Automation Systems

Automation Systems
Programmable Logic Controllers, PLCs

Programmable logic controllers

The programmable (logic) controller (PLC) is an electronic device for machine or process control. The PLC receives signals via inputs, processes them according to the instructions of a program, and transfers signals to the outputs.

The program is created using programming software which is able to link inputs and outputs in any required sequence, to measure time, or even carry out arithmetic operations.

The most important specifications of a PLC are its maximum number of inputs/outputs, its memory size and its processing speed.

The PS40 Series and the new xSystem are the two automation systems offered by Moeller. These are described below.

PS40 Series

Compact PLCs

The PS4 compact PLCs have the following system characteristics:

- Standard programming
- Remote and local expansion options
- Integrated fieldbus interface (Suconet)
- Plug-in screw terminals
- Small, compact in size

The controllers in this range are very versatile with a wide range of features, such as integrated setpoint potentiometers, analog inputs/outputs or memory expansion modules (from PS4-150).

Modular PLCs

The PS416 modular PLC has the following key features:

- High processing speed
- Compact size
- Wide range of networking options
- Extensive memory

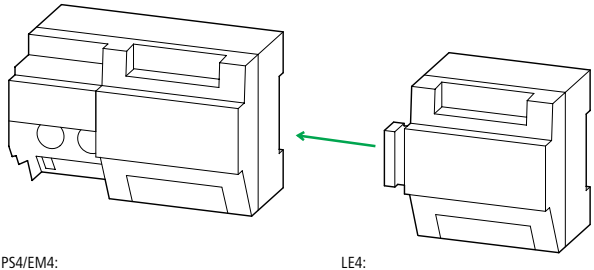
Sucosoft programming software

Sucosoft is the name of the software for programming the PS40 PLCs.

Program examples are provided in the PLC Beginners' Guide "Automation with Programmable Logic Controllers" (FB2700-017).

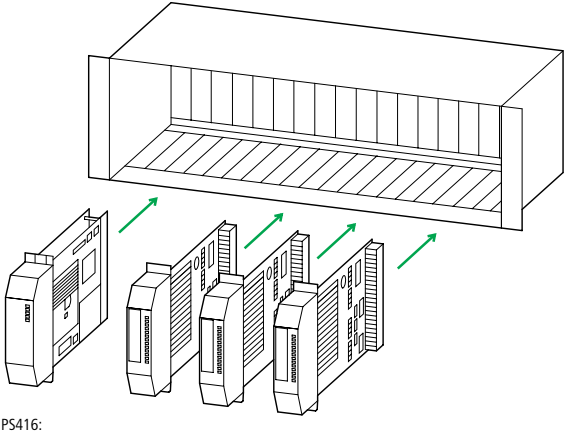
Moellers' entire PLC range is described in the Main Catalogue for Automation Systems and Drives, as well as in the Product overview for automation.

Automation Systems
Programmable Logic Controllers, PLCs



PS4/EM4:
Compact PLC or expansion module

LE4:
Local expansion



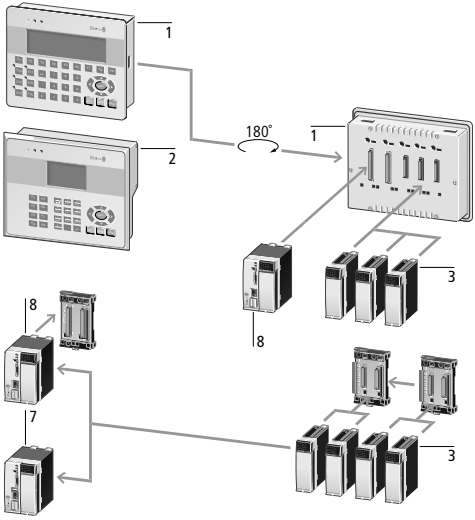
PS416:
Modular PLC

Automation Systems
xSystem

xSystem

xSystem is Moeller's latest modular automation system. It can be configured for the individual requirements of small or large applications. xSystem reduces the hardware and software interfaces required. The system features IT functions that are already integrated.

The XSoft software combines programming, configuring, testing, commissioning and visualization functions in a single tool designed for the entire xSystem product range.



