Bachelor's thesis big bag station

Pneumatic transport installation

Bachelor Elektromechanica
Afstudeerrichting: Automatisatie
Academiejaar: 2020-2021

Jorden Van Bakel
J-Tec
Robin Moorthamer

ARTESIS PLANTIJN
HOGESCHOOL ANTWERPEN

Foreword

Writing a thesis is not always an easy task. It is therefore often with the help and especially the motivation of others that I have managed to push myself through this difficult period. The document that you see here is intended to give the most complete picture possible in connection with this installation, being a pneumatic transport with big bag station.

The installation, programming, and operation of this installation will all be discussed in this document. In this installation, I work with different components that can be found throughout the entire Electromechanical Engineering education, with priority given to the automation part.

This project was commissioned by J-Tec to deliver a finished project as the final test before graduation. This project was set up in the final period of the Electromechanical Automation course at the AP University College in Antwerp. This project has been realised during the last four months, in which I have studied, designed, and documented this type of pneumatic transport.

Thanks to a former secondary school teacher, Jan Leys, I came into contact with this company. He was convinced that I could learn a lot there and produce a good thesis, but also that this was a company that catered for my interests. So, with the help of my internship and company supervisor, I drew up a bachelor thesis. The result is a project with an emphasis on the design and programming of this installation. Both supervisors have always helped me whenever I had a question. I would therefore like to thank them for their help during the development of this test.

I would also like to thank all the colleagues I met at J-Tec. They always made sure that I felt at home in the company and that my spirits did not slip.
Finally, I would also like to thank my friends and family for their support. Thanks to them, this difficult period remained a little more bearable, which helped bring about this result.

I hope you enjoy reading this book.

Van Bakel Jorden
Antwerpen, 07 juni 2021

Contents

1 Project description

Objective:

A bachelor thesis is a good preparation for what reality in the industry can be like in a company on a day-to-day basis. Several things or properties are addressed here that is very important in an Electromechanical Engineering degree.
For example, it is important to be able to work independently, but also to be able to adjust oneself if necessary. The ability to divide tasks and think creatively is also important. In reality, you are almost constantly under time pressure, and things come at you that you cannot prepare for. That is why it is necessary to practise this or come into contact with it in a learning context.
In addition, it is good to be able to look for missing information yourself and to pass it on to the other parties involved. This, in turn, requires the preparation of reports and, of course, the ability to present them.

Project description:

This project aims to design, program, and document an entire installation. The installation in question is a transport system that will use compressed air to transport a medium through the system. This is done based on several accompanying documents.
Some of the documents that are certainly provided by the company are things such as a P&ID. This shows an overview of the entire installation, with the corresponding components, as well as a brief look at how the installation will function. A process description will also be provided. This will describe in a little more detail how the process will work.

Furthermore, some templates are obtained. This can be seen as a kind of starting file from which the student can start working. Some settings have already been made so that these files are and remain in conformity with the necessary standardisation. The templates include matters that the student has generally not yet come into contact with or still needs to gain insight into. The templates that will be passed on are those concerning: the HMI description, CSA, electrical schematics & the in company name report.
An entry and exit list is also part of this. As it is a file already finished by the pre-engineering department of the company. This again ensures the necessary standardisation and avoids making mistakes on things that are basically less important in this situation.

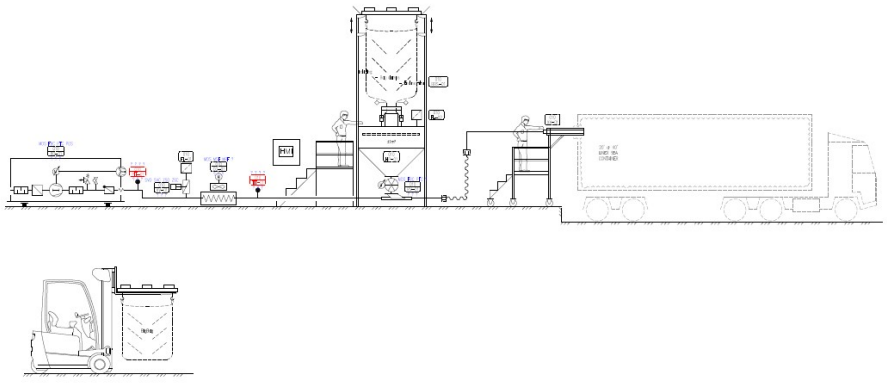


Figure 1 - Project description P&ID

Requirements:

Based on all the documents provided, the student will have to complete the project. This means that the student will have to design and set up various schemes and programmes. The first thing to do is to make electrical schematics. This also involves a lot of documentation, which increases the understanding of the installation and its components.
Then the student can start the PLC and HMI programming. A SIEMENS PLC will be used, which will be installed and programmed in "TIA Portal V16". Also, the HMI panel that will be used is from Siemens, of which the user interface must also be completely designed and programmed.
This HMI programming must in turn be provided with the necessary documentation. A general description of how it functions and behaves is certainly required. Then there is a report in company names and a CSA. The CSA (Control system architecture) is a graphical representation of the PLC equipment in Visio, showing the hierarchy of components working together.
These designs must be done according to the J-Tec standard applied in the company. The necessary explanation will be given in order to understand and apply this working method.
Finally, pre-installation quality inspections will take place. This is done first of all offline via simulation. This is very easy to do via "SIEMENS PLCSIM V16". If this goes smoothly and is possible, another online test may be done. This is done on an actual installation used in a test room.

When designing the plant, it must be borne in mind that this is a skid construction. This means that all components are implemented on the installation itself and that no distribution or control cabinets are installed further away in the field.

Summary “Deliverables”:

- Creating electrical diagrams according to J-Tec standard
- PLC programming according to J-Tec standard
- HMI programming according to J-Tec standard
- Preparation of documentation according to J-Tec standard HMI description
    - CSA (Control System Architecture)
    - Equipment in Visio
    - In company name report
- FAT
    - Offline (in simulation)
    - Online (with the actual installation)
- Project data book in English

1.1 Control sheet bachelor thesis

1.1.1 Check sheet

- ✓ Title page (front and back cover AP) with prescribed cover page
- ✓ Foreword
- ✓ Table of contents
- ✓ Description of the assignment Bachelor's thesis
- ✓ Checklist
- ✓ Schematics
- ✓ Conclusion
- ✓ Acknowledgments
- ✓ References in the texts
- ✓ Bibliography in accordance with the sources
- ✓ Table of figures and photographs
- ✓ Number of separate annexes: 10
- □ Others .....

1.1.2 Multidisciplinary

- □ Mechanical study parts
- ✓ Electrical study parts
- ✓ Electronic/ drive technical study parts
- ✓ Automation program design
- ✓ Hydraulic and pneumatic study parts
- ✓ Process engineering study components
- ✓ Cooling technology study parts
- □ Energy related items
- ✓ Safety aspects
- ✓ Standards, machinery directives, etc.
- ✓ Linguistic support at the college by Mr. Duré
- ✓ Other: IT (Excel)

1.2 Project definition

I obtained this project from my company supervisor in J-Tec. It is a project that they were also developing at the request of a customer in Thailand at that moment. They thought that this was good preparation for a future career, and so after a short meeting, this became the subject of my bachelor thesis.

The actual purpose was to design and develop an installation in which a product in granular form, in large quantities, can be supplied in "big bags" and then be transferred into a sea container by means of pneumatic transport. All this will be done on a PLC-controlled skid-build using an HMI control panel.

Figure 2 - General J-Tec pneumatic conveying systems

Previously, these transports were done manually, with the operator having to keep an eye on many things himself. This causes many delays and associated problems, especially in a high-level industry. Automating these installations ensures faster and clearer processing. In some situations, it will even provide a safer environment.
However, an automated installation is not all fun and games and will also bring its problems. For example, additional safety measures must be taken. The most common method of assessing the risks involved is by carrying out a risk analysis.

Any problems or dangers that may occur will mainly affect the operators.
Since they are the ones who come closest and have the most interest in the installation.
The cause can be found in the high demand for products and production resources. In industry, one would like to have the highest possible production in a small period of time.
The biggest problems or dangers will most likely occur during loading and fixing of a big bag, or during maintenance. At these times, an operator will be closer to the installation and therefore to the moving parts.
During normal operation, however, fewer dangers will occur. The operator is at the control panel at that time. At that moment it is a closed transport, directed and controlled through a PLC. This will therefore try to prevent any further dangerous situations from occurring.

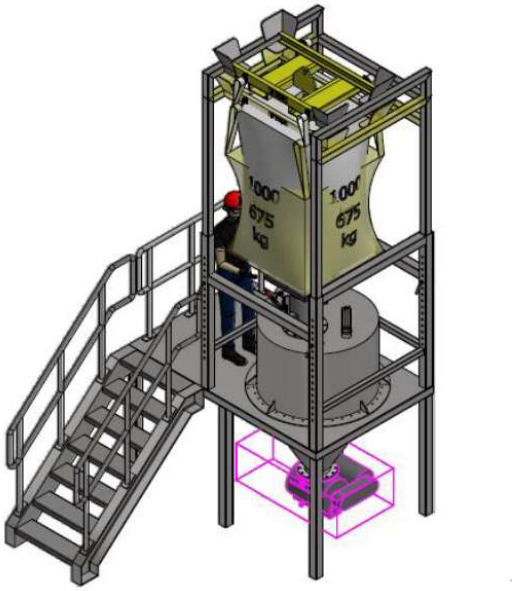


Figure 3 - Mechanical drawing big bag station

A finished project is expected, including an electrical file and the programming of the relevant installation. The idea is that this project can be used to wire, install and program a similar skid-build. The mechanical side of this project was not intended for me, however, as these installations are inherent to the company and they, therefore, have a specialised team for this.

In order to complete this project successfully, I will use previous courses and some sources on the Internet. I will also be using various software packages such as Siemens TIA Portal, e-PLAN Education & Microsoft Office.
I will try to complete this project using sufficient sources, descriptions, and images.

1.3 Plan of requirements (PoR)

Every business project is influenced by business and stakeholder requirements that constrain and guide it. Typically, a project manager uses these requirements to define the project's scope and outline success criteria. Requirements management refers to the process of identifying and managing these discrete requirements.

A requirements management plan is a document that is typically created alongside the primary project plan as a piece of the scope management process. Its primary purpose is to ensure that all stakeholder and business requirements are captured, analysed, managed, and addressed by the project plan.

Some of the most important questions answered in the requirements management plan include:

- How will you identify stakeholder requirements?
- How will you prioritize these requirements?
- Who will be responsible for requirements management?
- How will you establish traceability?
- How will changes to requirements be managed?

I have used the software "Mindjet MindManager" for this. I find this
a simple and clear way to draw up a plan of requirements (PoR) in a short amount of time.

The plan of requirements is attached in Chapter 10: Annex', Appendix I

1.4 IST-situation

In this chapter, it will be described what was given at the start of this project. It was a realistic project in the way that it was actually requested by a customer.
This means that the company where I was working, did the same project already. I just got the same assignment, so they had a clear view of what was needed to be done. They thought it would be good exercises with many learning possibilities.

Of course, there wasn't access to all this information.
The information I got was mostly pre-engineered designs and drawings like a P&ID, IO-list, process description, and some templates to start with.
The mechanical design was already made by the mechanical department of the company, whose specialty is designing these stations. These are stations that cannot be bought separately, but are always made on request for a project or customer.
The templates included some global structures and lay-out which makes it easier to fulfill the used standards and working methods.

1.5 SOLL-situation

The work on my part was to make the electrical design of the complete installation. This means from the power supply cable that enters the cabinet until the sensors and actuators. These drawings had to be made in the ‘E-plan education’ software.
Further on I also made the CSA (Control system architecture).
Afterward, I have made all programming regarding this installation. This had to be done in the 'Siemens TIA Portal' software and included also an HMI basic touch panel. These drawings and programming had to be done by the used standards of the company. Therefore, start files with the necessary pre-engineering in them were given to me.

For all of this, I also made a commissioning report with accompanying FATs. In the first place, this was to be done offline (in simulation), if there would be time left, online tests should be completed as well (skid build in a test area).

Finally, a risk analysis was carried out to obtain the safest possible installation. This risk analysis was drawn up according to the EN12100 standard. This standard describes how best to categorise hazards and thus estimate risk.
In addition, an operating manual was written that can be used to start, operate and stop the installation using the HMI touch panel.

2 Gaining insight into the system

The picture below shows a part of the P&ID. This design was not made by myself and was therefore provided to me by the company. However, this is the clearest diagram with which one can gain a first insight into the installation. For me, this type of installation was still fairly unknown in practical terms, and I was, therefore, able to extract a lot of necessary information from this diagram.

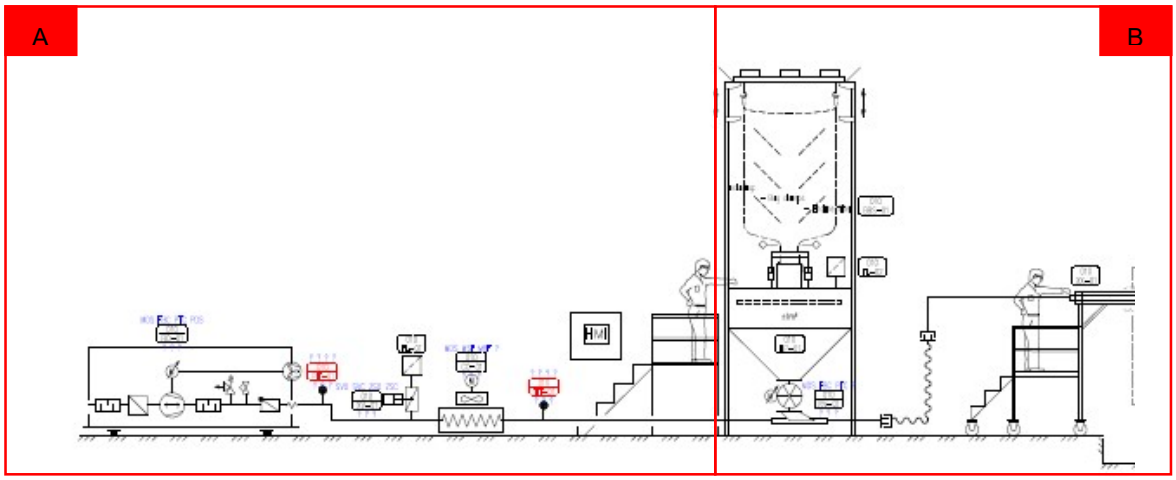


Figure 4 - Overview P&ID

This installation can be divided into two parts according to functional operation.

Part A:

- This is the part of the system where the transport is created, with the necessary additions to control and monitor the system in the most sustainable way possible.
- The blower (010-BO-01) is installed in this section. Together with the free air valve (010-XV-01), it ensures that air pressure can build up in the system pipes.
- The cooler (010-CO-01) in turn ensures that the pipes, which can heat up during transport, can be cooled.
- Finally, two transmitters are also provided in this section of the system. A pressure transmitter (010-PIT-01) and a temperature transmitter (010-TIT-01). These ensure that both parameters are monitored and can be adjusted if necessary.

Part B:

- In this part of the installation, the product is added to the pipe. In this way, a pneumatic transport is actually created.
- This is done by means of a "Big Bag", which is placed on top of the installation. Next, it is connected with the mouth to the rotary valve and clamped in place. These clamps not only ensure that the bag stays in place, but also improve the flow from the bag to the installation.
- In case the rotary valve is switched on, it will allow the product from the “Big Bag” to flow into the system piping and thus create a conveyance.

The piping and instrumentation diagram is attached in ‘Chapter 10: Annex', Appendix II

2.1 Equipment

2.1.1 Blower unit

The unit is equipped with:

Blower	*(010-BO-01)*
Cooler fan	*(010-CO-01)*
Transport temperature transmitter	*(010-TIT-01)*
Transport Pressure transmitter	*(010-PIT-01)*
Free air valve - (EFO)	*(010-XV-01)*

Table 1 - Equipment blower unit

2.1.2 Station

The unit is equipped with:

Rotary valve	*(010-RV-01)*

Table 2 - Equipment station

2.2 Safety Interlocks

All interlocks in this chapter are always active and independent of any active sequence.

