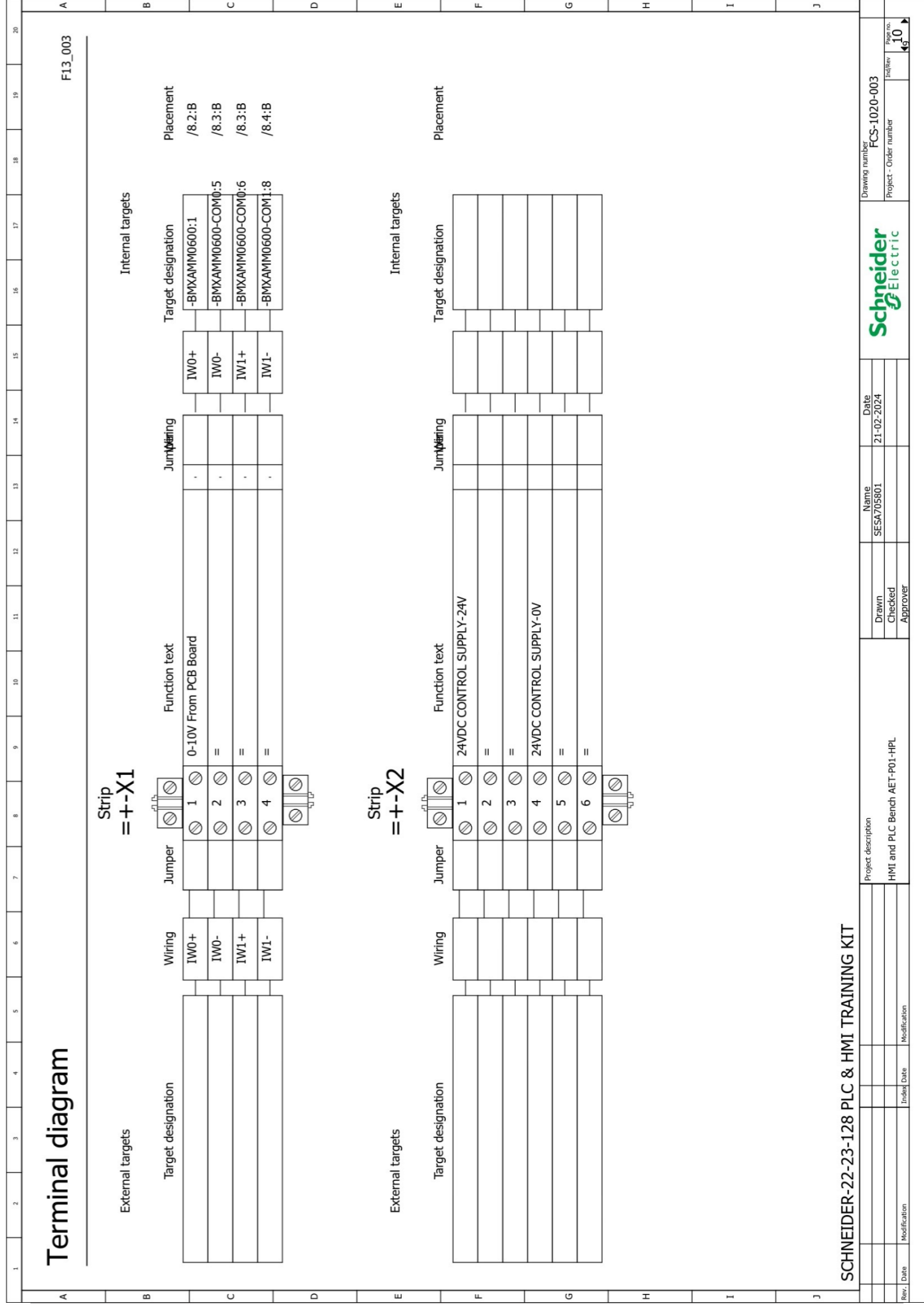
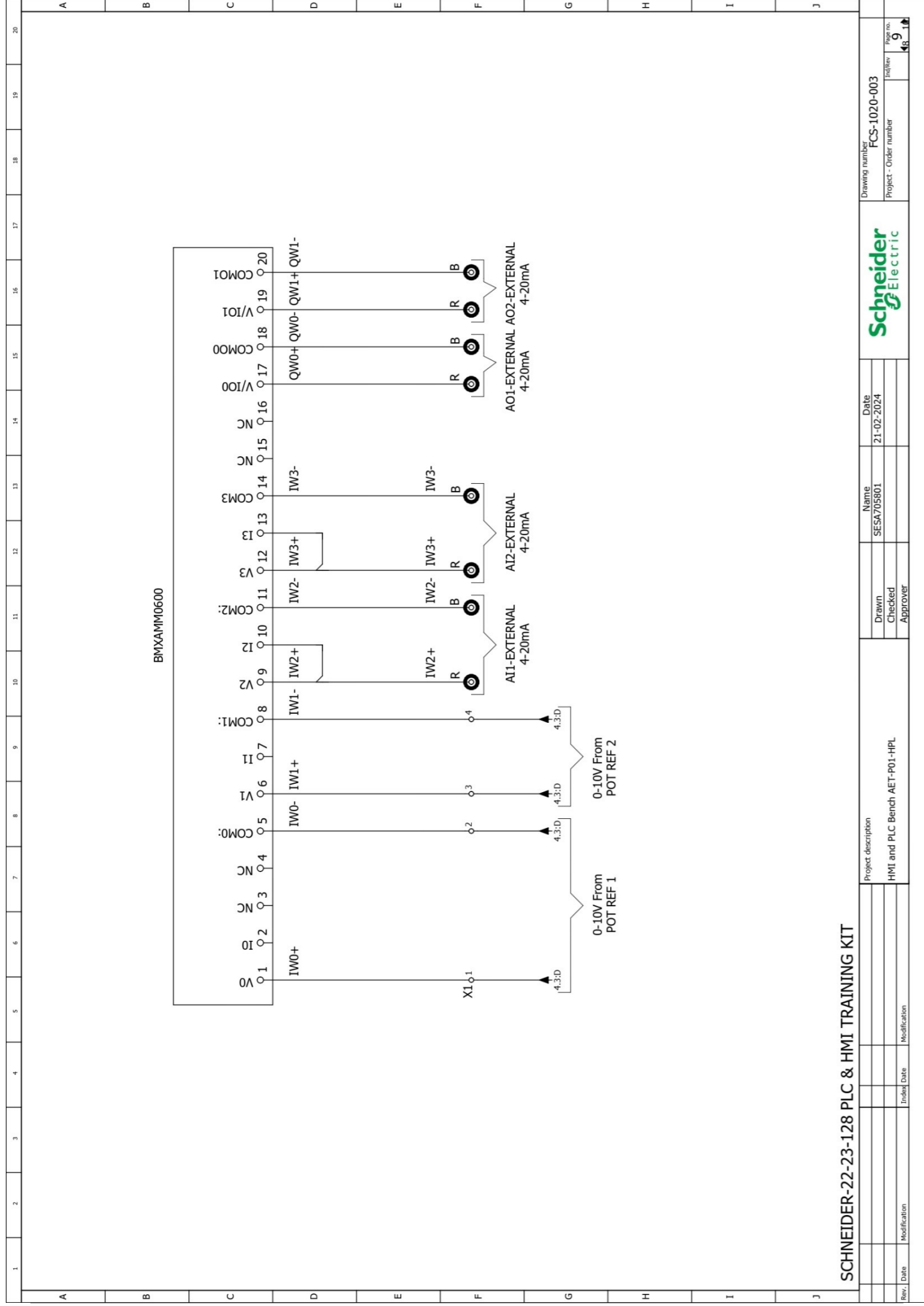
SCHNEIDER-22-23-128 PLC & HMI TRAINING KIT

	Project description	
Name Drawn	Name Checked	Name Approver
SESAT05801		
Date 22-02-2024	Date 22-02-2024	Date 22-02-2024
Drawing number FCS-1020-003	Project - Order number	Page no 1/2
Schneider Electric logo		











Technical Characteristics of the Constituents

H2 PLC M340

H4 Human Machine Interface

H8 DC Power Supply

BMXAMM0600

Mixed analog I/O module X80 - 4 inputs - 2 outputs



Product Data Sheet Characteristics

Main	
Range Of Product	Modicon X80
Product Or Component Type	Mixed analog I/O module
Electrical Connection	20 ways 1 connector
Isolation Between Channels	Non isolated
Input Level	High level
Analogue Input Number	4
Analogue Input Type	Current 0...20 mA Current 4...20 mA Voltage +/- 10 V Voltage 0...10 V Voltage 0...5 v Voltage 1...5 v
Complementary	
Analogue Input Resolution	12 bits 0...20 mA 12 bits 0...5 V 12 bits 1...5 V 12 bits 4...20 mA 13 bits 0...10 V 14 bits +/- 10 V
Permitted Overload On Inputs	+/- 30 mA 0...20 mA +/- 30 mA 4...20 mA +/- 30 V +/- 10 V +/- 30 V 0.10 V +/- 30 V 0.5 V +/- 30 V 1.5 V
Input Impedance	250 Ohm

BMXAMM0600

Mixed analog I/O module X80 - 4 inputs - 2 outputs

Precision Of Internal Conversion Resistor	0.1 % - 15 ppm/°C
Type Of Filter	First order digital filtering by firmware
Fast Read Cycle Time	1 ms + 1 ms x number of channels used
Nominal Read Cycle Time	5 ms for 4 channels
Current Consumption	3.2 W 24 V DC maximum
	0.35 W 3.3 V DC typical
	0.48 W 3.3 V DC maximum
	240 mA at 3.3 V DC
Temperature Drift	0.25 % of full scale 4...20 mA 25 °C output
	<= 0.35 % of full scale +/- 10 V 0...60 °C input
	<= 0.35 % of full scale 0...10 V 0...60 °C input
	<= 0.35 % of full scale 0...5 V 0...60 °C input
	<= 0.35 % of full scale 1.5 V 0...60 °C input
	<= 0.5 % of full scale 0...20 mA 0...60 °C input
	<= 0.5 % of full scale 4...20 mA 0...60 °C input
	<= 0.6% of full scale +/- 10 V 0...60 °C output
	<= 0.6 % of full scale 0...20 mA 0...60 °C output
	<= 0.6% of full scale 4...20 mA 0...60 °C output
	0.25% of full scale +/- 10 V 25 °C output
	0.25 % of full scale +/- 10 V 25 °C input
0.25 % of full scale 0...10 V 25 °C input	
0.25% of full scale 0...5 V 25 °C input	
0.25 % of full scale 1.5 V 25 °C input	
0.35 % of full scale 0...20 mA 25 °C input	
0.35% of full scale 4. 20 mA 25 °C	
Recalibration	100 ppm/°C +/- 10 V output
	100 ppm/°C 0...20 mA output
	100 ppm/°C 4...20 mA output
	30 ppm/°C +/- 10 V input
	30 ppm/°C 0...10 V input
	30 ppm/°C 0...5 V input
	30 ppm/°C 1...5 V input
	50 ppm/°C 0...20 mA input
50 ppm/°C 4.20 mA input	
Minimum Crosstalk Attenuation	70 dB
Common Mode Rejection	80 dB
Isolation Voltage	1400 V DC between channels and ground
	1400 V DC between channels and bus
	750 V DC between group of I/O channels
Output Level	High level