Automation Systems
xSystem

System components

- Modular PLCs
  - XC100 ⑧
    8 DI, 6 DO, CANopen, RS 232, 4 interrupt inputs
    Slot for multimedia memory card,
    64 – 256 KByte program/data memory,
    4/8 KByte for retentive data,
    0.5 ms/1000 instructions
  - XC200 ⑦
    8 DI, 6 DO, CANopen, RS 232, Ethernet,
    2 counters, 2 interrupt inputs, WEB/OPC server, USB, locally expandable with XI/OC I/O modules, 256 – 512 KByte program/data memory, 0.05 ms/1000 instructions
- Text display PLCs
  - Modular text display PLCs ①
    Consisting of XC100, up to 3 XI/OC modules and LCD text display with 4 × 20 or 8 × 40 lines/characters
  - Compact text display PLC ②
    Minimum mounting dimensions and high interface integration density (10 DI, 8 DO, 8 DIO, 2 AI, 2 AO, 2 counter inputs, 2 interrupt inputs, 1 encoder input)
- XI/OC input/output modules ③
  - Can be fitted to the XC100/200 (max. 15 modules)
  - Plug-in terminals with screw or springloaded terminal
- XSoft
  - Programming, configuring, testing/commissioning in a single tool

Refer to the following product overview and manuals for further information:

- Automation product overview (AWB2700-7546)
- XC100 hardware and engineering (AWB2724-1453)
- XC200 hardware and engineering (AWB2724-1491)
- XI/OC hardware and engineering (AWB2725-1452)
- XV100 hardware and engineering (AWB2726-1461)
- xStart-XS1 hardware and engineering (AWB2700-1426)
- XSoft PLC programming (AWB2700-1437)
- Function blocks for XSoft (AWB2786-1456); including data handling function blocks for text display PLCs

The latest edition is available from http://www.moeller.net/support: Enter the numbers shown in brackets, e.g. "AWB2725-1452G", as a search term.

Automation Systems
Modular I/O System XI/ON

XI/ON – the concept

XI/ON is a modular I/O system for use in industrial automation applications. It links sensors and actuators on the field level with the higher-level controller. Fieldbus protocols PROFIBUS-DP, CANopen and DeviceNet are supported.

XI/ON offers modules for virtually every application:

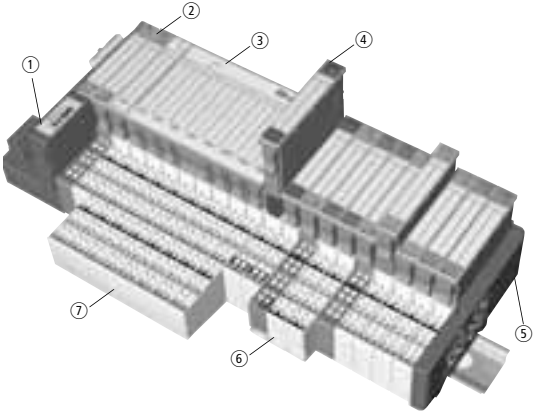
- Digital input and output modules
- Analog input and output modules
- Technology modules

A XI/ON station consists of a gateway, power supply modules and I/O modules.

A complete XI/ON structure counts as a single bus station in any fieldbus structure and therefore only requires one bus address. The individual XI/ON peripheral modules are therefore independent of the higher-level fieldbus.

The I/O modules consist of a combination of a base module designed as a terminal block, and a plug-in electronics module.

The XI/ON peripheral modules are linked to the fieldbus via the XI/ON gateway. This is used for the communication between the XI/ON station and the other fieldbus stations.



1 Gateway
2 Power supply module
3 Electronics module in block design
4 Electronics module in slice design
5 End plate
6 Base module in slice design
7 Base module in block design

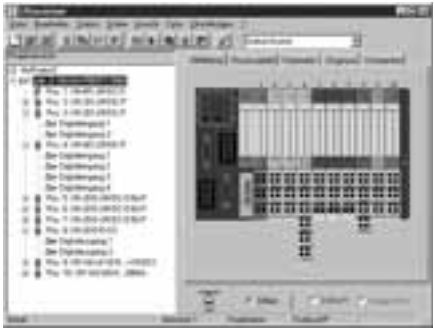
Automation Systems
Modular I/O System XI/ON

Flexibility
Each XI/ON station can be adapted exactly for the required number of channels since the modules are available in different levels of granularity.
For example, digital input modules with 2, 4, 16 or 32 channels are available in slice or block design.
A XI/ON station can contain modules in any combination. This enables the system to be adapted to virtually any application in industrial automation.

