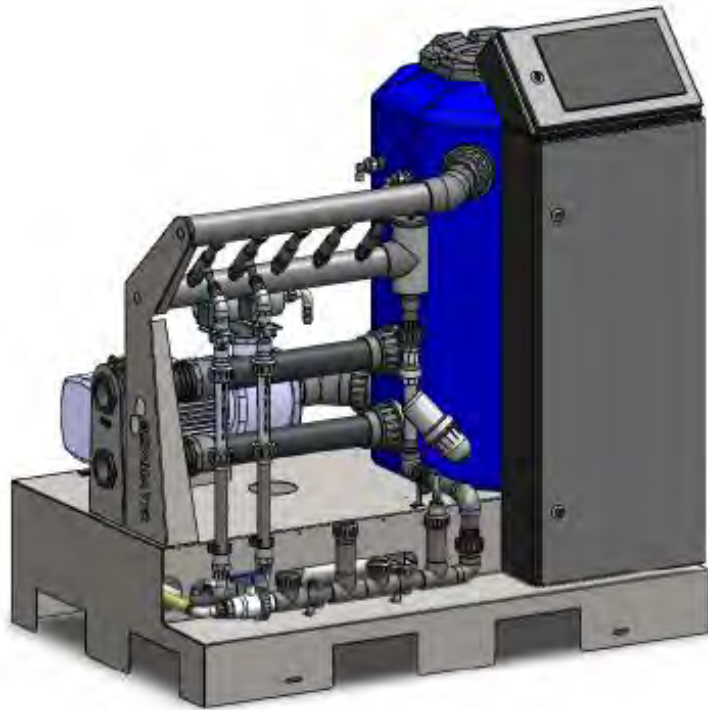


AMI Penta Installation





CERTIFICATE OF CONFORMITY

Product: AMI Penta & LCC1, LCC2, LCC4
Part Number(s): 5510141 - 590330 & 310000 - 310400

We, Senmatic A/S, hereby declare that the Irrigation and Fertilize mixer AMI Penta, and Climate computer LCC1, LCC2, and LCC4 intended for controlling Irrigation and of humidity and temperature within greenhouse sector and horticultural industry, has been developed and produced in conformity with:

EMC - Directive: 2004/108/EC

EN 61131-2:2007 Programmable controllers – Part 2: Equipment requirements and tests

EN 61000-6-2:2005 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments

EN 61000-6-4:2007 Electromagnetic compatibility (EMC) – Part 6: Generic standards – section 4: Emission standard for industrial environments

Low voltages directive 2006/95/EC

EN 61131-2:2007 Programmable controllers – Part 2: Equipment requirements and tests

EN 60204-1:2006 Safety of machinery – Electrical equipment of +A1/2009 machines – Part 1: General requirements

Manufacturer's Name: Senmatic A/S

Manufacturer's Address: Industrivej 8
DK-5471 Søndersø
Denmark

Date: January 20th 2016

Mads Andersen

Development Manager

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Technical specification

AMI Penta Computer

Supply Voltage:	AC 85 – 264 V (Wide range), 45/65Hz DC 95 – 250 V
Power Usage:	App. 64VA
Communication:	Ethernet and POWERLINK

Physical data

Temperatur:	0-50°C (32-122°F), without direct sun radiation
Humidity:	95RH% without condensation
Tightness:	IP65

EXP.

Supply Voltage: AC 85 – 264 V (Wide range), 45/65Hz
DC 95 – 250 V

Power Usage: App. 64VA

Communication: Ethernet

Physical data

Temperatur: 0-50°C (32-122°F), without direct sun radiation.

Humidity: 95RH% without condensation

Tightness: IP65

AMI Penta and EXP general installation instructions.

Units: Place the EXP a suitable place, where cabling is optimal. It does not have to be next to the AMI Penta, but within the Ethernet limit.



The Units must NOT be exposed by direct sunshine, because the temperature inside the unit can become unacceptable high! High temperature in the AMI Penta may cause “black” display. The display normally returns to normal, when the temperature is normal again, but it will affect the life time of the display!



The Units must be placed, where they are not exposed by direct water splash!



High Voltage!

Warning! High voltage can kill or serious injure people! Connection of main power supply must only be done by a skilled electrician. The electrical connections must always be carried out in accordance with local regulations!

Note! Remember the ground connection!

In places with very unstable or noisy power supply, it might be necessary to improve it by installing extra filters, transient absorbers, UPS or voltage stabilizer.

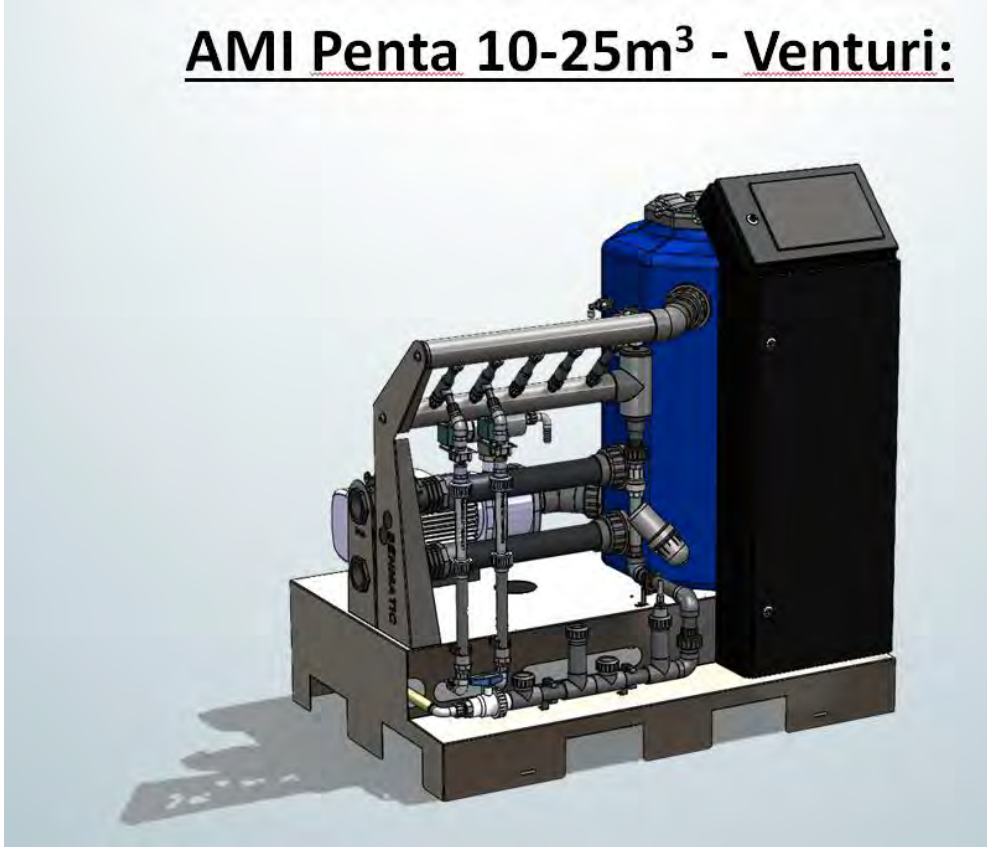
Sensors: All sensors must be connected to the EXP via a screened cable.

Note! The screen must be connected to the power ground terminal.

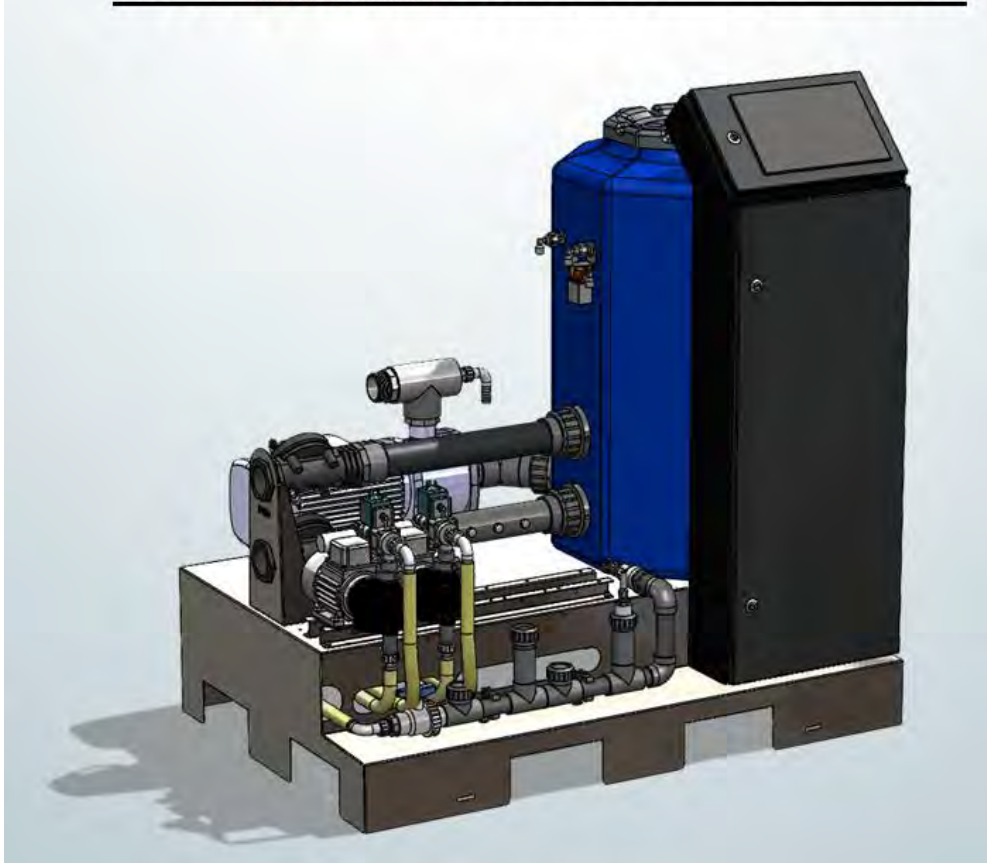
Ethernet: It is very important that the installation instructions are followed.

AMI Penta comes in different configurations.

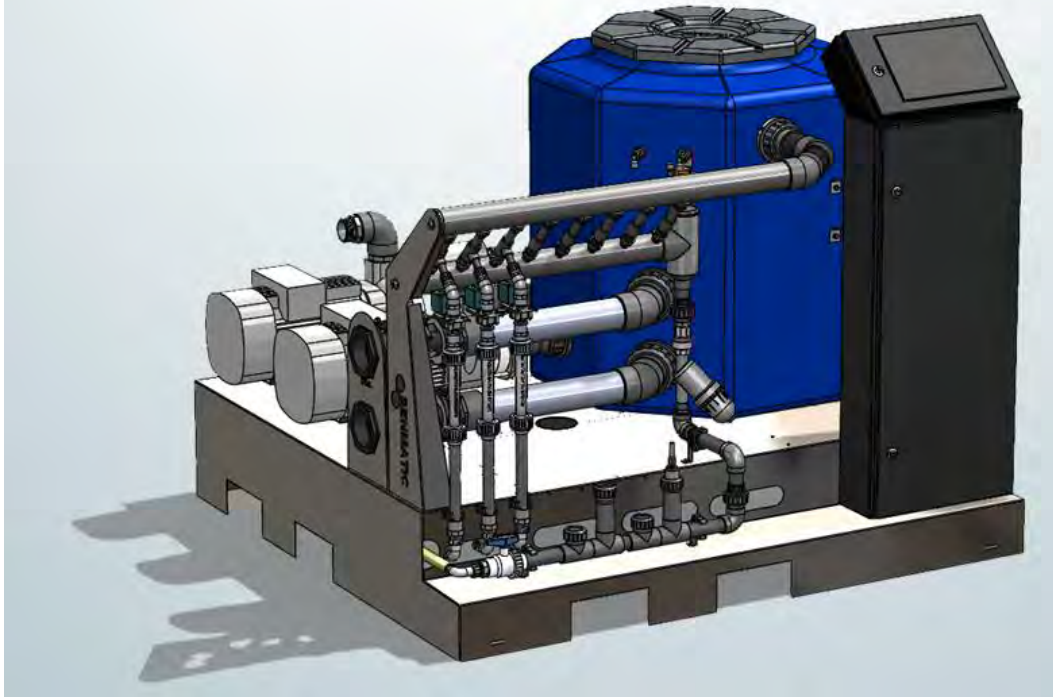
AMI Penta 10-25m³ - Venturi:



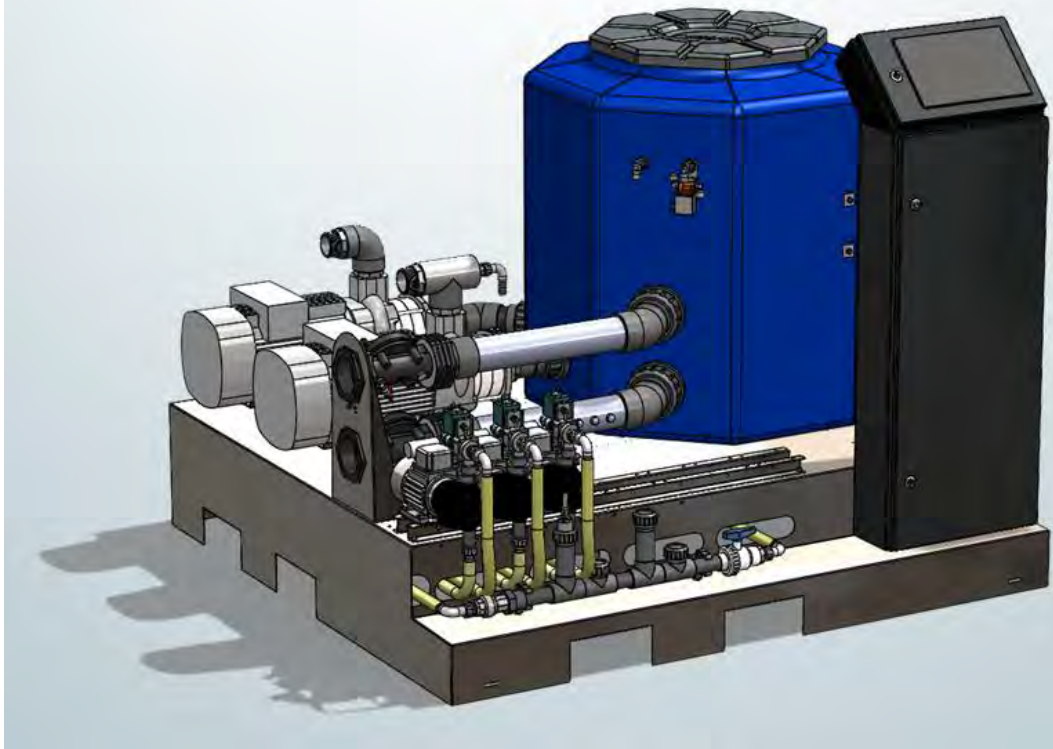
AMI Penta 10-25m³ – PP40S:



AMI Penta 32-64m³ – Venturi:



AMI Penta 32-64m³ – PP40s:



Excample of AMI Penta installation

AMI Penta

EC, pH and Ratio Control

Possible extension up to:

5 (8) Dosing Pumps

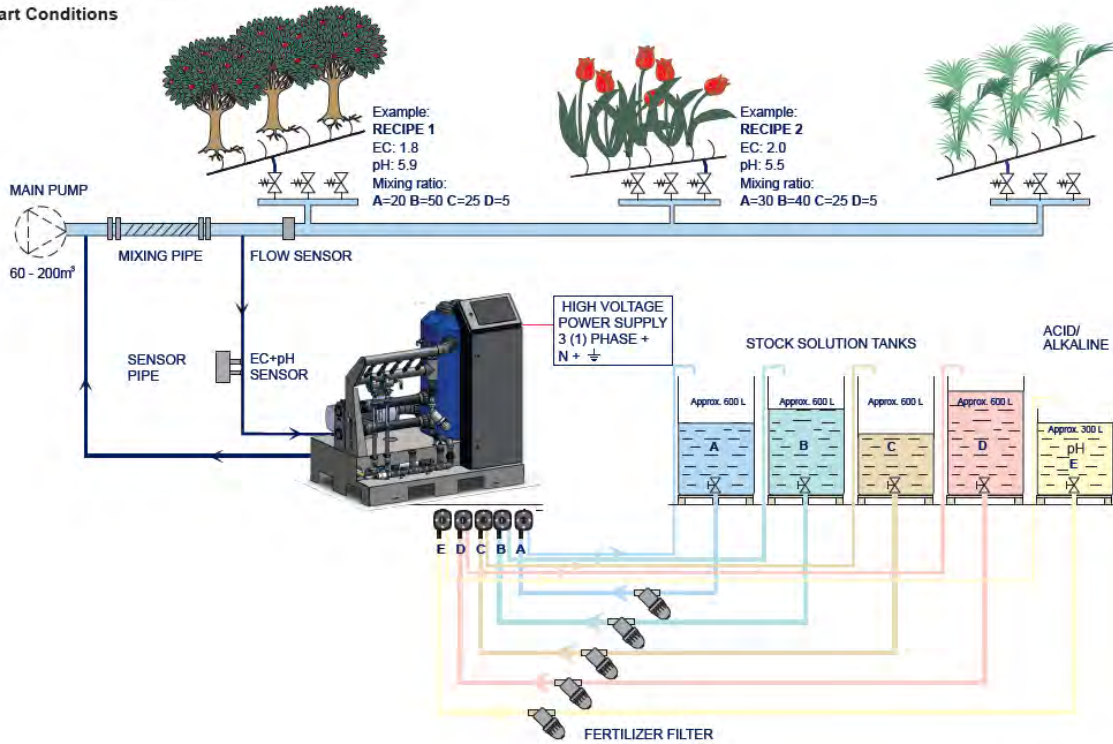
20 Recipes / 100 Groups

Absolute and Relative Alarms

200 Valve Irrigation Control

7 Start Conditions

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Denmark
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e-mail: dgtsales@senmatic.com
www.senmatic.com





This AMI Penta is extended with pH control.

The basic configuration of AMI Penta

Basic version of AMI Penta has 8 DO (Digital Outputs) of 24 VDC.

DO 1 – 4 are predefined from factory:

- DO 1: Main Pump
- DO 2: Water Supply Valve
- DO 3: Fertilizer A
- DO 3: Fertilizer B

All digital outputs coming after these 4 can be freely defined by the dealer or end user.

- DO 4 – DO nn

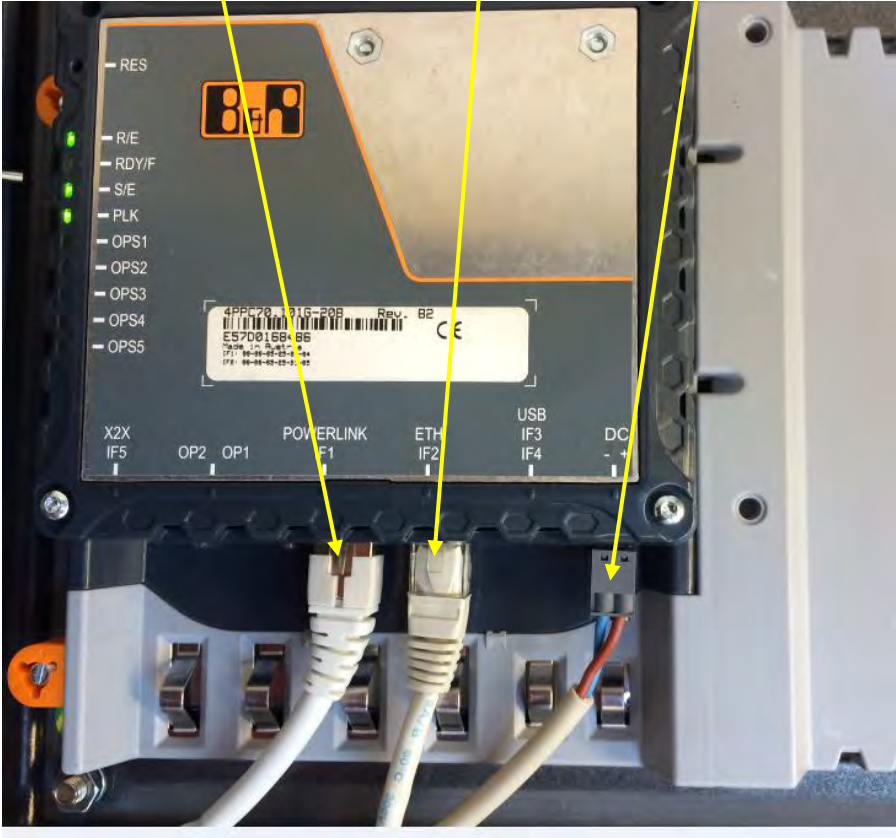
On the next page you can make the list of the AMI Penta configuration.