BMXAMM0600

Mixed analog 1/0 module X80 - 4 inputs - 2 outputs

Analogue Output Number	2
Analogue Output Type	Current: 0...20 mA Current: 4...20 mA Voltage: +/- 10 V
Analogue Output Resolution	11 bits, 0... 20 mA 11 bits, 4... 20 mA 12 bits, + 10 V
Conversion Time	<= 2 ms
Maximum Conversion Value	+ - 11.25 V +/- 10 V output +/- 11.25 V +/- 10 V input 0...30 mA 0...20 mA input 0...30 mA 4...20 mA input +/- 11.25 V 0...10 V input +/- 11.25 V 0...5 V input +/- 11.25 V 1...5 V input 0.24 mA 0...20 mA output 0.24 mA 4.20 mA output
Fallback Mode	Predefined Configurable
Mtbf Reliability	1400000 H
Operating Altitude	0...2000 m 2000...5000 m with derating factor
Status Led	1 LED (green) RUN 1 LED per channel (green) channel diagnostic 1 LED (red) ERR 1 LED (red) 1/0
Net Weight	0.155 kg

Environment

Vibration Resistance	3 gn
Shock Resistance	30 gr
Ambient Air Temperature For Storage	-40...85 °C
Ambient Air Temperature For Operation	0...60 °C
Relative Humidity	5...95% at 55 °C without condensation
Ip Degree Of Protection	IP20
Directives	2014/35/EU - low voltage directive 2014/30/EU - electromagnetic compatibility
Product Certifications	CE RCM CSA EAC Merchant Navy UL

BMXAMM0600

Mixed analog 1/0 module X80 - 4 inputs - 2 outputs

Standards	EN/EC 61010-2-201 EN/EC 61131-2 UL 61010-2-201 CSA C22.2 No 61010-2-201
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Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	5.500 cm
Package 1 Width	11.000 cm
Package 1 Length	11.600 cm
Package 1 Weight	171.000 g
Unit Type Of Package 2	S02
Number Of Units In Package 2	15
Package 2 Height	15.000 cm
Package 2 Width	30.000 cm
Package 2 Length	40.000 cm
Package 2 Weight	2.882 kg
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. Rohs Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

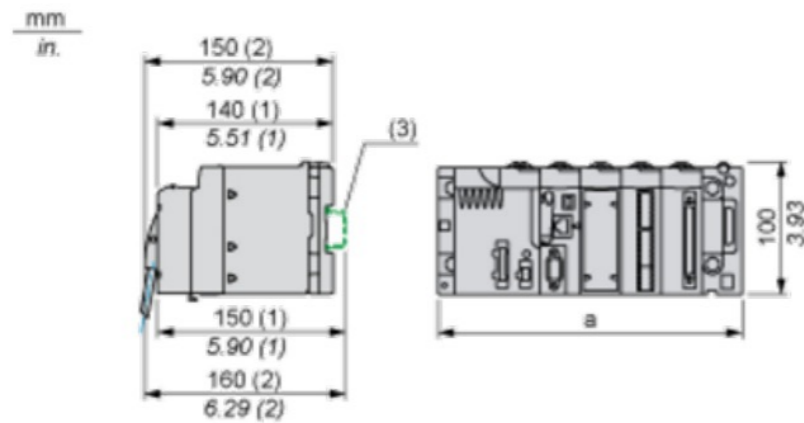
BMXAMM0600

Mixed analog 1/0 module X80 - 4 inputs - 2 outputs

Dimensions Drawings:

Modules Mounted on Racks

Dimensions



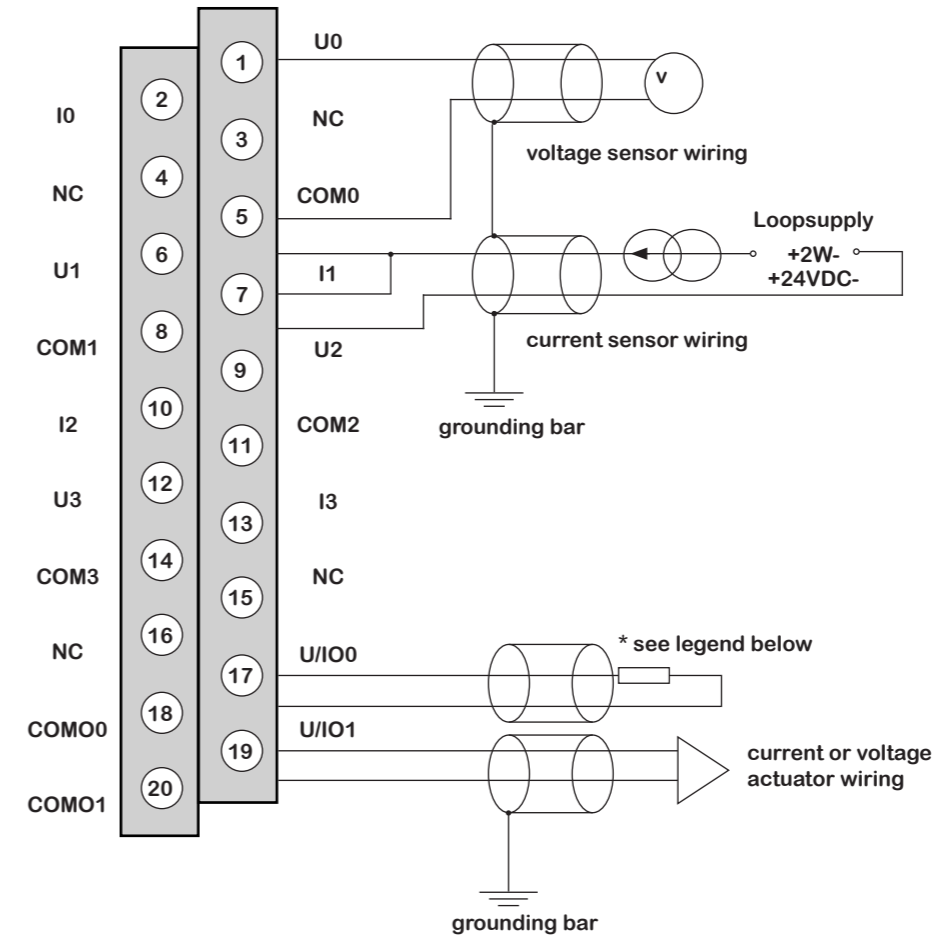
- (1) With removable terminal block (cage, screw or spring).
- (2) With FCN connector.
- (3) On AM1 ED rail: 35 mm wide, 15 mm deep. Only possible with BMXXBP0400/0400H/0600/0600H/0800/0800H rack.

Rack references	a in mm	a in in.
BMXXBP0400 and BMXXBP0400H	242.4	09.54
BMXXBP0600 and BMXXBP0600H	307.6	12.11
BMXXBP0800 and BMXXBP0800H	372.8	14.68
BMXXBP1200 and BMXXBP1200H	503.2	19.81

BMXAMM0600

Mixed analog 1/0 module X80 - 4 inputs - 2 outputs

Cabling view



- U_x +** pole input for channel x
- COM_x -** pole input for channel x
- U/IO_x +** pole output for channel x
- COMO_x -** pole output for channel x
- * The current loop is self-powered by the output and does not request any external supply.

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W



Product Data Sheet Characteristics

Main	
Range Of Product	Mocicon X80
Product Or Component Type	Power supply module
Backplane Compatibility	Not compatible with BMEXBP.02
Primary Voltage	24 V isolated
Supply Circuit Type	DC
Secondary Power	16.8 W 24 V DC VO module power supply and processor 8.3 W 3.3 V DC I/O module logic power supply
Complementary	
Primary Voltage Limit	18.31.2 V
Input Current	1 A 24 V
Inrush Current	30 A 24 V
PT On Activation	0.6 A.s 24 V
It On Activation	0.15 A.s 24 V
Mtbf Reliability	4886000 H
Protection Type	Internal fuse not accessible for primary circuit Overload protection for secondary circuit, 24 V sensor power supply Overvoltage protection for secondary circuit, 24 V sensor power supply Short-circuit protection for secondary circuit, 24 V sensor power supply
Current At Secondary Voltage	0.7 A 24 V DC I/O module power supply and processor 2.5 A 3.3 V DC I/O module logic power supply
Maximum Power Dissipation In W	8.5 W
Status Led	1 LED (green) rack voltage OK
Control Type	RESET push-button cold restart

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

Electrical Connection	1 connector 2 pin(s) alarm relay 1 connector 5 pin(s) line supply, protective earth, 24 V DC input sensor
Maximum Cable Distance Between Devices	20 m power supply cable copper 1.5 mm? 30 m power supply cable copper 2.5 mm?
Insulation Resistance	>= 10 MOhm primary/ground >= 10 MOhm primary/secondary
Net Weight	0.29 kg

Environment	
Immunity To Microbreaks	1 ms
Dielectric Strength	1500 V primary/ground 1500 V primary/secondary
Shock Resistance	30 gn
Ip Degree Of Protection	IP20
Directives	2014/35/EU - low voltage directive
Ambient Air Temperature For Storage	2014/30/EU - electromagnetic compatibility
Ambient Air Temperature For Operation	-40...85 °C 0...60 °C
Relative Humidity	5...95 % at 55 °C without condensation
Protective Treatment	TC
Operating Altitude	0...2000 m 2000. 5000 m with derating factor

Packing Units	
Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	13.238 cm
Package 1 Width	15.451 cm
Package 1 Length	15.597 cm
Package 1 Weight	420.0 g
Unit Type Of Package 2	S04
Number Of Units In Package 2	12
Package 2 Height	30 cm
Package 2 Width	40 cm
Package 2 Length	60 cm
Package 2 Weight	6.31 kg
Unit Type Of Package 3	P06
Number Of Units In Package 3	48
Package 3 Height	75 cm
Package 3 Width	60 cm
Package 3 Length	80 cm
Package 3 Weight	32 kg

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

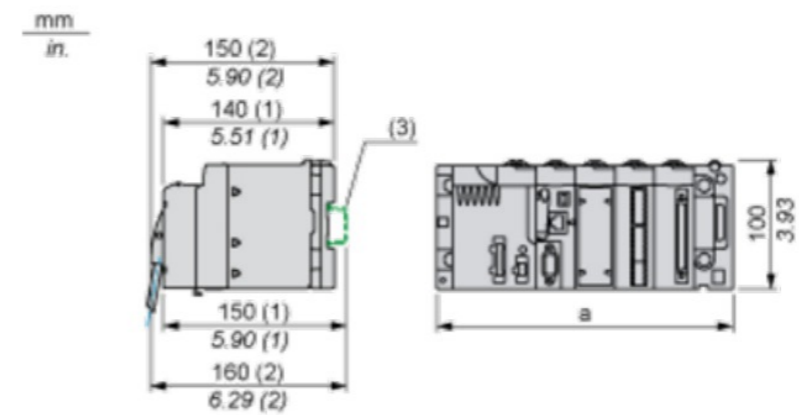
Contractual warranty

Warranty	18 months
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. RoHS Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China RoHS Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

Dimensions Drawings:

Modules Mounted on Racks

Dimensions



(1) With removable terminal block (cage, screw or spring).

(2) With FCN connector.

(3) On AM1 ED rail: 35 mm wide, 15 mm deep. Only possible with BMXXBP0400/0400H/0600/0600H/0800/0800H rack.