Compact design
The narrow mounting width of the XI/ON modules (gateway 50.4 mm; slice 12.6 mm, block 100.8 mm) and the low mounting height make the system ideal for use in applications where space is at a premium.

Simple handling
Apart from the gateway, all XI/ON modules consist of a base module and an electronics module.
The gateway and the base modules can be snap-fitted on mounting rails. The electronics modules can then be plugged simply onto the assigned base module.
The base modules are available as terminal blocks. They are wired either with spring-loaded or screw terminals. The electronic modules can be fitted or removed during commissioning or for maintenance without disturbing the wiring.
A design coding feature ensures that the electronic modules can only be fitted at the correct locations provided.

I/Oassistant diagnostics and engineering software
The I/Oassistant provides support during the entire planning and implementation phase of an I/O system. It provides help for engineering the stations, the configuration and for setting the parameters. The software is used for commissioning systems and carrying out tests and diagnostics on the stations.
The entire documentation for the station, including a parts list for ordering, can be generated after the engineering phase.



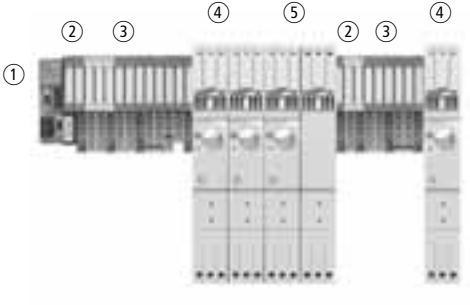
Automation Systems
Networkable Motor Starters xStart-XS1

xStart-XS1

xStart-XS1 is the modular, networkable version of the tried and tested motor starter from Moeller. It connects the motors with the XI/ON system and thus ensures flexible availability between systems, irrespective of the fieldbus in use.

xStart-XS1 offers DOL and reversing starters in different ratings and available with or without a trip-indicating auxiliary contact (AGM).

The xStart-XS1 modules consist of a base module and a power module that contains the tried and tested PKZM0 motor-protective circuit-breaker and one or two DILEM contactors. They enable the connection of assigned motor ratings up to 4.0 kW at a rated operational voltage U_e of 400 V AC.



1. XI/ON gateway
2. Supply module
3. XI/ON I/O modules
4. xStart-XS1 DOL starter module
5. xStart-XS1 reversing starter module

Flexibility

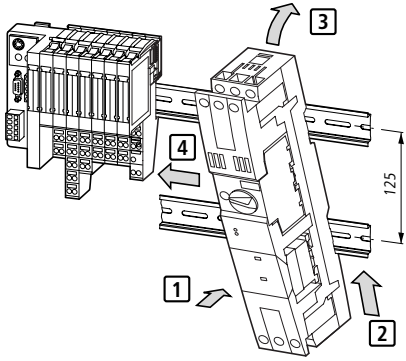
You can adapt xStart-XS1 exactly to the requirements of the system used.

xStart-XS1 can be used at any position on a XI/ON station so that you can organise your station conveniently into system areas.

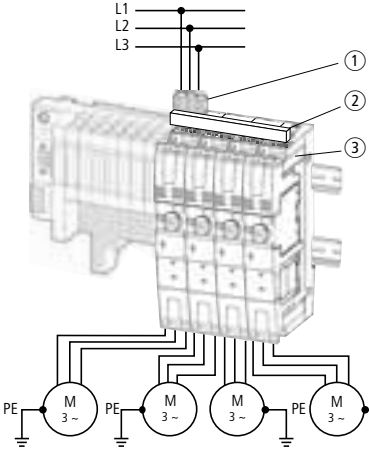
The motor can be disconnected at the machine by using the rotary handle.

Mounting

The complete module is mounted by simply snap-fitting it onto two top-hat rails. You can also simply mount the base module and add the power section at a later time. Mounting and removal are carried out without any tools.