Emergency stops (Hardware interlocks)
- Immediate stop (trip)

Emergency stops (Software interlocks)
- Immediate stop (trip)

Safety interlocks (Hardware interlocks)
- None

Safety interlocks (Software interlocks)
- None

Explosion safety interlocks (Hardware interlocks)
- None

Explosion safety interlocks (Software interlocks)
- None

2.3 Functionality: Refill

Blower:

- The blower is equipped with an oil pressure switch *(010-BO-01-PDS)*
  This switch is used to indicate that the oil pressure has dropped. When the feedback of this switch becomes 0 (fail safe) an alarm message ***Blower oil pressure*** should be generated
  This alarm trips the blower and the control sequence.
- The blower is also equipped with a temperature switch *(010-BO-01-PTC)*
  The function of this switch is to indicate that the blower motor is too hot and is connected to the frequency drive

Air cooling:

- The air can be cooled with the air cooler *(010-CO-01)*
  This unit is controlled through the temperature transmitter *(061201-TT-011)*. The system should be foreseen with a ***"Transport temperature setpoint"*** setting. Whenever the temperature becomes higher than this setpoint, the air cooler *(061201-MO-013)* should start working
  When the temperature drops 5 degrees below the setpoint, the air cooler will stop

2.3.1 Before conveying:

- When a truck arrives, the truck operator connects the earthing. Afterward, the Storz-connection is connected
- The operator can now press the alarm reset and acknowledge buttons. If no alarm or trip conditions are still active, the alarm list will be empty
- After pressing the system reset button, he can press the start transport button, which starts the conveying startup

2.3.2 Startup of conveying:

When a start command is given and all start conditions are fulfilled, the conveying will start.

- When the conveying is started, first the blower *(010-BO-01)* is started, while a timer ***"Startup time blower"*** is started, giving the blower time to start
  (figure 4, section B)
- As this timer runs out or the blower is at speed, the open-air valve *(010-XV-01)* is closed
  (figure 4, section C)
- When this valve is closed, the whole conveying line will build up pressure and airspeed. During this phase, we wait a certain time to guarantee a good airspeed before dropping the product in the pipe for transportation. This is done by ***"Time for building up airspeed"***.
  This timer is started as soon as the open-air valve *(010-XV-01)* is closed
  (figure 4, section D)
- When the timer ***"Time for building up airspeed"*** is completed, we can start feeding the product into the transportation system.
  Now the transportation of the product is active
  (figure 4, section E)

2.3.3 Stop conveying:

When a stop command is given or a stop condition is fulfilled, the conveying will stop.

- To stop conveying, the product feed has to stop first. This is done by stopping the rotary valve.
  (figure 4, section H)
- After the product feed has stopped, all the remaining products in the pipe will be blown out of the conveying line. To monitor whether the conveying line is empty, the pressure *(010-PIT-01)* in the system needs to be lower than the ***"PSL empty pipeline resistance"*** value for a time ***"Empty line stabilization time"***
  - If the pressure does NOT decrease below the ***"PSL empty pipeline resistance"*** at the end of the timer ***"PSL timer during stop"*** the alarm **** PSL not reached during stop**** should be given and the conveying has to be entirely stopped (trip)

  (figure 4, section I)
- When the conveying line is empty, the open-air valve *(010-XV-01)* is opened
  (figure 4, section J)
- After opening the open-air valve, the blower *(010-BO-01)* can be stopped
  The operator can place the cap on the Storz connection and disconnect the earthing.
  (figure 4, section K)

"Note: The blower will keep running for 5min, as long there is no request for a new transport"

2.3.4 Pressure monitor during conveying:

- When the pressure *(010-PIT-01)* is too high during conveying, it indicates that the pipeline is blocked with the product.
- If this occurs, feeding the product to the truck has to be stopped immediately. This pressure can be monitored by the operator using the pressure indicator. The ideal transporting pressure is placed on the cabinet after commissioning
  (figure 4, section F)
- The product feed is stopped. Now the pipeline will be emptied and the pressure will decrease. This action is monitored with a timer ***"PSL timer during stop"***.
  during this there are two possible scenarios in this case:
  - If the pressure decreases below the ***"PSL empty pipeline resistance"***
    the product feed can be resumed: conveying of product is again active
    (figure 4, section G)
  - If the pressure does NOT decrease below the ***"PSL empty pipeline resistance"*** at the end of the timer ***"PSL timer during stop"*** the alarm **** PSL not reached during stop**** should be given and the conveying has to be entirely stopped (trip)

2.3.5 Trip conveying:

- When a trip condition becomes active, the entire transport trips. The operator can see this because the blower trip and all valves return to their inactive state and the pressure in the system drops rapidly. The necessary alarms will be displayed
- Stopping the product feed will occur automatically according to to the programmed sequence, if this is not the case the operator has to stop the product feed manually by using the HMI panel

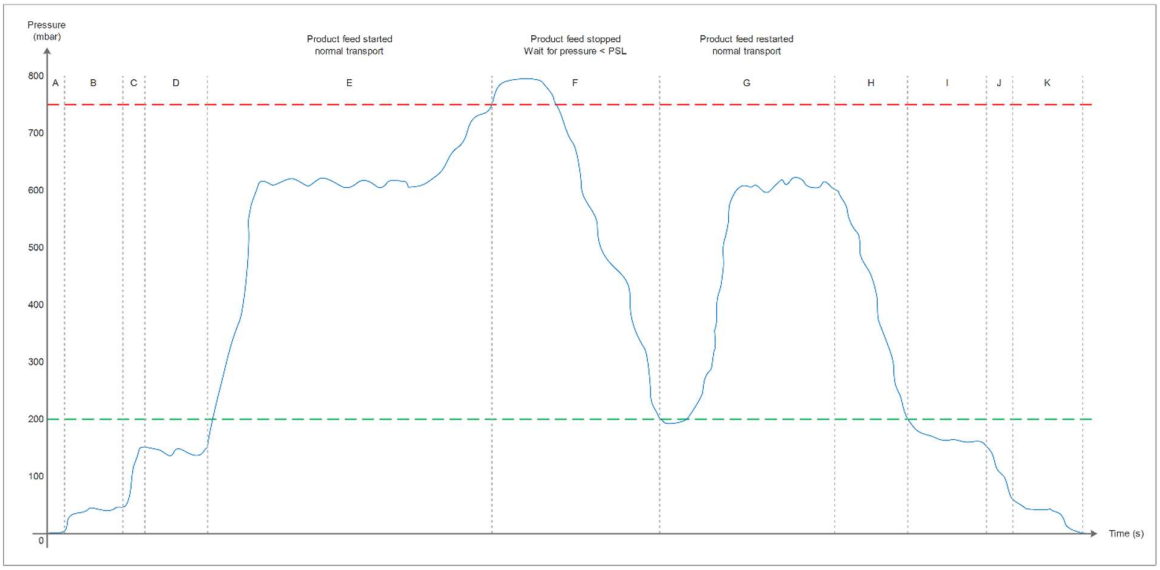


Figure 5 - Conveying trend

2.3.6 Sequence logic

Start conditions

- No stop or trip conditions active
- Filling permission control system

When these conditions are all true, the conveying will start. The start conditions are only monitored to start. They are not used while the conveying is active.

Stop conditions

- A piece of equipment or specific stop alarm (see below)

When one of these conditions becomes true, the conveying will stop in a controlled manner.

Trip conditions

- A piece of equipment or specific trip alarm (see below)

When one of these conditions becomes true, the conveying will stop immediately, all valves return to their rest positions and all motors stop.

2.3.7 Equipment alarms/messages for this system:

Stop Alarms	Related Tag-number
Rotary valve alarm	*(010-RV-01)*

Trip Alarms	Related Tag-number
Emergency stop active	(I/ES_1)
Free air valve alarm	(010-XV-01)
Blower oil pressure switch	(010-BO-01_PDS)
Blower motor maintenance switch	(010-BO-01_MDS)
Rotary valve motor maintenance switch	*(010-RV-01_MDS)*
Cooler motor maintenance switch	*(010-CO-01_MDS)*
PIT signal lost	*(010-PIT-01)*
PSH to long active (alarm)	*(010-PIT-01)*
PSL not reached during stop (alarm)	(010-PIT-01)

Hold Alarms	Related Tag-number

Table 3 - Equipment alarms/ messages for this system

2.3.8 Specific alarms/messages for this system:

Messages

Warnings

Stop Alarms

- Temperature too long above high limit (010-TIT-01)

Trip Alarms

- Conveying pipeline blocked alarm (010-PIT-01)
- Emptying pipe takes too long when stopping, no ***"PSL"*** after 60s (010-PIT-01)

Hold Alarms

Table 4 - Specific alarms/ messages for this system

2.3.9 Settings Blower unit

Parameter Name	Unit	Value			Description
		Default	Min	Max	
timer blower	S	15	0	180	Startup time blower
Build air speed timer	S	30	0	60	Build up air speed time
Blower setpoint	%	50	0	100	Setpoint of exhauster/blower
Transport temperature set-point	°C	40	-10	150	Temperature setpoint to which the air cooler should limit the tempera-ture
PSL timer during stop	S	15	0	60	Time before PSH causes a trip (hardcoded)
PSL Empty pipe line re-sistance	mbar	0.02	0	500	Pressure when the pipe is empty
Empty line stabilization time	S	15	0	20	Time while PSL before empty pipe
PSL timer during stop	S	15	0	20	Time to reach PSL during stop
PSH: high conveying pres-sure	mbar	250	0	-1000	Pipes blocked pressure

Table 5 - Settings blower unit

3 Elaboration

3.1 Mechanical design

As already mentioned, the mechanical design was not made by me. For this, the company has a team that designs similar installations on a daily basis, as the company is known for this.

Figure 7 - Blower unit

Figure 6 - Cooler & FAV on skid

Of course, this design was necessary to be able to proceed with the electrical design and, in a further stage, to complete the programming of the project. For me, the greatest asset in this was the P&ID. It gives a good overview of the various components that will be used and provided in the logical part of the installation, and it also gives a first visual impression of what the installation will actually look like.

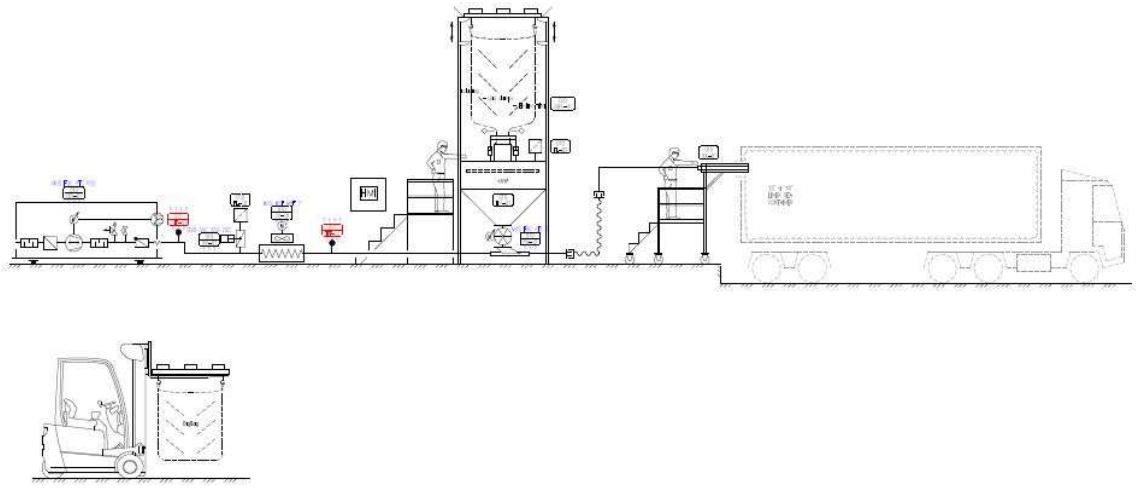


Figure 8 - P&ID

It is worth noting that only the components with a full line in their tag symbol are brought into the PLC. The other components are local sensors and the like, which have to be monitored separately by the operator.

The piping and instrumentation diagram is attached in ‘Chapter 10: Annex', Appendix II.

3.2 Electrical design

3.2.1 “Codex of Well-being at Work” - Electrical installations

In order to complete the risk analysis, the "Codex for Well-being at Work" was used. Below you will find a part of the codex that is in force at this installation.

3.2.1.1 Electrical installations

The electrical installation must be designed and constructed in such a way that it does not present a risk, fire, or explosion and that persons are adequately protected against accidental risks resulting from direct or indirect contact.
An incorrectly designed or poorly maintained electrical installation is one of the main causes of fire and explosion.

For example, if fuses are too large in relation to the installation's conductors, or if differential switches are not installed to detect leakage currents, overheating and electric arcs may occur.
Damaged conductors, plugs, or switches may also be at the origin of a fire, as may poor contact in a junction box, placing a light fitting too close to combustible materials, or using a lamp with too much power concerning the fitting.
In the case of leakage current, even a small intervention on the electrical installation (e.g. replacing a light bulb) involves the risk of contact between the person and an electrical conductor.
This contact may be direct (with a normal live conductor) or indirect (with an object that is normally not live) and
can lead to different effects on the person (from sensing a shock, to death by electrocution) depending on the electrical contact (current strength, duration of contact, path of the current through the body) and the person (age, state of health, skin moisture, ...).
The design, implementation, and choice of materials and protective devices must take into account the voltage, external influences, and expertise of persons having access to parts of the installation.

The employer will pay attention to, among other things
- the voltage of the installation: low voltage, high voltage, very low safety voltage, ...
- external influences: e.g. temperature and humidity, presence of dust, the humidity of the body, qualification of persons (with BA4 or BA5 certificate), flammability of the building materials used, ...
- the class of the electrical equipment: in the function of the insulation level (class I, II, III)
- the degree of protection of the electrical equipment: against the penetration of solid bodies and the penetration of water (index IP)
- means of protection: circuit breakers, differential circuit breakers, earthing (several possible schemes: TT, IT, TN), equipotential bonding, overcurrent protection, overvoltage protection, minimum voltage relays, etc.
- classification into hazardous zones: risk of explosion in a gaseous explosive atmosphere, risk of explosion due to dust
- work on electrical installations
- the obligations regarding periodic technical inspections by an approved body.

SHEET ON ELECTRICAL INSTALLATIONS

Design and implementation:
- no risk of fire or explosion
- protect persons against direct or indirect contact

Most important points AREI:
- article 4 "subdivision of the installations according to their voltage range
- Article 30 "classes of electrical equipment"
- Articles 31 and 32 'conventional voltage limits, very low safety voltage
- Articles 69, 70 and 71 "the earthing installation".
- Articles 72 and 73 "equipotential bonding".
- Article 79 "The three earthing systems".
- Article 105 and 106 'risk of explosion in explosive atmospheres, hazardous areas'.
- Article 226 "Degree of protection against the ingress of water".
- Article 227 "Degree of protection against the ingress of solid objects".
- Article 266 "Work on electrical installations"
- Articles 271 and 272 "inspection visit by an approved body

Royal Decrees applicable to electrical installations
- the Royal Decree of 4 December 2012 on the minimum safety requirements for electrical installations at workplaces
- the Royal Decree of 26 March 2003 on the welfare of workers potentially at risk from explosive atmospheres

3.2.2 Components

Below you will find an overview of the components used in the electrical section. However, these are not all components, but the ones I looked for and documented myself. All other components were provided to me by the company through an MCL file (Machine component list).

The MCL-file and the component list is attached in ‘Chapter 10: Annex', Appendix III.