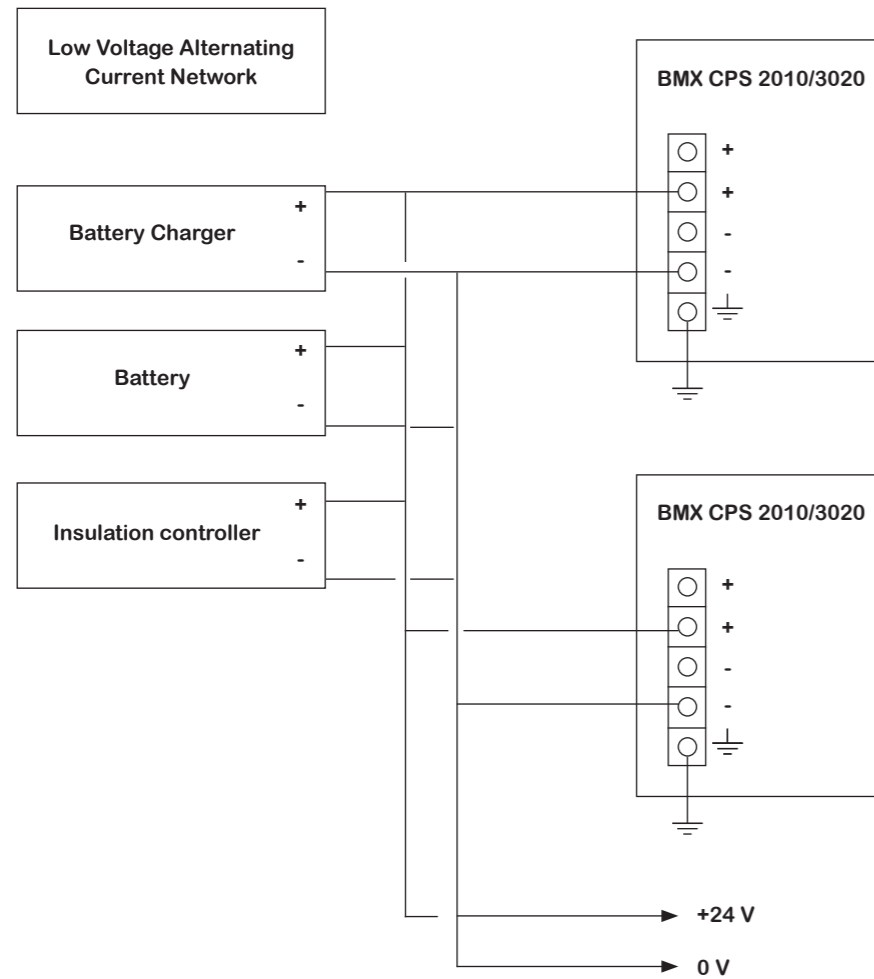
Rack references	a in mm	a in in.
BMXXBP0400 and BMXXBP0400H	242.4	09.54
BMXXBP0600 and BMXXBP0600H	307.6	12.11
BMXXBP0800 and BMXXBP0800H	372.8	14.68
BMXXBP1200 and BMXXBP1200H	503.2	19.81

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

Connections and Schema

Connection of Direct Current Power Supply Modules to a 24 Vdc or 48 Vdc Floating Direct Current Network



24 VDC floating network for the power supply of sensors, actuators and input/out modules

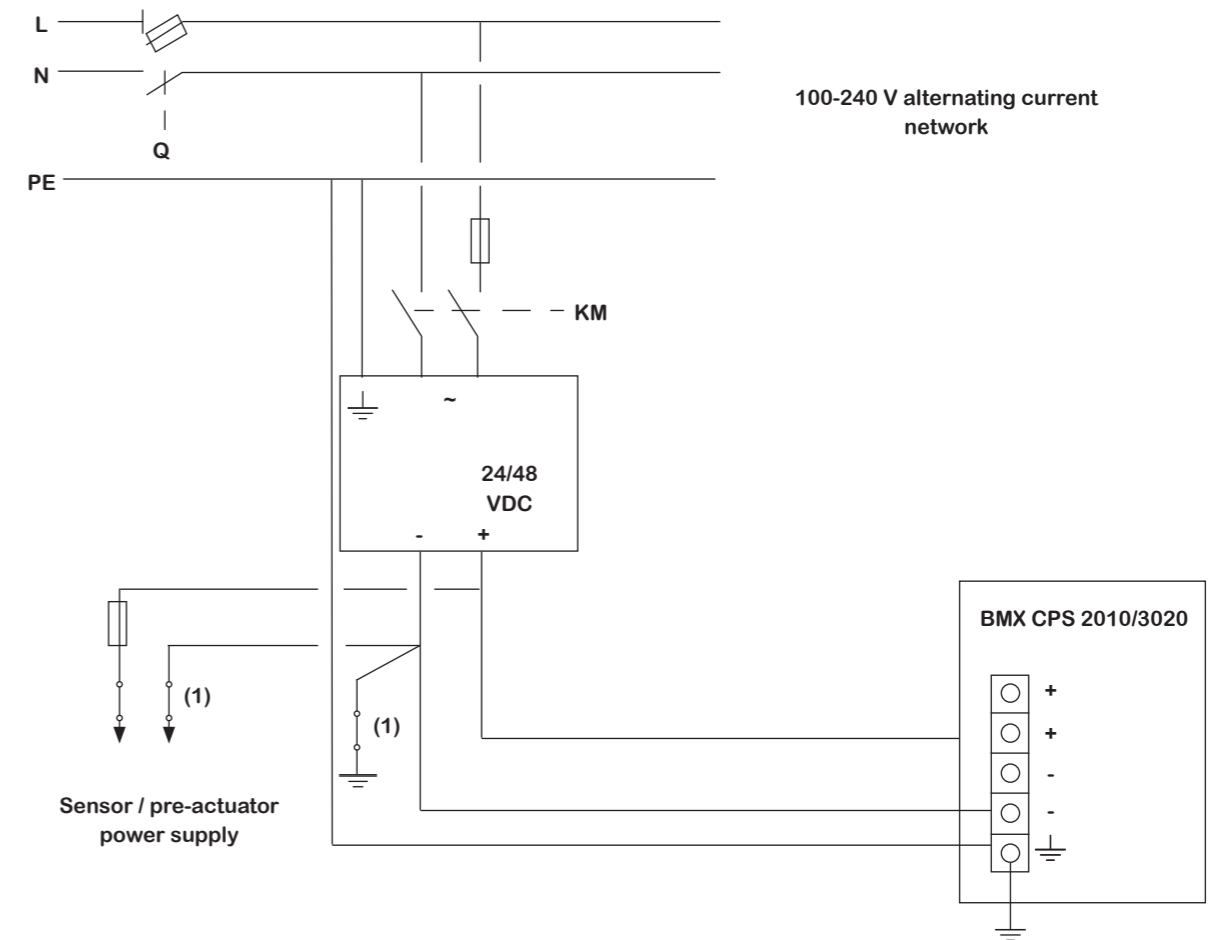
BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

Connections and Schema

Connection of Direct Current Power Supply Modules to an Alternating Current Network

Connection of a Single Rack PLC Station



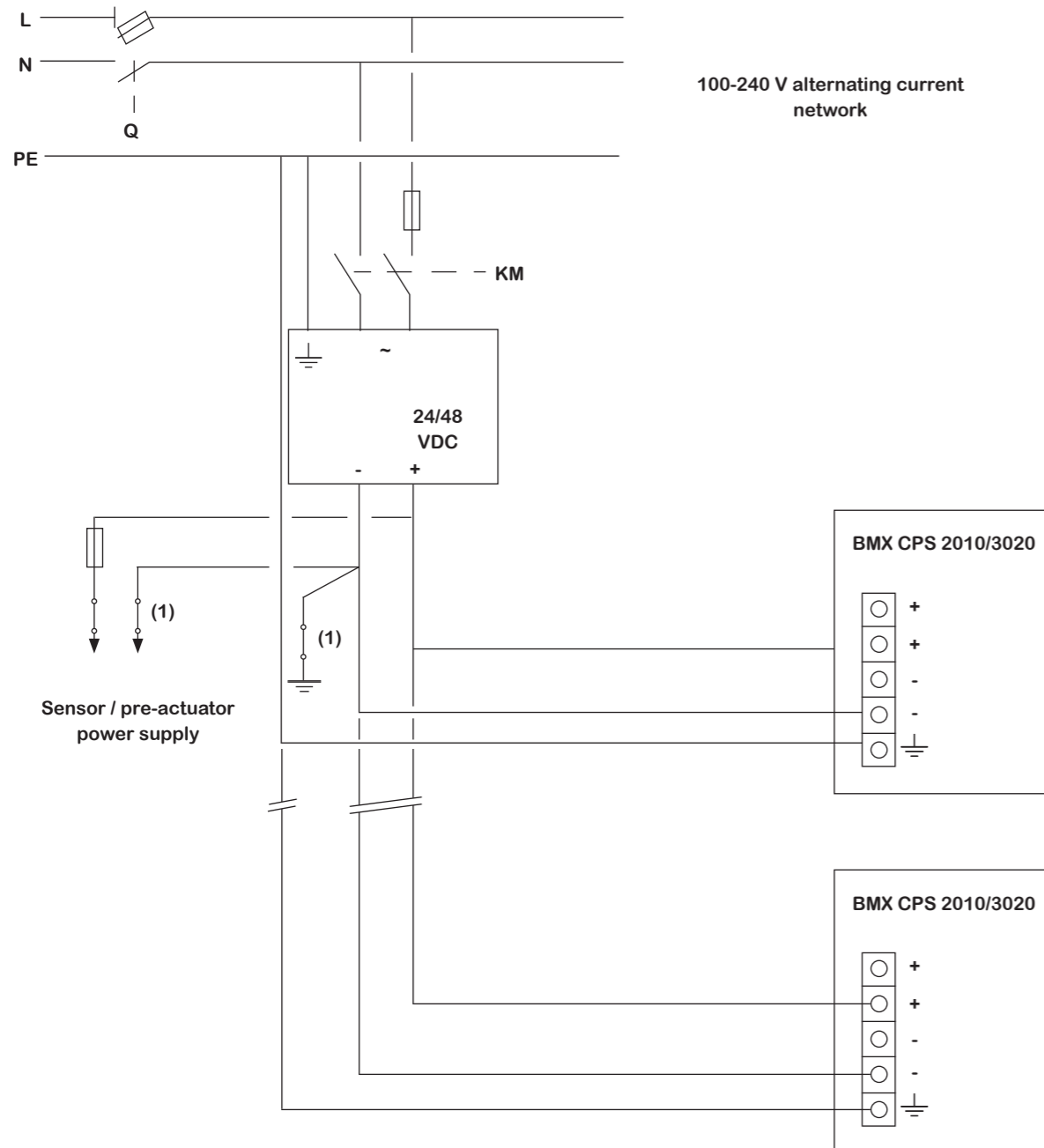
Q General isolator
 KM Line contactor or circuit breaker
 (1) Insulation connector bar for locating grounding errors
 Connection of a Multi-Rack PLC Station

BMXCPS2010

Power Supply Module X80 - 24 V DC - 16.8 W

BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive



Q General isolator

KM Line contactor or circuit breaker

(1) Insulation connector bar for locating grounding errors



Product Data Sheet Characteristics

Main

Range Of Products	Modicon X80
Product Or Component Type	Discrete input module
Discrete Input Number	16
Discrete Input Type	Isolated
Input Type	Current sink (logic positive)
Discrete Input Voltage	24 V DC, discrete input logic: positive
Discrete Input Current	3.5 mA