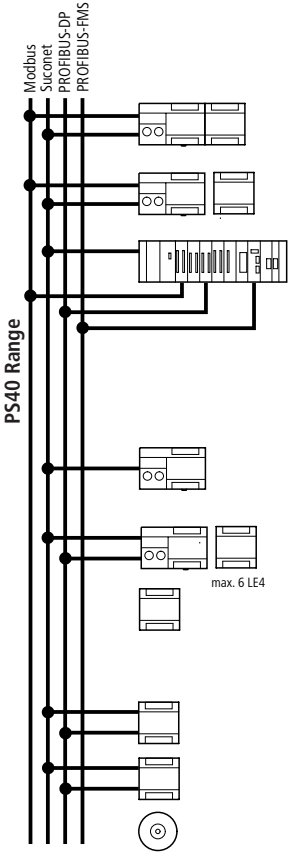


Power supply accessories are available for reducing wiring costs. If several xStart-XS1 modules are mounted next to each other, the power can be fed via a distribution system. This power distribution is available for an operating current of up to 63 A.

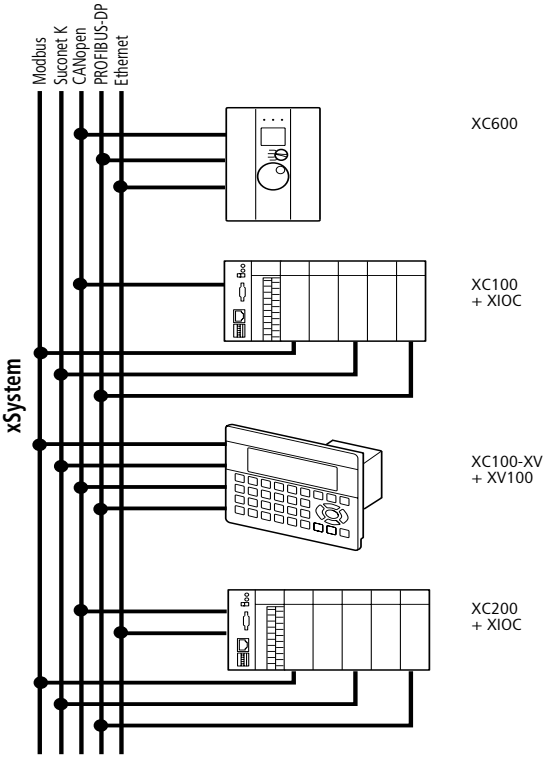


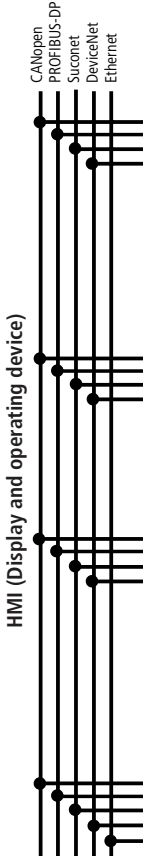
① Incoming terminal for three-phase commoning link
② Three-phase commoning link for up to 4 DOL starters without trip-indicating auxiliary contact AGM
③ DOL starter without AGM trip-indicating auxiliary contact

Automation Systems
Networking PS40 Series

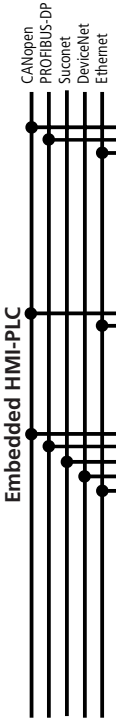


Part No.	Interface	Memory
PS4-141-MM1	Suconet K + RS 232	64 kByte
PS4-151-MM1	Suconet K + RS 232	64 kByte
PS4-201-MM1	Suconet K + RS 232	64 kByte
PS4-271-MM1	Suconet K + RS 232	64 kByte
PS4-341-MM1	Suconet K + RS 232	512 kByte
PS416-BGT...		
PS416-CPU...		
PS416-POW...		
PS416-INP...		
PS416-OUT...		
PS416-AIN...		
PS416-AIO...		
PS416-CNT-200		
PS416-TCS-200		
PS416-NET...	Suconet K (M/S)	
PS416-COM-200	serial interface	
PS416-MOD-200	Modbus(SI)	
EM4-101-...	Suconet K/K1	
EM4-111-...	Suconet K/K1	
EM4-201-DX2	Suconet K	
EM4-204-DX1	PROFIBUS-DP	
LE4-104-XP1		
LE4-108-...		
LE4-116-...		
LE4-206-...		
LE4-308-...		
LE4-622-CX1	2 × 3 counter	
LE4-633-CX1	3 × 3 path measurement	
LE4-501-BS1	Suconet K	
LE4-503-BS1	PROFIBUS-FMS (Slave)	
CM4-504-GS1	Suconet K, PROFIBUS-DP	
CM4-505-GS1	Gateway	
ZB4-501-UM4	interface converter	
S40	Programming software	