Fill out the specific AMI Penta configuration

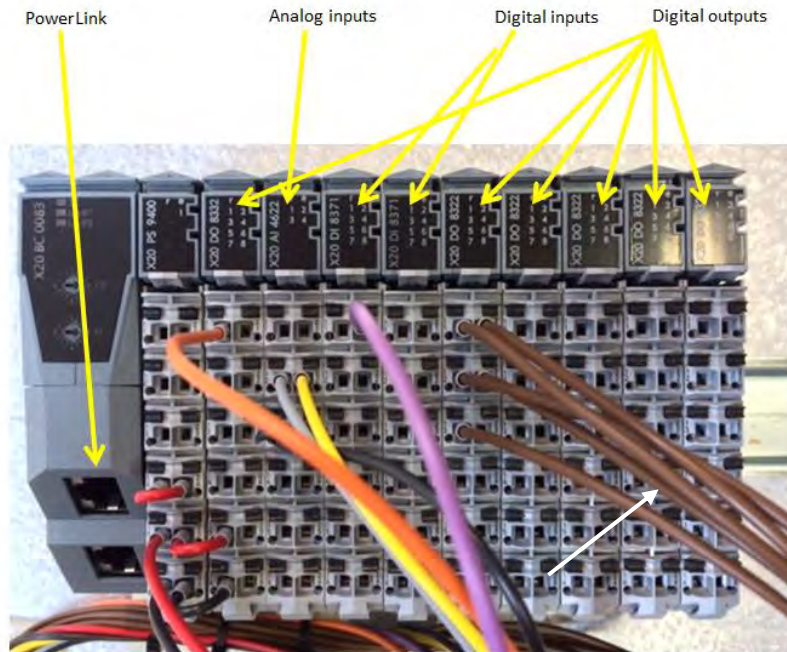
DO 1	Main Pump	DO 9		DO 17		DO 25	
DO 2	Water Supp. Valve	DO 10		DO 18		DO 26	
DO 3	Fert. A	DO 11		DO 19		DO 27	
DO 4	Fert. B	DO 12		DO 20		DO 28	
DO 5		DO 13		DO 21		DO 29	
DO 6		DO 14		DO 22		DO 30	
DO 7		DO 15		DO 23		DO 31	
DO 8		DO 16		DO 24		DO 32	
DO 33		DO 41		DO 49		DO 57	
DO 34		DO 42		DO 50		DO 58	
DO 35		DO 43		DO 51		DO 59	
DO 36		DO 44		DO 52		DO 60	
DO 37		DO 45		DO 53		DO 61	
DO 38		DO 46		DO 54		DO 62	
DO 39		DO 47		DO 55		DO 63	
DO 40		DO 48		DO 56		DO 64	
DO 65		DO 73		DO 81		DO 89	
DO 66		DO 74		DO 82		DO 90	
DO 67		DO 75		DO 83		DO 91	
DO 68		DO 76		DO 84		DO 92	
DO 69		DO 77		DO 85		DO 93	
DO 70		DO 78		DO 86		DO 94	
DO 71		DO 79		DO 87		DO 95	
DO 72		DO 80		DO 88		DO 96	
DO 97		DO 105		DO 113		DO 121	
DO 98		DO 106		DO 114		DO 122	
DO 99		DO 107		DO 115		DO 123	
DO 100		DO 108		DO 116		DO 124	
DO 101		DO 109		DO 117		DO 125	
DO 102		DO 110		DO 118		DO 126	
DO 103		DO 111		DO 119		DO 127	
DO 104		DO 112		DO 120		DO 128	
DO 129		DO 137		DO 145		DO 153	
DO 130		DO 138		DO 146		DO 154	
DO 131		DO 139		DO 147		DO 155	
DO 132		DO 140		DO 148		DO 156	
DO 133		DO 141		DO 149		DO 157	
DO 134		DO 142		DO 150		DO 158	
DO 135		DO 143		DO 151		DO 159	
DO 136		DO 144		DO 152		DO 160	

Connection overview AMI Penta

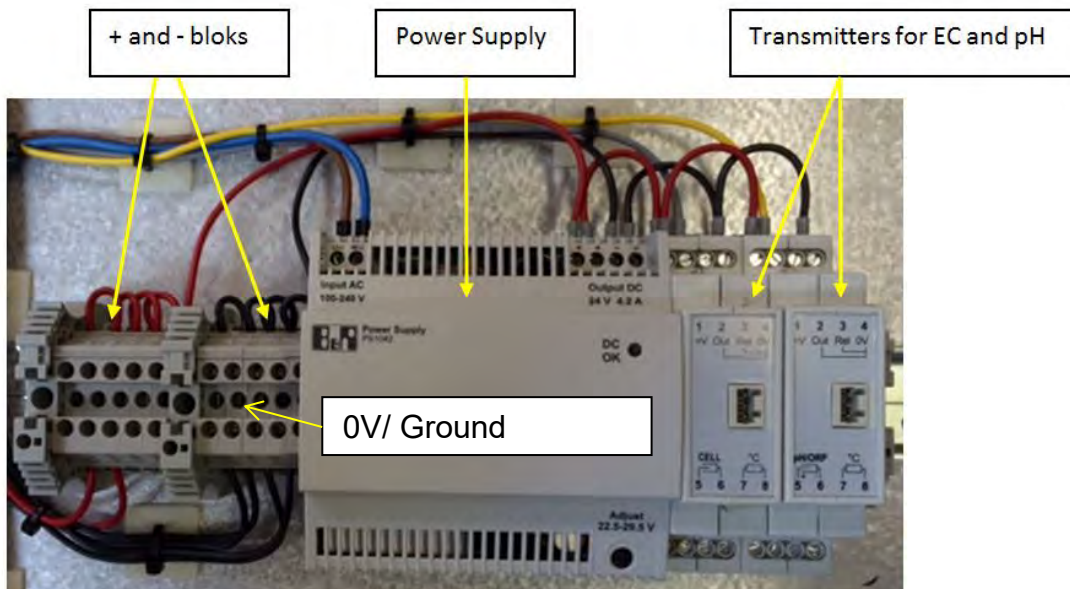
POWERLINK Connection Ethernet Connection Supply voltage: 24 VDC



Connection overview EXP



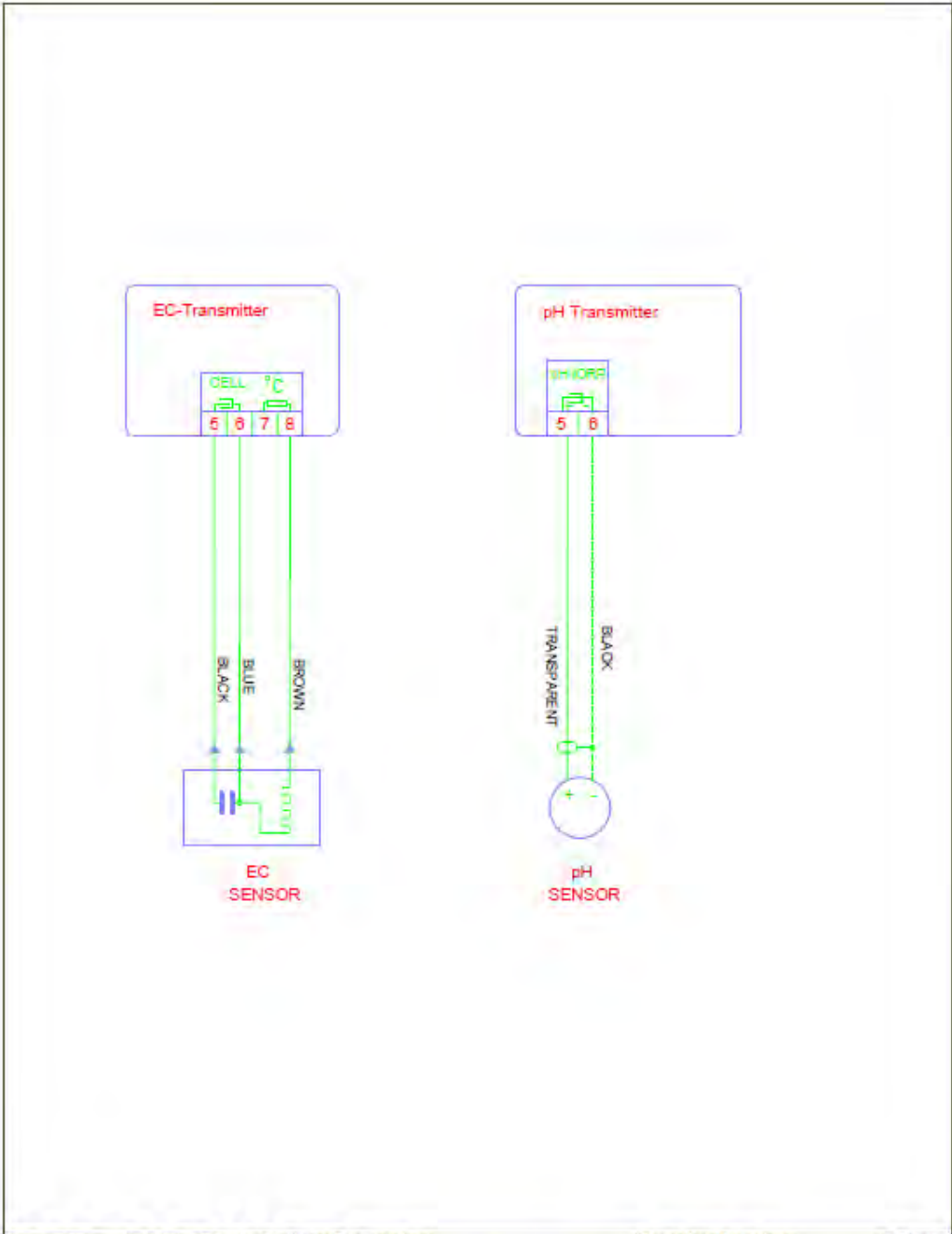
Power Supply and transmitters for EC and pH measurements.





The + and – bloks are used for all sensor supplies. +24VDC and 0VDC

Sensor connections

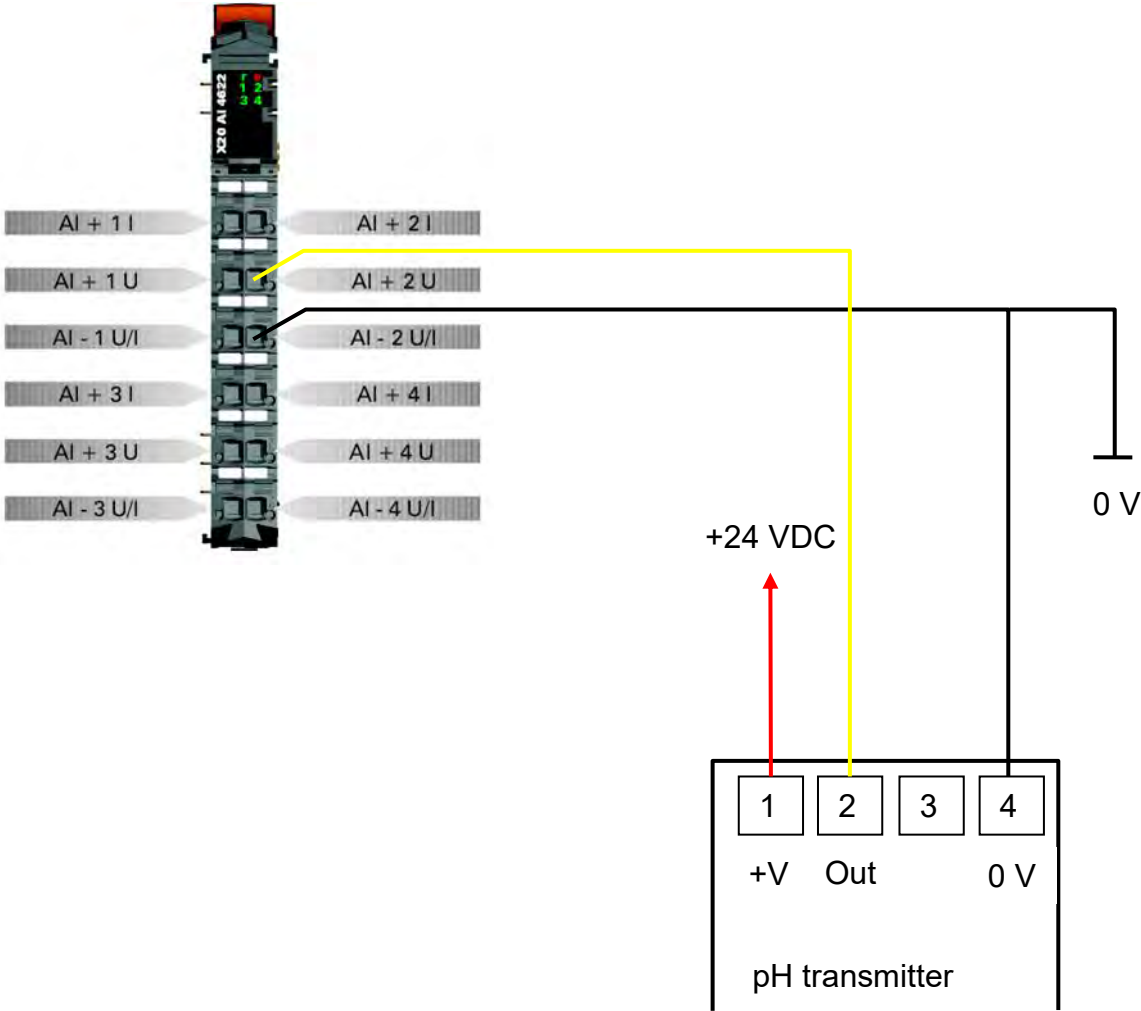
Connection of EC and pH sensors



 <p> SENOMATIC Industrivej 6 DK-5471 Sanderse Denmark Phone +45 5489 2211 Fax +45 5489 3311 </p>	Item Description: CONNECTION OF AMI PENTA EC SENSORS AND pH SENSORS		Drawing Number: 160801-01	Rev.:	
	First angle projection 	Tolerance: ISO 2768-MK Debur and break all edges.	Application:		
	Sheet name: Component specification sheet	Scale: 1:1	Department:	Material:	
	Date/Designed: / 1.8.16 LOCH			Page 1 of 1 Sheet format: A4	

pH transmitter internal connections

In this example AI 2 is used for pH. Remember I/O setup!



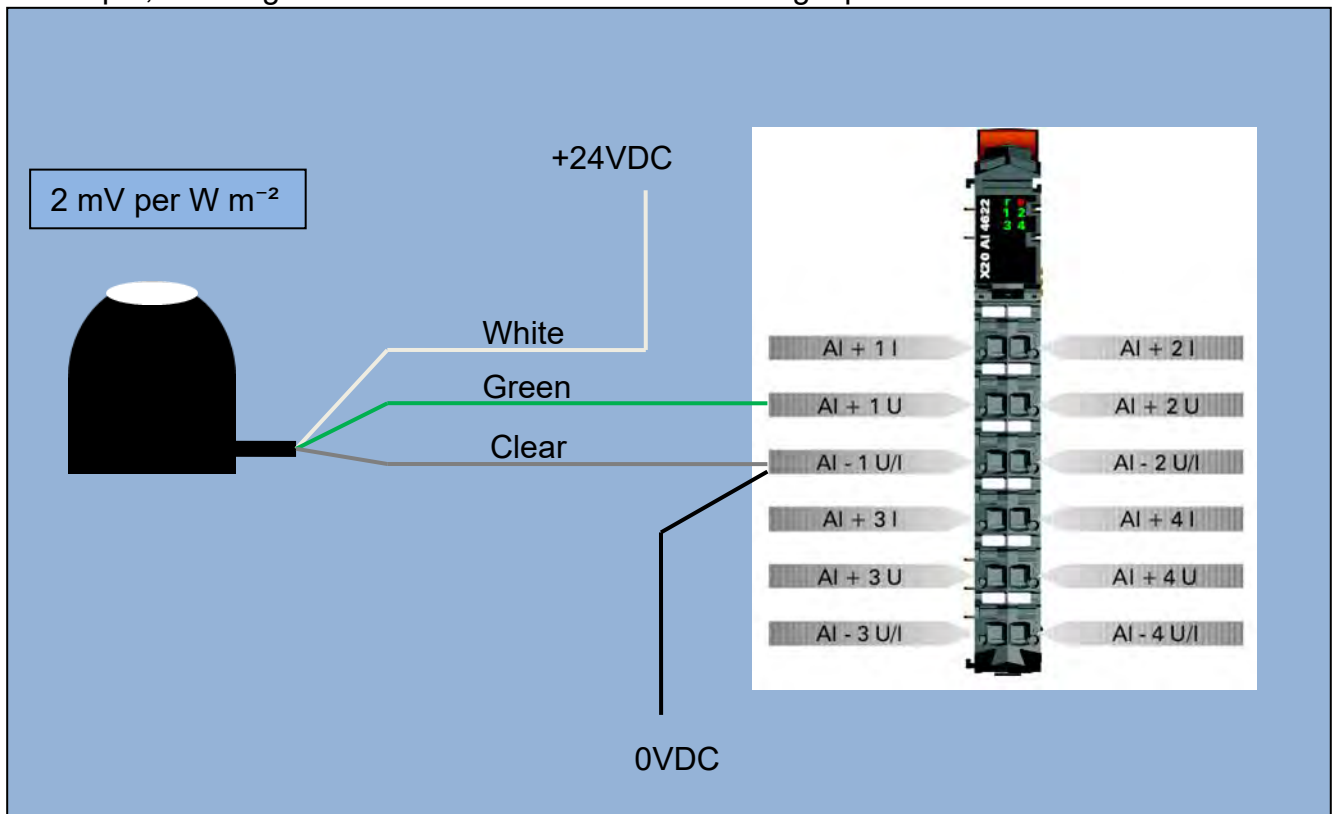
Solar cell connection

OPERATION AND MEASUREMENT

Connect the sensor to a measurement device (meter, datalogger, controller) capable of measuring and displaying or recording a voltage signal (an input measurement range of 0-2.5 V or 0-5 V is required to cover the entire range of total shortwave radiation from the sun). In order to maximize measurement resolution and signal-to-noise ratio, the input range of the measurement device should closely match the output range of the pyranometer. **DO NOT connect the sensor to a power source greater than 24 VDC.**



Example, showing the solar cell connected to an analog input.