Complementary

Input Compatibility	With 2-wire/3-wire proximity sensors conforming to IEC 60947-5-2 With 2-wire/3-wire proximity sensors conforming to IEC 61131-2 type 3
Sensor Power Supply	19.30 V
Current State 1 Guaranteed	≥ 2 mA
Current State 0 Guaranteed	≤ 1.5 mA
Input Impedance	6800 Ohm
Insulation Resistance	> 10 MOhm 500 V DC
Power Dissipation In W	2.5 W
Do Typical Response Time	4 ms
De Maximum Response Time	7 ms
Paralleling Of Inputs	Yes
Typical Current Consumption	76 mA at 3.3 V DC
Mtbf Reliability	775000 H
Protection Type	1 external fuse per group of channe 0.5 A fast blow reverse polarity protection
Voltage Detection Threshold	< 14 V DC sensor fault > 18 V DC sensor OK

BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive

Status Led	1 LED (green) module operating (RUN) 1 LED per channel (green) channel diagnostic 1 LED (red) module error (ERR) 1 LED (red) module IO
Net Weight	0.115 kg

Environment

Ip Degree Of Protection	1P20
Directives	2014/35/EU - low voltage directive 2014/30/EU - electromagnetic compatibility
Environmental Characteristic	Fungal spore resistant class 3B2
Dielectric Strength	1500 V AC at 50/60 Hz 1 minute, primary/secondary
Vibration Resistance	3 gn
Shock Resistance	30 gn
Ambient Air Temperature For Storage	-40...85 °C
Ambient Air Temperature For Operation	0...60 °C
Relative Humidity	5...95% at 55 °C without condensation
Operating Altitude	0...2000 m 2000...5000 m with derating factor

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	5.488 cm
Package 1 Width	11.188 cm
Package 1 Length	11.741 cm
Package 1 Weight	151.0 g
Unit Type Of Package 2	502
Number Of Units In Package 2	15
Package 2 Height	15 cm
Package 2 Width	30 cm
Package 2 Length	40 cm
Package 2 Weight	2.931 kg
Unit Type Of Package 3	P06
Number Of Units In Package 3	240
Package 3 Height	75.0 cm
Package 3 Width	40.0 cm
Package 3 Length	80.0 cm
Package 3 Weight	57 kg
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products.

BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive

	Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. Rohs Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

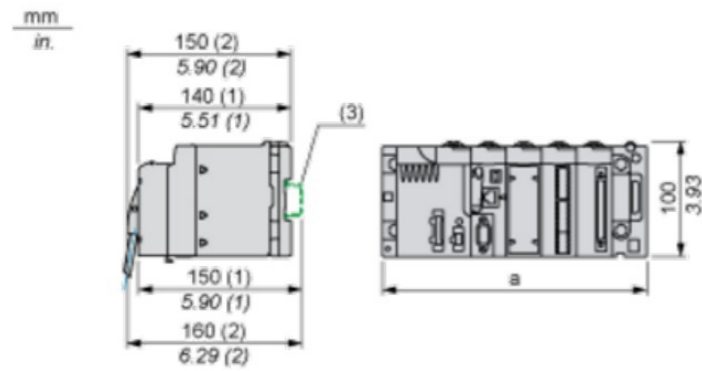
BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive

Dimensions Drawings:

Modules Mounted on Racks

Dimensions



(1) With removable terminal block (cage, screw or spring).

(2) With FCN connector.

(3) On AM1 ED rail: 35 mm wide, 15 mm deep. Only possible with BMXXBP0400/0400H/0600/0600/0800/0800H rack.

Rack references	a in mm	a in in.
BMXXBP0400 and BMXXBP0400H	242.4	09.54
BMXXBP0600 and BMXXBP0600H	307.6	12.11
BMXXBP0800 and BMXXBP0800H	372.8	14.68
BMXXBP1200 and BMXXBP1200H	503.2	19.81

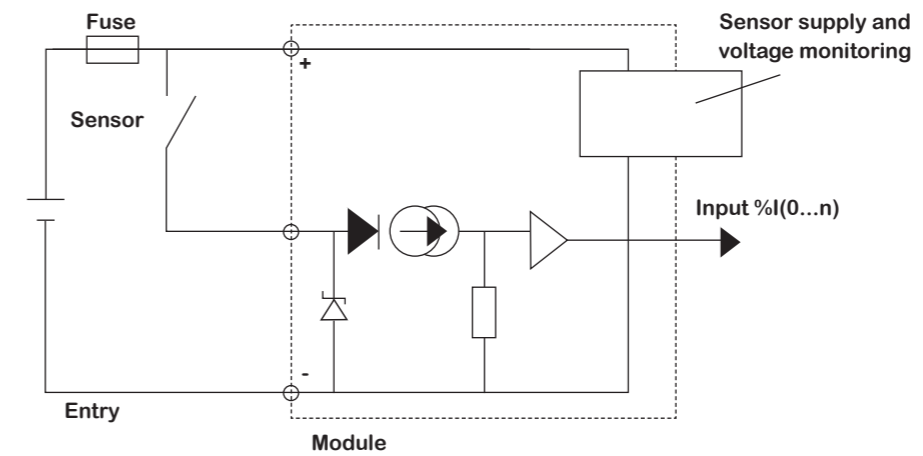
BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive

Connections and Schema

Connecting the Module

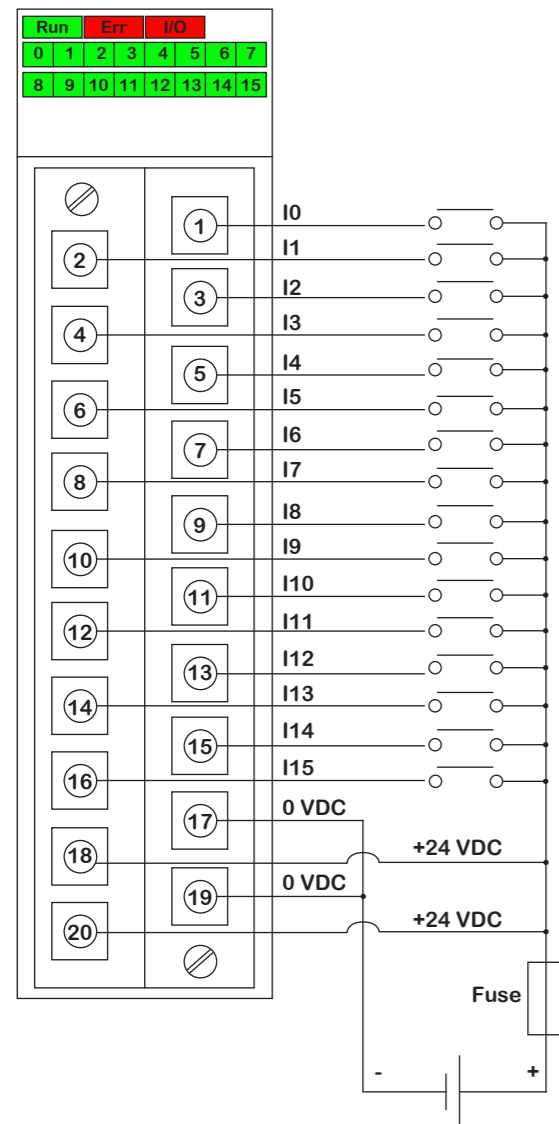
Input Circuit Diagram



Module Connection

BMXDDI1602

Discrete input module X80 - 16 inputs - 24 V DC positive



Power supply 24 VDC
fuse fast blow fuse of 0.5 A

BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC



Product Data Sheet Characteristics

Main

Range Of Product	Modicon X80
Product Or Component Type	Discrete output module
Discrete Output Number	16 EN/EC 61131-2
Discrete Output Type	Relay
Discrete Output Voltage	24.48 V 19. 60 V DC 24.240 V 19.264 VAC

Complementary

The Current Free Air Thermal Current	2 A
Insulation Resistance	> 10 MOhm 500 V DC
Power Dissipation In W	3 W
Response Time On Output	< 8 ms activation < 10 ms deactivation
Typical Current Consumption	100 mA 3.3 V DC 95 mA 24 V DC
Mtbf Reliability	2100000 H
Output Overload Protection	Use 1 fast blow fuse per channel or group of channel
Output Overvoltage Protection	Use discharge diode on each output DC Use RC circuit on each output AC Use ZNO surge limiter on each output AC
Output Short-Circuit Protection	Use 1 fast blow fuse per channel or group of channel
Minimum Switching Current	1 mA 5 V DC

BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC

Electrical Durability	AC-15 100000 cycles 240 VA 200 V 0.7)	
	AC-15 100000 cycles 120 VA 200 V 0.35)	
	AC-12 100000 cycles 200 VA 100 V	
	AC-12 100000 cycles 80 VA 48 V	
	AC-12 100000 cycles 50 VA 24 V	
	AC-15 100000 cycles 120 VA 100 V	
	AC-15 100000 cycles 120 VA 24 V	
	AC-15 100000 cycles 120 VA 48 V	
	DC-12 100000 cycles 24 W 24 V	
	DC-13 100000 cycles 10 W 24 V	
	DC-13 100000 cycles 10 W 48 V	
	AC-15 300000 cycles 72 VA 200 V 0.7)	
	AC-15 300000 cycles 36 VA 200 V 0.35)	
	AC-12 300000 cycles 200 VA 200 V	
	AC-12 300000 cycles 80 VA 100 V	
	AC-12 300000 cycles 50 VA 48 V	
	AC-15 300000 cycles 36 VA 100 V	
	AC-15 300000 cycles 72 VA 100 V	
	AC-15 300000 cycles 36 VA 48 V	
	AC-15 300000 cycles 72 VA 48 V	
	AC-15 300000 cycles 36 VA 24 V	
	AC-15 300000 cycles 72 VA 24 V	
	DC-13 300000 cycles 3 W 24 V	
	DC-13 300000 cycles 3 W 48 V	
	DC-13 7000 cycles 24 W 24 V	
	DC-13 7000 cycles 24 W 48 V	
	DC-12 50000 cycles 24 W 48 V	
	Status Led	1 LED (Green) RUN
		1 LED per channel (Green) channel diagnostic
		1 LED (Red) ERR
	1 LED (Red) I/O	
Net Weight	0.33 lb(US) (0.15 kg)	
Environment		
Ip Degree Of Protection	IP20	
Dielectric Strength	2000 V AC 50/60 Hz 1 min	
Vibration Resistance	3 gn	
Shock Resistance	30 gn	
Ambient Air Temperature For Storage	-40...185 °F (-40. 85 °C)	
Ambient Air Temperature For Operating	32...140 °F (0...60 °C)	
Relative Humidity	5...95 % 131 °F (55 °C) without condensation	
Operating Altitude	0...6561.68 ft (0...2000 m)	
	2000...5000 m with derating factor	

BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC

Ordering and shipping details	
Category	US 1PC3418160
Discount Schedule	PC34
Gtin	3595863909234
Returnability	Yes
Country Of Origin	Us
Packing Units	
Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	2.09 in (5.300 cm)
Package 1 Width	4.33 in (11.000 cm)
Package 1 Length	4.53 in (11.500 cm)
Package 1 Weight	6.31 oz (179.000 g)
Unit Type Of Package 2	S02
Number Of Units In Package 2	15
Package 2 Height	5.91 in (15.000 cm)
Package 2 Width	11.81 in (30.000 cm)
Package 2 Length	15.75 in (40.000 cm)
Package 2 Weight	6.53 lb(US) (2.960 kg)
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. Rohs Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

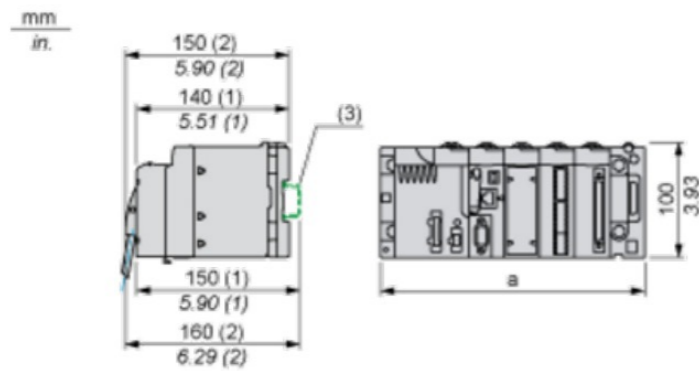
BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC

Dimensions Drawings

Modules Mounted on Racks

Dimensions



(1) With removable terminal block (cage, screw or spring).