Part no	Resolution	Code	Display
Text operator panel M14			
MI4-110-KC1	120 × 32	11	LCD monochrome
MI4-110-KD1	120 × 32	19	LCD monochrome
MI4-110-KG1/2	120 × 32	35	LCD monochrome
MI4-140-KF1	120 × 64	27	LCD monochrome
MI4-140-KI1	240 × 64	46	LCD monochrome
MI4-140-KJ1	240 × 64	46	LCD monochrome
Graphic operator panel M14			
MI4-150-KI1	320 × 240	56	Monochrome
MI4-450-KI1	320 × 240	56	STN colour
MI4-570-KH1	640 × 480	50	TFT
Touch operator panel M14 (Resistive)			
MI4-130-TA1	320 × 240	–	Monochrome
MI4-140-TA1	320 × 240	–	Monochrome
MI4-450-TA1	320 × 240	–	STN colour
MI4-550-TA1	320 × 240	–	TFT colour
MI4-160-TA1	640 × 480	–	Monochrome
MI4-570-TA2	640 × 480	–	TFT
MI4-580-TA1	800 × 600	–	TFT
MI4-590-TA1	1024 × 768	–	TFT
Touch operator panel MV4 (Infra-red)			



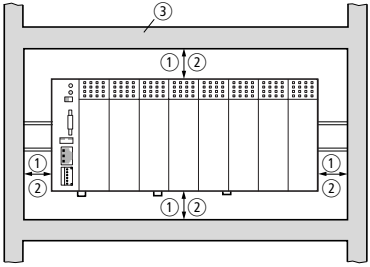
Part no	Resolution	Touch	Display
MC-HPG-230 MC-HPG-230-DP	320 × 240	Infra-red	STN colour
MC-HPG-300 MC-HPG-300-DP	640 × 480	Infra-red	TFT
XVH-340-57CAN	320 × 240	Infra-red	STN colour
XVH-330-57CAN	320 × 240	Resistive	STN colour
XV-442-57CQB-x-13-1	320 × 240	Infra-red	STN colour
XV-432-57CQB-x-13-1	320 × 240	Resistive	STN colour
XV-440-10TVB-x-13-1	640 × 480	Infra-red	TFT
XV-430-10TVB-x-13-1	640 × 480	Resistive	TFT
XV-440-12TSB-x-13-1	800 × 600	Infra-red	TFT
XV-430-12TSB-x-13-1	800 × 600	Resistive	TFT
XV-440-15TXB-x-13-1	1024 × 768	Infra-red	TFT
XV-430-15TXB-x-13-1	1024 × 768	Resistive	TFT

Note: The XVH- ... devices are also available with RS 232 or MPI interface.

1

Device arrangement

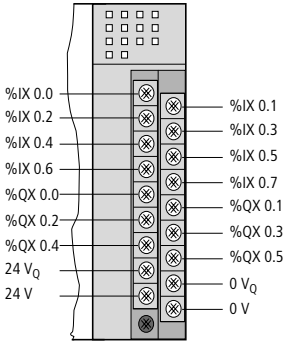
Install the rack and the PLC horizontally in the control cabinet – as shown in the following figure.



① Clearance > 50 mm
② Clearance > 75 mm from active elements
③ Cable duct

Terminal assignment

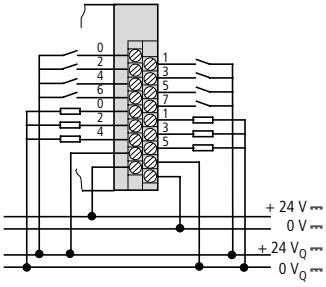
The terminals for the power supply and the local I/O have the following assignment:



Wiring example of power supply unit

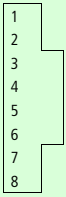
The voltage terminal 0VQ/24VQ is only used for the power supply of the local 8 inputs and 6 outputs, and is potentially isolated from the bus. The outputs 0 to 3 can be loaded with 500 mA and the outputs 4 and 5 with 1 A, each with a 100 % duty factor (DF) and a simultaneity factor of 1.

The wiring example shows the wiring with a separate power supply for the PLC and the IO terminals. If only one power supply is used, the following terminals must be connected:
24 V to 24VQ and 0 V to 0VQ.