This Solar Cell, together with a mounting bracket and a 4-input analog input module X20AI4622 has itemnumber **590130**

From serial number **9898** these colors are used



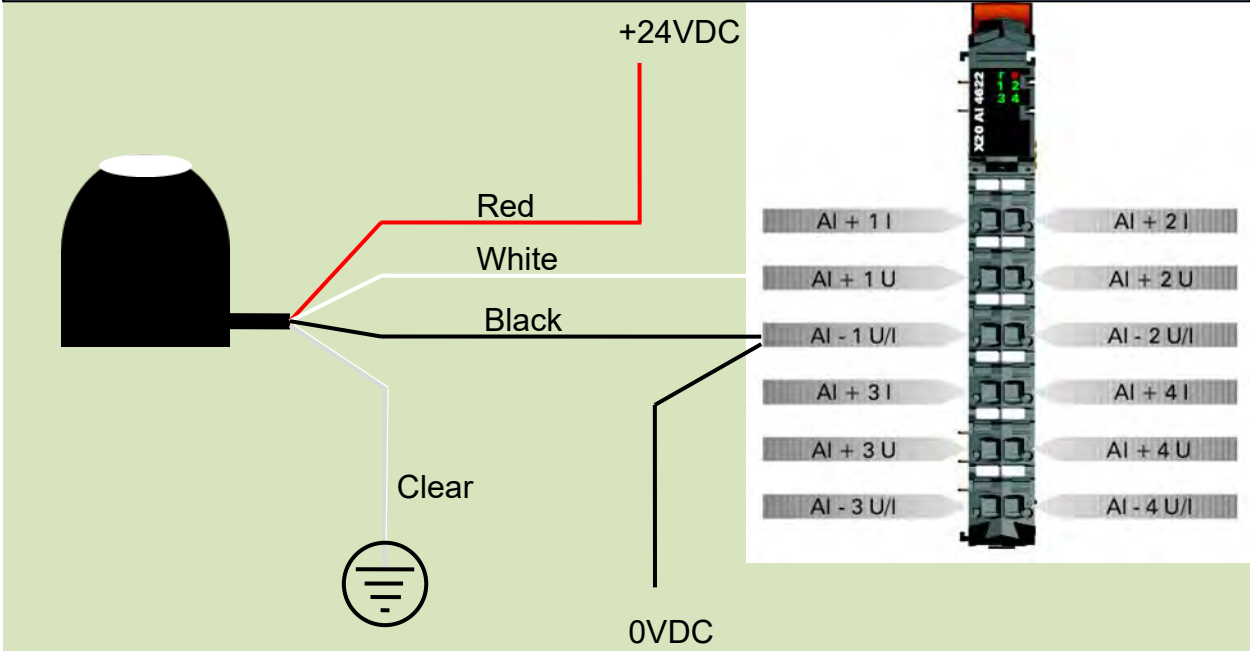
Black: Ground (from sensor signal and output power)

Red: Input Power SP-212 3.3-24 V DC, SP-215 5.5-24 V DC

White: Positive (signal from sensor)

Clear: Shield/Ground

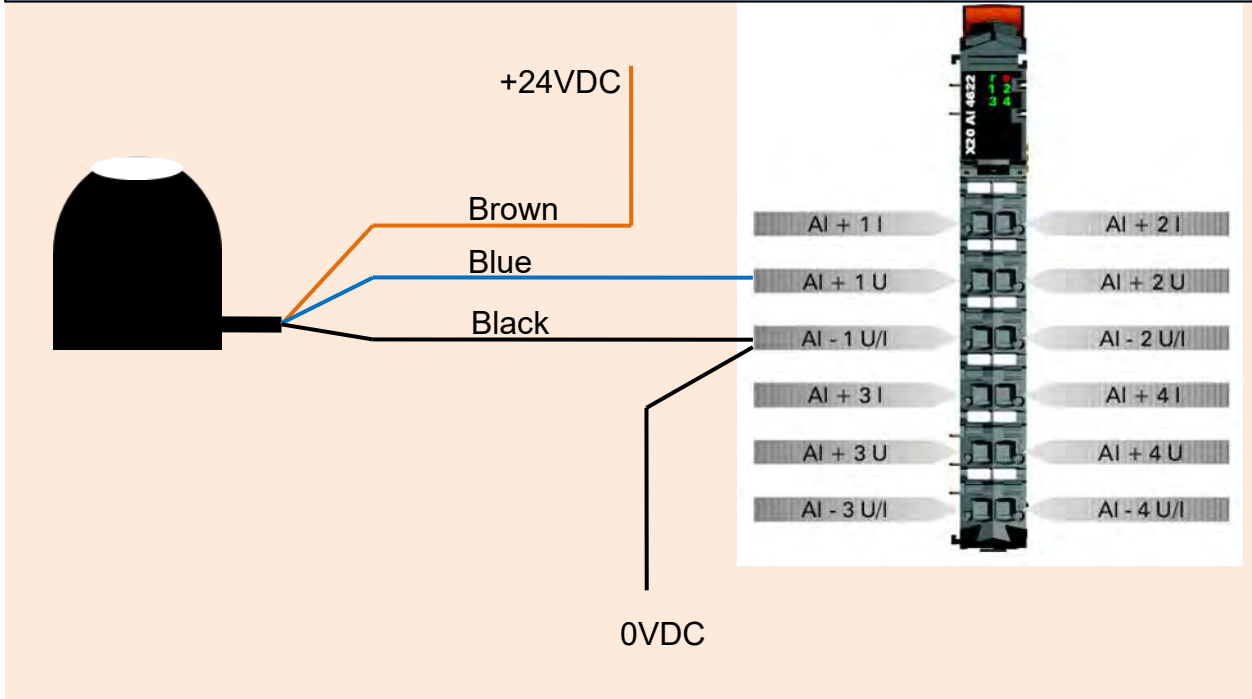
2 mV per $W\ m^{-2}$ before serial number **10517** Select V1 in Penta (Version 1)
 1,25 mV per $W\ m^{-2}$ from serial number **10517** Select V2 in Penta (Version 2)



This Solar Cell, together with a mounting bracket and a 4-input analog input module X20AI4622 has itemnumber **590130**



2 mV per W m⁻² before serial number **10517** Select V1 in Penta (Version 1)
 1,25 mV per W m⁻² from serial number **10517** Select V2 in Penta (Version 2)



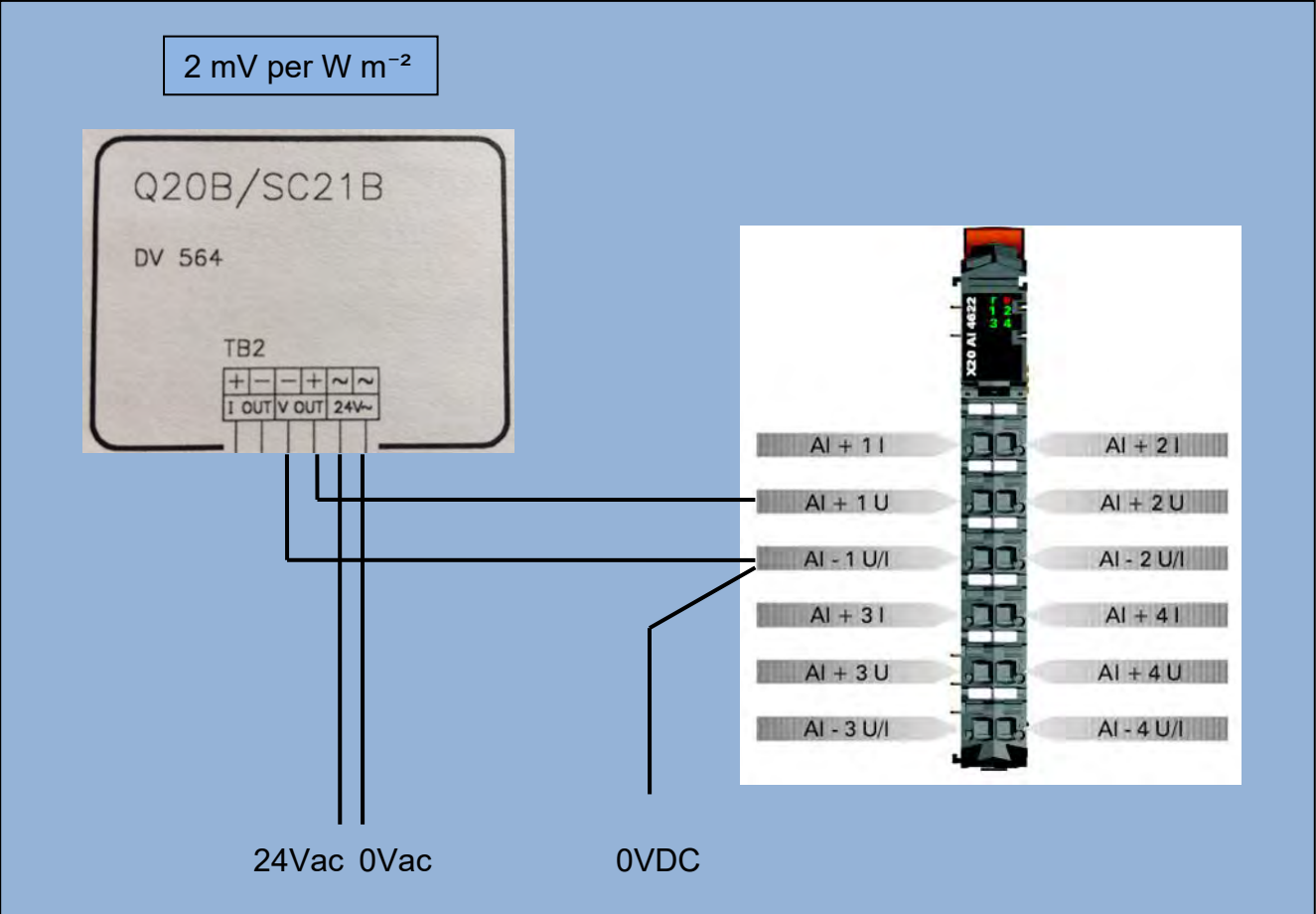
This Solar Cell with 7 meters of cable has itemnumber **310414**

Selecting the Sun sensor type

Pressure control	Select Value		
Number of main pumps	Sensor V1	<input type="text" value="1"/>	27-03-2019 13:23
Basin	Sensor V2	<input type="text" value="No"/>	Service
Use linear level sensors			Installation
Sun			Unit Setup
Choice of solar cell		<input type="text" value="Local"/>	IO Setup
Local sun sensor type		<input type="text" value="Sensor V2"/>	Mixer Setup
Weather station			Water supply
Choice of weather station		<input type="text" value="Global"/>	Regulation
			Pressure
			Basin
	Cancel		Activity
		senmatic	Back Home
			70.4.1.139

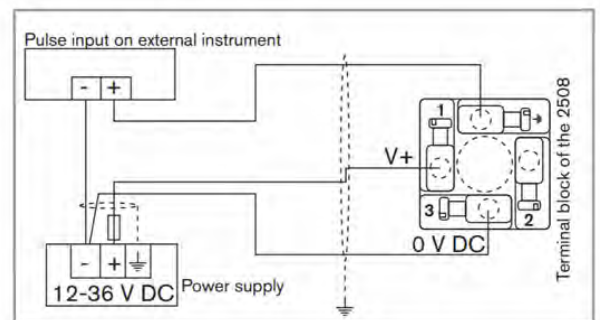
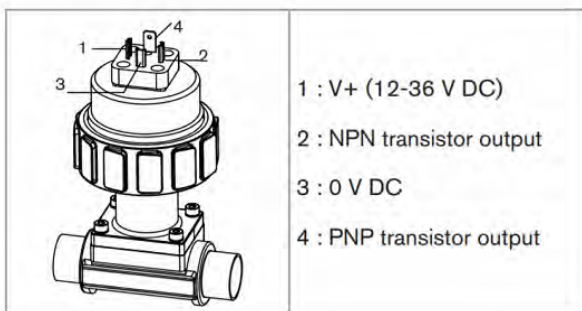
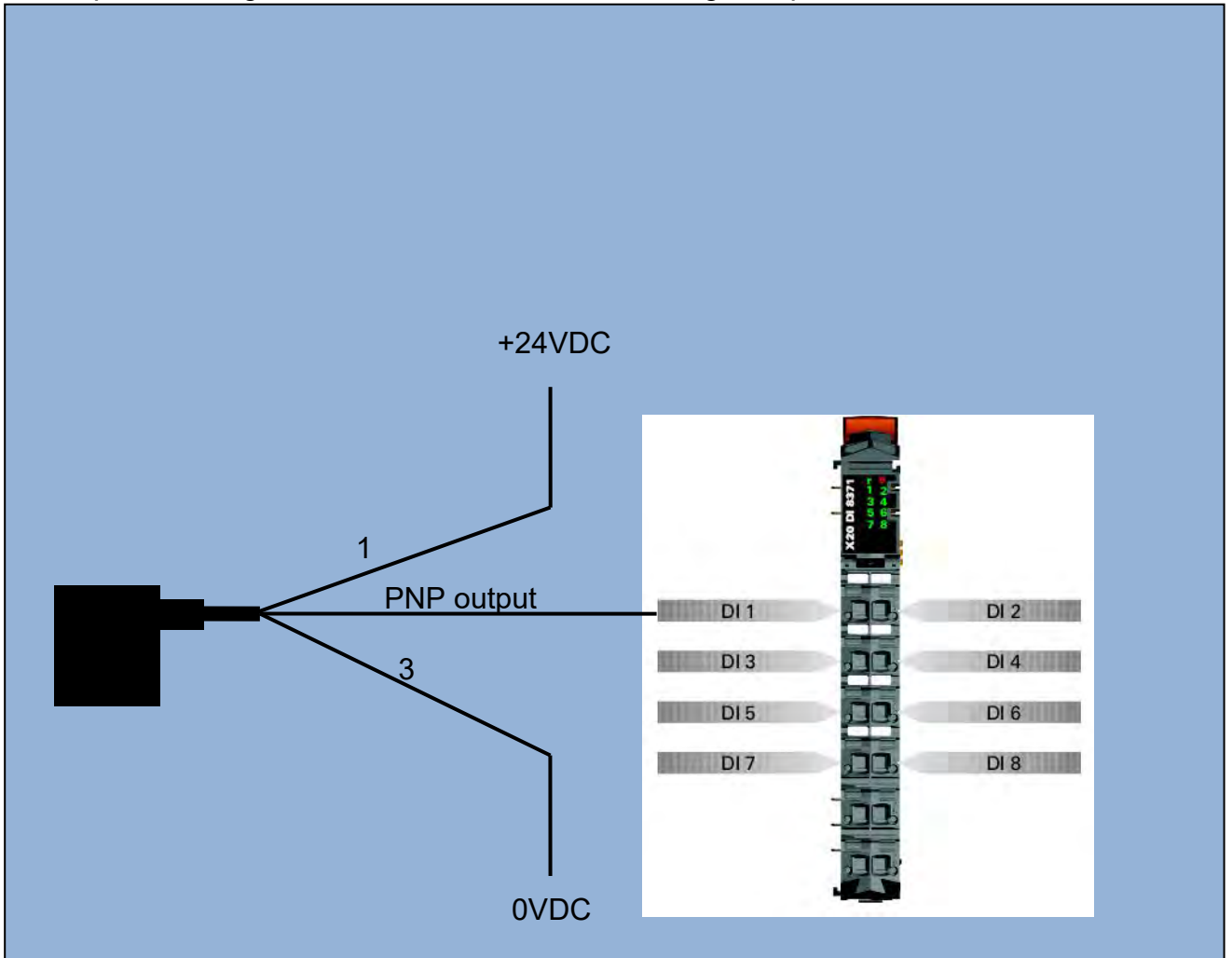
SC21B installation


Excample, showing SC21B solar cell connected to an analog input.



Flow sensor (PNP) connection

Example, showing the flow sensor connected to a digital input.



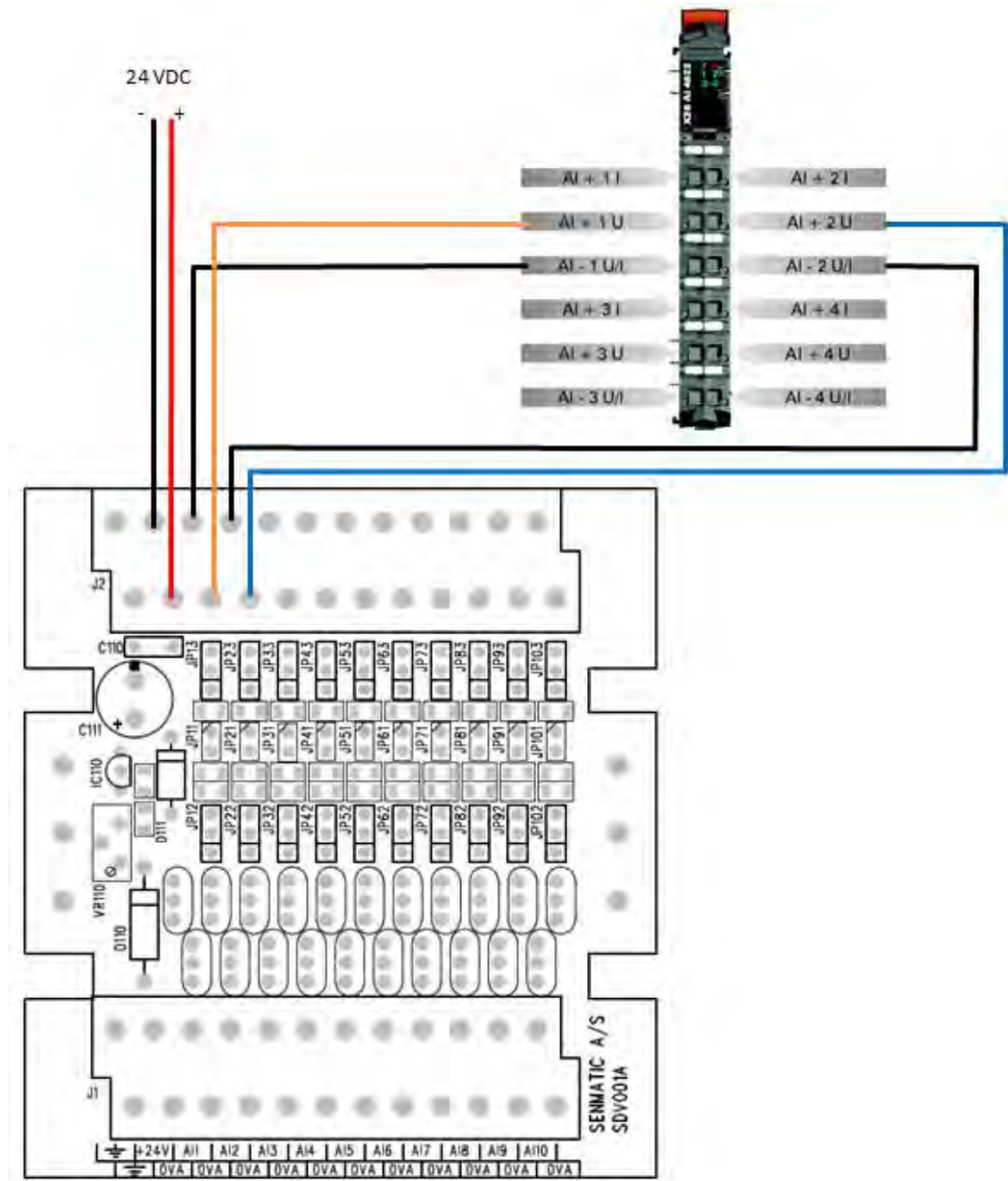
The PNP output has the Earth symbol at the connector. 

Temperature and humidity sensors connections

You will need a SDV001 PCB, item number 839030, for the connection of temperature and humidity sensors. Also you will need free analog inputs.

The 12 V is reference for the measurements and must be 12.0 V. The reference is adjusted at Senmatic when the PCB is tested.

Below is an example, showing analogue input 1 and 2 connected with an X20 AI 4622 module.