(2) With FCN connector.

(3) On AM1 ED rail: 35 mm wide, 15 mm deep. Only possible with BMXXBP0400/0400H/0600/0600H/0800/0800H rack.

Rack references	a in mm	a in in.
BMXXBP0400 and BMXXBP0400H	242.4	09.54
BMXXBP0600 and BMXXBP0600H	307.6	12.11
BMXXBP0800 and BMXXBP0800H	372.8	14.68
BMXXBP1200 and BMXXBP1200H	503.2	19.81

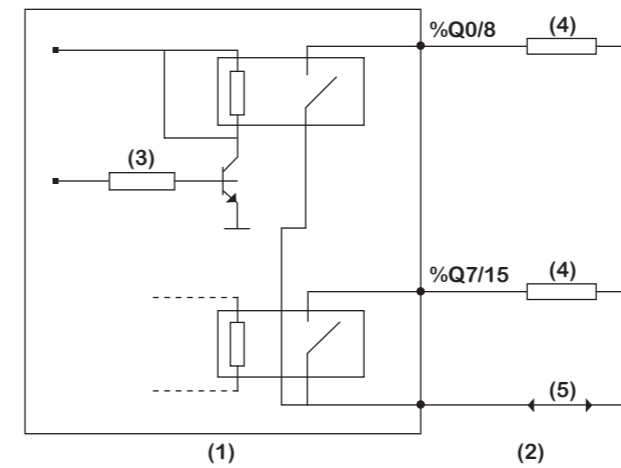
BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC

Connections and Schema

Connecting the Module

Output Circuit Diagram



(1) Module

(2) Output

(3) Command

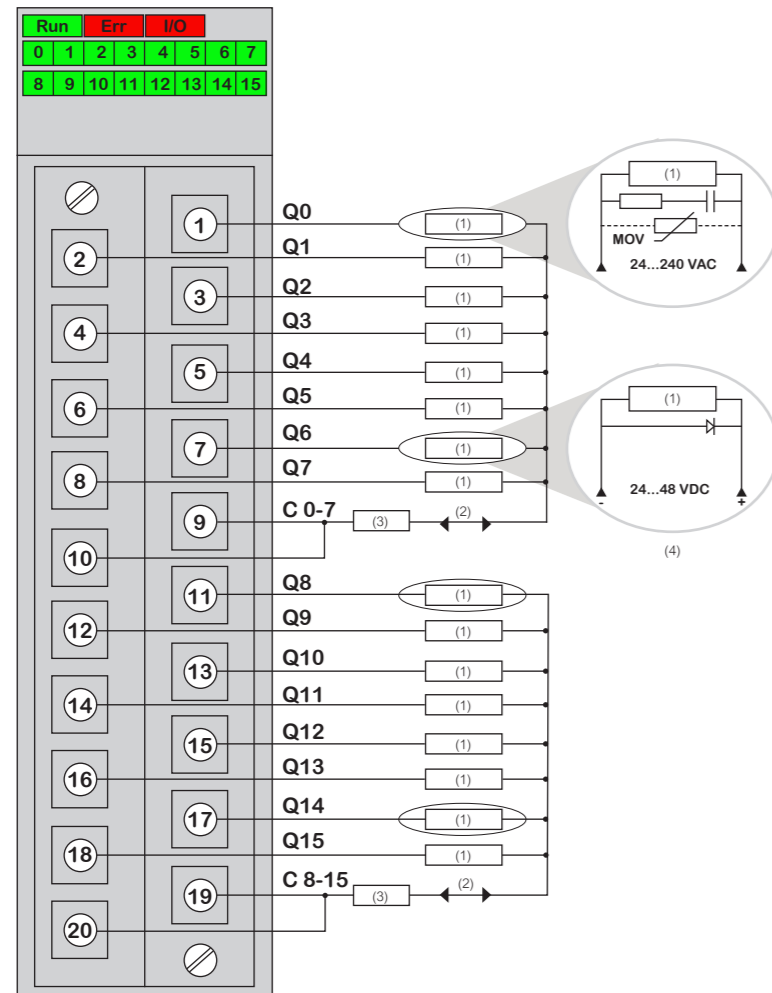
(4) Pre-actuator

(5) Power supply

Module Connection

BMXDRA1605

Discrete output module, Modicon X80, 16 NO relay outputs, 24 to 240V AC, 24 to 48V DC



- (1) Pre-actuator
- (2) Power supply: 24.48 VDC or 24...240 VAC
- (3) Fuse: 1 fast blow fuse of 12 A for each 8-channel group
- (4) We recommend installing this type of protection on the terminals of each pre-actuator

BMXFCW303

Cord set - 40-way terminal - two ends flying leads - for M340 /0 - 3m



Product Data Sheet Characteristics

Main	
Range Of Product	Modicon X80
Accessory / Separate Part Type	Preformed cordset
Accessory/ Separate Part Designation	Preformed cordset with one end with flying leads
Accessory/ Separate Part Designation	For I/O module with 40-way connectors
Number Of Cables	2
Electrical Connection	1 connector 40 ways 2 ends with color-coded flying leads conforming to DIN 47100
Cable Length	3m
Complementary	
Total Number Of Wires	40
Wire Section	0.324 mm ²
Awg Gauge	AWG 22
Net Weight	0.9 kg
Packing Units	
Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	5.000 cm
Package 1 Width	27.000 cm
Package 1 Length	27.000 cm
Package 1 Weight	885.000 g
Unit Type Of Package 2	S02
Number Of Units In Package 2	5
Package 2 Height	15 cm
Package 2 Width	30 cm
Package 2 Length	40 cm
Package 2 Weight	4.74 kg
Unit Type Of Package 3	P12

BMXFCW303

Cord set - 40-way terminal - two ends flying leads - for M340 /0 - 3m

Number Of Units In Packaae 3	288
Package 3 Length	120.000 cm
Package 3 Weight	284.830 kg
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. Rohs Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

BMXFTB2000

20-pin removable caged terminal blocks -1 x 0.34..1mm²



Product Data Sheet Characteristics

Main	
Range Of Produc	Modicon X80
Accessory / Separate Part Type	Removable connection block
Number Of Terminals	20 removable cage clamp terminal block
Dostration Separale Part	For module with 20-pin removable terminal block

Complementary	
Net Weight	0.093 kg

Packing Units	
Unit Typo Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	3.500 cm
Package 1 Width	4.500 cm
Package 1 Length	11.000 cm
Package 1 Weight	109.000 g
Unit Type Of Package 2	S02
Number Of Units In Package 2	60
Package 2 Height	15.000 cm
Package 2 Width	30.000 cm
Package 2 Length	40.000 cm
Package 2 Weight	6.941 kg
Unit Type Of Package 3	P06
Number Of Units In Package 3	960
Package 3 Height	75.000 cm
Package 3 Width	60.000 cm
Package 3 Length	80.000 cm
Package 3 Weight	119.056 kg

BMXFTB2000

20-pin removable caged terminal blocks -1 x 0.34..1mm²

Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. Rohs Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

BMXP342020

Processor module M340 - max 1024 discrete + 256 analog I/O - Modbus - Ethernet



Product Data Sheet Characteristics

Main	
Range Of Product	Modicon M340 automation platform
Product Or Component Type	Processor module
Concept	Transparent Ready CANopen
Number Of Racks	4
Number Of Slots	11
Discrete I/O Processor Capacity	1024 I/O multi-rack configuration 704 I/O single-rack configuration
Analogue I/O Processor Capacity	256 I/O multi-rack configuration 66 I/O single-rack configuration
Number Of Application Specific Channel	36
Monitoring	Diagnostic counters Modbus Event counters Modbus
Complementary	
Control Channels	Programmable loops
Integrated Connection Type	Non isolated serial link RJ45 character mode, transmission mode: asynchronous in baseband, RS232C, transmission mode: 2 twisted shielded pairs at 0.3...19.2 kbit/s full duplex Non isolated serial link RJ45 character mode, transmission mode: asynchronous in baseband, RS485, transmission mode: 1 twisted shielded pair at 0.3...19.2 kbit/s half duplex Non isolated serial link RJ45, master/slave Modbus, RTU/ASCII, transmission mode: asynchronous in baseband, RS232C, transmission mode: 1 twisted shielded pair at 0.3...19.2 kbit/s half duplex Non isolated serial link RJ45, master/slave Modbus, RTU/ASCII, transmission mode: asynchronous in baseband, RS485, transmission mode: 1 twisted shielded pair at 0.3...19.2 kbit/s half duplex USB port at 12 Mbit/s Ethernet TCP/IP RJ45, transmission mode: 1 twisted pair at 10/100 Mbit/s

BMXP342020

Processor module M340 - max 1024 discrete + 256 analog 1/0 - Modbus - Ethernet

Communication Module Processor Capacity	2 Ethernet communication module 4 AS-Interface module
Embedded Communication Service	Bandwidth management, Ethernet TCP/P Data Editor, Ethernet TCP/IP Modbus TCP messaging, Ethernet TCP/P Rack Viewer, Ethernet TCP/IP SNMP network administrator. Ethernet TCP/P
Port Ethernet	10BASE-T/100BASE-TX
Number Of Devices Per Segment	0...32 (character mode) 0...32 (Modbus)
Bus Length	0...10 m serial link non isolated character mode segment 0...10 m serial link non isolated Modbus segment 0...1000 m serial link isolated character mode segment 0...1000 m serial link isolated Modbus segment 0...15 m character mode point-to-point 0...15 m Modbus point-to-point
Maximum Tap Links Length	<15 m serial link non isolated character mode segment <15 m serial link non isolated Modbus segment <40 m serial link isolated character mode segment <40 m serial link isolated Modbus segment
Number Of Addresses	0...248 for character mode 0...248 for Modbus
Requests	1 K data bytes per request character mode 252 data bytes per RTU request Modbus 504 data bytes per ASCII request Modbus
Control Parameter	One CRC on each frame (RTU) Modbus One LRC on each frame (ASCII) character mode One LRC on each frame (ASCII) Modbus
Memory Description	Supplied memory card (BMXRMS008MP) backup of programs, constants, symbols and data Internal RAM 4096 kB Internal RAM 256 kB data Internal RAM 3584 kB program constants and symbols Supplied memory card (BMXRMS008MP) activation of standard web server, class B10
Maximum Size Of Object Areas	256 kB unlocated internal data 32634 % Mi located internal bits
Default Size Of Object Areas	1024% MWi internal words located internal data 256% KW i constant words located internal data 512% Mi located internal bits
Application Structure	1 cyclic / periodic master task 1 periodic fast task No auxiliary task 64 event tasks