Component	TAG	Description	Type N°	Article N°	Brand	Quantity	Price € (P.P.)
Electronics							
Main switch	010S1	Main power switch - 63A / 480V	P3-63/EA/SVB	31607	Eaton	1	122.17
Transformer 1	010T4	Transformer 480V AC / 230V AC - 630VA - Back plate mounted	ABL6TS63U	608-6533	Schneider Electric	1	233.48
Fuse 1	010F4	Tube fuse NFC 8.5 x 31.5 mm tubular - aM 2 A - without pilot light	TeSys DF, LS1/GK1	DF2BA0200	Schneider Electric	2	3.18
Fuse 2	010F4.1	Tube fuse NFC 8.5 x 31.5 mm tubular - gG 2 A - without pilot light	TeSys DF, LS1/GK1	DF2BN0200	Schneider Electric	1	3.18
Circuit breaker	010Q7	Fault current circuit breaker - 2poles - 230V AC	A9F89206 & A9Q21225	A9F89206 & A9Q21225	Schneider Electric	1	212.41
Fuse holder 1	010F4	1P+N fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15645	Schneider Electric	1	24.32
Fuse holder 2	010F4.1	1P fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15635	Schneider Electric	2	21.99
Cabinet Lamps	010H7	Cabinet lamps - 9,8 W	PILD E 608 W 315/B	2702227	PHOENIX CONTACT	1	193.88
Motor circuit breaker	011F1	Motor circuit breaker, 3P, 0.16-0.25 A, screw clamp terminals	TeSys GV2	GV2ME02	Schneider Electric	1	49.99
Motor circuit breaker feedback module	multiple	TeSys Auxiliary Contact - 1NO/1NC, 2 Contact, Side Mount, 6 A	GVAN11	395-0122	Schneider Electric	2	13.90
Motor fan	011M1	Panel ventilation		SK 32441440 & SK 3243200	Rittal	1	393.08
Contactor 1	011K6	Panel vent. contactor - 3P(3 NO) - AC-3 -<= 440 V 9 A - 24 V DC coil	TeSys D	LC1D09BD	Schneider Electric	4	96.98
Enclosure thermostat	11U5	Enclosure thermostat	RIT.3110000	RIT.3110000	Rittal	1	36.07
Safety relay	025K3	PNOZ S1 C - 24V DC - 2n/o	PILZ 751101	PILZ 751101	Pilz	1	155.47
Fuse holder 3	040F1	3P fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15655	Schneider Electric	1	24.32
Fuse 3	040F1	Tube fuse NFC 8.5 x 31.5 mm tubular - aM 4 A - without pilot light	TeSys DF, LS1/GK1	DF2BA0400	Schneider Electric	1	3.78
Converter 2	040T1	Converter 230V AC / 24V DC - 3 poles	2903154	2903154	PHOENIX CONTACT	1	223.00
Fuse switch 3	040F2	1 pole fuse switch 10A + fuse	5SG7611-0KK10 & 5SE2310	5SG7611-0KK10 & 5SE2310	Siemens	1	109.91
Fuse 4	040F3	500mA Glase fuse, Speed F	GSB	GSB1/2	Ferraz Shawmut	1	1.50
Fuse 5	040F4	2,5A Glass Fuse, Speed F	GSB	GSB2	Ferraz Shawmut	1	1.10
Fuse 6	040F5	1.6A Glass Fuse, Speed F	GSB	GSB1-6/10	Ferraz Shawmut	1	1.20
Fuse 7	040F6	6.3A Glass Fuse, Speed F	GSB	GSB6-3/10	Ferraz Shawmut	1	0.95
Fuses 8	040F7 - 040F8 - 041F2	1A Glass Fuse, Speed F	GSB	GSB1	Ferraz Shawmut	3	0.95
Fuse Switch 3	080F1	fuse switch disconnector, D01, 3-pole, In: 10 A, Un AC: 400 V	5SG7631-0KK10	5SG7631-0KK10	Siemens	1	125.00
Fuse 9	080F1	fuse 230V AC - 10A gG	5SE2310	5SE2310	Siemens	4	0.91
Motor protection switch 1	100F1	Motor protection switch - 2.5..4 A - 3P 3d - thermomagnetic	TeSys D	GV2ME08	Schneider Electric	1	76.77
Maintenace disconnect switch	multiple	Motor dip switch	INS40	28900	Schneider Electric	3	50.51
Fuse Switch 3	150Q1	Switch disconnector with Fuse, D02, 3-pole, In: 50 A, Un AC: 400 V	5SG7133-8BA50	5SG7133-8BA50	Siemens	1	83.46
Fuses 10	150Q1	3 pole fuse switch - 230V AC - 50A gG	5SE2350	5SE2350	Siemens	3	3.41
Fuse Switch 4	151Q1	fuse switch disconnector, D01, 3-pole, In: 16 A, Un AC: 400 V	5SG7631-0KK16	5SG7631-0KK16	Siemens	1	58.46
Fuses 11	151Q1	3 pole fuse switch - 230V AC - 16A gG	5SE2316	5SE2316	Siemens	3	2.81
Connector (male) power supply motor	151X1	Han 6HPR Hood Top Entry M25 Screw lock	19 40 006 1261	19 40 006 1261	HARTING	1	49.77
Connector (female) power supply motor	151X1	Han 6HPR base panel M25 Screw lock	19 40 006 0411	19 40 006 0411	HARTING	1	47.82
connector therm. Feedback (male)	151X2	connector therm. Feedback	154-8104	1424649	PHOENIX CONTACT	1	14.24
connector therm. Feedback (female)	151X2	connector therm. Feedback	154-8114	1424660	PHOENIX CONTACT	1	25.79
Emergency switch	025S3	Emergency switch - turn to unlock - 24V DC	XB5AS8445	XB5AS8445	Schneider Electric	1	40.90
Mechanical							
Switch board	EX001	Rittal AX, 1000x1400x400mm (BxHxD).	AX 1115.000	AX 1115.000	Rittal	1	659.00
Power rail	XV1	Distribution board CVT 125A 4 rows 15 connections 500VAC	110338	110338	SEP	1	24.20
Earth rail	PE	Rittal Earthing Rail Earthing Bar for use with TS IT Cabinet	7113000	826-2868	Rittal	1	40.66

Table 6 - Component list

3.2.3 Calculations

3.2.3.1 Power loss in the control panel

COMPONENT	POWER LOSS	QUANTITY
DRIVE ROTARY VALVE	63W	1
DRIVE BLOWER	740W	1
PLC	10,1W	1
TOTAL POWER LOAD	813.1W	

Table 7 - Power loss in control panel

3.2.3.2 Total integrated power load

COMPONENT	POWER CONSUMPTION (480V AC)	QUANTITY
ROTARY VALVE	1100W	1
BLOWER	18500W	1
COOLER	1100W	1
MOTOR FAN (VENTILATION)	140W	1
TOTAL POWER LOAD	20840W = 20,8kW	

Table 8 - Total integrated power load

3.2.3.3 Ambient temperature during operation

COMPONENT	AMBIENT TEMPERATURE
FREQUENCY DRIVES	0°C – 55°C
HMI	0°C – 40°C
PLC	0°C – 50°C
CHOSEN AMBIENT TEMP.	40°C

Table 9 - Ambient temperature during operation

3.2.3.4 The total cost of the installation

COMPONENT	AMBIENT TEMPERATURE
COST GIVEN EQUIPMENT	€ 5669.13
COST UNGIVEN EQUIPMENT	€ 3678.62
TOTAL COST	€ 9347.75

Table 10 - Total cost of the installation

NOTE: These are basic prices, without VAT or business discount.

3.2.4 Control panel fan determination

Based on these values, a handy online tool “Therm” from Rittal makes it easy to determine the necessary fan that will end up in the control panel. A list of the best matching options is displayed, allowing the user to immediately choose the component to be implemented.

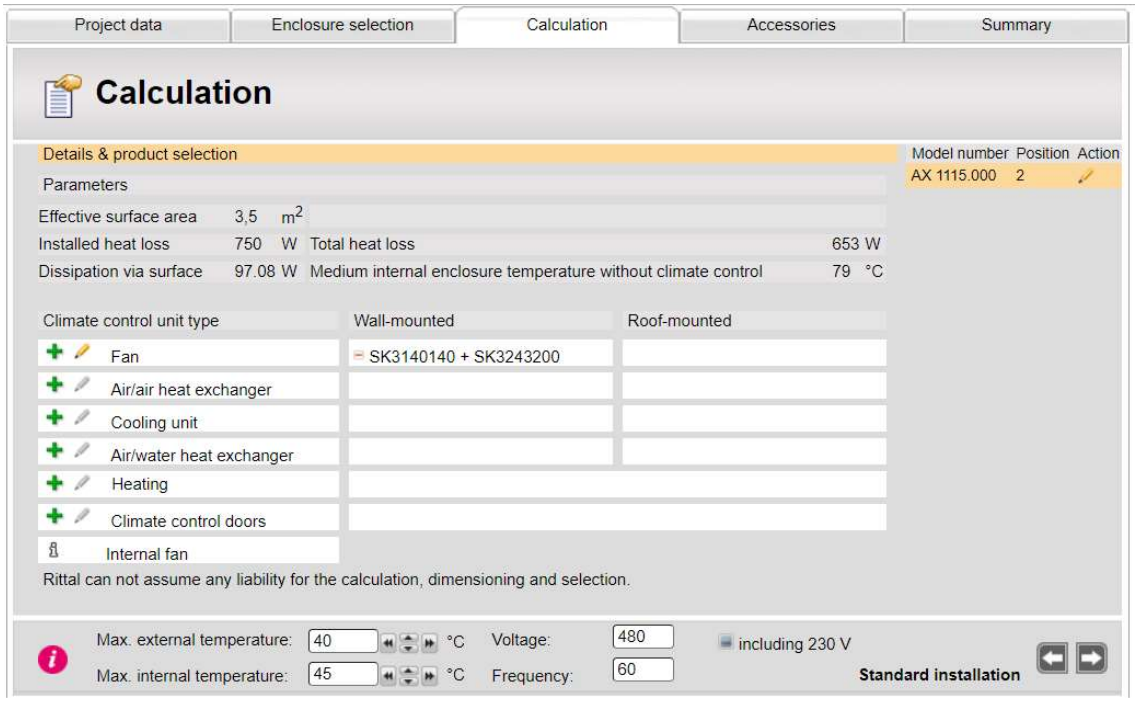


Figure 9 - Rittal term calculations

Above is an example of what this might look like.

The full summary is attached in ‘Chapter 10: Annex', Appendix IV.

3.2.5 Design

Before I started on this design, I worked for a while in the electrical design department during my internship. It was there that I first came into contact with the standard used at the company. It does not have such big differences with the earlier learned methods but it took some time to get used to it.

Afterward, for this project, I first received a table describing the page layout.

Shown below.

001	FRONT PAGE PROJECT
002.1	TECHNICAL DATA BOOKLET: CABINET CONSTRUCTION
002.2	TECHNICAL DATA BOOKLET: WIRING STANDARD
002.3	TECHNICAL DATA BOOKLET: MARKINGS
002.4	TECHNICAL DATA BOOKLET: CABLES
005	INDEX
010	CABINET SUPPLY
015	SUPPLY 230VAC
020	SUPPLY 24VAC
025	EMERGENCY STOP & SAFETY
040	DISTRIBUTION 24VDC
060	DISTRIBUTION 230VAC
080	DISTRIBUTION 400VAC
090	POTENTIAL FREE CONTACTS
100	MOTORS STAR-DELTA
110	MOTORS DOL
150	MOTORS VFD
200	FEEDERS
250	CONFIGURATION PLC
260	CONFIGURATION RACK 1 (FOR INTERNAL WIRING IF 1 RACK IS TOO BIG)
270	CONFIGURATION RACK 2 (FOR EXTERNAL WIRING IF 1 RACK IS TOO BIG)
280	HMI CONFIGURATION
290	NETWORK CONFIGURATION
300	FIELD EQUIPMENT
1000	CABLE WIRE LIST

Table 11 - Electrical page layout

The handy thing about this is that it takes into account that a project is sometimes changed or revised several times. This often results in the need to rename pages before the design can actually be started. If one follows this table, the chance of this happening is already drastically reduced as many pages are kept free.

For me, the biggest change when drawing according to this standard is that much more use is made of specially designed macros. These have been provided for use in e-PLAN Education. The macros used have more logic and are therefore more user-friendly. An additional novelty was that many of the variable texts could only be changed in the table. The advantage of this is that all the information of the relevant macro can be modified together in one table, where previously one had to search in the various property tabs.

The macros provided included only the CPU and PLC cards. These have the additional advantage of being very compact. This means that they can easily be added to the multi-line diagram of the component concerned, instead of having several pages reserved for all the inputs and outputs of the system. They are therefore designed to be used at all times, even in very large projects, where one would otherwise have to browse too much during, for example, maintenance check of a device or equipment.

3.2.6 Electrical diagrams

The electrical diagrams are attached in 'Chapter 10: Annex', Appendix V.

These are drawn in the E-plan Education software.

3.2.6.1 Component specifications

Below is a list of specifications of some of the components that are chosen because of some specific needs, by the customer or not.

- Primary switched-mode power supply (2903154)

Brand	Phoenix Contact
Rated output voltage	24 V DC
Rated output current	10 A/240 W
Input voltage range	400...500 V AC (3-p)
DIN-rail mounting	
Degree of protection	IP20

Chosen because of the 3-phases input voltage to minimize the grid load.

Figure 10 - Power supply

- Cabinet lamps (PLD E 608 W 315/B)

Brand	Phoenix Contact
Number of poles	3
Supply voltage range	100 ... 125 V AC (50/60 Hz)
Current consumption	max. 12 A (from socket)
Power consumption	9.8 W

On request from costumer because of the 230V AC output connector.

Figure 11 - Cabinet lamps

- Motor connectors (19400061261 & 19400060411 + heavy-duty connector)

Brand	HARTING
Cable entry	M25
Degree of protection	IP65

On request from costumer because of the easy maintenance possibility.

Figure 12 - Motor connector

- Thermal motor connectors (154-8114 & 154-8104)

Brand	Phoenix Contact
Number of poles:	3
Supply voltage range	48-60V
Current consumption	4 A
Connector size	M12
Degree of protection	IP67

On request from costumer because of the easy maintenance possibility.

Figure 13 - Therm. connector

3.3 Risk analysis

A risk analysis is a way in which we map out the hazards that can be encountered when using the installation. This makes it easy to obtain an overview of the occurring hazards and, if necessary, to take measures to reduce the risk. The risk analysis is prepared according to the EN12100 standard. According to this standard, the severity of a possible consequence and the quantification of the risk can be categorised based on a few questions. This makes it easier to assess a dangerous situation and prevent it by means of safety precautions.

The questions to be asked are:

- How serious can an injury be as a result of the installation?
- What is the frequency of contact with the installation?
- How likely is it that the injury will be sustained during the use of the installation?
- If a dangerous situation arises, can this be averted, and to what extent?

The risk analysis shows that mild to serious injuries can be sustained in the installation. It must therefore be taken into account that the included prevention measures only guarantee a risk reduction and do not always remove the entire danger.

The risk analysis are attached in 'Chapter 10: Annex', Appendix VI.

3.4 CSA information model

CSA stands for "control system architecture". It shows how the components communicate with each other. This can be done using various network protocols. In this installation, however, only ProfiNet communication was used. It also shows the location of the relevant components in the network. In most cases, this is defined by an assigned IP address.

In addition, it will also be indicated which different distribution and switching cabinets are realised in the project and which voltage they are powered by. In this project, this is fairly simple, as all the components are placed on the same control panel and all require a 24V DC power supply.

A legend of this diagram can be found in the lower-left corner.

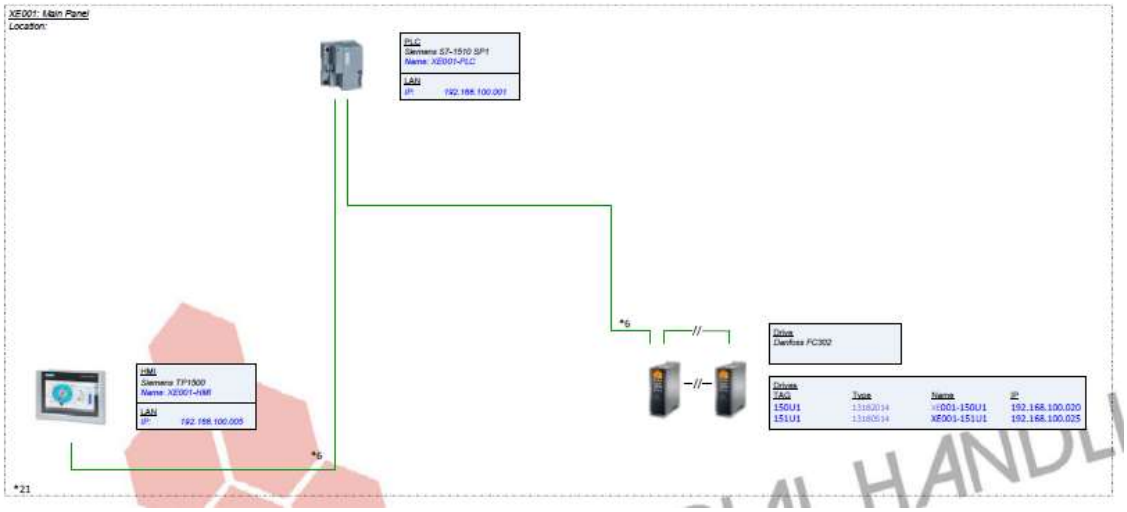


Figure 14 - Control system architecture

The full CSA model is attached in ‘Chapter 10: Annex', Appendix VII.