Ground connection

+24 V the same 24VDC, as provided by the built-in power supply

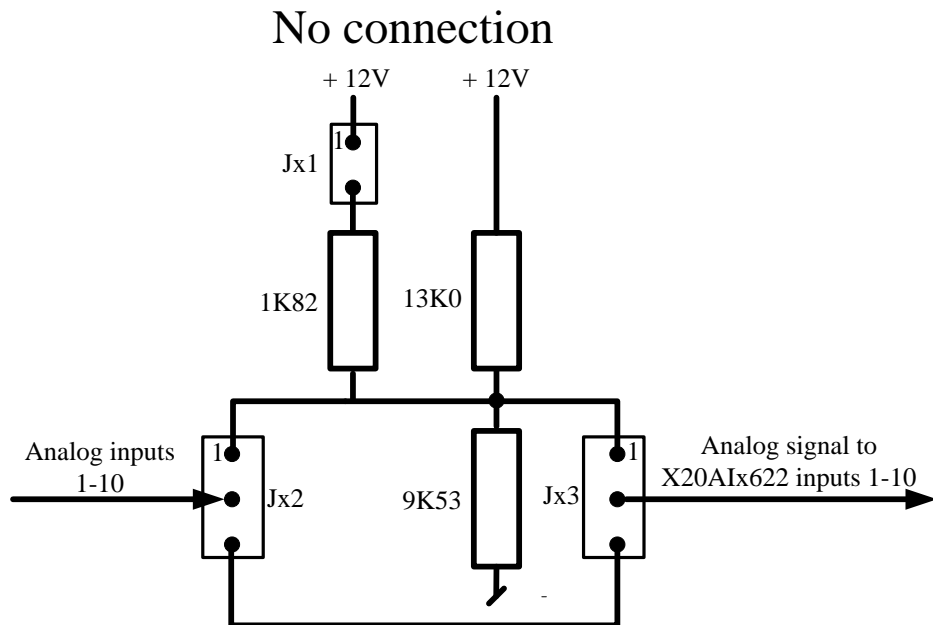
AI1-AI10 analog inputs 1 to10

0VA Common ground

Jumpers:

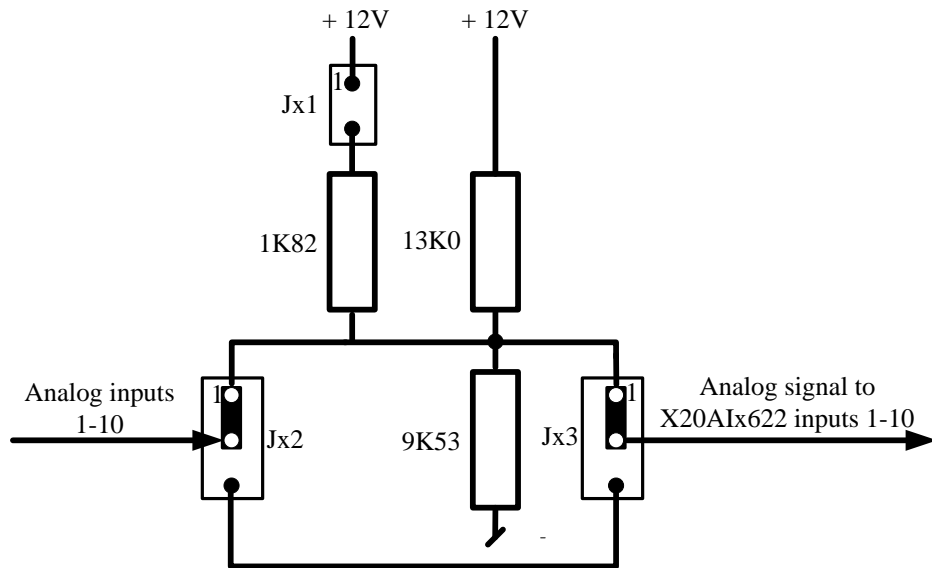
- JP11, JP12 and JP13 belong to analog input 1
- JP21, JP22 and JP23 belong to analog input 2
- JP31, JP32 and JP33 belong to analog input 3
- JP41, JP42 and JP43 belong to analog input 4
- JP51, JP52 and JP53 belong to analog input 5
- JP61, JP62 and JP63 belong to analog input 6
- JP71, JP72 and JP73 belong to analog input 7
- JP81, JP82 and JP83 belong to analog input 8
- JP91, JP92 and JP93 belong to analog input 9
- JP101, JP102 and JP103 belong to analog input 10

Different jumper settings



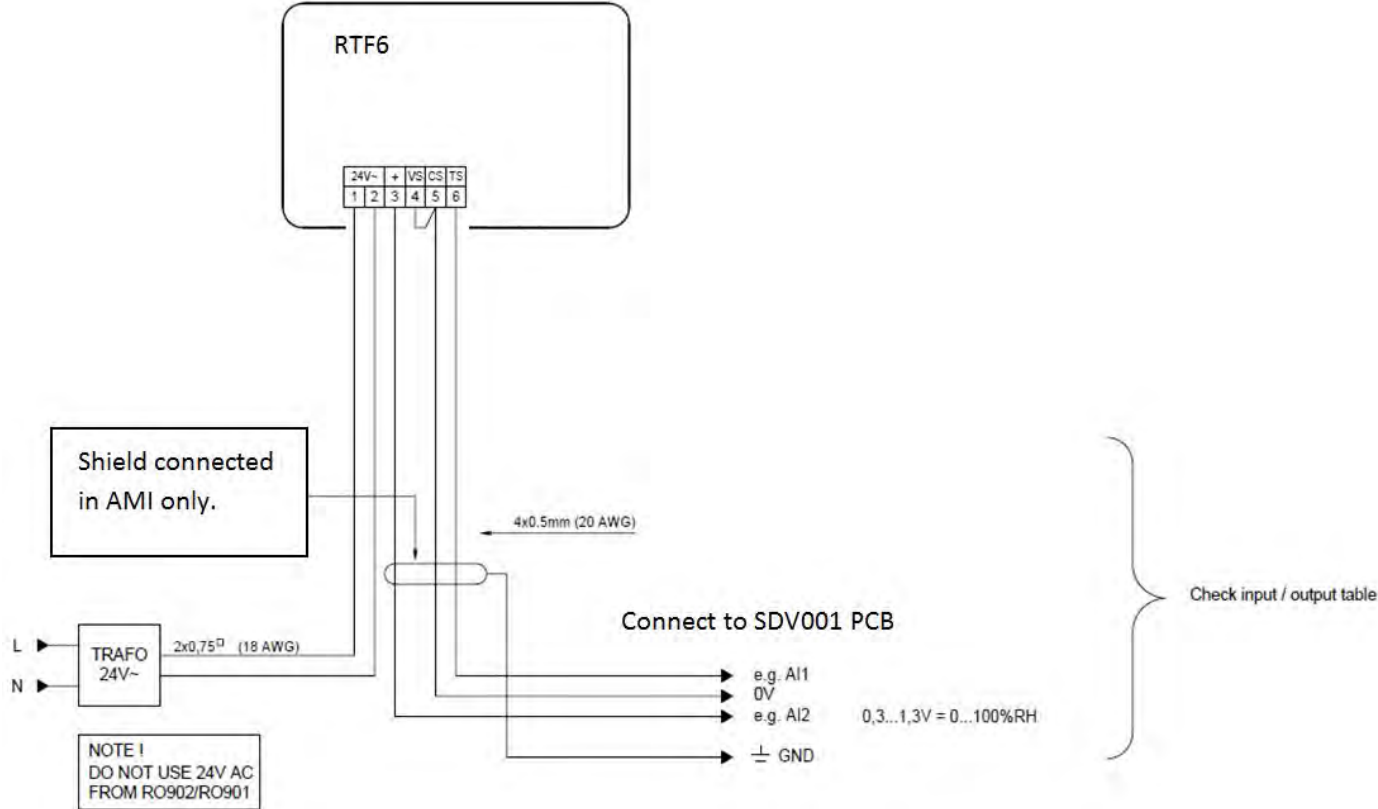
As shown above, there is no connection from the analog input, if there are no headers (connections) mounted on jumper Jx1, Jx2 or Jx3.

Standard input (Temp. osv)



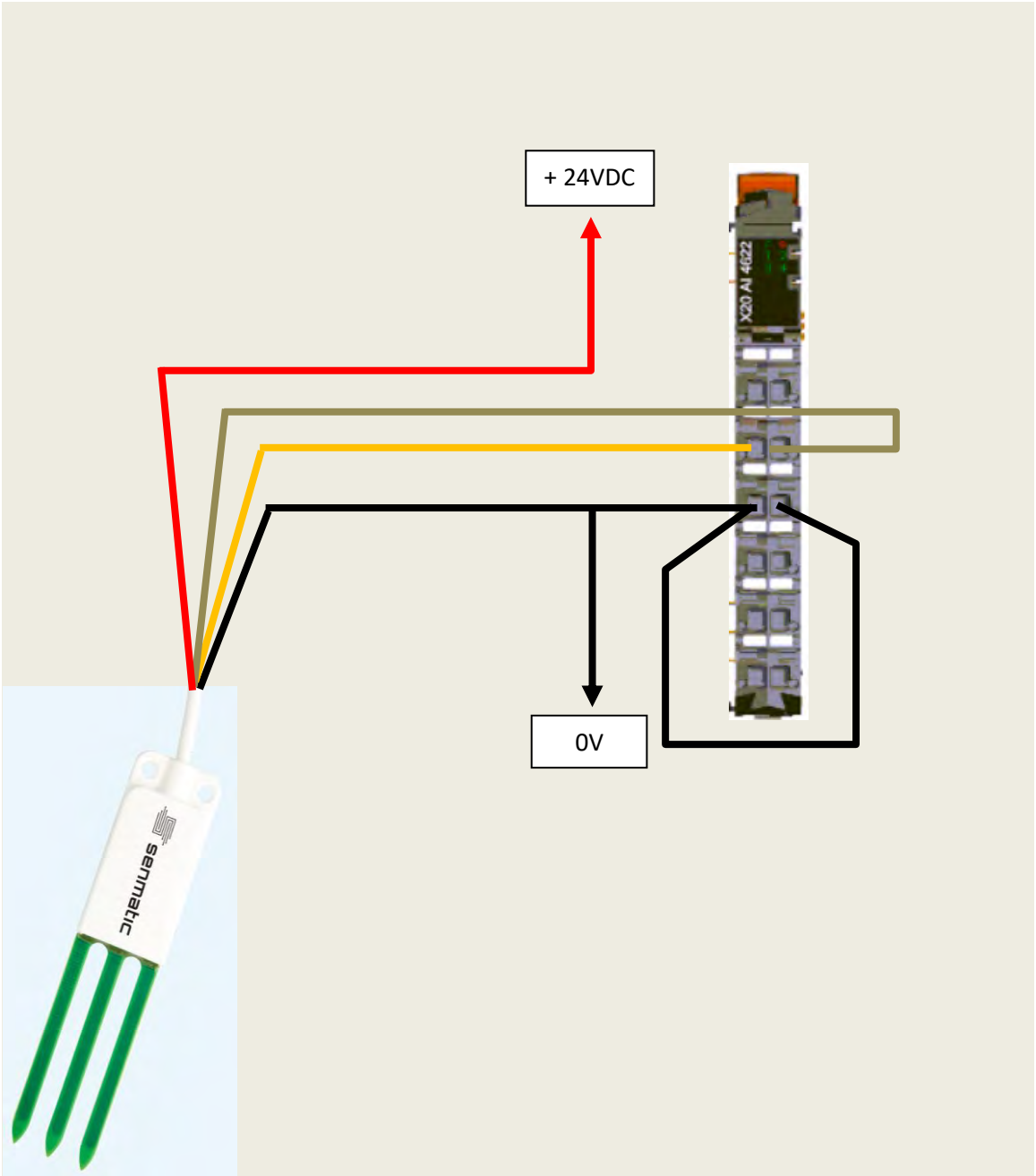
The analog input can be used for an standard sensor, such as a temperature sensor, if a header is mounted between pin 1 & 2 for jumper Jx2 and Jx3 (Jumper Jx1 does NOT have a header mounted).

RTF6 installation



Soil Sensor installation

at AI4622 module in AMI Penta



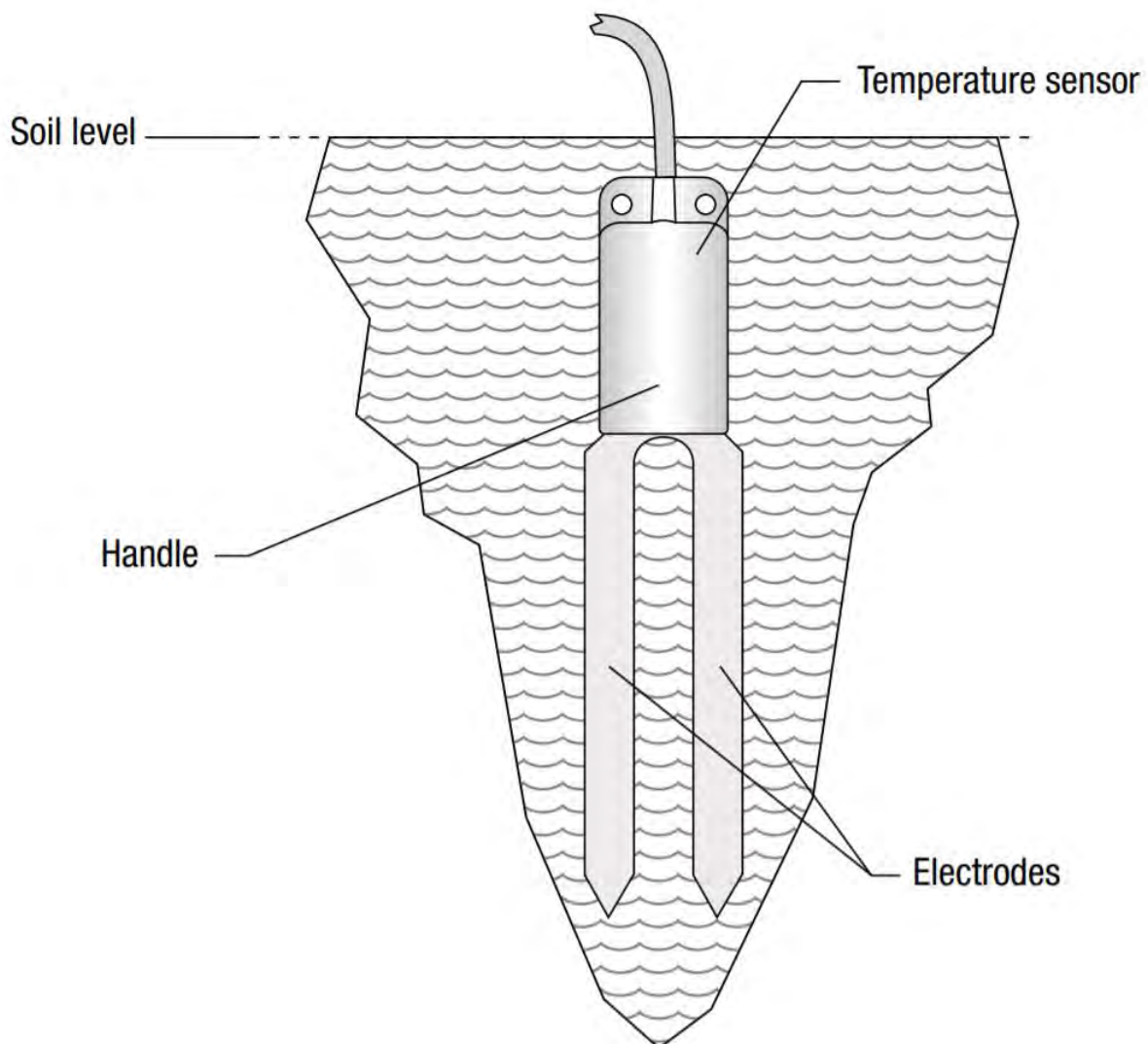
Orrance: Humidity
Brown: Temperature

Humidity signal range:
0,5 V 0 %VWC
3,0 V 60 %VWC

Temperature signal range:
0,5 V -40°C
3,0 V 60°C

Installation

By means of an accessory, perform a hole into the soil deep enough to accommodate the probe. Never use the probe to make the hole in the soil, in order to avoid mechanical damage to the probe itself. Once the hole was done, insert the probe completely into the soil so that the entire handle is covered by the ground: the temperature sensor is located inside the handle, close to the electrodes; therefore, it is necessary that the handle is immersed in the soil for a correct detection of the temperature. After the introduction of the probe, fill in the empty spaces between the soil and the probe with some soil made powder. To obtain accurate measurements, the soil should be in contact with the electrodes and the probe handle.



Scalings

Analog setup			
	Name	Minimum	Maximum
Analog 1	Soil humidity	-12.00	228.00
Analog 2	Soil tempetature	-60.00	340.00
Analog 3		0.00	10.00
Analog 4		0.00	10.00
Analog 5		0.00	10.00
Analog 6		0.00	10.00
Analog 7		0.00	10.00
Analog 8		0.00	10.00


21-02-2019 10:30

- Settings
- Filter Clean
- User Setup
- Alarms
- UV light
- Pressure control
- Valves
- Analog setup

Activity

Back

Home



10.4.1.739

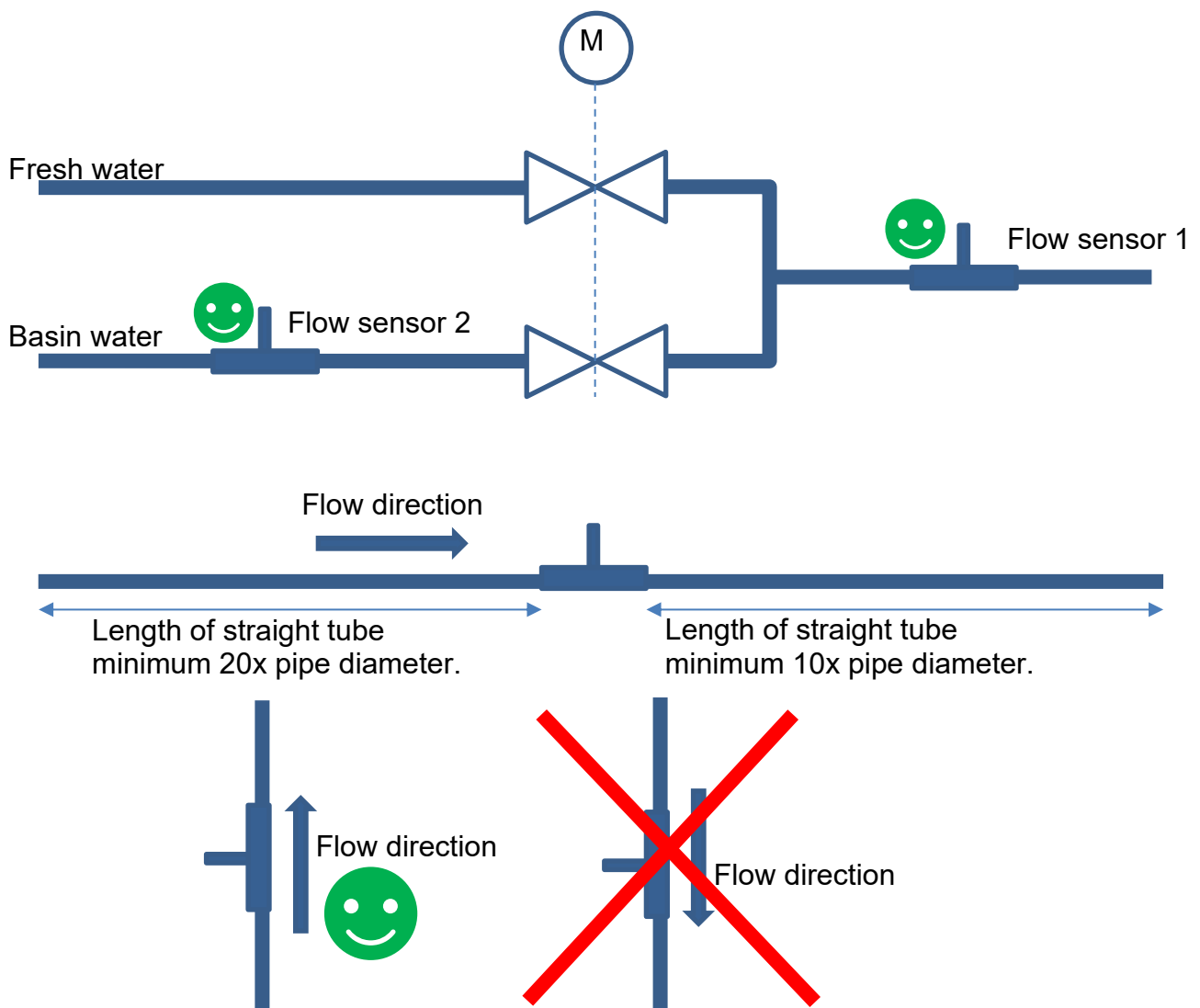
Mixer valve Connection and installation

In case of using a Mixer valve, AMI Penta is equipped with one inlet only. The output port of the Mixer valve must be connected to the inlet of AMI Penta.

The two input ports of the Mixer valve are connected to fresh water and basin water. The Mixer valve will be able to regulate the proportion from two flow meters.

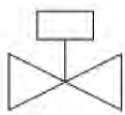
Flow meter 1, located at the output port of the Mixer valve. This is hard coded.

Flow meter 2, located at one of the input ports. This must also be defined in the setup menu of AMI Penta. The port with the highest flow must be selected. This is important as the minimum water speed is 1 meter per second. A lower water speed will **not** work. From this knowledge, it's also important to use an appropriate pipe dimension. If the pipe diameter is too large the water speed will get too low. Also, the length of a straight pipe before and after a flow meter is very important, due to turbulences.

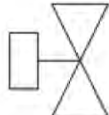




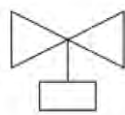
The motor must never be under the valves!