BMXP342020

Processor module M340 - max 1024 discrete + 256 analog 1/0 - Modbus - Ethernet

Execution Time Per Instruction	0.12 us Boolean 0.17 us double-length words 0.25 us single-length words 1.16 us floating points
Number Of Instructions Per Ms	6.4 Kinst/ms 65 % Boolean + 35 % fixed arithmetic 8.1 Kinst/ms 100 % Boolean
System Overhead	0.13 ms for fast task 0.7 ms for master task
Current Consumption	95 mA at 24 V DC
Supply	Internal power supply via rack
Marking	CE
Status Led	1 LED (green) activity on Ethernet network (ETH ACT) 1 LED (green) processor running (RUN) 1 LED (green) status of Ethernet network (ETH STS) 1 LED (red) data rate (ETH 100) 1 LED (red) I/O module fault (I/O) 1 LED (red) memory card fault (CARD ERR) 1 LED (red) processor or system fault (ERR) 1 LED (yellow) activity on Modbus (SER COM)
Net Weight	0.205 kg
Environment	
Operait Air Temperature For	0...60 °C
Relative Humidity	10.95% without condensation
Ip Degree Of Protection	IP20
Protective Treatment	TC
Directives	2014/35/EU - low voltage directive 2014/30/EU - electromagnetic compatibility
Product Certifications	CE UL CSA RCM EAC Merchant Navy
Standards	EN 61131-2 EN/IEC 61010-2-201 UL 61010-2-201 CSA C22.2 No 61010-2-201 IACS E10 EN/EC 61000-6-5, interface type 1 and type 2 EN/EC 61850-3, location G
Hazardous location class I division 2	
Environmental Characteristic	

BMXP342020

Processor module M340 - max 1024 discrete + 256 analog I/O - Modbus - Ethernet

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	5.500 cm
Package 1 Width	11.000 cm
Package 1 Length	11.500 cm
Package 1 Weight	246.000 g
Unit Type Of Package 2	SO2
Number Of Units In Package 2	15
Package 2 Height	15.000 cm
Package 2 Width	30.000 cm
Package 2 Length	40.000 cm
Package 2 Weight	4.033 kg
Sustainability	Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. RoHS Exemption Information Yes.
Reach Regulation	REACH Declaration
Eu RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China RoHS Regulation	China RoHS declaration
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

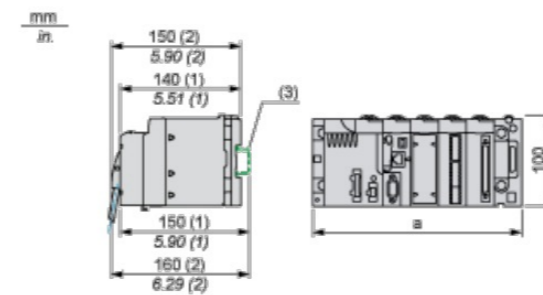
BMXP342020

Processor module M340 - max 1024 discrete + 256 analog I/O - Modbus - Ethernet

Dimensions Drawings

Modules Mounted on Racks

Dimensions



(1) With removable terminal block (cage, screw or spring).

(2) With FCN connector.

(3) On AM1 ED rail: 35 mm wide, 15 mm deep. Only possible with BMXXBP0400/0400H/0600/0600/0800/0800H rack.

Rack references	a in mm	a in in.
BMXXBP0400 and BMXXBP0400H	242.4	09.54
BMXXBP0600 and BMXXBP0600H	307.6	12.11
BMXXBP0800 and BMXXBP0800H	372.8	14.68
BMXXBP1200 and BMXXBP1200H	503.2	19.81

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting



Product Data Sheet Characteristics

Main	
Range Of Product	Modicon M340 automation platform
Complementary	
Number Of Slots	8 bus X
Product Compatibility	BMXPS processor BMXCPS power supply Specific application module
Power Consumption In W	2.21 W
Electrical Connection	1 connector (XBE) expansion module
Fixing Mode	By 4 screws - diameter: 4.32...6.35 mm, mounting on panel By 4 M6 screws, mounting on plate By clips, mounting on 35 mm symmetrical DIN rail
Height	103.7 mm
Width	372.8 mm
Depth	19 mm
Net Weight	0.95 kg
Environment	
Ip Degree Of Protection	1P20
Ambient Air Temperature For Operation	0...60 °C
Relative Humidity	10.95% without condensation
Protective Treatment	TC
Packing Units	
Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	6.600 cm
Package 1 Width	15.300 cm
Package 1 Length	45.500 cm
Package 1 Weight	996.000 g
Unit Type Of Package 2	S04
Package 2 Width	40.000 cm

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

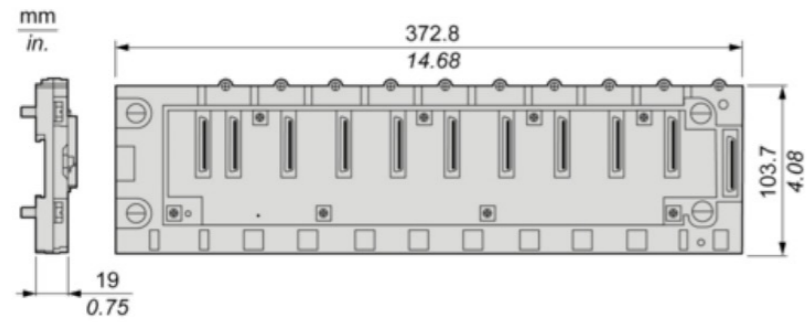
Package 2 Length	60.000 cm
Package 2 Weight	9.783 kg
Unit Type Of Package 3	P06
Number Of Units In Package 3	54
Package 3 Height	104.000 cm
Package 3 Width	60.000 cm
Package 3 Length	80.000 cm
Package 3 Weight	66.280 kg
Sustainability	Green Premium M label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO ₂ products. Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Well-being performance	Mercury Free. RoHS Exemption Information Yes.
Certifications & Standards	
Reach Regulation	REACH Declaration
Eu RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China RoHS Regulation	China RoHS declaration
Environmental Disclosure	Product Environmental Profile
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins
Circularity Profile	End of Life Information

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

Dimensions Drawings

Dimensions



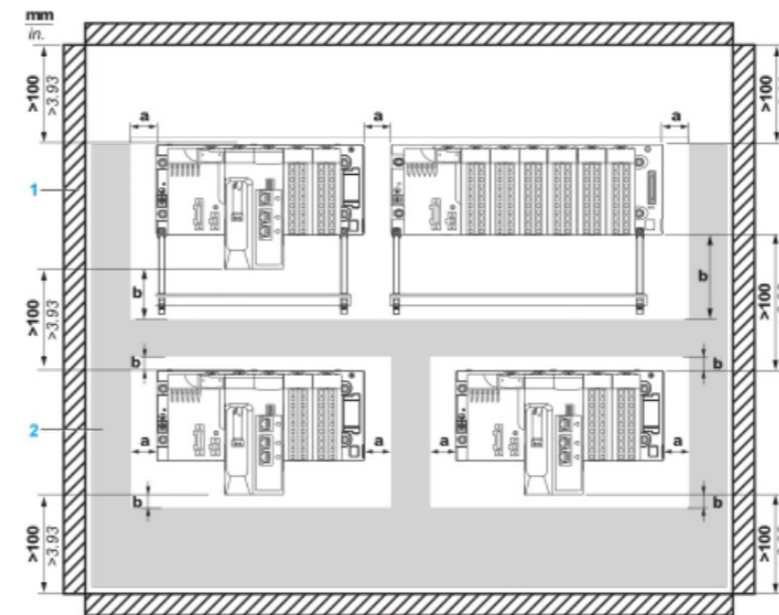
BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

Mounting and Clearance

Minimum Clearance

Minimum Clearance of a typical installation in a cabinet with ducts



- a. Side clearance: > 40 mm (1.57 in.)
- b. Top and bottom clearance with surrounding objects: > 20 mm (0.79 in.)
- 1. Installation or casing
- 2. Wiring duct or tray

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

Mounting on DIN rail

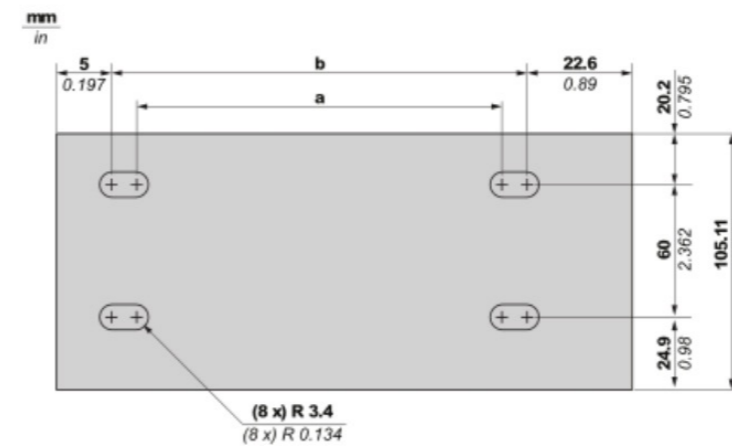
Symmetric DIN rail		Double-profile DIN rail
Type A	Type B	

NOTE: When mounted on a type B symmetric DIN rail, the rack withstands less mechanical stress.

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

Mounting on panels

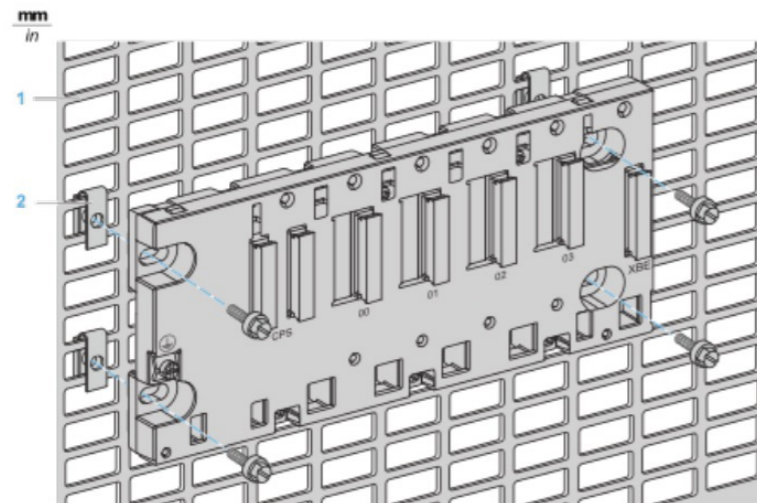


Rack Type	a	b	c
X Bus racks	BMXXBP0400	202.1 mm	214.8 mm
	BMXXBP0400H	(7.957 in)	(8.457 in)
	BMXXBP0600	267.5 mm	280 mm
	BMXXBP0600H	(10.531 in)	(11.023 in)
BMXXBP0800	BMXXBP0800	332.5 mm	345.2 mm
	BMXXBP0800H	(13.091 in)	(13.591 in)
BMXXBP1200 and BMXXBP1200H	BMXXBP1200 and BMXXBP1200H	462.9 mm (18.224 in)	475.6 mm (18.724 in)

BMXXBP0800

Rack M340 - 8 slots - panel, plate or DIN rail mounting

Mounting on Telequick mounting plate



1. Telequick plate
2. Clip-on nuts

Note: The two right side screws are accessible until there is no rack extender module installed

HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC



Product Data Sheet Characteristics

Main

Range Of Product	Harmony Easy GXU
Product Or Component Type	Advanced touchscreen panel
Display Type	LCD touch screen
Display Colour	65536 colours
Display Resolution	800 x 480 pixels WVGA
Display Size	7 inch

Complementary

Backlight Lifespan	20000 hours
[Us] Rated Supply Voltage	24 V DC
Software Designation	Vijeo Designer Basic configuration software
Memory Description	Internal, 48 MB for application Internal DDR, 128 MB Internal, 128 kB for backup
Integrated Connection Type	USB type mini B COM1 serial link: 9-way male SUB-D connector, RS232C COM2 serial link: 9-way male SUB-D connector, RS422/RS485 USB type A Ethernet 10/100BASE-TX
Cut-Out Dimensions	190 x 135 mm

Environment

Quality Labels	CE
Operat Air Temperature For	0..50 °C
Ambient Air Temperature For Storage	-20..60 °C
Ip Degree Of Protection	1P65 (front panel)

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1

HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC

Package 1 Height	9.163 cm
Package 1 Width	18.024 cm
Package 1 Length	25.544 cm
Number Of Units In Package 2	12
Package 2 Height	30 cm
Package 2 Width	40 cm
Package 2 Length	60 cm
Package 2 Weight	11747 g
Unit Type Of Package 3	P12
Number Of Units In Package 3	144
Package 3 Height	95 cm
Package 3 Width	80 cm
Package 3 Length	120 cm
Package 3 Weight	149964 g

Sustainability

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Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

Resource performance

Upgradeable Through Digital Modules

Well-being performance

Mercery Free

Rohs Exemption information	Yes
Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration

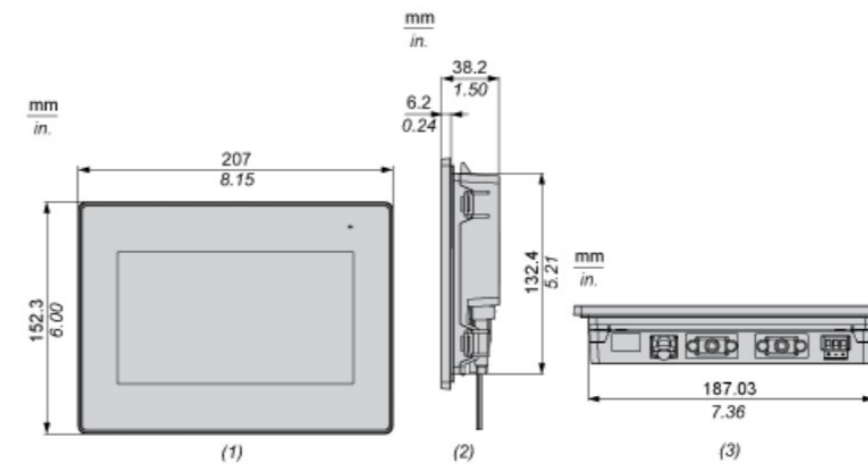
HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC

Dimensions Drawings

Dimensions

External Dimensions

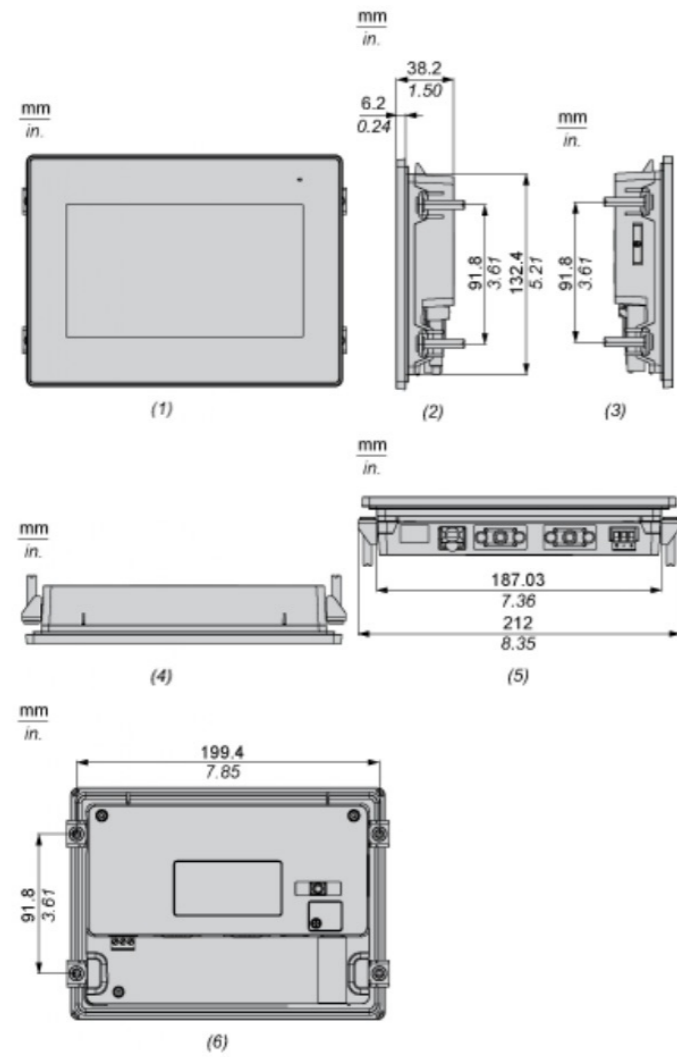


- (1) Front
- (2) Right
- (3) Bottom

Installation with Installation Fasteners

HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC

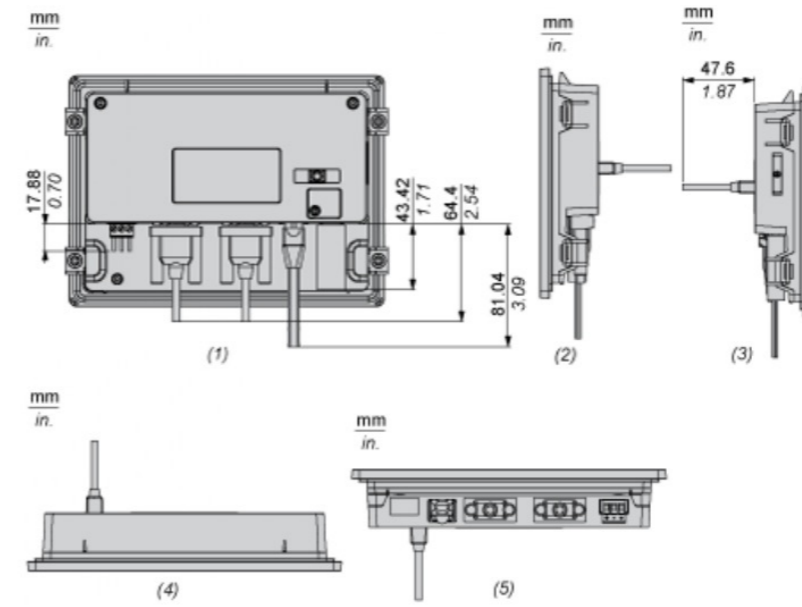


- (1) Front
- (2) Right
- (3) Left
- (4) Top
- (5) Bottom
- (6) Rear

Dimensions with Cables

HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC



- (1) Rear
- (2) Right
- (3) Left
- (4) Top
- (5) Bottom

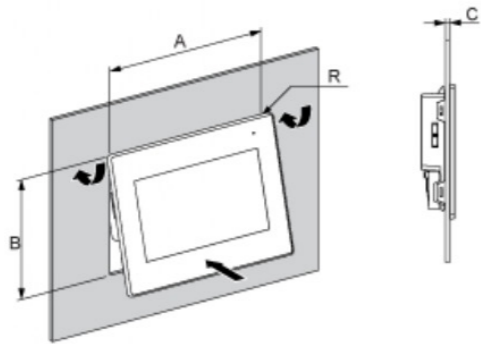
HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC

Mounting and Clearance

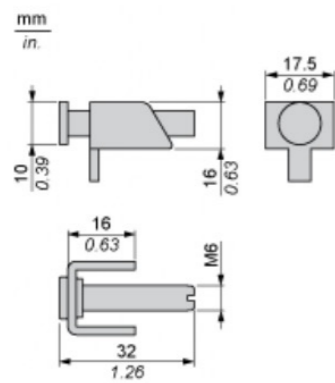
Mounting

Panel Cut Dimensions



A		B		C		R	
mm	in.	mm	in.	mm	in.	mm	in.
190 ^{+/-1}	7.48 ^{+/-0.04}	135 ^{+/-0.7}	5.31 ^{+/-0.03}	1...5	0.04...0.19	3 max	0.12 max

Installation Fasteners Dimensions

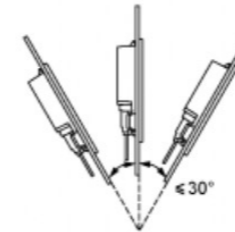


HMIGXU3512

7 inch wide screen, Universal model, 2 serial ports, 1 Ethernet port, embeddedRTC

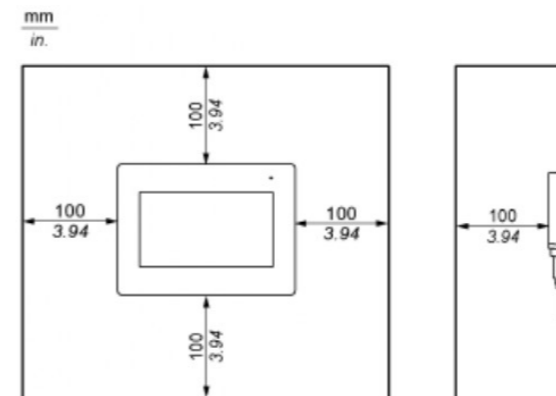
Installation Requirements

Mounting Angle



When installing the panel in a slanted position, and the panel face inclines more than 30°, the ambient temperature must not exceed 40°C (104°F)

Clearance



ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A



Product Data Sheet Characteristics

Main

Range Of Product	Modicon Power Supply
Product Or Component Type	Power supply
Power Supply Type	Regulated switch mode
Nominal Input Voltage	100.120 V AC single phase, terminal(s): N-L1 200.500 V AC phase to phase, terminal(s): L 1-L2
Rated Power In W	72 W
Output Voltage	24 V DC
Power Supply Output Current	3 A
Bernissible Temporary Current	1.5 x In (for 4 s)
Anti-Harmonic Filter	Low frequency harmonic currents

Complementary

Input Voltage Limits	170.550 V AC 85.132 V AC
Inrush Current	30 A
Power Factor	0.51 at 240 V AC 0.59 at 120 V AC
Efficiency	87 %
Output Voltage Adjustment	24. 28.8 V adjustable
Power Dissipation In W	7.8 W
Provided Equipment	Power factor correction filter conforming to IEC 61000-3-2
Output Protection Type	Against overload, protection technology: manual or automatic reset Against overvoltage, protection technology: 30.32 V. manual reset Against short-circuits, protection technology: manual or automatic reset Against undervoltage, protection technology: tripping if U < 21.6 V Thermal, protection technology: automatic reset