3.5 S88 software analyses

S88, shorthand for ANSI/ISA-88, is a standard addressing batch process control. It is a design philosophy for describing equipment, and procedures. It is not a standard for software, it is equally applicable to manual processes. It was approved by the ISA in 1995 and updated in 2010. Its original version was adopted by the IEC in 1997 as IEC 61512-1.

The current parts of the S88 standard include:

- ANSI/ISA-88.01-2010 Batch Control Part 1: Models and terminology
- ANSI/ISA-88.00.02-2001 Batch Control Part 2: Data structures and guidelines for languages
- ANSI/ISA-88.00.03-2003 Batch Control Part 3: General and site recipe models and representation
- ANSI/ISA-88.00.04-2006 Batch Control Part 4: Batch Production Records
- ISA-TR88.00.02-2008 Machine and the unit States: An Implementation Example of ISA-88

S88 provides a consistent set of standards and terminology for batch control and defines the physical model, procedures, and recipes. The standard sought to address the following problems: lack of a universal model for batch control, difficulty in communicating user requirements, integration among batch automation suppliers, difficulty in batch control configuration.
(Wikipedia, 2020)

The s88 model was not requested in this situation. It was designed to obtain a better view of the whole new installation. This means getting a vision about the necessary control modules, communication channels, the construction of the installation, and further programming.
The result obtained is therefore not in direct association with the further programming of the installation and they may therefore differ from one another.

The entire S88 software analysis is attached in 'Chapter 10: Annex', Appendix VIII.

3.6 Warnings and errors

Firstly, many alarms are automatically generated and addressed based on the associated control module of a component. The number of alarms belonging to a certain component is predefined (e.g. for motors it is always five).

The alarms that have been created based on the necessary conditions of the installation are the ones starting from 9500. This is done using a building block from the library. Only the necessary variables need to be entered. This provides a modular structure for the programming and ensures that the engineer can no longer make mistakes on a piece of code that recurs several times in just about every installation. A real-life example is shown below.

```
// PSH pipe blocked
"SINGLE_ALARM"(Alarm_Nr := 9500,
               Condition := #StepNr = 201 AND #SepTimer.Q,
               Enable := TRUE,
               Auto_Ack := TRUE,
               Ack := #Temp_Ack,
               Reset := "ManualControls".mReset,
               Reset_Group := "GROUPS_DB".ResetAlarmGroup[1].General,
               Mem_Ack := #Temp_Mem);
```

Figure 15 - Example single alarm

As it was the first time encountering this method, a table was created with all the different alarms and their alarm ID. This ID is obviously not the address in the PLC, but the number in the HMI. This will also be the number that will be shown on the control panel when the alarm is activated.

Start nr.	Equipment	Stop alarm's	Trip alarms				
1000	Blower oil pressure		PDS alarm				
3000	Pressure transmitter		Feedback alarm				
3005	Temperature transmitter		Feedback alarm				
5000	Blower		MDS alarm	Fuse alarm	Feedback alarm	Drive alarm	Running hours exceded
			5000	5001	5001	5002	5003
5012	Rotary value	Alarm present	MDS alarm	Fuse alarm	Feedback alarm	Drive alarm	Running hours exceded
			5012	5013	5014	5015	5016
5018	Cooler		MDS alarm	Fuse alarm	Feedback alarm	Drive alarm	Running hours exceded
			5018	5019	5020	5021	5022
6000	Free air valve		Feedback alarm	Running hours exceded			
			6000	6001			
9500	PIT		PSH pipe blocked				
9501	PIT		PSL not reached				
9502	TIT	TSH to long active					
9503	Emergency stop pressed		ES active				

Table 12 - Warnings and errors

Addressing in the PLC is done based on a data block in which an "ARRAY" is programmed at "WORD" level. This means that in this building block an array exists, consisting of a whole series of alarm "WORDS". Each "WORD" has 16 bits, each of which represents an alarm if it is defined in a control module or the programming.

3.7 Sequence

A sequence, or GRAFCET32 is a graphical method for achieving a structured solution to a sequential process. The guidelines of GRAFCET are included in the NEN-EN-IEC 60848 standard.

A GRAFCET is translated into a software user programme at a later stage.
Here one has the choice of programming in more "normal" programming languages such as FBD, LAD, STL or SCL33 or in a graphical programming language that is closely related to GRAFCET, namely SFC34. The standard NEN-EN-IEC 61131 describes the guidelines for programming languages that use GRAFCET such as SFC programming.
(Van Grieken, 2018 - 2019)

3.7.1 Used sequence

The designed sequence is slightly different from the already taught method. Although the biggest differences are in structure and construction. The operation or way of thinking necessary to realise this design is almost the same. The biggest difference in structure is found in the initial steps of the process (trip & idle state). Furthermore, the different control modules used, as well as the conditions, are placed on the diagram as well.

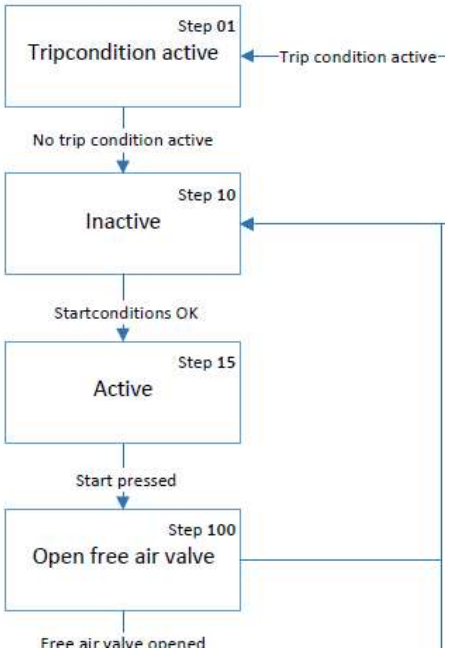


Figure 16 - Used sequence

Above, a part of the designed sequence diagram is shown.

The entire diagram is attached in ‘Chapter 10: Annex', Appendix IX.

3.8 Programming

The entire installation is programmed in the Siemens software package TIA Portal, which also includes the HMI programming. Communication between the various components takes place via IO modules and/or ProfiNet communication.

When programming the installation, the biggest challenge was to do it according to the standard used in the company. A starting document was provided for this purpose. It took some time to go through it for the first time. At first glance, the biggest difference was the composition and structure of the document. Furthermore, numerous lines of programming were already pre-programmed in it. For the most part, these are components that require little or no adjustment, but they do provide the necessary communication between the various components and associated programming blocks.

Then, starting from an already designed sequence model (also according to the J-Tec standard), a sequence is programmed. This programming includes especially the starting and stopping of the installation as well as the activation of the actual transport. This is done by programming the necessary step transitions. The actions to be taken at various steps, as well as the corresponding alarms, are also programmed and generated here. This is because the structure of the programming and the constant states of the installation was already pre-programmed.

This sequence is then called up in another function block. In this function block, the control modules of the other components, such as those of the frequency controls, are also written. This function block is then called up in the main organisation block (OB1), where all other programmed blocks and control modules are called up as well for the proper functioning of the system.

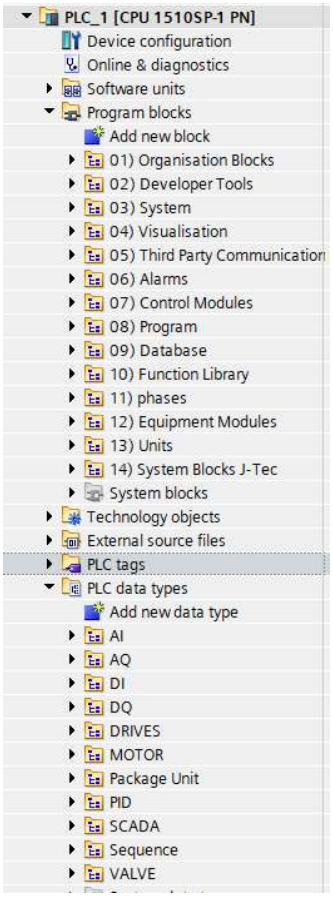


Figure 17 - Project tree Siemens TIA Portal

What was very impressive was that a lot of things that occur in programming can be generated automatically from the MCL file. This is done using a source, which is also an Excel file. In this source, the necessary files are generated using the MCL file and an IO list. These files are of a ".scl" & ".DB" format. If these are imported into TIA Portal, they will provide the necessary function and data blocks with pre-programmed variables.

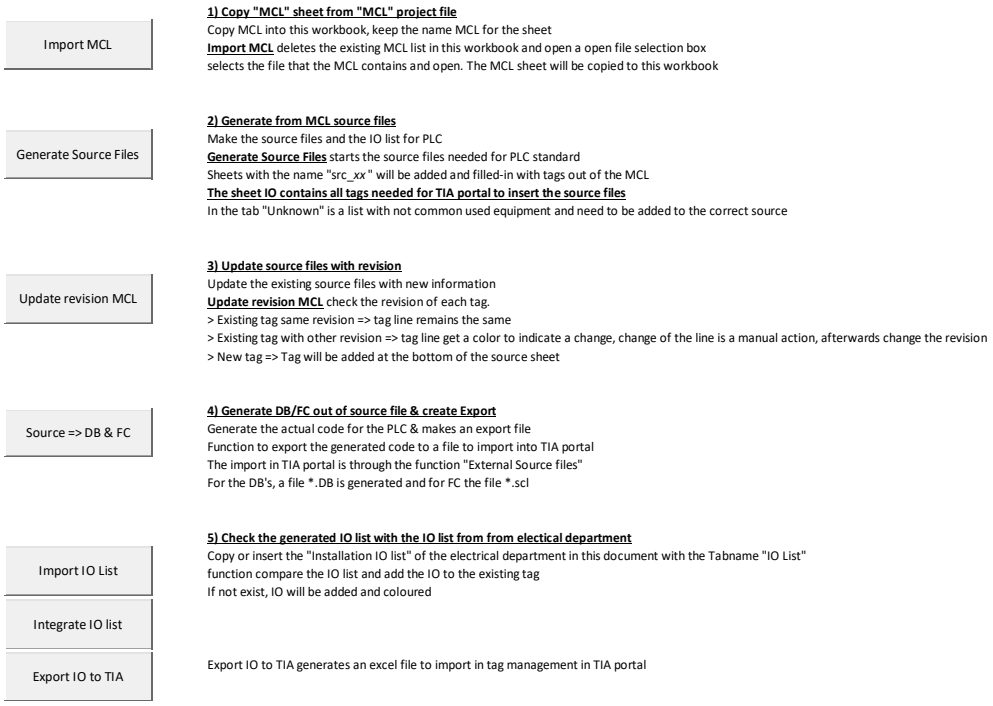


Figure 18 - Source file pt. 1

In this same source file, one can also generate the function block "GROUP_COMMANDS", HMI scripts & tags, and a cloud source. A cloud did not apply to this project and therefore did not need to be generated. The "GROUP_COMMANDS" function block will later provide the necessary communication with various components. For example, a signal to switch to the simulation mode of all components.

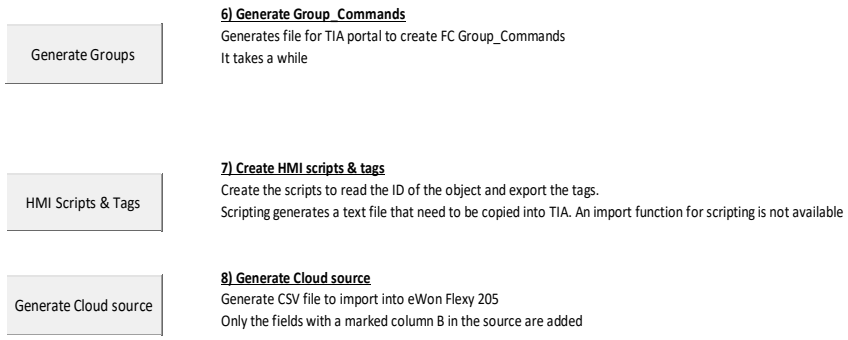


Figure 19 - Source file pt. 2

One element that requires a lot of attention is communication with the frequency drives. This may be done through a network connection, but they still work with addressing inputs and outputs like any other component. This means that there is still communication at bit level. The frequency drives used in this project are from the "FC 302" series from "Danfoss". By looking in the accompanying manual, one finds that the main communication is done by using 2 "WORDS". These are on the one hand and input "WORD" (STW: Status word) and on the other hand an output "WORD" (CTW: Control word). Some tables with the enclosing bits are shown below.

Bit	0	1
0	Control not ready	Control ready
1	Drive not ready	Drive ready
2	Coasting	Enable
3	No error	Trip
4 (1)	Not homed	Home done
5	Reserved	Reserved
6	No error	Trip lock
7	No warning	Warning
8 (1)	Not on target position	Target position reached
9	Local operation	Bus control
10	Out of frequency limit	Frequency limit OK
11	No operation	In operation
12	Drive OK	Stopped, auto start
13	Voltage OK	Voltage exceeded
14	Torque OK	Torque exceeded
15	Timer OK	Timer exceeded

Table 13 - Status word frequency drive

Bit	0	1
0	Preset reference LSB	–
1	Preset reference MSB	–
2 (1)	Preset reference EXB	–
3	Coast stop	No coast stop
4	Quick stop	No quick stop
5 (1)	No reference	Enable reference
6	Ramp stop	Start
7	No reset	Reset
8	No jog	Jog
9 (1)	Absolute	Relative
10	Data not valid	Data valid
11 (1)	No homing	Start homing
12 (1)	No touch	Activate touch
13	Set-up select LSB	–
14	Set-up select MSB	–
15	No reversing	Reversing

Table 14 - Control word frequency drive

Some more specified programming, is attached in ‘Chapter 10: Annex', Appendix X.

3.9 HMI

During the programming of the HMI controls, there were some problems in designing according to the standard used. Since this standard is developed on "SIMATIC Comfort Panels", there are several functions and graphics that were not possible because in this project a "SIMATIC Basic Panel" is used. Therefore, the layout deviates from the obtained start file. Nevertheless, a working control was designed and delivered by discussing necessary decisions with the respective coordinator.

The intention was to create a complete control panel with the necessary visualisation and safeguards. This means that automatic and manual operations had to be established. Switching between the two modes is also possible. However, when the manual mode is switched on, it is protected so that it can only be used during maintenance work by the respective service technician.

Furthermore, the status of the system, its components, and conditions is visualised on the control panels. This provides a clearer overview and consequently a more pleasant operation of the installation. The panel will also generate the necessary alarms if they occur.

For a complete overview and to clarify the operation of the control panel, an entire manual is attached below.

3.10 Manual

3.10.1 Purpose of document

This basic design gives an overview of the basic functionality of the system.
It envelops the description of images, trending, alarm and event loggers, settings, and the available controls. This description does not cover the full description of the functionality of the different sequences. Settings, values, product names, or recipes in the included images in this document have dummy values, which give no indication of the real values unless explicitly stated otherwise.

3.10.2 Basic setup of the system

3.10.2.1 System architecture

The control system is based on the WinCC system of Siemens (certified software).

Main control of a system can be divided over several units
- HMI panels
  The HMI visualizes the information needed to preform local control.
- PLC
  The PLC will handle the actual control of the equipment based on the sequences.