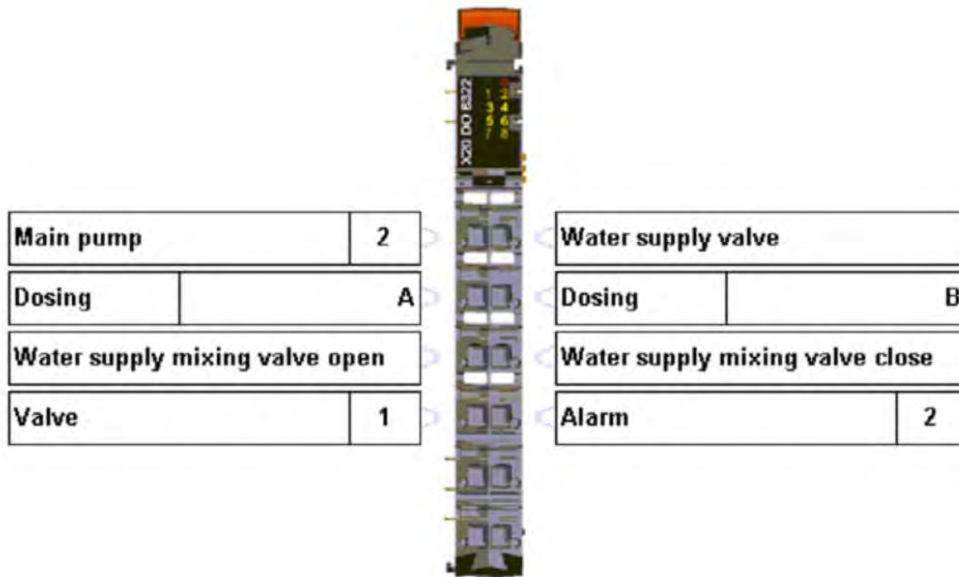
correct



correct



wrong

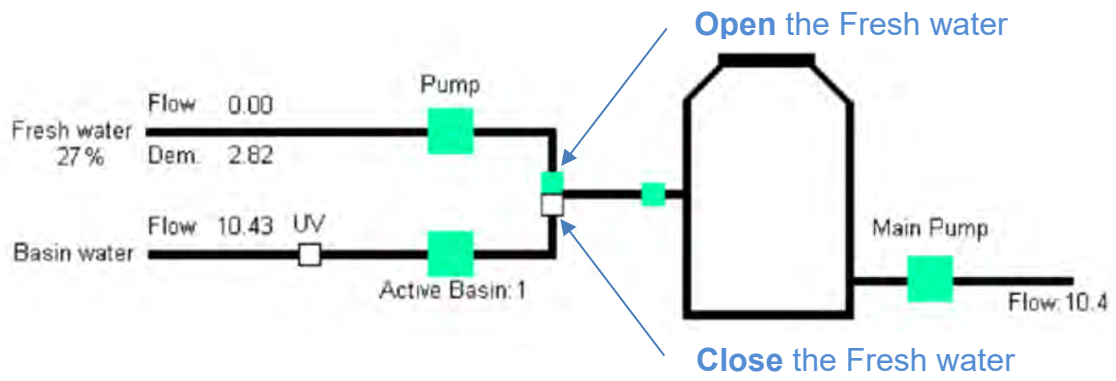


The signal defined from “Water supply mixing valve open”

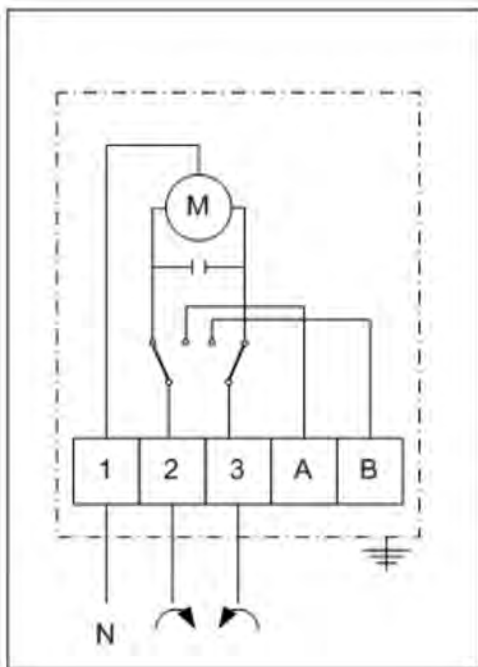
- **Opens** the Fresh water port and closes the Basin water port.

The signal defined from “Water supply mixing valve close”

- **Closes** the Fresh water port and opens the Basin water port.



Normally 24 Vac motor is used. Please verify if it's 24 Vac or 230 Vac.
 Two "hand over" relays must be used for the open and close function.
 Coil must be 24 V DC. Relay wit socket item number **310217**



Start signal from AMI Penta to Senmatic UV Water Treatment.

Important: External start must be activated in Senmatic UV Water Treatment.

Parameter menu in Senmatic UV Water Treatment.

In this menu the specific settings for the chosen unit type are located. Pressing **F2** accesses the menu and hereafter the choice is between display **F1** and input **F2**. Using exit **F4** returns to the previous display. If display is chosen all parameters in the control menu can be viewed but no changes can be made. Using the input button a code is required (Only available for Aqua System A/S service personel) Type the code and enter with **F4**

The control menu has the following choices:

- > Configuration
- Delays
- Service data
- Operation data
- Basic settings

The selection is made with the arrow keys **▲** and **▼** using the enter key **F4** the submenu can be accessed. Using exit **F4** returns to the previously display.

Code: 0812

Remote control

The remote control has to be activated at this point before the input can be used. It needs a potential free contact at the external equipment to work.

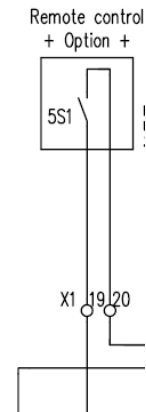
Options

Input connected	YES / NO
-----------------	----------



Note: If the remote control function is activated the unit can no longer be turned on and off using the button **F1**. If service is required the function must be deactivated.

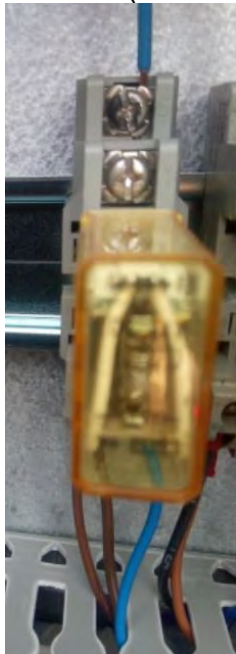
This picture is from inside Senmatic UV Water Treatment.



The function of the terminals 19 -20 is a potential free contact input for starting Senmatic UV Water Treatment.

This is an example of a 24 V DC hand over relay.

The NO (Normally Open) is connected to terminals 19 -20



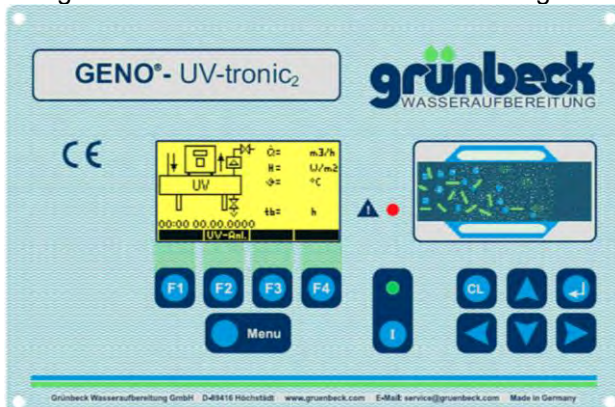
The relay is 24 VDC. The coil of this relay is connected to an output from a DO8322 and 0V.

The hand over relay can of course also be 24 V ac, connected to an ac output module DO4622 and N₂₄.

This output must be set as UV in the I/O setup of AMI Penta.

Finding the warmup time.

The green LED is lit when the unit is on. The green LED flashes during start-up.



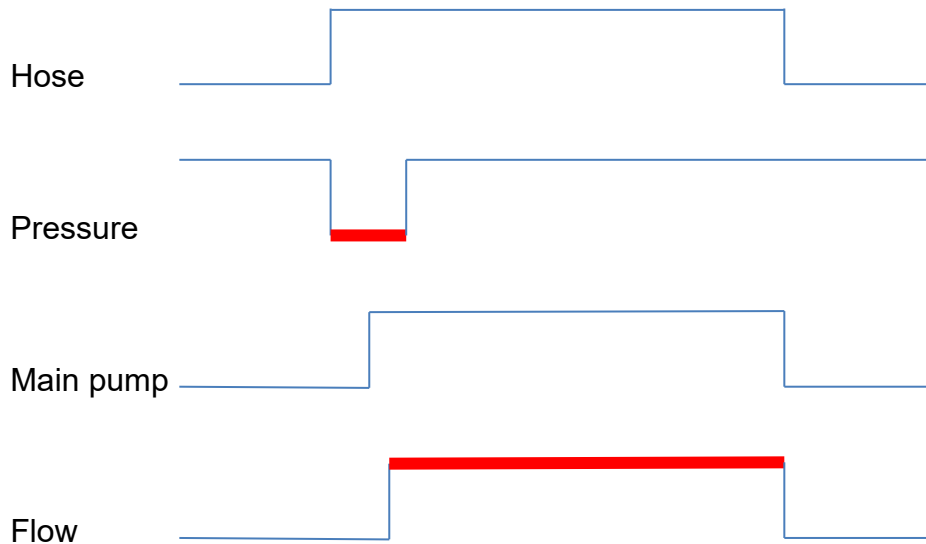
If you measure the time of flashing green LED and add 10 sec. you have the time to set “UV light prestart time”



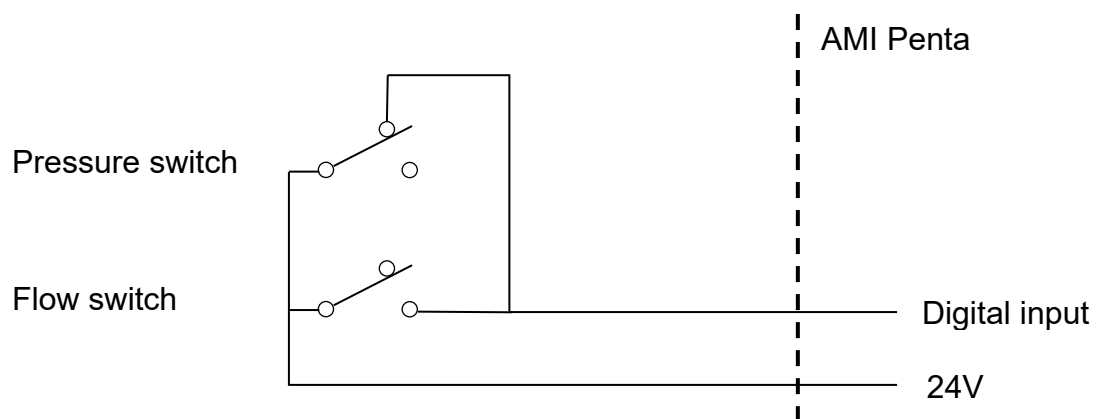
Pressure switch and flow switch

Pressure switch and flow switch can be installed if hose irrigation is needed. AMI Penta outlet must be under pressure, also when the mainpump has stopped. When the hose, mounted at the outlet, is opened manually, AMI Penta starts. When it's closed, AMI Penta stops.

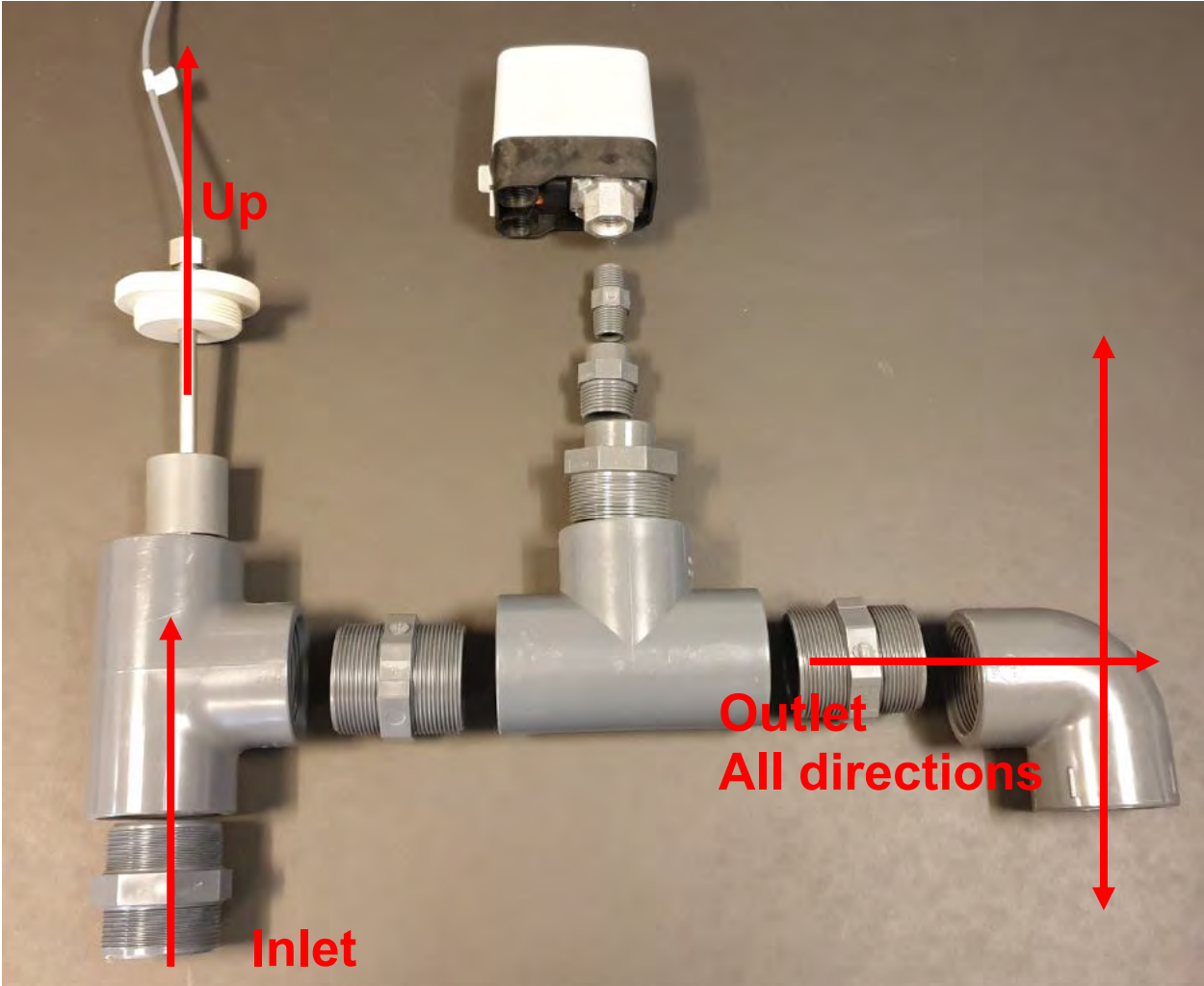
The pressure switch and flow switch are combined and connected to a digital input, which must be dedicated as Pressure switch in the IO setup.



The pressure switch gets **active** by decreasing pressure (Normally Closed)
The flow switch gets **active** by increasing flow (Normally Open)

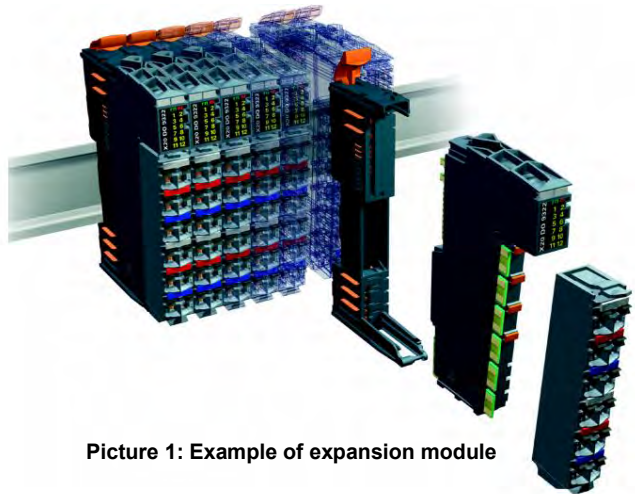


This can also be done without a flow switch. If a flow sensor is installed, this will trigger, by a flow more than 0,3 m³/hour.



Expansion structure

The picture shows some digital output modules, which is put together and mounted on a DIN rail. Each module consists of 3 parts as shown on the picture. The first module is a bus module, which also functions as base for all 24V X20 I/O modules. This is also the module, which is used for mounting a module on the DIN rail. The second module is a X20 I/O module in which the electronics is, in this case it would either be a supply module, a digital input/output module or an analog input/output module. The third module is the termination module, in which the cables should be mounted.



Picture 1: Example of expansion module

Installation of cables:

It is possible to mount the cables in the termination modules without any use of tools. (See picture 6).

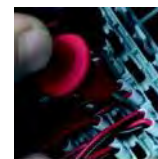
The modules use a fully integrated push-in connector system,

in which one can easily mount the cables. The cables can be removed again by means of a screwdriver or the like.



Picture 6: Cable mounting

Each terminal has a measuring point, which can be found next to the mounted cable. (See picture 7). It is therefore possible eg. to measure the digital output without first having to dismount the cables.



Billede 7: Terminal testpoint.


Description of each X20 module for structure of the expansions

As mentioned earlier, each expansion consists of a communication module, a power supply module and a number of in- and outputs. In this section, each module will be described individually.

X20BC0083 – Communication module

The X20BC0083 module is the bus controller of the expansion. This module is always placed on the left side of the expansion. On the front of this module there are three following things one should be aware of, in connection with the mounting.

Node switch

Figure	Description
	This is where you set the node on the expansion. For further description see the section "Ethernet configuration"

POWERLINK module X20BC0083


Figure	LED	Color	Status	Description	
	S/E ¹⁾	Green	Off	No power supply or mode is NOT_ACTIVE. In this mode, the bus controller waits for about 5 seconds after restarting. No communication with the bus controller is possible. If no POWERLINK communication is detected during these 5 seconds, the bus controller goes into the BASIC_ETHERNET mode. If POWERLINK communication is detected before this time passes, however, the bus controller goes into the PRE_OPERATIONAL_1 mode.	
			Flickering	BASIC_ETHERNET mode. The bus controller did not detect any POWERLINK communication. In this mode, direct communication with the bus controller is possible using UDP. If POWERLINK communication is detected while in this mode, the bus controller goes into the PRE_OPERATIONAL_1 mode.	
			Single flash	PRE_OPERATIONAL_1 mode. With operation on a POWERLINK V1 master, the bus controller goes directly into PRE_OPERATIONAL_2 mode. With operation on a POWERLINK V2 manager, the CN (Controlled Node) waits for the reception of a SoC frame and then switches over to PRE_OPERATIONAL_2 mode.	
			Double flash	PRE_OPERATIONAL_2 mode. In this mode the bus controller is normally configured by the manager. A command (POWERLINK V2) or setting the data valid flag in the output data (POWERLINK V1) then switches the mode to READY_TO_OPERATE.	
			Triple flash	READY_TO_OPERATE mode. In a POWERLINK V2 network, the manager then switches via command to OPERATIONAL mode. In a POWERLINK V1 network, the bus controller then switches automatically to OPERATIONAL mode as soon as input data are present.	
			On	OPERATIONAL mode	
	L/A 1Fx	Green	Blinking	STOPPED mode. No output data sent nor input data received. Only the appropriate command from the manager can enter or leave this mode.	
			Red	On	The bus controller has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). Note: The LED blinks red several times immediately after startup. This is not an error.
			On	A link to the remote station has been established.	
			Blinking	A link to the remote station has been established and there is activity on bus.	

Table: LED status indicators

1) The Status/Error LED "S/E" is a green/red dual LED.

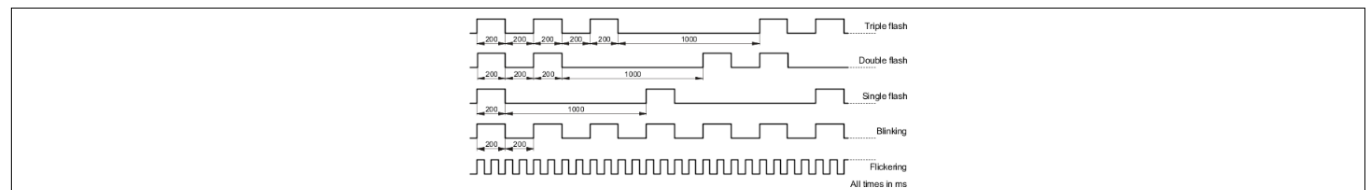
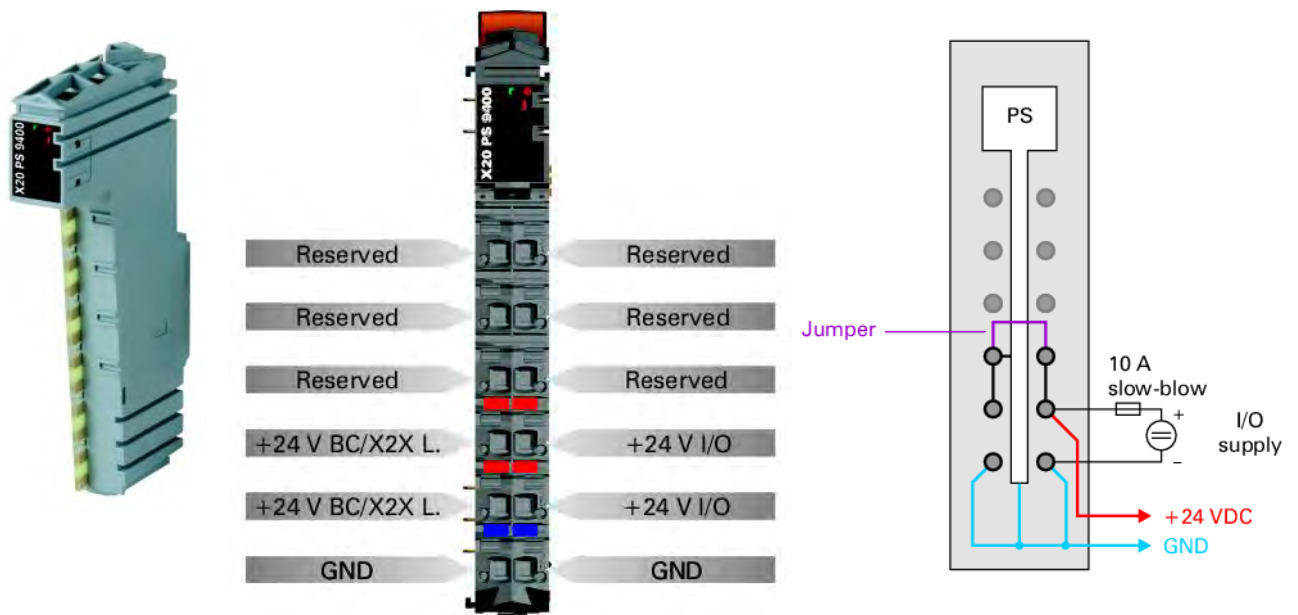


Image: Status LEDs - Blinking patterns

X20PS9400

The X20PS9400 module is the power supply module of the expansion.
This module is always placed as number 2 seen from the left side of the expansion.