RS 232 serial interface

This interface is used by the XC100 to communicate with the PC. The physical connection is implemented via an RJ 45 interface. The interface is not isolated. The connector has the following assignment:

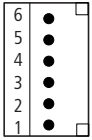
Pin	Designation	Description
		
4	GND	Ground
5	TxD	Transmit Data
7	GND	Ground
8	RxD	Receive Data

You can use the COM1 or COM2 interface on the PC.

You use the XT-SUB-D/RJ45 programming cable for the physical connection.

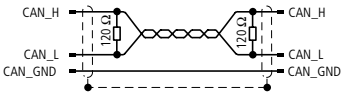
CANopen interface

Assignment of the 6-pole Combicon connector:

	Terminal	Signal
	6	GND
	5	CAN_L
	4	CAN_H
	3	GND
	2	CAN_L
	1	CAN_H

Only use a cable that is permissible for CANopen with the following properties:

- Surge impedance 108 to 132 Ω
- Capacitance per unit length < 50 pF/m

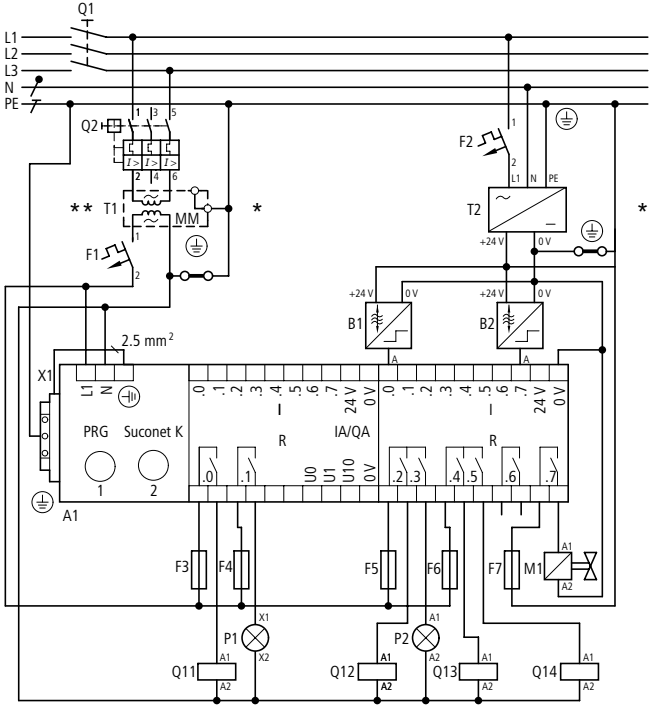


Baud rate [Kbit/s]	Length [m]	Cable cross section [mm^2]	Loop resistance [Ω/km]
20	1000	0.75 – 0.80	16
125	500	0.50 – 0.60	40
250	250	0.50 – 0.60	40
500	100	0.34 – 0.60	60
1000	40	0.25 – 0.34	70

1

PS4-151-MM1 compact PLC

- Wiring for a 230 V AC supply circuit
- Relay contacts with different potentials: 230 V AC and 24 V DC
- 24 V DC inputs from an external power supply unit, earthed operation

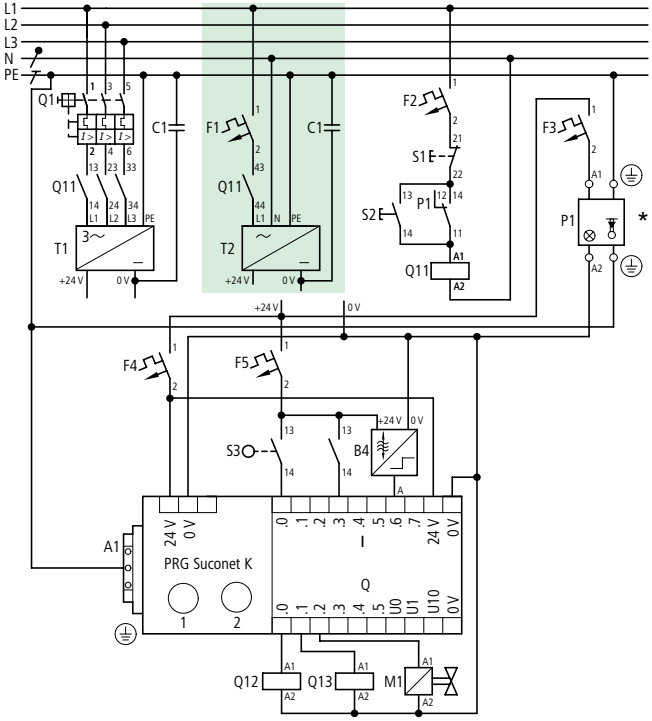


* Insulation monitoring must be provided where the control circuits are not earthed. (EN 60204-1 and VDE 0100-725)