Used communication protocols are
- Profinet
  This network is used to
  - Exchange data between the PLC & HMI Panels
  - Exchange data between the PLC & frequency drives

3.10.3 General info about the user interface

3.10.3.1 Layout of the main screen

Figure 20 - Layout main screen

The screen is divided into 3 areas (resolution is 1280 x 800 px)

- A The title bar
  The title bar contains:
  - The name of the current user
  - The name of the installation
  - Current date and time
  - The active system mode

- B The system menu button / Navigation menu button
- C The image area, this area will show the selected image or screen

3.10.4 Users and permissions

Some of the areas within the control system need a higher user level before you can access them.

The HMI system can use different security levels.
On each level, there can be different users with their passwords.

3.10.4.1 User levels

The system contains 5 different user levels

- Level 0
  This level is called the **Log off / No User** level.
  No operations are allowed.
- Level 1
  This level is called the **Operator** level.
  All operators work in this level.
- Level 2
  This level is called the **Supervisor** or **Process Configuration** level.
  Only certain process engineers have access to this level because it allows them to change specific process settings.
- Level 3
  This level is called the **Maintenance** level.
  This level allows the access to some specific functions intended for the maintenance department, like changing all process parameters and manual control of the equipment.
- Level 4
  This is the **administrator** level.
  Only J-Tec staff and developers have access to this level.

Predefined Users

User Name	Password	Level
-	-	0
Operator	********* (not shown in this document)	1
Maintenance	********* (not shown in this document)	3
Administrator	********* (not shown in this document)	4
Sysop	********* (not shown in this document)	4

Table 15 - Predefined users

If no one is logged on to the system the level is reduced to level 0.

3.10.4.2 Permissions for the different levels

Permissions

Level	0	1	2	3	4
Functionality		O	S	M	A
Activate orders, start/stop production, …		X	X	X	X
Normal operation of the system					
Enabling/disabling locations		X	X	X	X
Enabling/disabling the location so it can be used					
Alarm treatment (View and acknowledge alarms)		X	X	X	X
Normal operation of the system					
Maintenance mode			X	X	X
Manual operation of driven equipment					
Changing settings			X	X	X
Limits, timers …					
Changing the advanced settings that during normal operation never need to be changed.					
Changing password levels				X	
Add, change and remove users					

Table 16 - Permission of different levels

All functionality and actions that can be taken by the levels 1 up to level 4 are discussed in this manual. For the functionality dedicated to level 5, we would like to refer to the HMI manuals written by Siemens.

3.10.4.3 Log on as a different user

If you want to perform certain actions on the HMI screen and no user is active or the current user does not gain access, a log-in pop-up will appear.

Figure 21 - Log on screen

When selecting an input text area, a keyboard will appear to enter the data.

3.10.5 Basics concerning colors and animations

These are general conventions; not all mentioned situations may be used in this project.

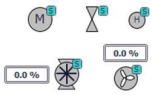
Motors	
	Motor is not running (grey)
	Motor is running, with feedback (green)
	Motor is in alarm
	***Fans, screws, blenders, switches and rotary valves use the same representation symbolism.**

Table 17 - HMI: Motors

Values	(numeric or string)
000.00 %	Changeable input settings are visualized with this colour combination.
0000 mBar	Unchangeable output settings are visualized with this colour combination.

Table 18 - HMI: Values

Tag numbers	
	Each object has a tag number for recognition; this tag number refers to the P&ID (No tag numbers are visualized on the overview, only on the manual screen).

Table 19 - HMI: Tag numbers

3.10.6 Alarm handling and event logging

3.10.6.1 General philosophy

If you want to perform certain actions on the HMI screen and no user is active or the current user does not gain access, a log-in pop-up will appear.

Figure 22 - Alarm pop-up window

Acknowledgment of an alarm has the only purpose to indicate that the operator has seen the alarm. A separate reset command is necessary to release the alarm situation in the system, this is only possible when the alarm condition is no longer active in the system.

	Acknowledge all alarms on the screen
	Reset all alarms on the screen

Table 20 - Alarm buttons

NOTE:
All alarms should first be acknowledged before the reset

3.10.6.1.1 Alarms

Figure 23 - Alarm buttons

Once a module has an alarm, it can be acknowledged through the “ACK-button” and reset by using the “RESET-button”. However, remember that a reset will only be performed when the module's alarms are eliminated.
Acknowledging an alarm can also be done within an alarm screen. The overview screen also has a general reset button that will reset the alarms that are present.

- A: Acknowledge button
- B: Reset button

3.10.6.2 Alarm screen

An alarm screen is provided in the general navigation of the HMI touch panel. Here one can find an overview of all active and known alarms that are active in the installation. At the bottom right of the screen, a button is provided to indicate that the alarms have been viewed.
If a new alarm occurs, it will be displayed by means of a pop-up screen. Only the active alarms can be seen here. This screen is easy to close by clicking on the cross at the top right.

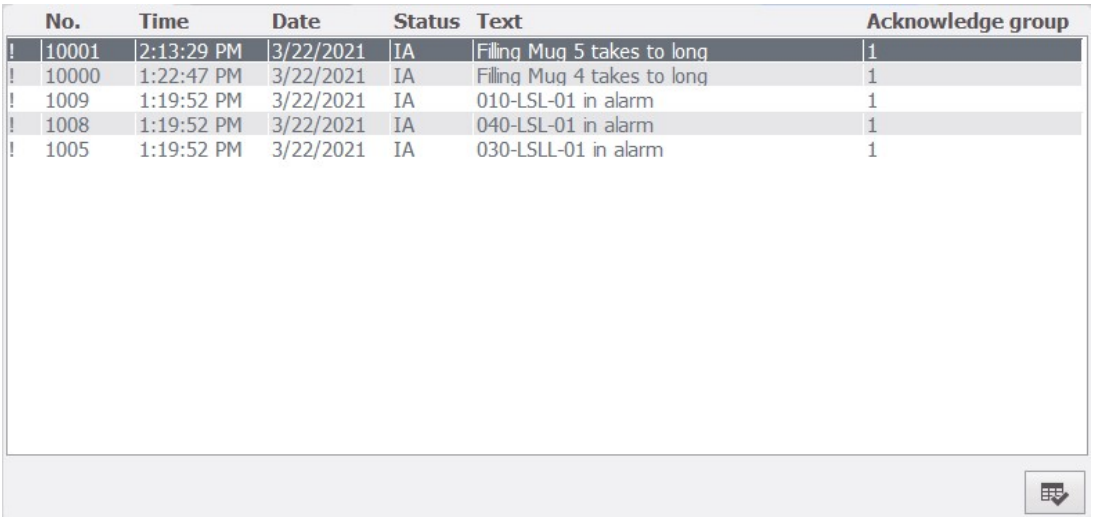


Figure 24 - Alarm screen layout

NOTE:
The above alarms do not add any value to the installation, but are only intended as examples.

Each alarm is shown with several data:

- No. Unique alarm number
- Time Time
- Date Date
- Status Status of the alarm
  - I = Incoming alarm
  - A = Acknowledged
  - O = Outgoing alarm
- Message text Description of the alarm
- Acknowledge group Not always applicable

If one or more alarms are active, viewed or not, this will also be displayed additionally by means of an alarm icon in the top right-hand corner. This will also show how many alarms are still active.
If the alarm conditions are no longer active, one still has to acknowledge and reset the alarms before the installation can be operated again.

3.10.7 HMI-screens

3.10.7.1 Home Screen

The screen below is the start screen of the installation and will therefore also be shown automatically at start-up.

Figure 25 - HMI: Home screen

Nothing can be operated on this screen. Here you can see some information about J-Tec. At the bottom of this screen, one can already see the navigation keys that can be applied by using the underlying shortcut keys.

The different screens that can be navigated between are:
- Start screen
- Process screen
- Manual screen
- Conditions screen
- Alarms
- Settings
- Different jobs

The mode in which this installation is switched on is always shown at the top of the screen, together with the project name of this installation, the current time and date, the name of the screen is being displayed and the user currently logged on.

3.10.7.2 Process screen

On this screen, the current state of the installation is visualised. This is done by means of a simple representation of the process, together with the current values of the implemented analog measurements.
Above this representation is the general state of the different conditions that apply in the system, namely, the start, stop, and trip conditions. If all conditions of each category are fulfilled, this will be indicated by a "V-mark".

At the top of the screen, the control buttons are provided. With these, the whole sequence can be started, stopped, and reset if necessary. Under this control, part one sees an IO-field, where the actual state of the sequence is presented.

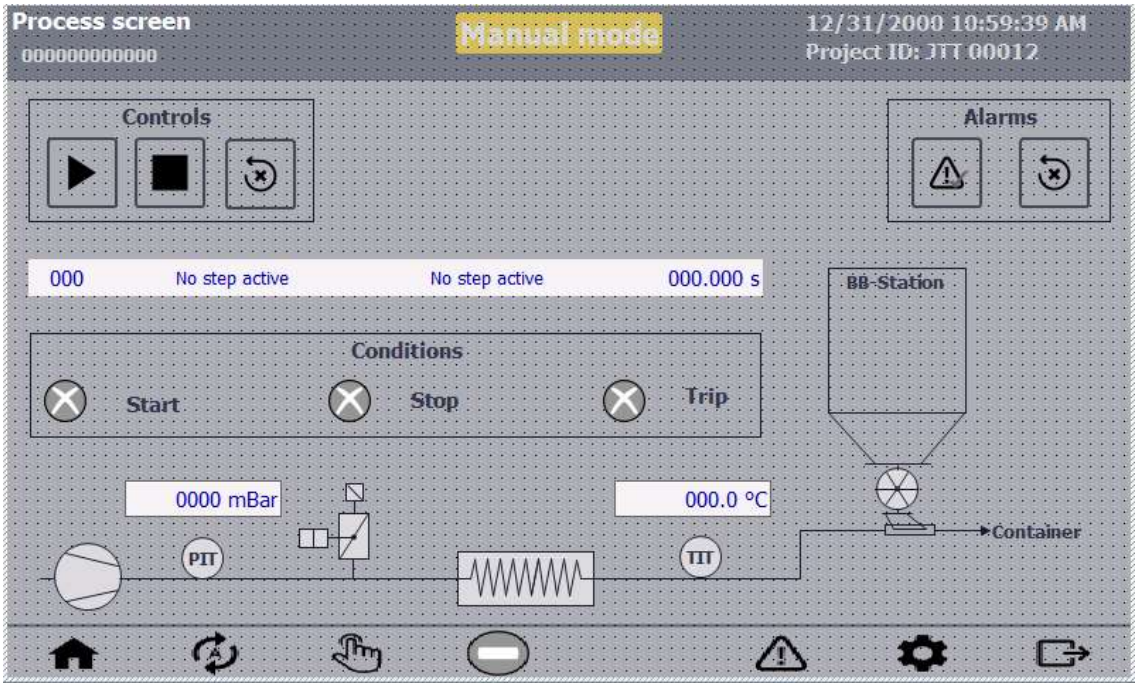


Figure 26 - HMI: Process screen

This is done in the first place by means of the step at which one currently is, followed by the status of the machine. The machine statuses that can occur are:
- Tripped
- Idle
- Running
- Stopped
- Starting
- Stopping

Furthermore, there is also a field in the top right corner with the alarm controls. With these buttons, active alarms can be acknowledged and reset if the alarm condition is no longer active.

3.10.8.2.1 Sequence control

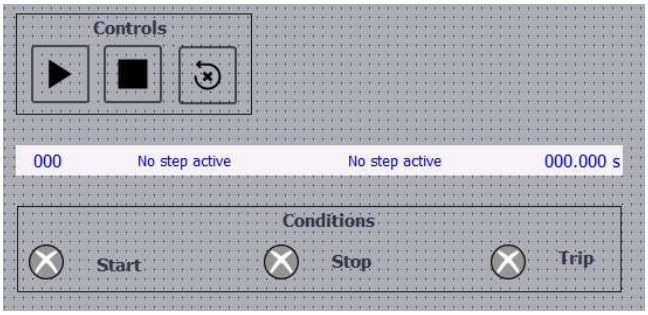


Figure 28 - Automatic mode controls

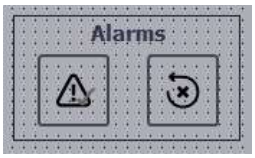


Figure 27 - Alarm controls

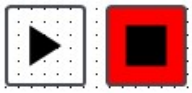
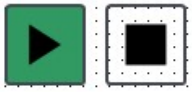
	Sequence stopped, press start to start the sequence (if all conditions are OK)
	Sequence started, press stop to stop the sequence
 All conditions OK	Conditions icon, conditions are ok to start It is possible to open the conditions screen (start, stop and trip) for the sequence by pressing the 4th shortcut button
 Conditions not OK	Conditions icon, conditions are not ok to start It is possible to open the conditions screen (start, stop and trip) for the sequence by pressing the 4th shortcut button
	Acknowledge all alarms for the corresponding sequence
	Reset all alarms for the corresponding sequence
	Settings button This opens the settings for this sequence.
	Active step number
	Active step description

Table 21 - HMI: Sequence control icons

Starting the installation sequence

If you want to use the sequence, you must first check whether the installation is in automatic mode. This can be seen at any time at the top of the screen.
If the automatic mode is enabled, the installation can be started, depending on the state of the installation. If the installation has just been started up, it will be in "Idle" mode. In this case, it is necessary to ensure that the starting conditions are met and then you can start the installation by simply pressing the start button.

In case the system has been active for some time, it might be in the tripped state. If this is the case, you should first check whether any alarms are still active, eliminate them and reset the alarms. Then the whole installation can be reset. The installation will switch from the tripped state to the idle state and you can start the installation if all conditions are met.

Stopping the installation sequence

If you want to stop the installation before a mode of transport is active, the installation will stop immediately and return to Idle state. This also happens if a stop condition is activated before the transport.

When a stop condition or command comes on while the transport is already active, the installation will first make sure that no more product is transported, and that the pipeline is, therefore, empty, before it will stop. If the installation is stopped in this way, the blower and cooler will remain active for 5 minutes, waiting for a new transport request. This is to prevent the installation from being switched on and off many times over a short period.

After stopping a transport, the reset button must always be pressed before a new transport can take place.
If the installation is stopped using an active stop condition, an alarm will always be generated. This alarm must be cleared and the alarms reset before the entire installation can be reset.

Tripped installation

If a trip condition is triggered at any time, the system will stop immediately and switch off its components. An associated alarm is triggered and must be cleared. The installation will not be operable until all alarm conditions have been removed and the alarm notification has been acknowledged and reset.

3.10.7.3 Manual screen

By pressing the 3rd hotkey, you can navigate to the manual screen. On this screen, mainly the manual operation of the installation is provided with accompanying visualisation.

This screen is also the place where you must activate the automatic mode, but this does not require higher rights. If you enable automatic mode while you are still operating components manually, they will all be disabled and the buttons to start them will disappear.

This manual operation is intended for maintenance and can under no circumstances be used during normal production. To use this manual mode, the user needs the corresponding access.

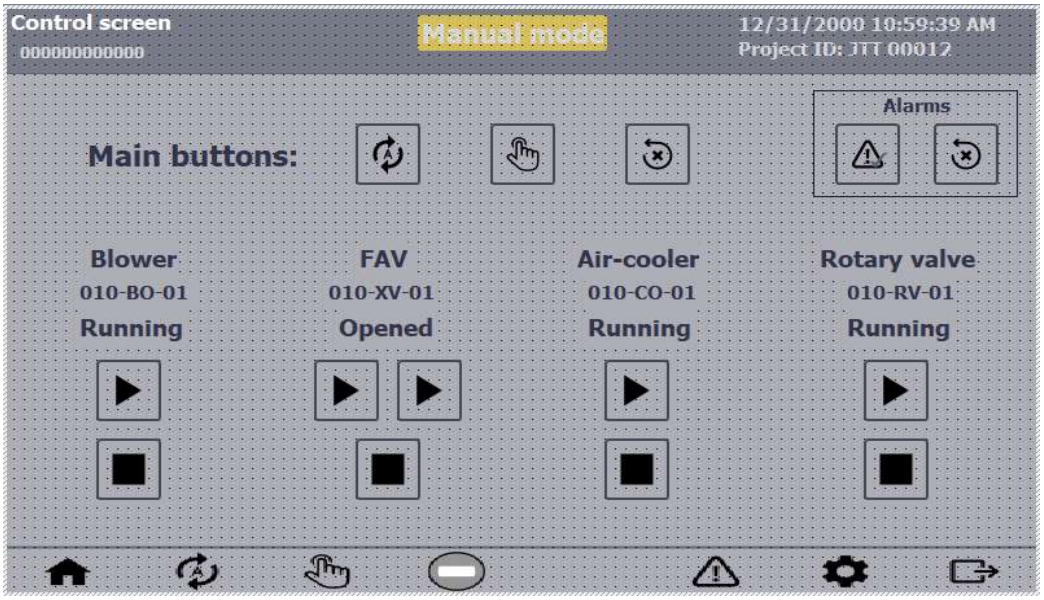


Figure 29 - HMI: Control screen

If an alarm occurs, a pop-up will be shown. This shows the different active alarms. To deactivate these, one first has to clear the alarm condition. Then one has to press the alarm to acknowledge and reset the button and reset the whole installation. These buttons are at the top right of the screen. After this, you can continue to operate the system manually.