Status LEDs

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
			Double flash	Indicates one of the following conditions: <ul style="list-style-type: none"> The bus controller / X2X Link power supply is overloaded I/O supply too low Input voltage for bus controller / X2X Link too low
	e + r	Steady red / single green flash	Invalid firmware	
	l	Red	Off	The bus controller / X2X link supply is within the acceptable range
On			The bus controller / X2X Link power supply is overloaded	

Technical data PS9400

Short description	
Power supply module	24 VDC supply module for bus controller, X2X Link bus supply and I/O
Bus controller / X2X Link supply input	
Input voltage	24 VDC (-15% / +20%)
Input current	Max. 0.7 A
Reverse polarity protection	Yes
Fuse	Integrated, cannot be exchanged
Bus controller / X2X Link supply output	
Rated output power	7.0 W
Parallel operation	Yes
Redundant operation of bus controller / X2X Link supply	Yes
I/O supply input	
Input voltage	24 VDC (-15% / +20%)
Fuse	Recommended pre-fusing max. 10 A slow-blow
I/O supply output	
Rated output voltage	24 VDC
Permitted contact load	10.0 A
General information	
Status indicators	Overload, operating state, module status
Diagnosics	
Module run/error	Yes, with status LED and software status
Overload	Yes, with status LED and software status
Electrical isolation	
Bus controller / X2X bus supply	Yes
I/O supply	No
Power consumption	
Bus	1.42 W
I/O internal	0.6 W
Certification	CE, C-UL-US, GOST-R
Operating conditions	
Operating temperature	
Horizontal installation	0°C to +55°C
Vertical installation	0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level	
0 - 2000 m	No derating
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
Storage and transport conditions	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
Mechanical characteristics	
Spacing	12.5 +0.2 mm

X20DI8371

The X20DI8371 module is one of the digital input modules of the expansion, which have 8 inputs.

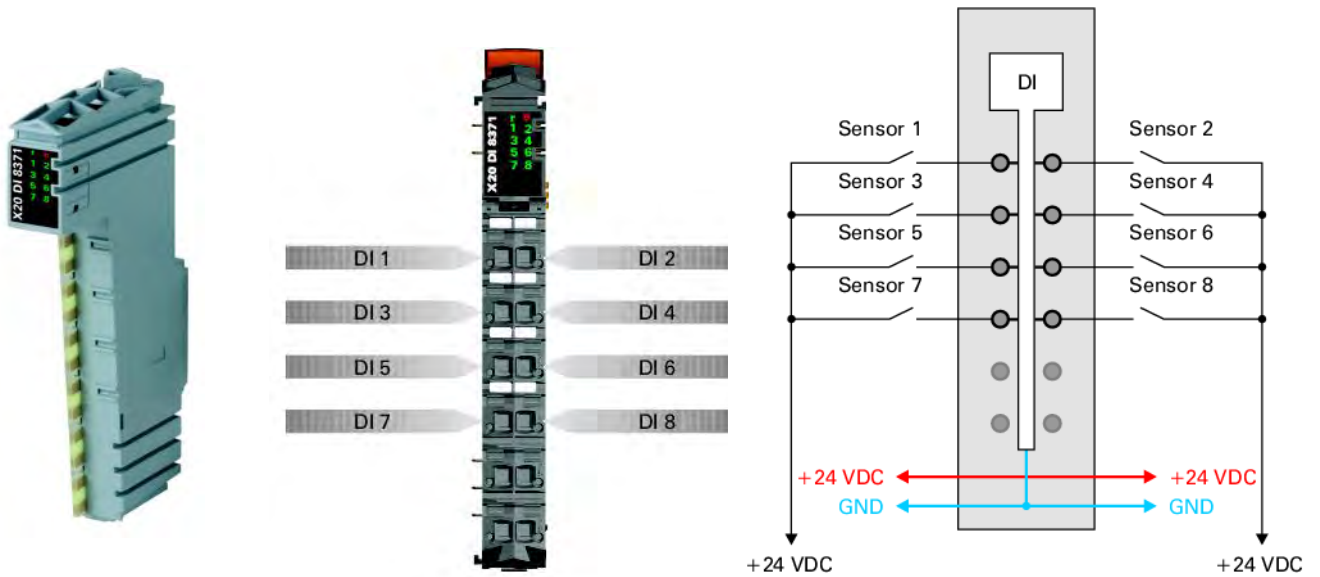
X20DI8371:

X20 = name on the relevant series

DI = Digital Inputs

8 = 8 inputs

371 = type designation



Status LEDs


Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
e + r	Steady red / single green flash		Invalid firmware	
1 - 8	Green		Input status of the corresponding digital input	

Technical data X20DI8371

Short description	
I/O module	Eight 24 VDC digital inputs for 1-line connections
Digital inputs	
Rated voltage	24 VDC
Input filter Hardware Software	≤100 μs Default 1 ms, can be configured between 0 and 25 ms in 0.2 ms intervals
Connection type	1-line connections
Input circuit	Sink
General information	
Status indicators	I/O function per channel, operating state, module status
Diagnostics Module run/error	Yes, with status LED and software status
Electrical isolation Channel - Bus Channel - Channel	Yes No
Power consumption Bus I/O internal I/O external	0.18 W - 1.2 W
Certification	CE, C-UL-US (in development), GOST-R
Operating conditions	
Operating temperature Horizontal installation Vertical installation	0°C to +55°C 0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level 0 - 2000 m >2000 m	No derating Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
Storage and transport conditions	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
Mechanical characteristics	
Spacing	12.5 +0.2 mm

X20DO8332

The X20DO8332 module is one of the digital output modules of the expansion, which have 8 outputs.

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
e	Red	Off	Module supply not connected or everything is OK	
		Single flash	Warning / error for an I/O channel. Level monitoring for digital outputs has been triggered.	
		Double flash	I/O supply too low	
e + r	Steady red / single green flash	Invalid firmware		
1 - 8	Orange		Output status of the corresponding digital output	

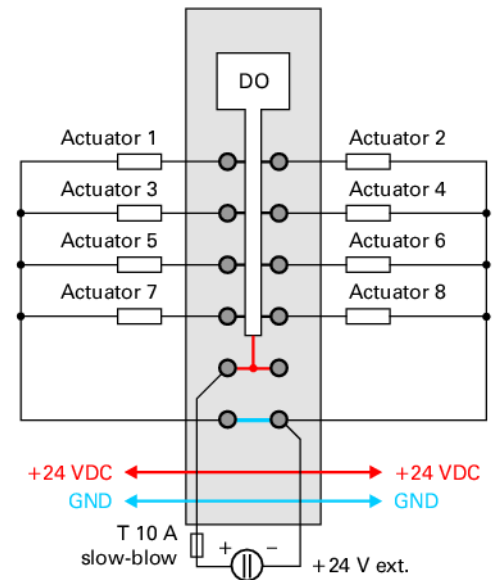
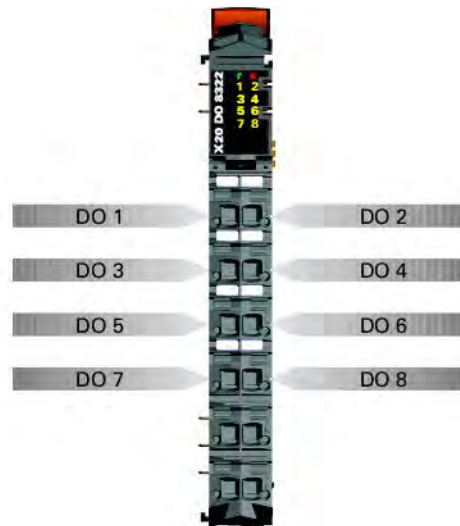
X20DO8332:

X20 = name on the relevant series

DO = Digital Outputs

8 = 8 outputs

332 = type designation




Technical data X20DO8332

Short description	
I/O module	Eight 24 VDC digital outputs for 1-wire connections
Digital outputs	
Rated voltage	24 VDC
Rated output current	2.0 A
Total current	8.0 A
Connection type	1-line connections
Output circuit	Source
Output protection	Thermal cutoff for overcurrent and short circuit, integrated protection for switching inductances
General information	
Status indicators	I/O function per channel, operating state, module status
Diagnostics Module run/error Outputs	Yes, with status LED and software status Yes, with status LED and software status (output error status)
Electrical isolation Channel - Bus Channel - Channel	Yes No
Power consumption Bus I/O internal	0.22 W 0.92 W
Certification	CE, C-UL-US, GOST-R
Operating conditions	
Operating temperature Horizontal installation Vertical installation	0°C to +55°C 0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level 0 - 2000 m >2000 m	No derating Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
Storage and transport conditions	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
Mechanical characteristics	
Spacing	12.5 +0.2 mm

X20DO8322

The X20DO8322 module is one of the digital output modules of the expansion, which have 8 outputs.

Figure	LED	Color	Status	Description	
	r	Green	Off	Module supply not connected	
			Single flash	Reset mode	
			Blinking	PREOPERATIONAL mode	
			On	RUN mode	
	e	Red	Off	Module supply not connected or everything OK	
			Single flash	Warning/Error on an I/O channel. Level monitoring for digital outputs has been triggered.	
	e + r		Red on / Green single flash	Invalid firmware	
	1 - 8		Orange		Output status of the corresponding digital output

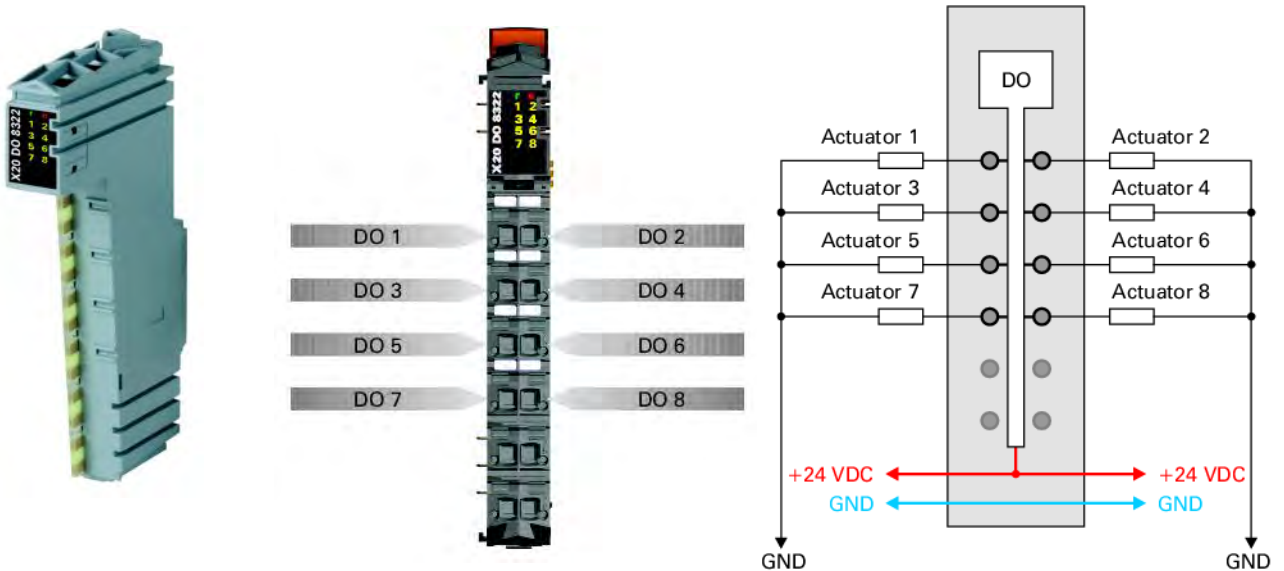
X20DO8322:

X20 = name on the relevant series

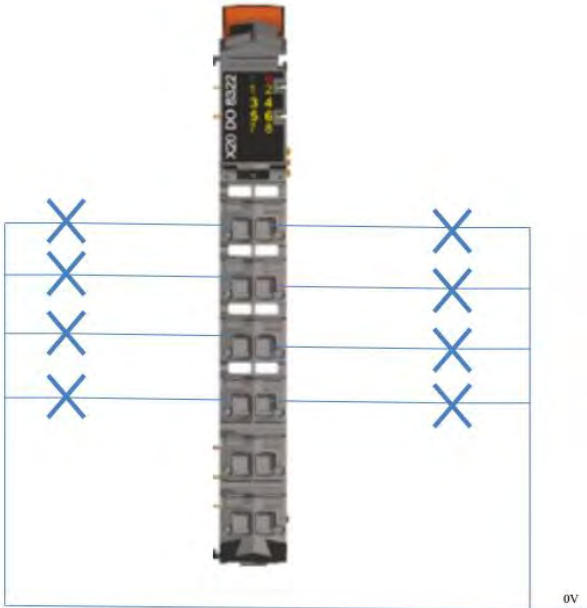
DO = Digital Outputs

8 = 8 outputs

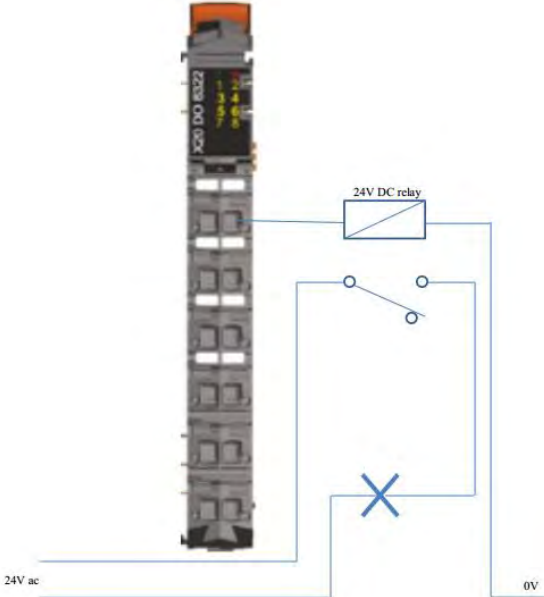
322 = type designation



Irrigation valves with 24 VDC coils, connection to AMI Penta



Irrigation valves with 24 VAC coils, connection to AMI Penta with external relay.




This is done with an extra hand over relay for each valve. 0V is equal to GND.

Technical data X20DO8322

Short description	
I/O module	Eight 24 VDC digital outputs for 1-wire connections
Digital outputs	
Rated voltage	24 VDC
Rated output current	0.5 A
Total current	4.0 A
Connection type	1-line connections
Output circuit	Source
Output protection	Thermal cutoff for overcurrent and short circuit, integrated protection for switching inductances
General information	
Status indicators	I/O function per channel, operating state, module status
Diagnostics Module run/error Outputs	Yes, with status LED and software status Yes, with status LED and software status (output error status)
Electrical isolation Channel - Bus Channel - Channel	Yes No
Power consumption Bus I/O internal	0.26 W 0.8 W
Certification	CE, C-UL-US (in development), GOST-R
Operating conditions	
Operating temperature Horizontal installation Vertical installation	0°C to +55°C 0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level 0 - 2000 m >2000 m	No derating Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
Storage and transport conditions	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
Mechanical characteristics	
Spacing	12.5 +0.2 mm

X20DO4649

The X20DO4649 module is one of the digital output modules of the expansion, which have 4 outputs.

Figure	LED	Color	Status	Description	
	r	Green	Off	Module supply not connected	
			Single flash	Reset mode	
			Blinking	Preoperational mode	
			On	RUN mode	
	e	Red	Off	Module supply not connected or everything is OK	
			On	Error or reset state	
	e + r	Steady red / single green flash		Invalid firmware	
	1 - 4	Orange		Output status of the corresponding digital output	

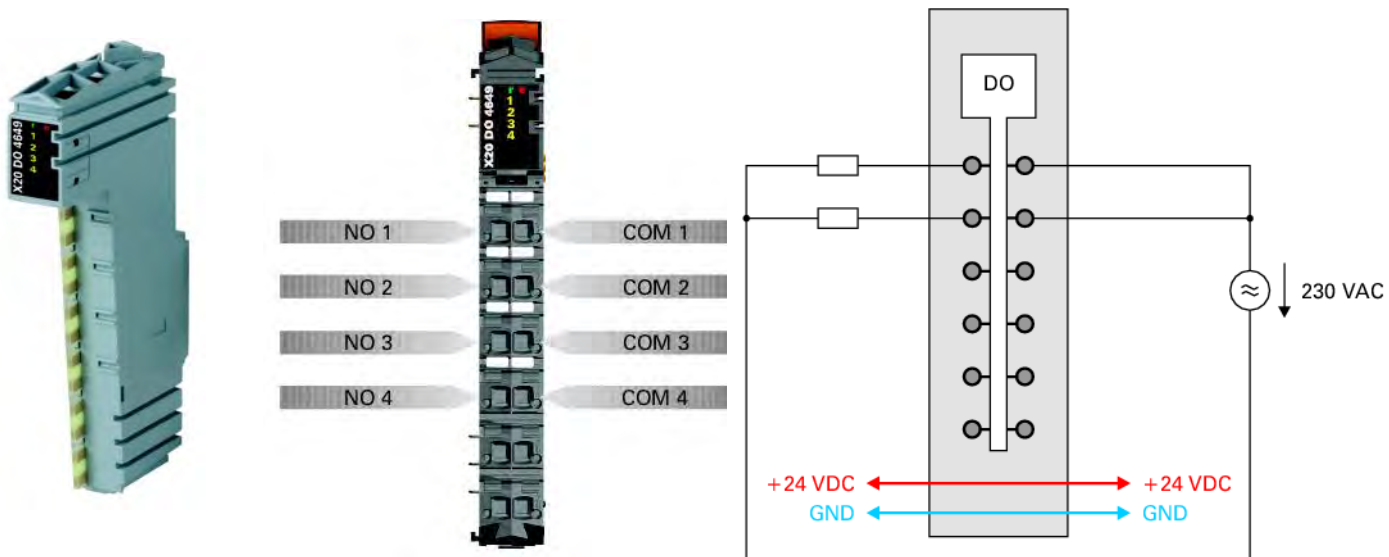
X20DO4649:

X20 = name on the relevant series

DO = Digital Outputs

4 = 4 outputs

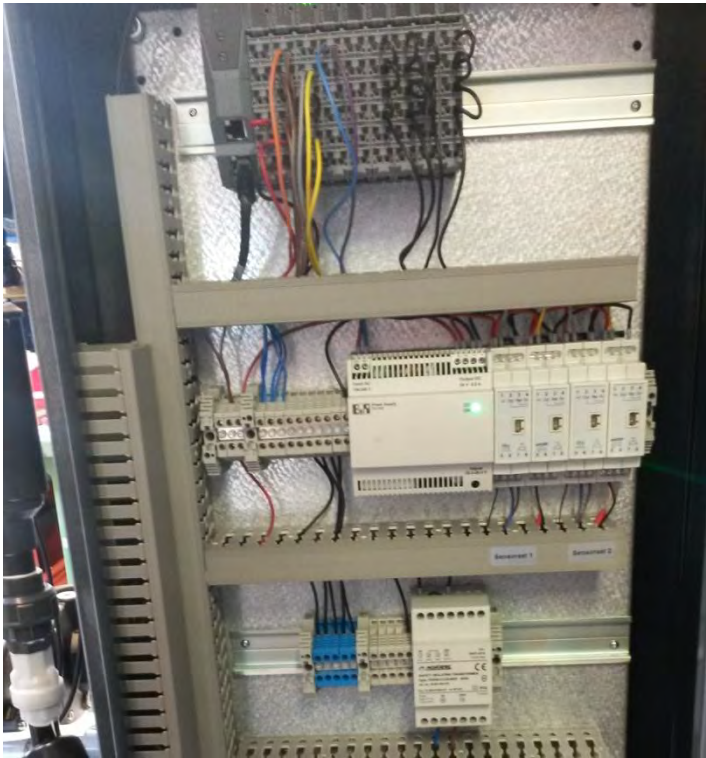
649 = type designation



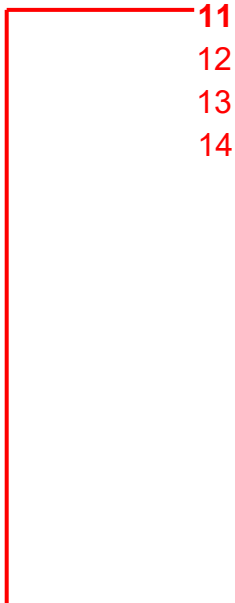
Short description	
I/O module	4 digital outputs 30 VDC / 230 VAC, outputs are single-channel isolated
Digital outputs	
Design	Relay / N.O. Channels are single-channel isolated
Rated voltage	30 VDC / 230 VAC
Rated frequency	DC / 45 to 63 Hz
Rated output current	5.0 A at 30 VDC / 5.0 A at 230 VAC
Total current	10.0 A at 30 VDC / 10.0 A at 230 VAC
Switching capacity Minimum Maximum	10 mA / 5 VDC 150 W / 1250 VA
Actuator supply	External
General information	
Status indicators	I/O function per channel, operating state, module status
Diagnostics Module run/error Outputs	Yes, with status LED and software status Yes, with status LED
Electrical isolation Channel - Bus Channel - Channel	Yes Yes
Power consumption Bus I/O internal	0.8 W -
Certification	CE, C-UL-US (in development), GOST-R
Operational conditions	
Operating temperature Horizontal installation Vertical installation	0°C to +55°C 0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level 0 - 2000 m >2000 m	No derating Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
Storage and transport conditions	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
Mechanical characteristics	
Spacing	12.5 +0.2 mm
Comment	Order terminal block 1x X20TB12 separately Order bus module 1x X20BM11 separately

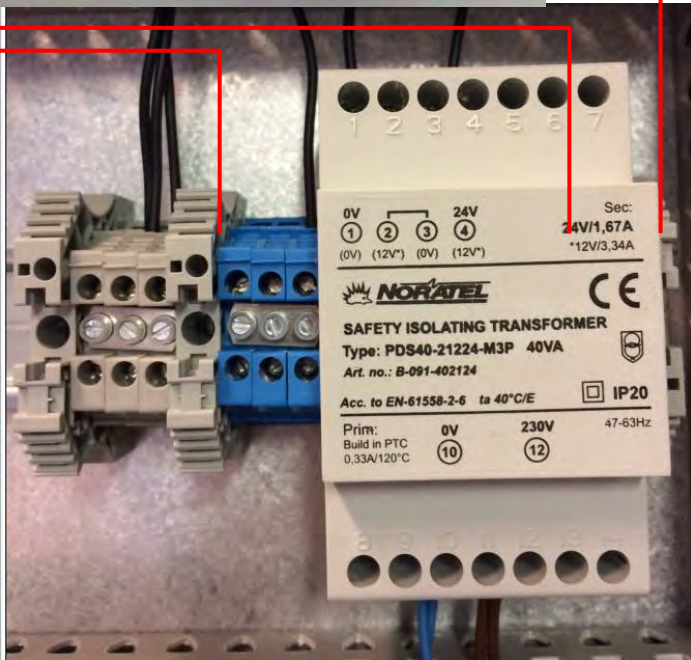
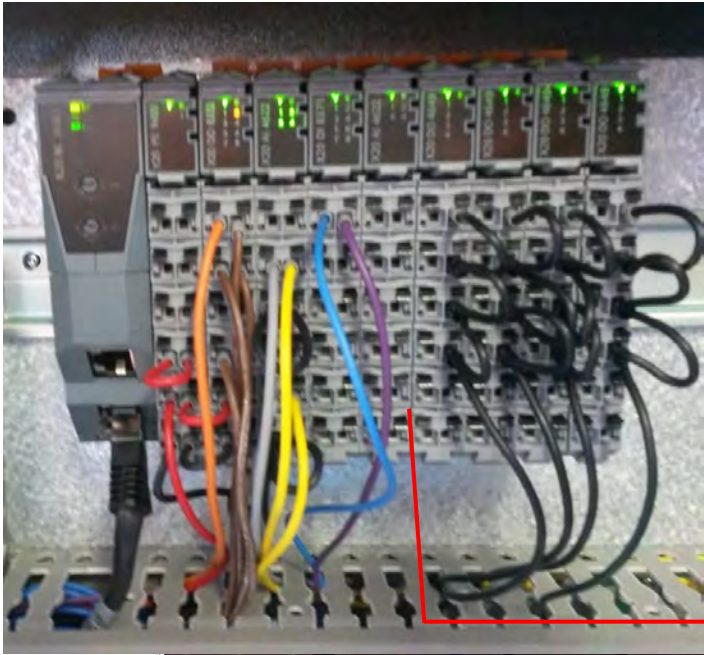
Irrigation valves with 24 VAC coils, connection to AMI Penta.

This is an example with a AMI Penta with 16 Valves (4 x X20DO4649 modules).



How to connect valve 1 – 4 on the first X20DO4649 modul





Valve 1
(24VAC) ~~X~~

Valve 2
(24VAC) ~~X~~

Valve 3
(24VAC) ~~X~~

Valve 4
(24VAC) ~~X~~

X20AI4622

The X20AI4622 module is one of the analog input modules of the expansion, which have 4 inputs.

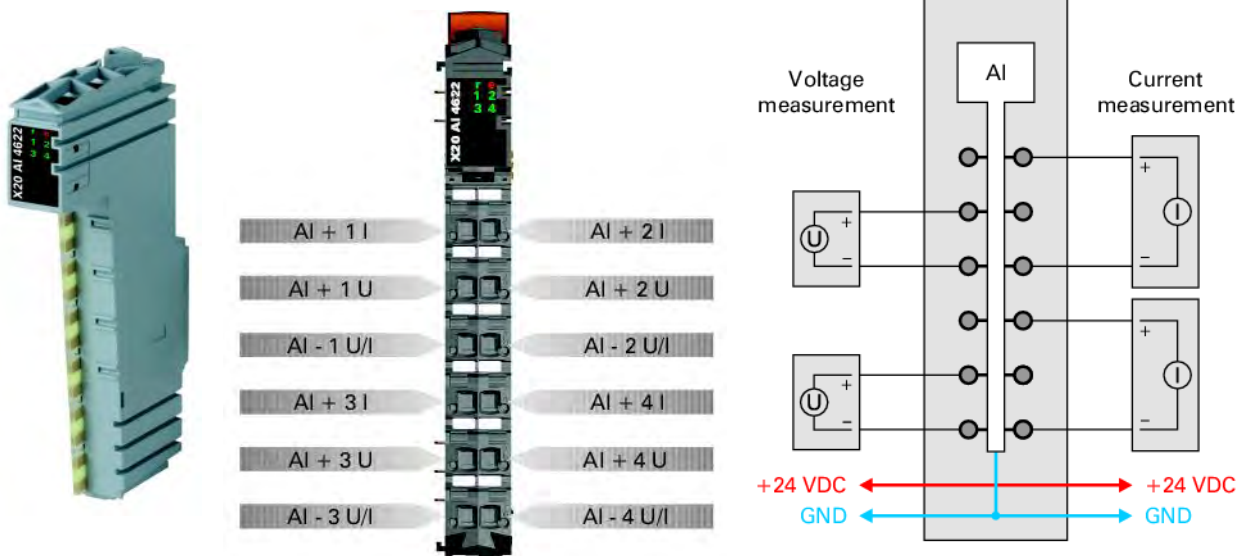
X20AI4622:

X20 = name on the relevant series

AI = Analog Inputs

4 = 4 inputs

622 = type designation



Status LEDs

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
			On	Error or reset state
	e + r	Steady red / single green flash	Invalid firmware	
	1 - 4	Green	Off	Open connection or sensor is disconnected
			Blinking	Overflow or underflow of the input signal
			On	The analog/digital converter is running, value is OK

Technical data X20AI4622

Short description		
I/O module	4 analog inputs ± 10 V or 0 to 20 mA / 4 to 20 mA	
Analog inputs	Voltage	Current
Input	± 10 V or 0 to 20 mA/4 to 20 mA, using different connection terminal points	
Input type	Differential input	
Digital converter resolution	± 12 -bit	12-bit
Conversion time	400 μ s for all inputs	
Output format	UINT	
Input impedance in signal range	20 M Ω	-
Load	-	<400 Ω
Maximum error at 25°C		
Gain	0.08%	0 to 20 mA = 0.08% 4 to 20 mA = 0.1%
Offset	0.015%	0 to 20 mA = 0.03% 4 to 20 mA = 0.16%
Input protection	Protection against wiring with supply voltage	
General information		
Status indicators	I/O function per channel, operating state, module status	
Diagnostics		
Module run/error	Yes, with status LED and software status	
Inputs	Yes, with status LED and software status	
Channel type	Yes, with software status	
Electrical isolation		
Channel - Bus	Yes	
Channel - Channel	No	
Power consumption		
Bus	0.01 W	
I/O internal	1.1 W	
Certification	CE, C-UL-US, GOST-R	
Operating conditions		
Operating temperature		
Horizontal installation	0°C to +55°C	
Vertical installation	0°C to +50°C	
Relative humidity	5 to 95%, non-condensing	
Mounting orientation	Horizontal or vertical	
Installation at altitudes above sea level		
0 - 2000 m	No derating	
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m	
Protection type	IP20	
Storage and transport conditions		
Temperature	-25°C to +70°C	
Relative humidity	5 to 95%, non-condensing	
Mechanical characteristics		
Spacing	12.5 +0.2 mm	

The expansions are constructed on the following way:

All EXPs consist of a controller, which is placed on the far left (X20BC0083), subsequently one will find the power supply module (X20PS9400). These 2 modules are followed by one digital output module (X20DO8332), one analog input module (X20AI4622), and last one digital input module (X20DI8371) all together call the standard mixer exp.

To make the connection properly, one have to look at the previous pages, where each module is defined and all connections to each individual module described.

After the above modules you can freely decide which modules you want to install.

Standard Mixer

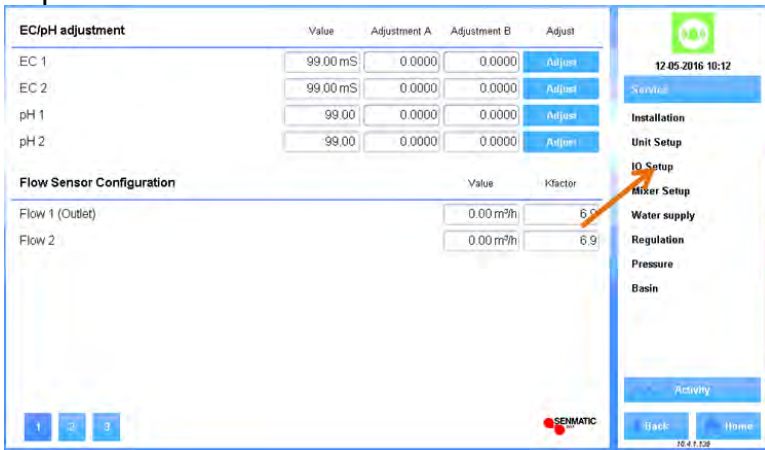


IO configuration

When you have built your expansion, you must define the inputs and outputs. Here is a step by step description on how to set up the IO configuration.



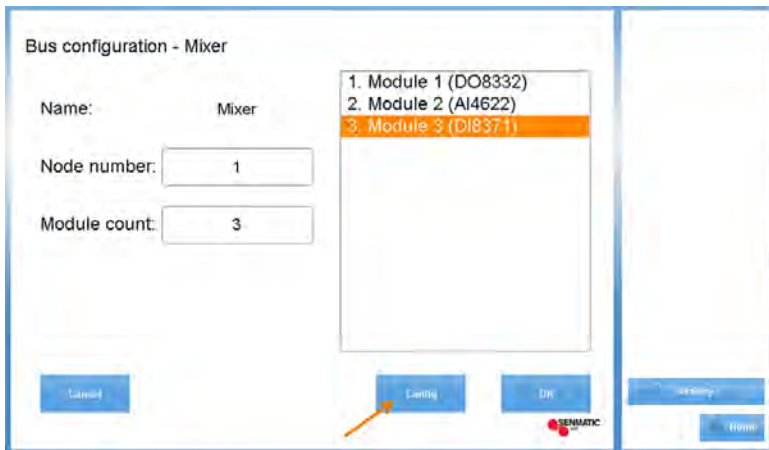
Tap the “Service” button.



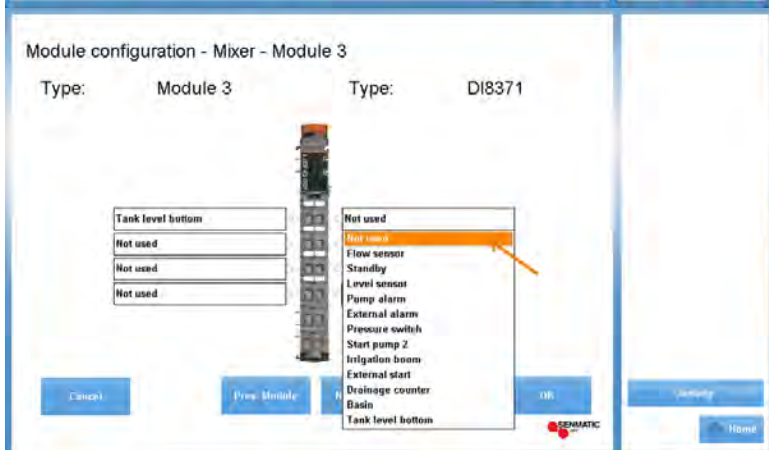
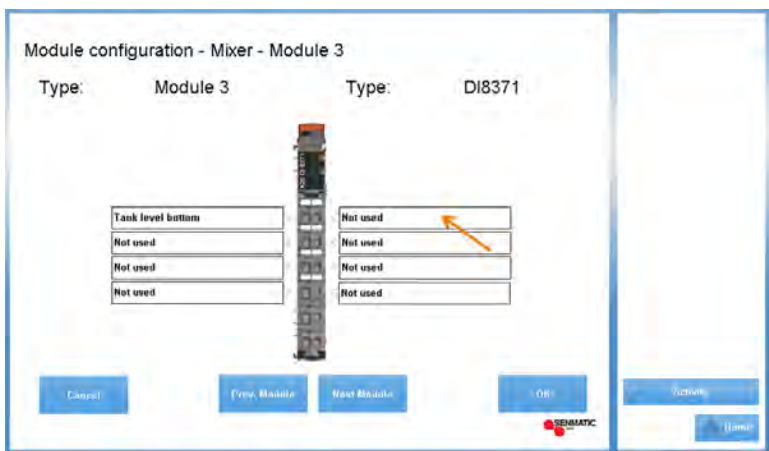
Enter IO setup.



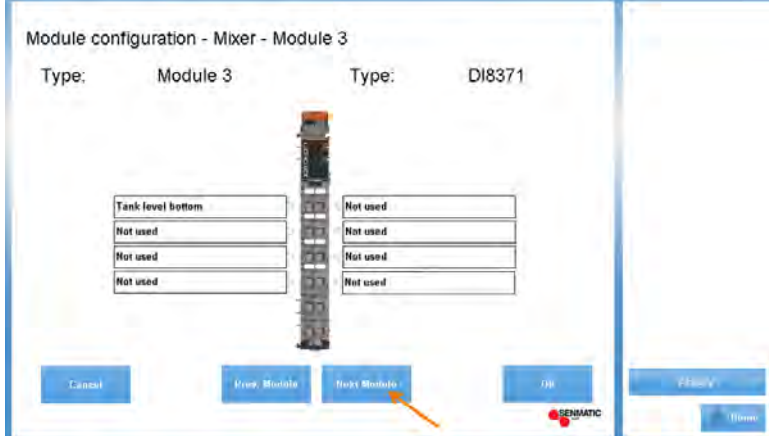
Tap the “Config” button.



Choose the module you want to configure and Tap the “Config” button.



Select from the “Drop down” menu the wanted function for this input.



When finished with this module, go to the next module.

Module configuration - Mixer - Module 1
Type: Module 1 Type: DO8332

Main pump	1	Dosing	A
Dosing	B	Valve	1
Valve	2	Valve	3
Valve	4	Alarm	1
+24 VDC		+24 VDC	
GND		GND	

Module configuration - Mixer - Module 2
Type: Module 2 Type: AI4622

Voltage	EC 1	pH 1	Voltage
	EC 1	pH 1	
Voltage	Not used	Not used	Voltage
	Not used	Not used	

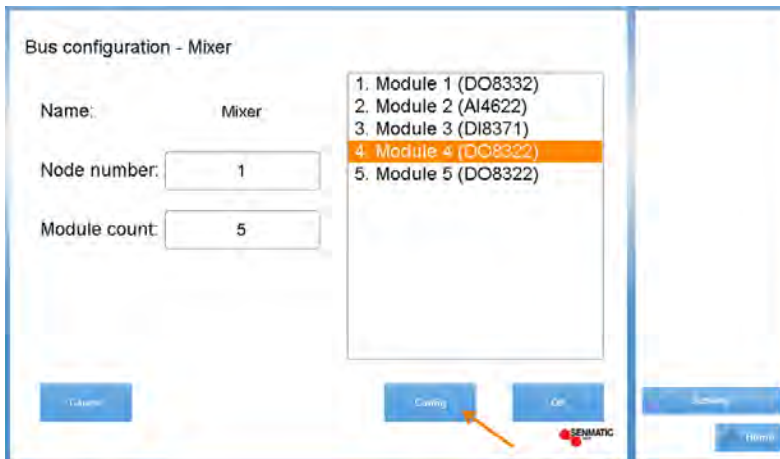
Bus configuration - Mixer
Name: Mixer

Node number: 1

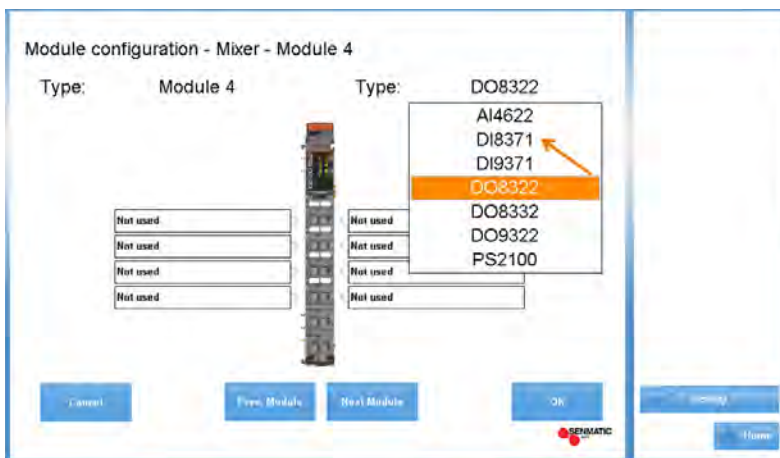
Module count: 3

- 1. Module 1 (DO8332)
- 2. Module 2 (AI4622)
- 3. Module 3 (DI8371)

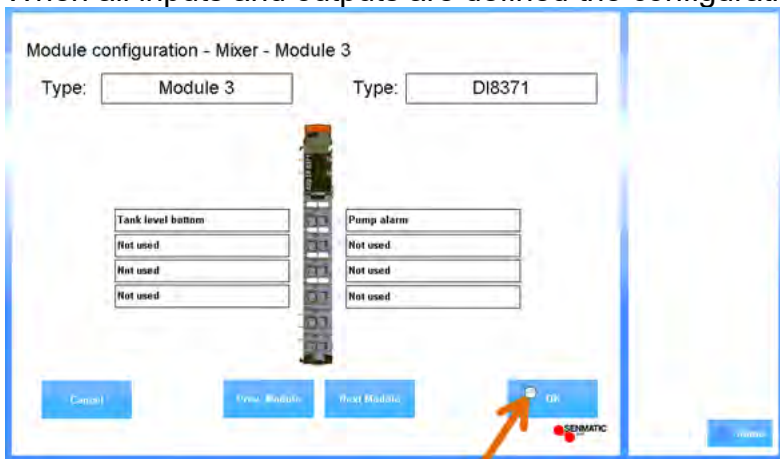
The total number of modules can be chosen here.