Connections - Terminals	Screw type terminals: 3 x 0.5...3 x 4 mm*. (AWG 22..AW G 12) for input connection Screw type terminals: 1 x 0.5...1 x 4 mm?, (AWG 22. AWG 12) for input ground connection Screw type terminals: 4 x 0.5...4 x 4 mm?, (AWG 22..AW G 12) for outout connection Screw type terminals: 1 x 0.5...1 x 4 mm*, (AWG 22..AWG 12) for output ground connection
Status Led	1 LED (green and red) output voltage 1 LED (green, red and orange) output current
Depth	125 mm
Net Weight	0.3 kg
Output Coupling	Parallel Series
Marking	CE
Mounting Support	35 x 15 mm symmetrical DIN rail 35 x 7.5 mm symmetrical DIN rail
Operating Position	Vertical
Supply	SELV conforming to IEC 60950-1 SELV conforming to IEC 60204-1 SELV conforming to IEC 60364-4-41
Dielectric Strength	3500 V with between input and ground 4000 V with between input and output 500 V with between output and ground

Environment

Standards	CSA C22.2 No 60950-1 UL 508 EN/EC 62368-1
Product Certifications	CCS Aus EAC UL RCM KC
Environmental Characteristic	EMC conforming to IEC 61000-6-1 EMC conforming to IEC 61000-6-3 EMC conforming to IEC 61000-6-2 EMC conforming to IEC 61000-6-4 EMC conforming to EN/EC 61204-3 Safety conforming to IEC 60950-1 Safety conforming to EN/EC 61204-3
Operating Altitude	2000 m
Ip Degree Of Protection	IP20 conforming to IEC 60529
Ambient Air Temperature For Operation	50...60 °C with derating factor mounting position A < 2000 m -25.. 50 °C without derating mounting position A < 2000 m

ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	6.437 cm
Package 1 Width	14.493 cm
Package 1 Length	16.458 cm
Package 1 Weight	780.0 g
Unit Type Of Package 2	506
Number Of Units In Package 2	120
Package 2 Height	73.5 cm
Package 2 Width	60.0 cm
Package 2 Length	80.0 cm
Package 2 Weight	100.0 kg

Sustainability

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Well-being performance

Upgradeable Through Digital Modules

Well-being performance

Mercery Free

Rohs Exemption information Yes

Pvc Free

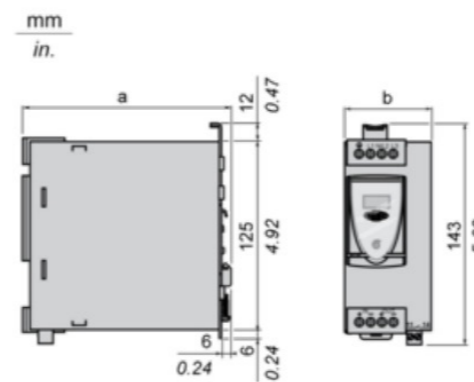
Certifications & Standards

Reach Regulation	REACH Declaration
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)
China Rohs Regulation	China RoHS declaration
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End of Life Information

Dimensions Drawings

Regulated Switch Mode Power Supplies

Dimensions



ABL 8	a in mm	a in in.	b in mm	b in in.
RPS24030	125	4.92	45	1.77
RPS24050	125	4.92	56	2.20
RPS24100	145	5.71	86	3.39
RPS24200	145	5.71	146	5.75
WPS24200	160	6.30	96	3.78
WPS24400	160	6.30	166	6.54

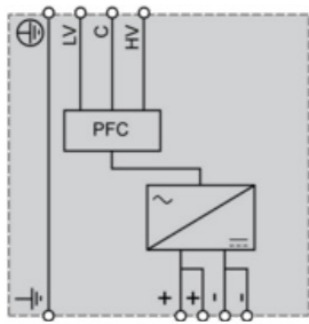
ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

Connections and Schema

Regulated Switch Mode Power Supplies

Internal Wiring Diagram



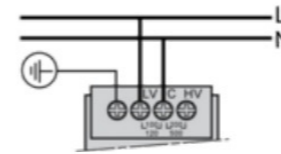
ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

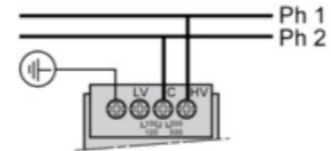
Regulated Switch Mode Power Supply

Line Supply Wiring Diagram

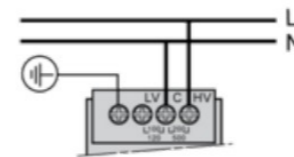
Single-phase (L-N) 100 to 120 V



Phase-to-phase (L1-L2) 200 to 500 V



Single-phase (L-N) 200 to 500 V



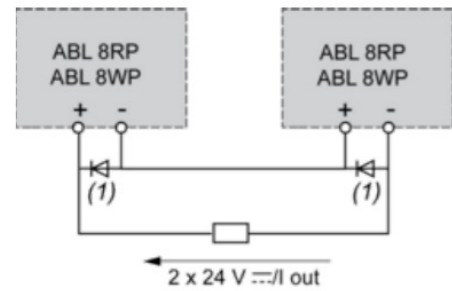
ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

Regulated Switch Mode Power Supplies

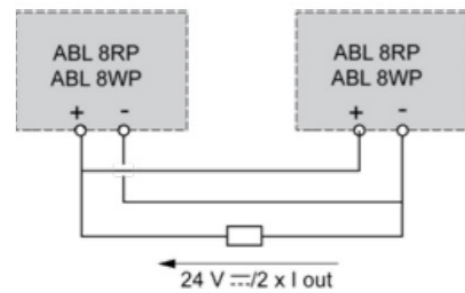
Series or Parallel Connection

Series Connection



(1) Two Schottky diodes I_{min} = power supply I_n and V_{min} = 50 V

Parallel Connection



Family	Series	Parallel
ABL8RPS/8RPM/8WPS	2 products max. (1)	2 products max.

Note: Series or parallel connection is only recommended for products with identical references

For better availability, the power supplies can also be connected in parallel using the ABL8RED 24400 Redundancy module

ABL8RPS24030

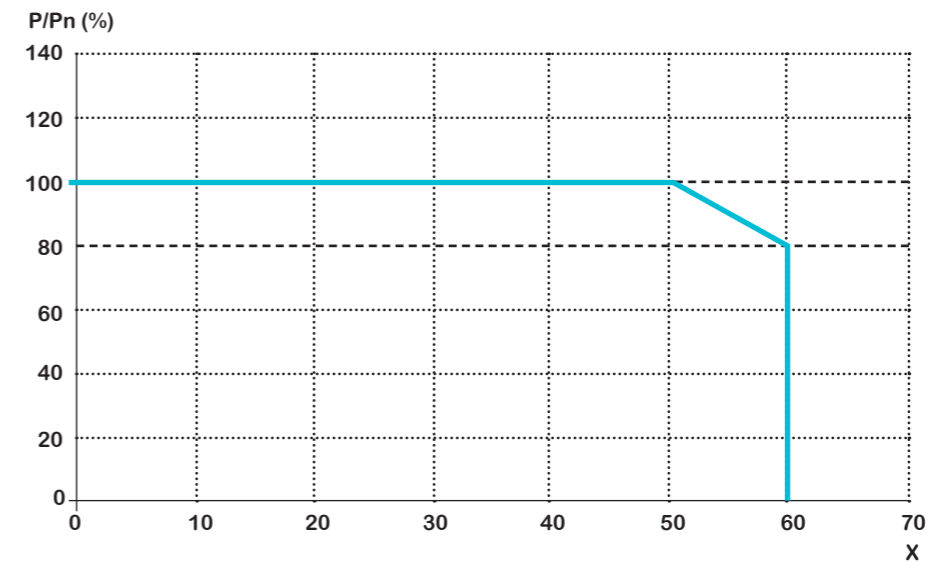
Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

Performance Curves

Regulated Switch Mode Power Supplies

Derating

The ambient temperature is a determining factor that limits the power an electronic power supply can deliver continuously. If the temperature around the electronic components is too high, their life will be significantly reduced. The nominal ambient temperature for the Universal range of Phaseo power supplies is 50°C. Above this temperature, derating is necessary up to a maximum temperature of 60°C. The graph below shows the power (in relation to the nominal power) that the power supply can deliver continuously, depending on the ambient temperature.



X Maximum operating temperature (°C)

ABL 8RPM, ABL 8RPS, ABL 8WPS mounted vertically Derating should be considered in extreme operating conditions: Intensive operation (output current permanently close to the nominal current, combined with a high ambient temperature)

Output voltage set above 24 Vdc (to compensate for line voltage drops, for example)

Parallel connection to increase the total power

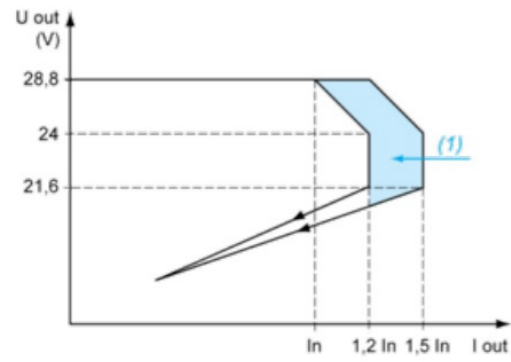
ABL8RPS24030

Regulated SMPS - 1 or 2-phase - 100.500 V - 24 V - 3 A

Regulated Switch Mode Power Supplies

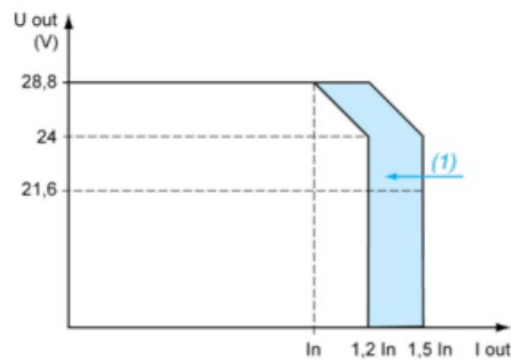
Load Limit

Manual Reset Protection Mode



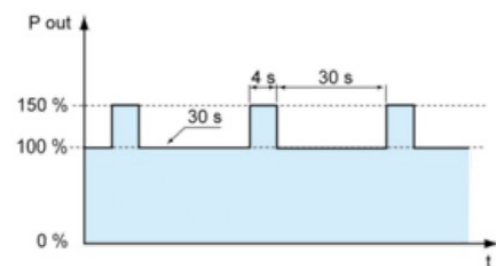
(1) Boost 4s

Automatic Reset Protection Mode



(1) Boost 4s

"Boost" Repeat Accuracy



This type of operation is described in detail in the user manual, which can be downloaded from the website



**MANUFACTURER'S
DECLARATION OF
CONFORMITY**

Schneider Electric Didactic

NOUS : SCHNEIDER ELECTRIC FRANCE
35 rue Joseph MONIER
92500 Rueil Malmaison
FRANCE

declare under our sole responsibility that the products:

MARK: Schneider Electric
NAME, TYPE: Pedagogical Equipment "Magelis Terminal PLC
Console"
MODELS: "MD1AE170"

ACCESSORIES:

to which this declaration refers, comply with standard

NF EN 60204-1 of 01/09/2006

Subject to installation, maintenance and use in accordance with their intended purpose, regulations, current standards, supplier instructions and professional rules, the products comply with the provisions of the European Directives:

Low Voltage Directive No. 2014/35/EU EMC
Directive No. 2014/30/EU

Made in Rueil Malmaison - FRANCE
January 25, 2017

Signing Authority
Last Name: Thierry RUARD
Title: Director of Didactic Activity

Signature:



Schneider Electric France
35 rue Joseph Monier - CS 30323
92506 RUEIL-MALMAISON Cedex
Tel. +33(0)1 41 39 37 85
Fax +33(0)1 41 39 00 76

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se.com/services

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05/2024