Each component has its own start and stops button(s), but these are only available in the manual mode is enabled first. To enable this mode, the correct user data is required. The user must have administrator or maintenance rights. This is to prevent an unauthorised person from operating the components in an uncontrolled manner.
If you operate a component, the visualisation is carried out by means of the text below with a green background. This visualisation is only visible when the component is active.

Attention: When the equipment is switched in manual mode, all automatic controls are disregarded

It is the operator's express task and responsibility to monitor the consequences of switching the object to manual mode.

3.10.8.3.1 Manual control

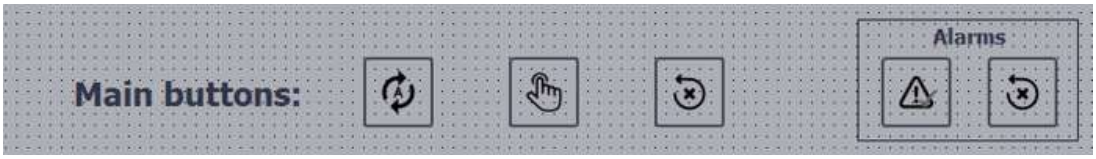


Figure 30 - Manual control buttons

	Press to activate automatic mode
	Press to activate manual mode, user authorization required
	Press to reset entire installation
	Acknowledge all alarms for the corresponding equipment's
	Reset all alarms for the corresponding equipment's
	Press to start component
	Press to stop component
	Settings button This opens the settings for this system.

Table 22 - Manual control icons

3.10.7.4 Condition screen

The 4th screen to navigate to is a screen with an overview of all the different start, stop and trip conditions of the installation. These are simply visualised in the same way as on the process screen. If a condition is fulfilled, this will be indicated by a “V-mark”.

Figure 31 - HMI: Conditions screen

All conditions should have a “V-mark” to be able to start the installation.

3.10.7.5 Alarm screen

See chapter 3.10.7.2: “Alarm handling and event logging”.

3.10.7.6 Setting screen

By using the settings button, you can access the screen where you can enter process settings. This screen shows the current value of both process data, with the possibility of entering the necessary limits for these signals.

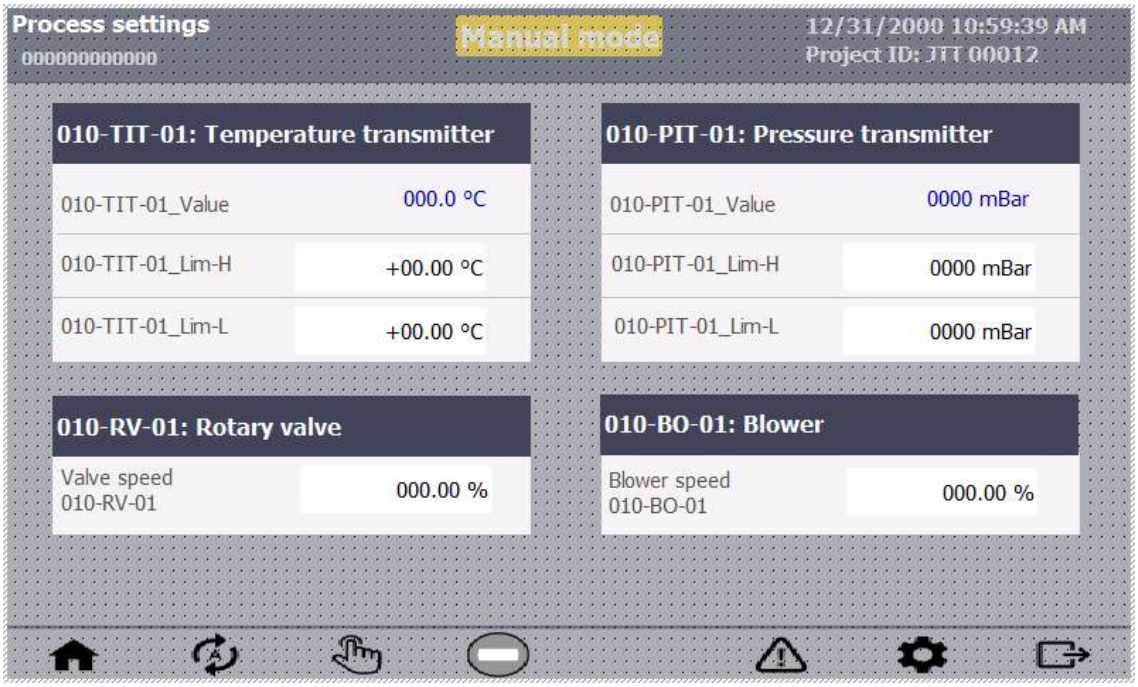


Figure 32 - HMI: Settings screen

Furthermore, the speed of the motors, equipped with frequency control, can be entered here. All these settings are immediately applied in the system, regardless of the mode of operation.

3.10.7.7 Different jobs

The last screen available is the 'different jobs' screen. In this screen, some general buttons are provided.
For example, one can log off the user here, or exit the full runtime of the HMI.

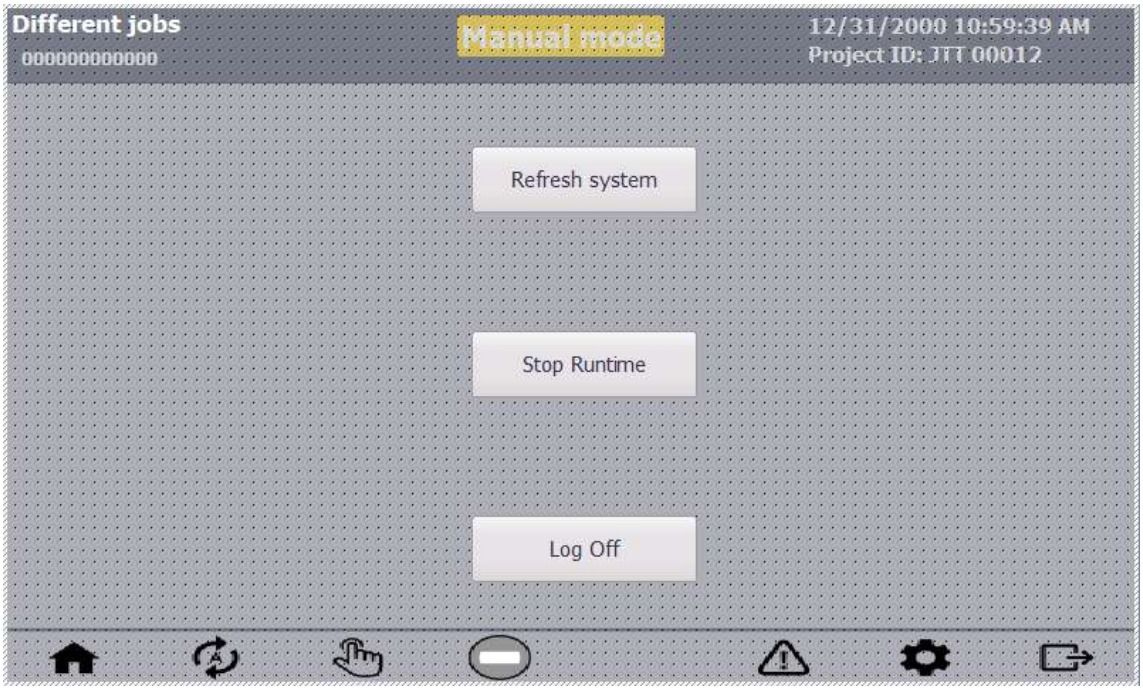


Figure 33 - HMI: Different jobs

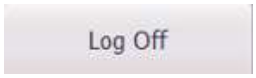
	Press to refresh system, needed after voltage drop
	Press to exit runtime
	Press to log off user

Table 23 - Different jobs buttons

Another button that may be important is the system refresh button. This allows the PLC to be reinitialised. This can be useful if you want to simulate some of the system's components or similar.

4 Functional test report

4.1 Functional test without product (Dry testing)

4.1.1 Objective

The objective of this functional test is to check all PLC sequences and the installation without product. Therefore, the complete installation will be split up and tested part by part. Also some utilities will be tested and adjusted in such a way that the installation is ready to start testing with product.

4.1.2 Utilities

- Electricity was provided at the test area.
- Problems while making the network connection with the frequency drives:
  - ➔ IP-assignment due putting par. 12-03 to DCP.
  - ➔ Fieldbus fault (W34): changing par. 8-02 from 'Control-source' to 'option A'
  - ➔ Drive warning (A68): "Safe stop" – reset drive manually
- Free air valve did not work, send back to manufacturer
- Problems controlling frequency drive:
  - ➔ Bit swap in byte swap control word drive – new control FB made
  - ➔ Changed from PPO 6 to PPO 4
  - ➔ Par. Speed reference: "option A"

4.1.3 Sequences

Main operation worked.
Wrong alarm addresses due byte swap.
Changed motor control from "STAT.req_on1" to "CNTR_Auto_req_on1"

4.2 Test results

4.2.1 Pneumatic transport

4.2.1.1 General

Nr	Date	Test	Initials testers
1	12/05/'21	Dry test	J.V.B.
2	12/05/'21	Performance test	J.V.B.
3	04/06/'21	Dry test	J.V.B.

Table 24 - Test results: General

4.2.1.2 Results

Nr	Date	Test	Value
1	12/05/'21	Dry test	Nok
2	12/05/'21	Performance test	Ok
3	04/06/'21	Dry test	Ok

Table 25 - Test results: Results

4.2.1.3 Parameters

Nr	Date	Parameter	Value
1	12/05/'21	Alarms	All ok but FAV
1	12/05/'21	Inputs	All ok but FAV
1	12/05/'21	outputs	All ok but FAV
1	12/05/'21	Sequence	Ok
3	04/06/'21	Alarms	Ok
3	04/06/'21	Inputs	Ok
3	04/06/'21	outputs	Ok

Table 26 - Test results: Parameters

5 Maintenance

However, the company has a team of mechanical specialists. For this project, this means that they draw up the maintenance plan and so on. Nevertheless, I wanted to think about what I would consider necessary as maintenance for the project I have developed. Of course, there will be maintenance aspects that I have not thought of.
In my opinion, predictive maintenance is the best choice. Below is a list of the maintenance choices I have made.

5.1 Preventive mechanical maintenance

- Constant attention to irregularities
  ➔ Many faults can be easily detected if the installation is operated correctly

- Monthly check with an ultrasonic meter
  ➔ Cost free costless, good method for condition detection and leakage detection, especially for air transport

- Monthly check of the rotary valve and if necessary cleaning and maintenance
  ➔ When dismantling the rotary valve, check the gaskets and lubrication and replace them if necessary

- For engines, this is done based on running the hours counter
  ➔ Alarm will be generated when exceeding running hours

5.2 Preventive electrical maintenance

- Quarterly check for alarms and protections
  ➔ Manual control alarm generating

- Annual check on wiring and connections
  ➔ Detecting bad connections due to vibrations

- Annual check on the operation of electrical components
  ➔ Fault or leakage currents in the control cabinet

- Annual control of cooling components
  ➔ Components may develop more heat as usage time increases

6 Resolution

I started the project by drawing up a plan of requirements. Throughout the entire period, this has been my reference point for knowing what I had to work towards. It has also been my biggest pillar of support to fall back on when I didn't know what to do or the like. This combined with the process description has helped to achieve the finished result.

However, a bachelor thesis is obviously not prepared without some challenges. For example, the design of the electrical diagrams was drawn up in a different way than had already been learned. Nevertheless, with the knowledge already acquired about electrical installations and the like, it did not take too much time to get the hang of this method.

The standard that is used for programming in Siemens TIA Portal, on the other hand, was a different story. Programming in the "SCL" programming language was already relatively new to me, as this is not the programming language that is focused on during the automation lessons. However, I have learned to understand how it works with the necessary explanation, help, and especially spending time in the standard programming and testing the results of the programming.

After the necessary checks and feedback on the programming of the installation, FATs were also carried out. These are tests that are carried out on the installation as a final check before it is transported to the customer. This means that all components are tested separately, as well as the components together as to how they would function in the system.
The operation and testing of such a large installation were new to me, but also very impressive and, above all, instructive. Problems always arise that cannot be foreseen in advance or learned at school.

To put it bluntly, I found it a very instructive process, in which I learned, above all, what the shop floor is like in reality. Considering the current situation everyone is in, I also found it a very good exercise to have to do this kind of work regularly from home. This seems to be good preparation for a further career after graduation.

7 Acknowledgments

After four years of toil and sweat, graduation is almost here. With this thesis, I am trying to bring it to a successful end. The past few months have been particularly difficult and it would be impossible to complete it without the necessary help of third parties.

First of all, I would like to thank my internship and company supervisors, G. Van Grieken and R. Moorthamer. Despite the busy period that they themselves experienced, they were always there for me when I had a question. They also, perhaps unconsciously, provided the necessary motivation to continue this period to a successful ending.

I would also like to thank my colleagues from J-Tec. They ensured pleasant cooperation and were always ready to help when needed. As a result, I am concluding this period with a good feeling and will certainly come back to J-Tec in the future.

Finally, I would like to take a moment to thank my family and friends. They have always continued to support and motivate me to finish this last period as well as possible. During a project of this magnitude, it is nice to be able to discuss other matters after hours.