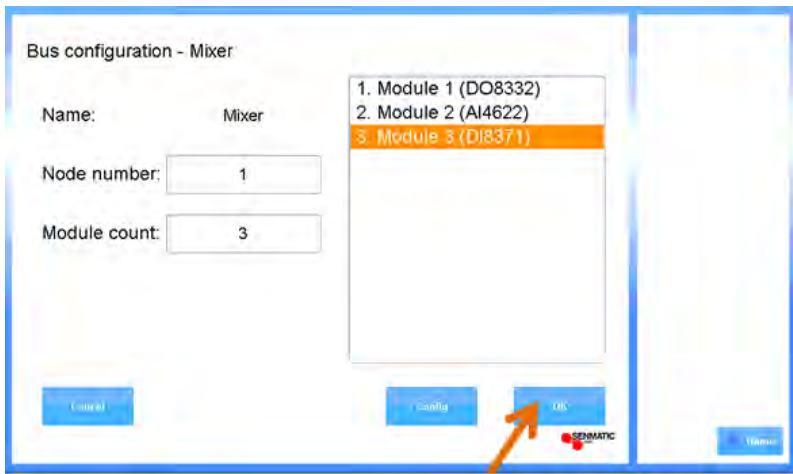


Here are 5 modules in total.

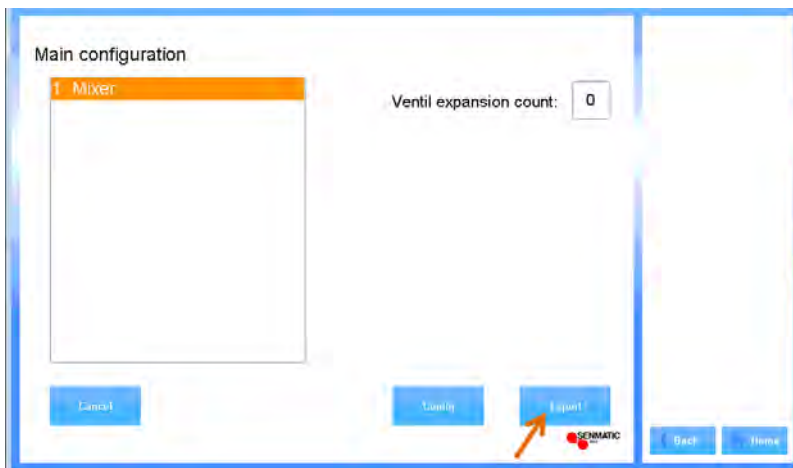


When all inputs and outputs are defined the configuration must be saved.

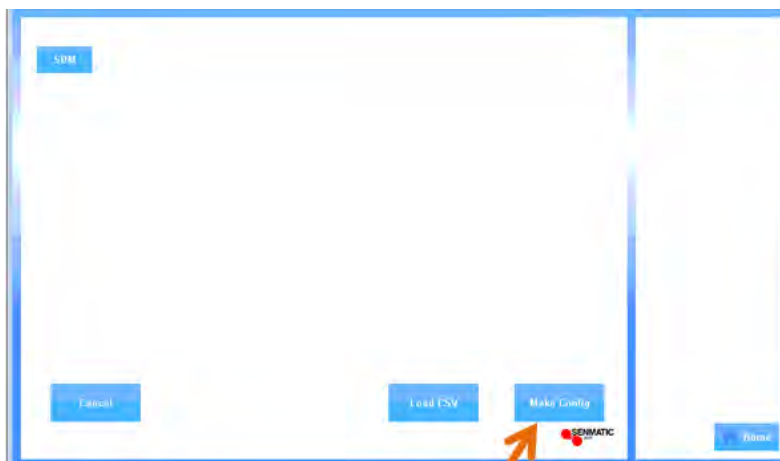




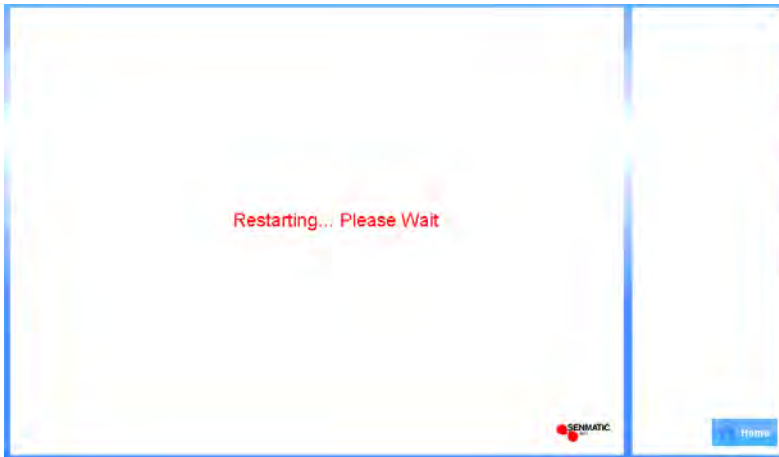
Tap "OK" twice.



Tap "Export"



Finally Tap "Make Config"



and the PLC will perform a restart.

Connection new modules to the Mixer Exp:

Digital inputs	8
Digital outputs	8

X20 DO 8322
X20 DI 8371
X20 DI 8371
X20 AI 4622
X20 DO 8332
X20 PS 9400
X20 BC 0083

Installation – POWERLINK

This is relevant only, if you are going to install a valve EXP up to 100 meters from the AMI Penta.

AMI Penta communicates via Ethernet, which is a standard data transmission network. Ethernet is standard for communication between SL5 pc, AMI Penta , LCC2, weather station and expansions for climate. Expansions for AMI Penta communicates with AMI Penta through POWERLINK. POWERLINK is actually the same network as Ethernet.

For proper installation, use category 5 shielded cable.

According to standard specifications, Ethernet cable may not be longer than 100 meters. Nevertheless, it is possible to make almost endless installations if a repeater or hub/switch is placed for every 100 meters.

Expansions also act like a repeater or switch, which means that it is possible to have 100 meter between each unit, without having to install a separate switch.

It is recommended that the units run on a separate Ethernet network, rather than on an existing internal network, to avoid having the extra load of the data traffic between the individual units on the internal network.

Furthermore, it is also recommended that Superlink, panels and weather station are placed on a main network line, while the expansions belonging to a panel are kept on a network line, which runs from the panel in question, as shown in figure 1.

Once again, this is because there is continuous communication between an AMI Penta panel and its expansions, and there is no reason to place this extra traffic on the main network line.

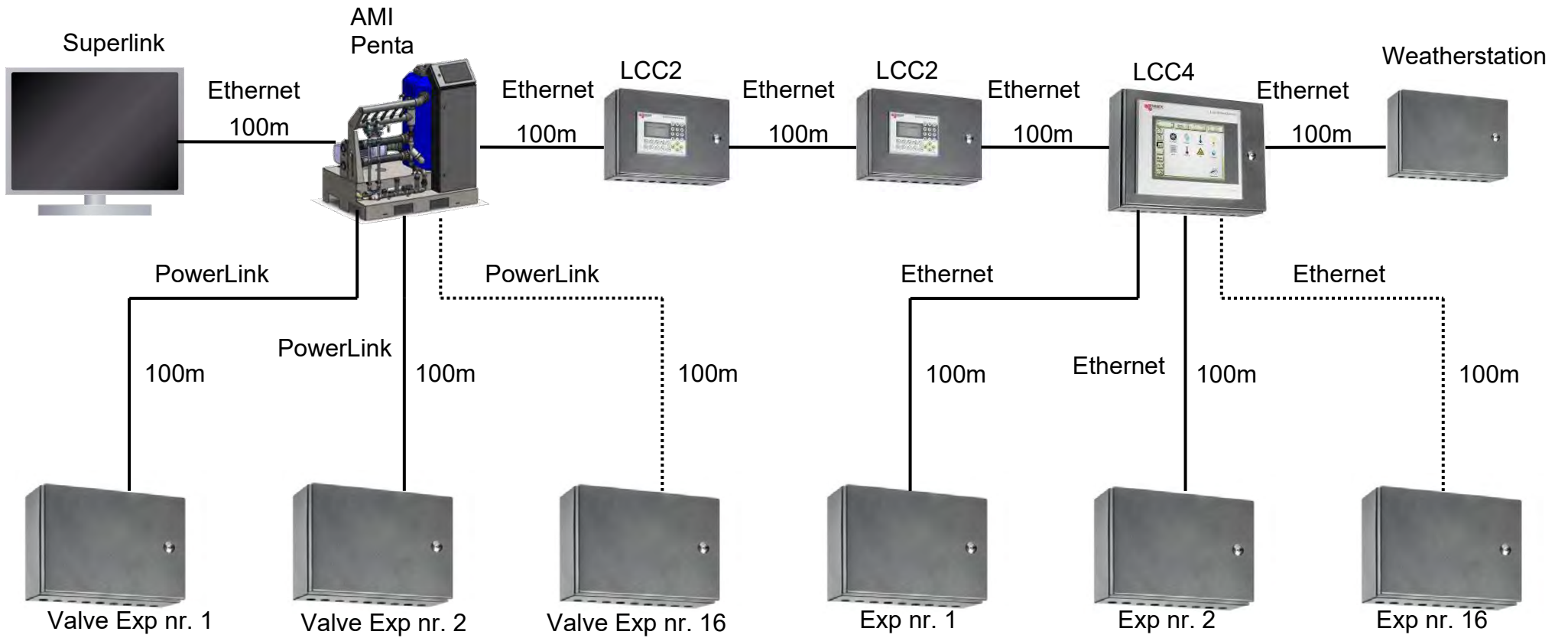
Figure 1 show one installation examples. Both contain 1 Superlink PC, 1 weather station, 2 AMI Penta, 2 LCC2 and 16 expansions.

Figure 1:

The advantage with this type of installation is that the power can be disconnected from an expansion, without affecting the rest of the installation.

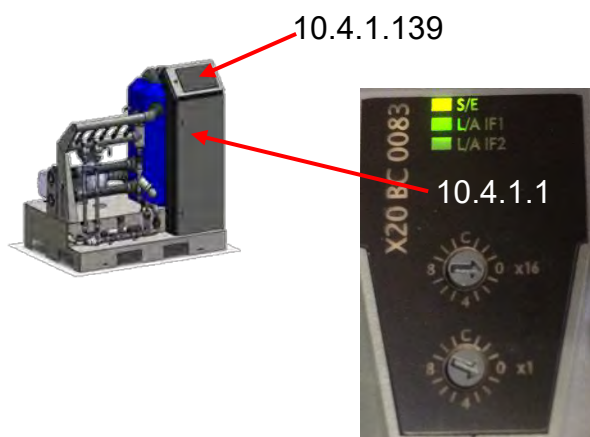
The disadvantage is that extra hardware is required to run the Ethernet out on 16 lines.

Example Ethernet/ PowerLink installation

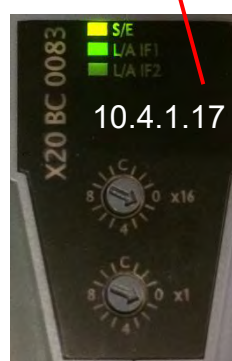
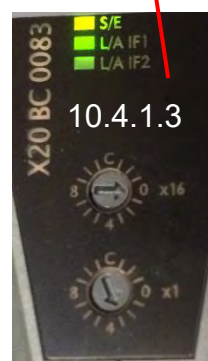


Figur 1: Ethernet / PowerLink connection overview

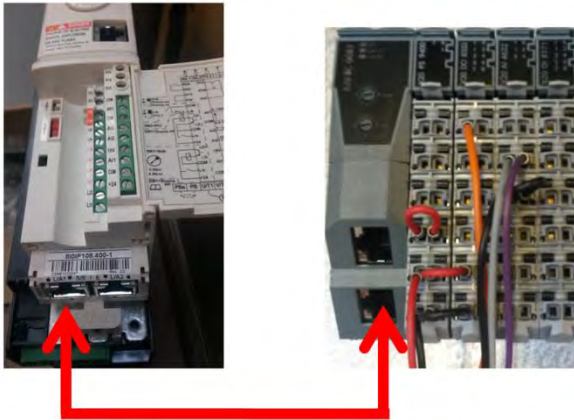
Adresses in AMI Penta EXP PowerLink installation



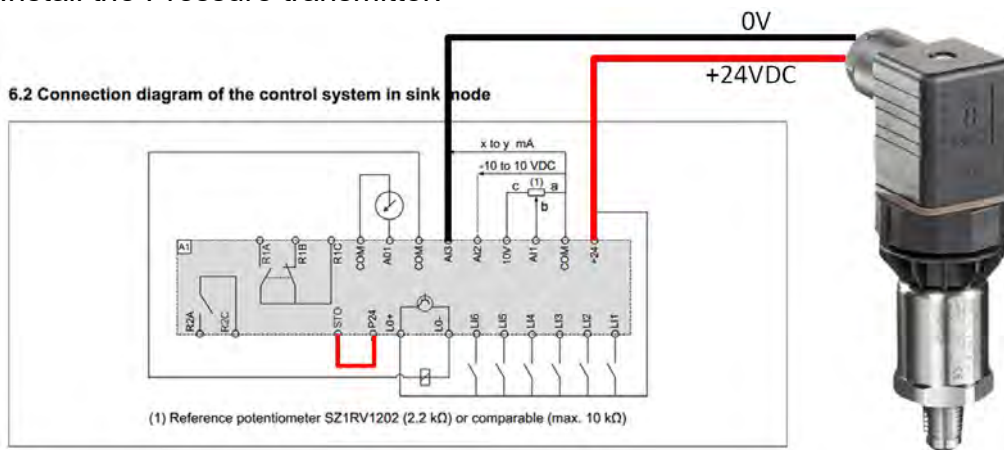
o o o o



Frequency converter installation.

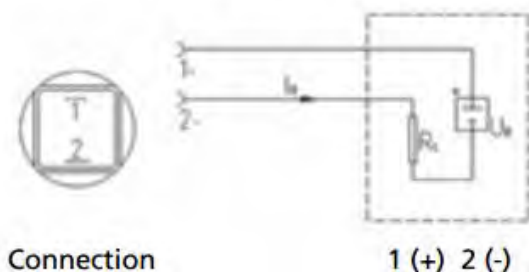


Install a Patch cable from the Frequency converter to Power Link.
 Set the node number at 200. 201 for Pump 2. Enter this menu:
 COnF -> Full -> Con- -> Cbd -> AdrC. Turn the wheel until the decided number is shown
 and press the wheel until the dots at the side stops flashing. Restart the converter.
 Install a short wire between STO and P24.
 Install the Pressure transmitter.



Electrical connections

Connecting with current output and plug complying with EN 175301



AMI Penta IP addresses.

The new series operates with IP address 10.4.1.xxx

Subnet 255.255.255.0

Last figures (xxx) can be selected in this menu:
Ina Node must be the same!

The screenshot shows the configuration interface for a SENMATIC device. The window title is 'VC Project 'Visu' - TightVNC Viewer'. The interface is divided into several sections:

- Network Settings:** IP address: 10.4.1.135, Ina Node: 135, Subnet mask: 255.255.255.0, Gateway: 10.4.1.248.
- System Settings:** Brightness: 50, Choose language: English, Activate screen calibration: **Activate**.
- Time and date adjust:** Date: 20-05-2016, Time: 07:08:32.
- Geographical settings:** Longitude: -12.57°, Latitude: 55.68°, Timezone difference (GMT): 1, Summertime: No.
- Navigation and Status:** A sidebar on the right contains a menu with options: Service, Installation, **Unit Setup**, IO Setup, Mixer Setup, Water supply, Regulation, Pressure, Basin. At the bottom of the sidebar are 'Back' and 'Home' buttons. The top right shows a date and time: 20-05-2016 07:08. The bottom right shows the IP address 10.4.1.135 and the SENMATIC logo.

The table below (1) shows which node number belongs to each unit.

E.g. if the new series sees a unit on the net with an IP address 10.4.1.129, it will expect that it is an LCC 2 LCC 4 or an AMI Penta panel and not an expansion unit.

Node number

1 – 127 (1-16, 17-32 etc)	Expansions
128	Reserved
129 – 199	LCC2, 4, AMI Penta etc
200 – 248	SuperLink etc
249	Backup Util
250	WT

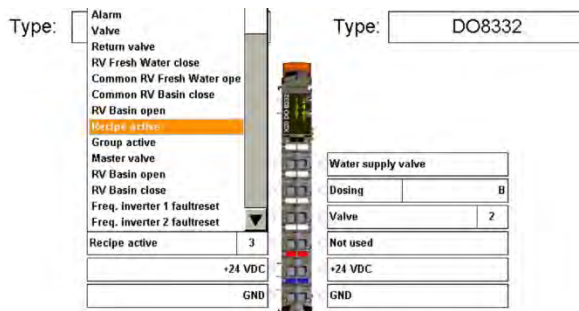
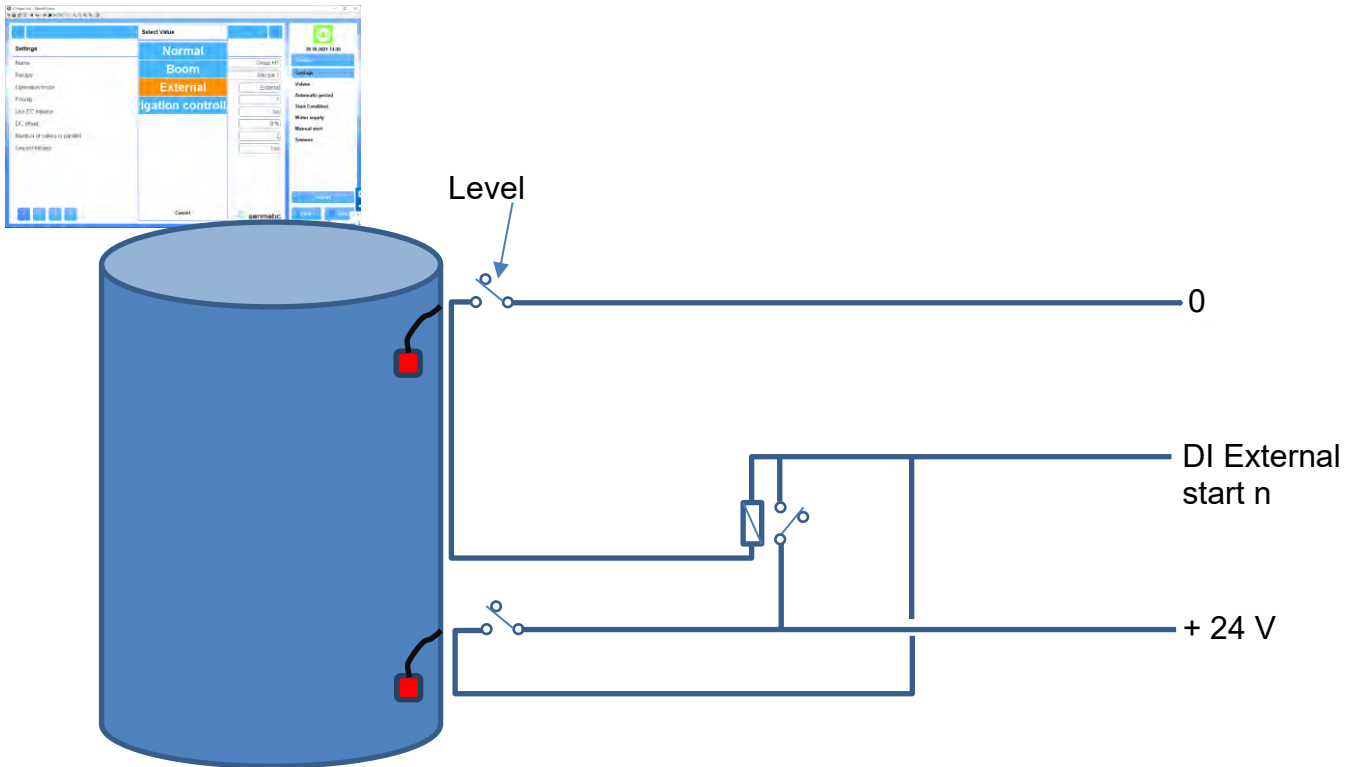
Table 1: Node numbers

Extra materal

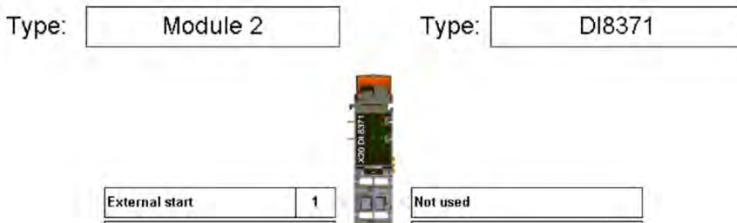
Fill up a tank with a recipe

Howe to run a recipe from an external input.

The selected recipe in the Group will start when tank is empty and stop when it's full. Operation must be set at "External"



This output can open the valve for filling.



The selection here is the Group with the wanted recipe. When operation is set at "External", Group (Recipe) will continue as long as this input is "high".