** IEC/EN 60204-1 specifies that a control transformer is required.

PS4-201-MM1 compact PLC

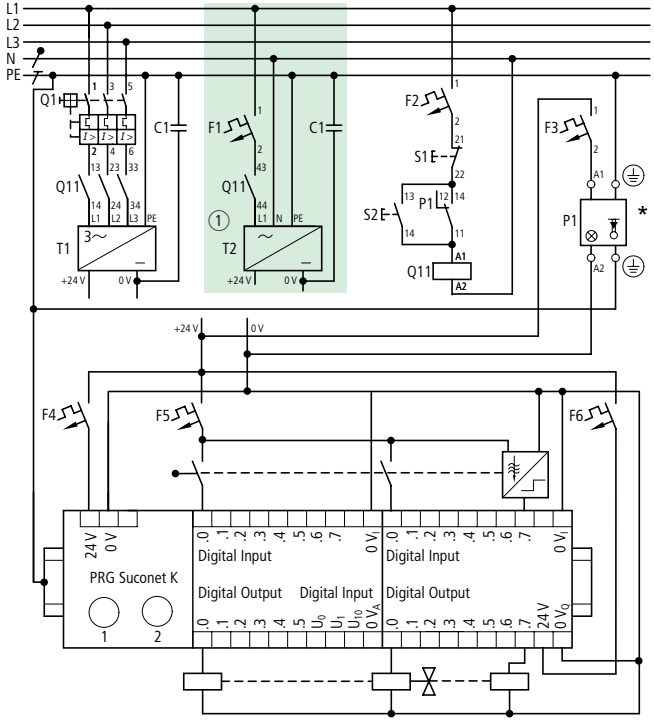
- Shared power supply for PLC and inputs/outputs
- Non-earthed operation with insulation monitoring



* For operation without insulation monitoring, 0 V must be linked with the PE potential in the control circuits.

PS4-341-MM1 compact PLC

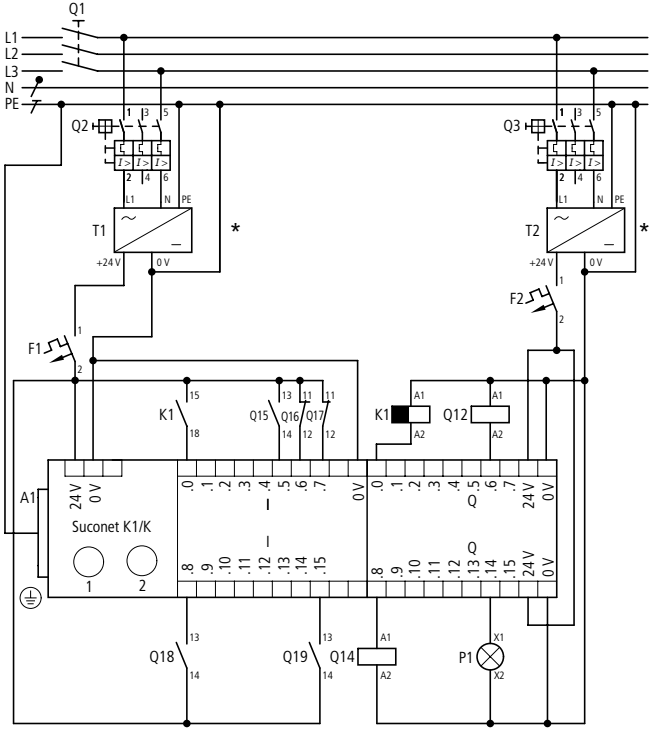
- Shared power supply for PLC and inputs/outputs
- Non-earthed operation with insulation monitoring



* For operation without insulation monitoring, 0 V must be linked with the PE potential in the control circuits.

EM4-201-DX2 expansion module and LE4-116-XD1 local expansion

- Inputs and outputs have a separate power supply
- Earthed operation



* Insulation monitoring must be provided where the control circuits are not earthed.

Notes