8 Illustration list

9 Table list

10 Bibliography

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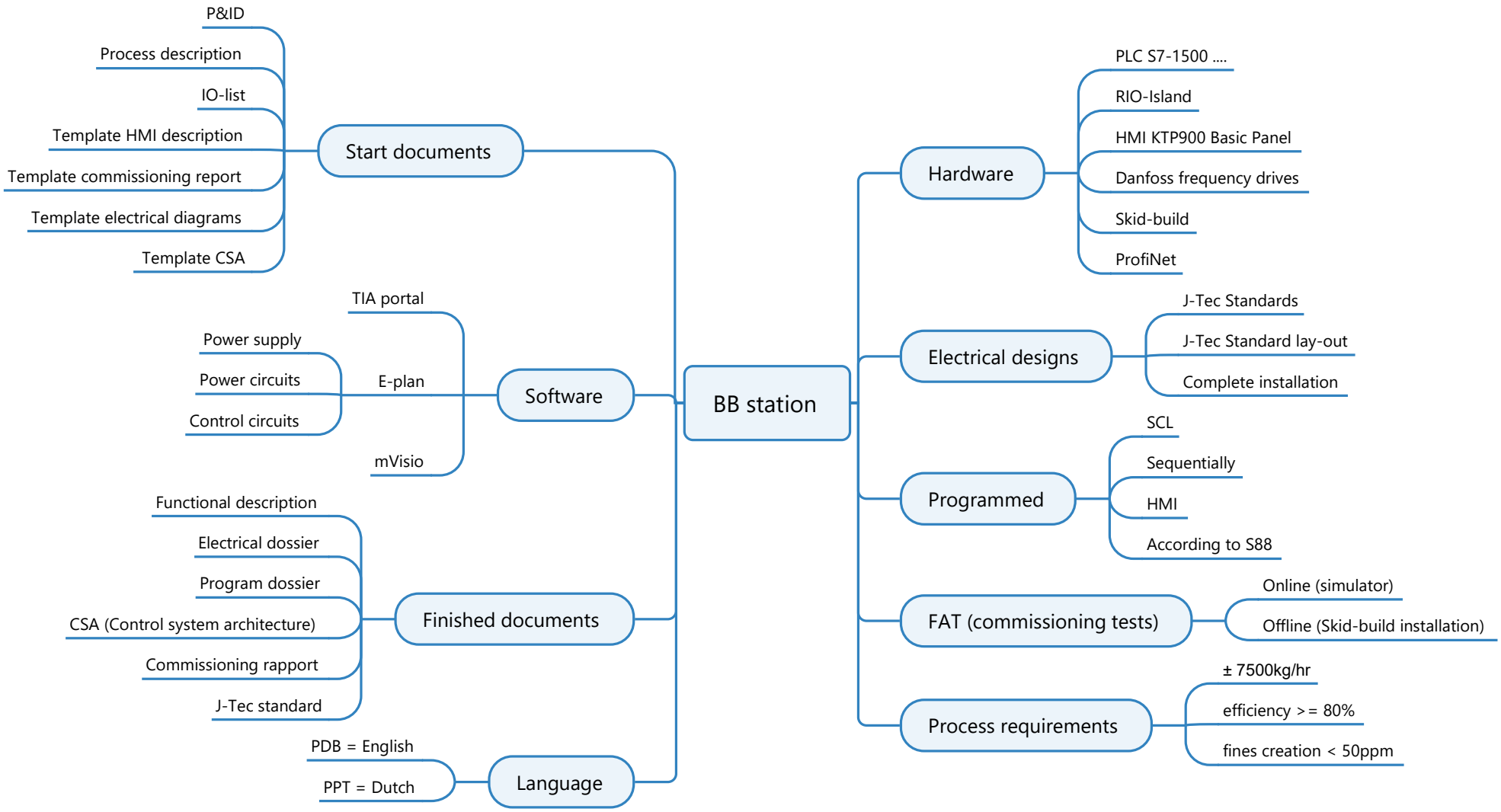
11 Annex


BB station
Start documents
P&ID
Process description
IO-list
Template HMI description
Template commissioning report
Template electrical diagrams
Template CSA
Software
TIA portal
E-plan
mVisio
Power supply
Power circuits
Control circuits
Finished documents
Functional description
Electrical dossier
Program dossier
CSA (Control system architecture)
Commissioning rapport
J-Tec standard
Language
PDB = English
PPT = Dutch
Hardware
PLC S7-1500 ....
RIO-Island
HMI KTP900 Basic Panel
Danfoss frequency drives
Skid-build
ProfiNet
Electrical designs
J-Tec Standards
J-Tec Standard lay-out
Complete installation
Programmed
SCL
Sequentially
HMI
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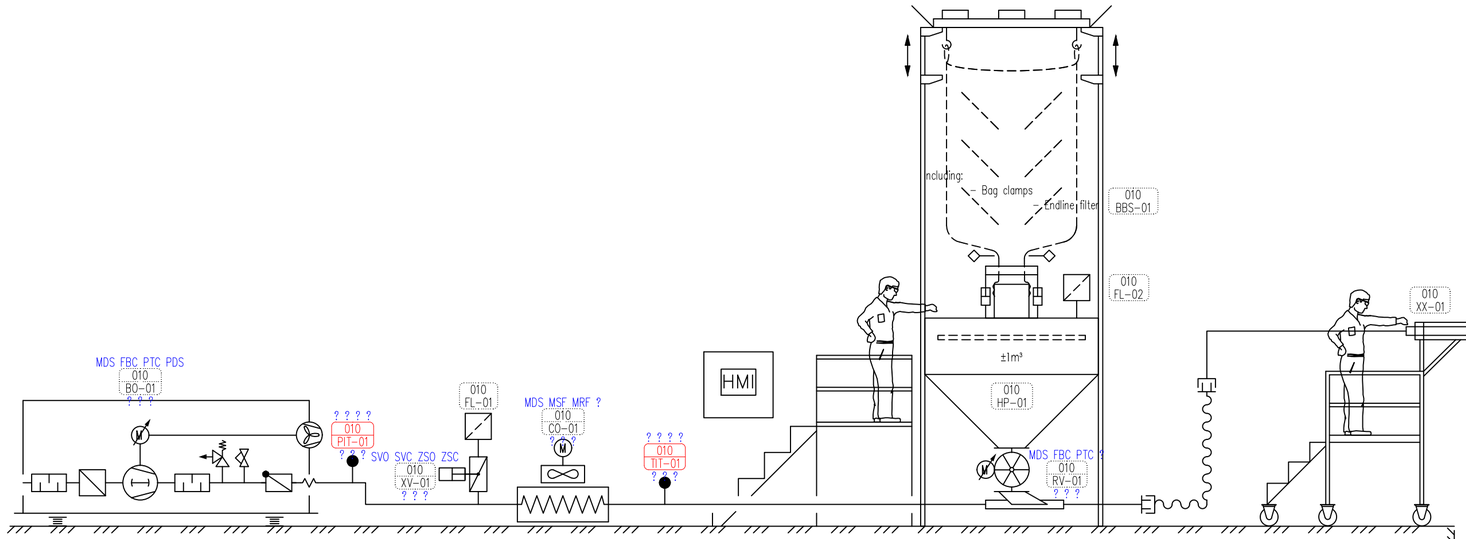
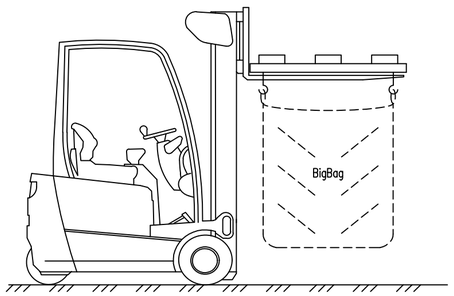
efficiency >= 80%
fines creation < 50ppm





Project Nr :	0012	Client : JG SUMMIT PETROCHEMICAL CORPORATION
Format :	A3	Description : BigBag to Sea Container Loading System . . .
		Drawing : 0012–001
		Minor Revision : 3

Jongerius Technology nv
L. Gevaertstraat 11
B–2950 Kapellen (Belgium)
Tel.: +32 (0)3.660.51.11
Fax: +32(0)3.660.51.10
http://www.j-tec.com
E-mail : info@j-tec.com
J-TEC MATERIAL HANDLING

Rev	Date	Notes	Name	Status
0	12/11/2020	Created	DRO	In Progress

Line Status	MCL Rev.	P&ID	TAG	size P&ID	Component	JGS Tag Numbers	Basic	Description/function	Brand	Type
C	0.3	0012-001	010-BO-01		J_TEC_Blower	K-8901 KM-8901 (separate tag for blower motor)	→	Blower	Aerzen	GM25SG5IH
C	0.3	0012-001	010-CO-01		Air Cooled Exchanger	E-8902 EM-8902 (separate tag for exchanger motor)	→	Air-Air Cooler	Aerzen	AER300
C	0.3	0012-001	010-XV-01		Butterfly Valve-Piston	HV-8903	→	Electrical Actuator Butterfly valve DN1(	Sodeco	Electrical Actuator
C	0.3	0012-001	010-FL-01		EndLineFilter	Y-8903	→	Mann Filter	J-Tec Service	

Line Status	MCL Rev.	P&ID	TAG	size P&ID	Component	JGS Tag Numbers	Basic	Description/function	Brand	Type
C	0.3	0012-001	010-PIT-01		Electrical Instrument	PIT-8901-1	→	Pressure indicator and transmitter	IFM	PN3097+EVC811
C	0.3	0012-001	010-TIT-01		Electrical Instrument	TIT-8902-1	→	Temperature indicator and transmitter	IFM	TD2511+EVT004 Connecting cable
D	0.1	0012-001	010-RV-01		Rotary Valve	S-8903 SM-8903 (separate tag for rotary feeder motor)	→	Drop Through Rotary Valve	Coperion	ZVB320
C	0.3	0012-001	010-XX-01		SuctionPipe		→	Loading Lance	J-Tec Service	SS304 with Vollenda Clamp.
C	0.3	0012-001	010-BBS-01		BBDischargingStatior	V-8904	→	Big Bag Unloading Station	J-Tec Service	Under verification. (Hoist or not)
C	0.3	0012-001	010-HP-01		Hopper	D-8905	→	Receiving Hopper	J-Tec Service	
C	0.3	0012-001	010-FL-02		EndLineFilter	Y-8905	→			
N	0.3	0012-001	010-RV-01		Rotary Valve Feeder					

MCL Rev.	P&ID	TAG	Capacity / size	Process connection	Ex Marking	Remarks Basic	Supplier	Supplier Name	ordered	Purchase order
0.3	0012-001	010-BO-01				Air flow: Calculated 339 m³/h (1778 rpm - 30 Hz); Max 815 m³/h (3555 rpm - 60 Hz) Discharge p: Calculated 400 mbar; Max 500 mbar Discharge T (40°C intake): Calculated 90 °C; Max 90 °C Sound pressure level approx. 70 dB(A) with acoustic hood for outdoor installation Material: EN-GJL-200 housing; C45N/C45N rotor; 16MnCr5 gears; RAL 6006 finish Drive: V-belt drive IP55 F class motor Safety pressure relief valve built-in (R3" - 1050 mbar setpoint) Intake filter / silencer (filter class G4) Motor executed with Tropicalized painting and anti-condensation heating Incl: Pressure gauge; Service indicator for filter				
0.3	0012-001	010-CO-01	365 kg/h			* Aluminium cooler block * AC motor: 230/400 V (+/-5%) and 1,1 kW at 50 Hz/1000 RPM * motor bracket * fan incl. box, protective screen - connections: * cooler unit intake: DN 100, PN 16 * cooler unit discharge: DN 100, PN 16 pressure loss: < 50 mbar See attached datasheet for more technical data.				
0.3	0012-001	010-XV-01	DN100			Wafer type butterfly valve Body in nodular iron GGG-50 Disc in stainless steel AISI 316 (machined) Seat in white EPDM Max. working pressure: 3 bar Face to face: ISO 5752 Connection: flange PN 10, PN 16 and ANSI 150 ISO mounting flange for direct mount With electric actuator - 24 VDC - type ESL (DN 32 to DN 80), type ENL (DN 100 to DN 300)				
0.3	0012-001	010-FL-01	DN100			Polyester needlefelt with PTFE membrane				

MCL Rev.	P&ID	TAG	Capacity / size	Process connection	Ex Marking	Remarks Basic	Supplier	Supplier Name	ordered	Purchase order
0.3	0012-001	010-PIT-01	Threaded Female G 1/4" G 1/4" to Male G 1/2" adapter (E30000)			Electronic pressure sensor; 0...1 bar; 0...1000 mbar; 0...14.5 psi; 0...29.5 inhg; 0...100 kpa; G 1/4 internal thread; switching signal; analogue signal; IO-Link; (configurable); 4...20 mA; 0...10 V; Connector; -25...80 °C; IP 65; IP 67;				
0.3	0012-001	010-TIT-01	Threaded male G 1/2"			Temperature transmitter; 1 x Pt 1000; (to DIN EN 60751, class A); analogue signal; IO-Link; (configurable); Installation length EL 50 mm; Measuring range -50...150 °C / -58...302 °F; Factory setting -10...150 °C; Pressure rating 160 bar; G 1/2 sealing cone; M12				
0.1	0012-001	010-RV-01	14,500 kg/h at 32,5 rpm			Material: SS 316 housing; Cast Aluminium hard shield; SS 321 rotor; Capacity: 19 l/rev (100% filling efficiency) Rotor: 10 blades; fixed execution with end plates (Closed Rotor) Drive: Direct drive IP55 F class motor; 15-18 rpm rotor speed (calc/max) Execution: MZC = Easy rotor dismounting with guide rails; T-bolt sensor External maintenance free bearings; Deaereation holes on housing; Cover air purge				
0.3	0012-001	010-XX-01				Unloading the pallet to the sea container sit on the adjustable filling car. Stainless Steel 304 SCH10S Diameter: 4 inches				
0.3	0012-001	010-BBS-01				Including: - Bag clamps - Endline filter				
0.3	0012-001	010-HP-01	±1m³			Pallet Receiving Hopper				
0.3	0012-001	010-FL-02				Hopper Filter				
0.3	0012-001	010-RV-01								

MCL Rev.	P&ID	TAG	Serial nr	Electrical	Voltage	Power [kW]	Current [A]	motor [Yes/No]	Powered by	Speed [RPM]	PTC [Yes/No]	Safety function [Yes/No]	freq. Drive [Yes/No]	Brake unit required [Yes/No]	Barrier required [Yes/No]	Remarks Electrical
0.3	0012-001	010-BO-01		→	3x 480V	18.5 kW		Yes			Yes		No	No		
0.3	0012-001	010-CO-01		→	230/400 V	1,1 kW		Yes					No	No		
0.3	0012-001	010-XV-01		→	24 VDC								No	No		
0.3	0012-001	010-FL-01		→									No	No		

MCL Rev.	P&ID	TAG	Serial nr	Electrical	Voltage	Power [kW]	Current [A]	motor [Yes/No]	Powered by	Speed [RPM]	PTC [Yes/No]	Safety function [Yes/No]	freq. Drive [Yes/No]	Brake unit required [Yes/No]	Barrier required [Yes/No]	Remarks Electrical
0.3	0012-001	010-PIT-01		→									No	No		
0.3	0012-001	010-TIT-01		→									No	No		
0.1	0012-001	010-RV-01		→	3x 480V	1,1 kW		Yes			Yes		No	No		
0.3	0012-001	010-XX-01		→									No	No		
0.3	0012-001	010-BBS-01		→				Yes					No	No		
0.3	0012-001	010-HP-01		→									No	No		
0.3	0012-001	010-FL-02		→									No	No		
0.3	0012-001	010-RV-01		→				Yes					No	No		

MCL Rev.	P&ID	TAG	TAG Addition	ES1	ES2	ES3	ES4	ES5	ES6	ES7	Doc	Misc.	cmp air	Remarks General
0.3	0012-001	010-BO-01	→	MDS	FBC	PTC	PDS							
0.3	0012-001	010-CO-01	→	MDS	MSF	MRF								
0.3	0012-001	010-XV-01	→	SVO	SVC	ZSO	ZSC							
0.3	0012-001	010-FL-01												

MCL Rev.	P&ID	TAG	TAG Addition	ES1	ES2	ES3	ES4	ES5	ES6	ES7	Doc	Misc.	cmp air	Remarks General
0.3	0012-001	010-PIT-01												
0.3	0012-001	010-TIT-01												
0.1	0012-001	010-RV-01	→	MDS	FBC	PTC								
0.3	0012-001	010-XX-01												
0.3	0012-001	010-BBS-01												
0.3	0012-001	010-HP-01												
0.3	0012-001	010-FL-02												
0.3	0012-001	010-RV-01	→	MDS	FBC	PTC								

Component	TAG	Description	Type N°	Article N°	Brand	Quantity	Price € (P.P.)
Electronics							
Main switch	010S1	Main power switch - 63A / 480V	P3-63/EA/SVB	31607	Eaton	1	122.17
Transformer 1	010T4	Transformer 480V AC / 230V AC - 630VA - Back plate mounted	ABL6TS63U	608-6533	Schneider Electric	1	233.48
Fuse 1	010F4	Tube fuse NFC 8.5 x 31.5 mm tubular - aM 2 A - without pilot light	TeSys DF, LS1/GK1	DF2BA0200	Schneider Electric	2	3.18
Fuse 2	010F4.1	Tube fuse NFC 8.5 x 31.5 mm tubular - gG 2 A - without pilot light	TeSys DF, LS1/GK1	DF2BN0200	Schneider Electric	1	3.18
Circuit breaker	010Q7	Fault current circiut breaker - 2poles - 230V AC	A9F89206 & A9Q21225	A9F89206 & A9Q21225	Schneider Electric	1	212.41
Fuse holder 1	010F4	1P+N fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15645	Schneider Electric	1	24.32
Fuse holder 2	010F4.1	1P fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15635	Schneider Electric	2	21.99
Cabinet Lamps	010H7	Cabinet lamps - 9,8 W	PLD E 608 W 315/B	2702227	PHOENIX CONTACT	1	193.88
Motor circuit breaker	011F1	Motor circuit breaker, 3P, 0.16-0.25 A, screw clamp terminals	TeSys GV2	GV2ME02	Schneider Electric	1	49.99
Motor circuit breaker feedback module	multiple	TeSys Auxiliary Contact - 1NO/1NC, 2 Contact, Side Mount, 6 A	GVAN11	395-0122	Schneider Electric	2	13.90
Motor fan	011M1	Panel ventilation		SK.3244140 & SK.3243200	Rittal	1	393.08
Contactor 1	011K6	Panel vent. contactor - 3P(3 NO) - AC-3 - <= 440 V 9 A - 24 V DC coil	TeSys D	LC1D09BD	Schneider Electric	4	96.98
Enclosure thermostat	11U5	Enclosure thermostat	RIT.3110000	RIT.3110000	Rittal	1	36.07
Safety relay	025K3	PNOZ S1 C - 24V DC - 2n/o	PILZ.751101	PILZ.751101	Pilz	1	155.47
Fuse holder 3	040F1	3P fuse holder switch - 10A - fuse 8,5 x 31,5 mm	Acti 9 STI	A9N15655	Schneider Electric	1	24.32
Fuse 3	040F1	Tube fuse NFC 8.5 x 31.5 mm tubular - aM 4 A - without pilot light	TeSys DF, LS1/GK1	DF2BA0400	Schneider Electric	1	3.78
Converter 2	040T1	Converter 230V AC / 24V DC - 3 poles	2903154	2903154	PHOENIX CONTACT	1	223.00
Fuse switch 3	040F2	1 pole fuse switch 10A + fuse	5SG7611-0KK10 & 5SE2310	5SG7611-0KK10 & 5SE2310	Siemens	1	109.91
Fuse 4	040F3	500mA Glase fuse, Speed F	GSB	GSB1/2	Ferraz Shawmut	1	1.50
Fuse 5	040F4	2,5A Glass Fuse, Speed F	GSB	GSB2	Ferraz Shawmut	1	1.10
Fuse 6	040F5	1.6A Glass Fuse, Speed F	GSB	GSB1-6/10	Ferraz Shawmut	1	1.20
Fuse 7	040F6	6.3A Glass Fuse, Speed F	GSB	GSB6-3/10	Ferraz Shawmut	1	0.95
Fuses 8	040F7 - 040F8 - 041F2	1A Glass Fuse, Speed F	GSB	GSB1	Ferraz Shawmut	3	0.95
Fuse Switch 3	080F1	fuse switch disconnector, D01, 3-pole, In: 10 A, Un AC: 400 V	5SG7631-0KK10	5SG7631-0KK10	Siemens	1	125.00
Fuse 9	080F1	fuse 230V AC - 10A gG	5SE2310	5SE2310	Siemens	4	0.91
Motor protection switch 1	100F1	Motor protection switch - 2.5..4 A - 3P 3d - thermomagnetic	TeSys D	GV2ME08	Schneider Electric	1	76.77
Maintenace disconnect switch	multiple	Motor dip switch	INS40	28900	Schneider Electric	3	50.51
Fuse Switch 3	150Q1	Switch disconnector with Fuse, D02, 3-pole, In: 50 A, Un AC: 400 V	5SG7133-8BA50	5SG7133-8BA50	Siemens	1	83.46
Fuses 10	150Q1	3 pole fuse switch - 230V AC - 50A gG	5SE2350	5SE2350	Siemens	3	3.41
Fuse Switch 4	151Q1	fuse switch disconnector, D01, 3-pole, In: 16 A, Un AC: 400 V	5SG7631-0KK16	5SG7631-0KK16	Siemens	1	58.46
Fuses 11	151Q1	3 pole fuse switch - 230V AC - 16A gG	5SE2316	5SE2316	Siemens	3	2.81
Connector (male) power supply motor	151X1	Han 6HPR Hood Top Entry M25 Screw lock	19 40 006 1261	19 40 006 1261	HARTING	1	49.77
Connector (female) power supply motor	151X1	Han 6HPR base panel M25 Screw lock	19 40 006 0411	19 40 006 0411	HARTING	1	47.82
connector therm. Feedback (male)	151X2	connector therm. Feedback	154-8104	1424649	PHOENIX CONTACT	1	14.24
connector therm. Feedback (female)	151X2	connector therm. Feedback	154-8114	1424660	PHOENIX CONTACT	1	25.79
Emergency switch	025S3	Emergency switch - turn to unlock - 24V DC	XB5AS8445	XB5AS8445	Schneider Electric	1	40.90
Mechanical							
Switch board	EX001	Rittal AX, 1000x1400x400mm (BxHxD).	AX 1115.000	AX 1115.000	Rittal	1	659.00
Power rail	XV1	Distribution board CVT 125A 4 rows 15 connections 500VAC	110338	110338	SEP	1	24.20
Earth rail	PE	Rittal Earthing Rail Earthing Bar for use with TS IT Cabinet	7113000	826-2868	Rittal	1	40.66

Therm 6.7 Summary

Project: BP_BB-station
Company: J-Tec
Contact person: Robin Moorthamer
Originator: NN
Telephone / Fax: NN

Ambient parameters

Maximum temperature outside the enclosure Ta:	40 °C
Maximum temperature inside the enclosure Ti:	45 °C
Mains voltage: (including 230 V)	480 V
Frequency:	60 Hz

Enclosure element no. 1	AX 1115000
Width x Height x Depth	1000 x 1400 x 400 mm
Type of installation site	Single enclosure for wall mounting

Climate control calculation

Enclosure element no. 1	AX 1115000
Width x Height x Depth	1000 x 1400 x 400mm
k-factor of the enclosure	5,5
Type of installation site	Single enclosure for wall mounting

Average enclosure temperature without climate control:	79 °C
Climate control necessary	Yes
Cooling unit required	No
1 x Addition	750 W
Heat loss	750 W
Heat exchange across surface	97 W
Heat to be dissipated	**653 W**

Therm 6.7 Summary

Project: BP_BB-station
Company: J-Tec
Contact person: Robin Moorthamer
Originator: NN
Telephone / Fax: NN

Measures to maintain the temperature

	Wall-mounted units	Roof-mounted units
1. Fan-and-filter units	SK3140140 + SK3243200 (610 [m3/h]) Necessary air throughput: 444 [m3/h]	
2. Heat exchangers		
3. Cooling units		
4. Air/water heat exchangers		
5. Heaters		
6. Climate control doors		

Item groups 1-4 should be used alternatively

Accessories

Main item / accessories	Quantity	Accessory designation
3140140 / 3110000	1	Thermostat Enclosure internal thermostat

Rittal can not assume any liability for the calculation, dimensioning and selection.

Jongerius Technology NV

OUR PEOPLE MAKE THE DIFFERENCE
J-TEC MATERIAL HANDLING

Company / Costumor	
Projectdescription	BB-Station with refill sea-container
Projectnumber	JTT 00012
Assigned by	JGSP

Projectname	BP_BBstation
Projectleader	Robin Moorthamer
Last used EPLAN-version	2.9.4
Year of build	2021
Type	BB-Station with refill sea-container
Place of installation	Thailand
Power supply	3x480V AC - 60Hz
Power feed	480V AC
Control voltage	24V DC
Specific needs	

Made on 25/03/2021
Changed on 7/06/2021 Designer Jorden Van Bakel Aantal pagina's 32

002

Technical Data Booklet

Cabinet Label

J-Tec Material Handling Ltd.
9 Pangmuang Chapao 3-1 Road
Tambol Huaypong, Amphur
Muang, Rayong 21150 TH
Tel. +66 0 38643200

PROJECT NR.	JTT 00012
EQ. ITEM NUMBER	

CONSTR. YEAR	2021	Inom.	63 A
VOLTAGE	3x480V AC - 60Hz	Icu MAX.	2kA
BUILD BY	Eltes		

Technical Data Booklet

Cabinet Construction

Design Data

Voltage (tolerance)	480Vac ± 5%
Frequency	60 Hz
Net type	3x480Vac + PE (no Neutral)
ICC	2kA
Inom	63A
Protection	To protect upstream
Control voltage	24V DC

Design Standard

EN 60204.1 and EN 61439-2

Data Main Cabinet

Type	Rittal AX
Finish	Sheet steel powder coated RAL 7035
Degrees of protection	IP 55
Base/plinth type	/
Input/output of cables	Bottom
Surrounding temp.	>5°C / <40°C
Relative humidity	<60%
Altitude	<1000m
Transport & storage	Between -25°C and 55°C Max 70°C for 24 hours

Data RIO Cabinet

Type	/
Finish	/
Degrees of protection	IP /
Base/plinth type	/
Input/output of cables	/
Surrounding temp.	/
Relative humidity	/
Altitude	/
Transport & storage	Between -25°C and 55°C Max 70°C for 24 hours

Technical Data Booklet

Wiring Color

Description	Code letter	Color	Ø
Main power conductors	L1, L2, L3	BK	≥ 2,5mm²
Neutral conductors	N	BU	≥ 2,5mm²
Grounding conductor	PE	GN/YE	
Control circuit	230V AC	RD	≥ 1mm²
	N	RD	≥ 1mm²
	+24V DC	BU	≥ 1mm²
	0V DC	BU	≥ 1mm²
Analogue signals		WH	≥ 1mm²
External power/voltage		OG	≥ 1mm²

Color	Code
Blue	BU
Black	BK
Brown	BN
Grey	GY
Green	GN
Orange	OG
Pink	PK
Red	RD
Violet	VT
White	WH
Yellow	YE

Standard terminals

X00	Cabinet power supply
X01	Motors (DOL and star/delta)
X02	Motors (frequency drives)
X03	Field (230/400V AC)
X04	Field (24V)
X05	Emergency and safety cicuit
X06	Digital outputs (24V DC)
X07	Digital outputs (230V AC)
X08	Dry contacts (external voltage)
X09	Digital inputs (24V DC)
X10	Digital inputs (230V AC)
X11	Analog inputs
X12	Analog outputs
X15	Spare

Markings

Marking of wires

Code for wire marking	XX:YY XX: Component marking YY: Connection on component
Example	100K5:A1
Color	Black front on yellow background

Design Standard

Code for cable marking	XXWY XX: Page number Y: Counter 100W1 or 100W2
Example	Black front on yellow background
Color	

Marking of components

Code for component	XXXYZ
Marking	XXX: Page number Y: Identification letter (acc to IEC) Z: Page column
Example	100K5
Color	Black front on yellow background

Data RIO Cabinet

EN 60204.1 and EN 61439-2

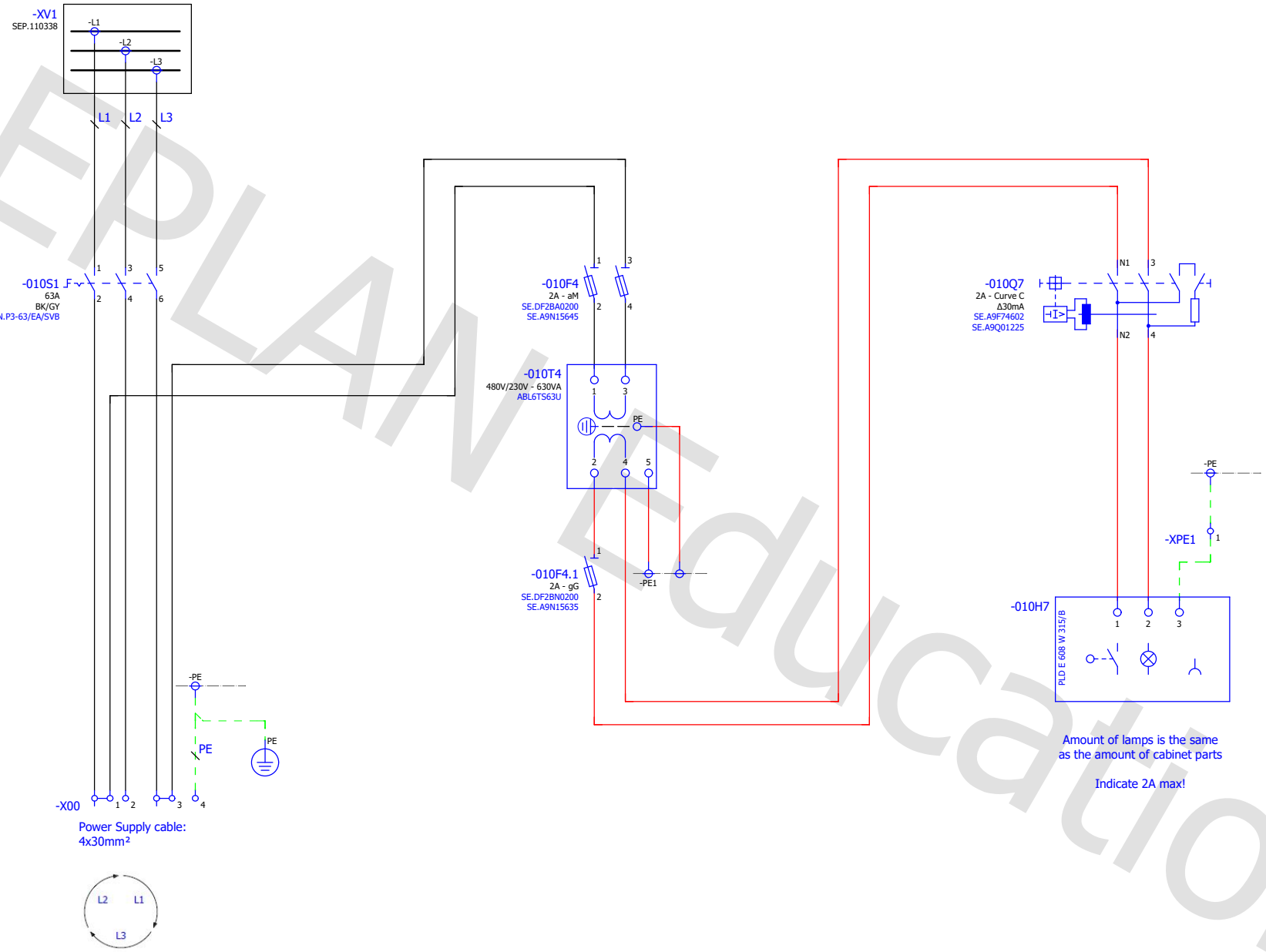
Inhoudsopgave

F06_002

Groep	Inbouwplaats	Pagina	Paginabeschrijving	Extra paginaveld	Datum	Bewerker
		001	Title page / cover sheet		23/04/2021	jorde
		002			23/04/2021	jorde
		002.b	Technical Data Booklet: Cabinet Construction		25/03/2021	jorde
		002.c	Technical Data Booklet: Wiring Standard		25/03/2021	jorde
		002.d	Technical Data Booklet: Markings		25/03/2021	jorde
		005	Table of contents : /001 - /1002		20/05/2021	jorde
		005.a	Table of contents : /1003 - /1006		20/05/2021	jorde
		010	Cabinet Supply		20/05/2021	jorde
		011	Cabinet Supply		20/05/2021	jorde
		025	Emergency stop & safety		20/05/2021	jorde
		040	Distribution 24VDC		20/05/2021	jorde
		041	Distribution 24VDC		20/05/2021	jorde
		080	Distribution 400V AC		20/05/2021	jorde
		100	Motors 010-CO-01		20/05/2021	jorde
		150	Motors VFD		20/05/2021	jorde
		151	Motors VFD		20/05/2021	jorde
		250	Configuration PLC		20/05/2021	jorde
		280	Configuration HMI		20/05/2021	jorde
		300	Field equipment		26/04/2021	jorde
		301	Field equipment		26/04/2021	jorde
		302	Field equipment		26/04/2021	jorde
		303	Field equipment		26/04/2021	jorde
		304	Field equipment		20/05/2021	jorde
		305	Field equipment		23/04/2021	jorde
		306	Field equipment		20/05/2021	jorde
		1000	Cable Diagram		26/04/2021	jorde
		1001	Cable Diagram		26/04/2021	jorde
		1002	Cable Diagram		26/04/2021	jorde

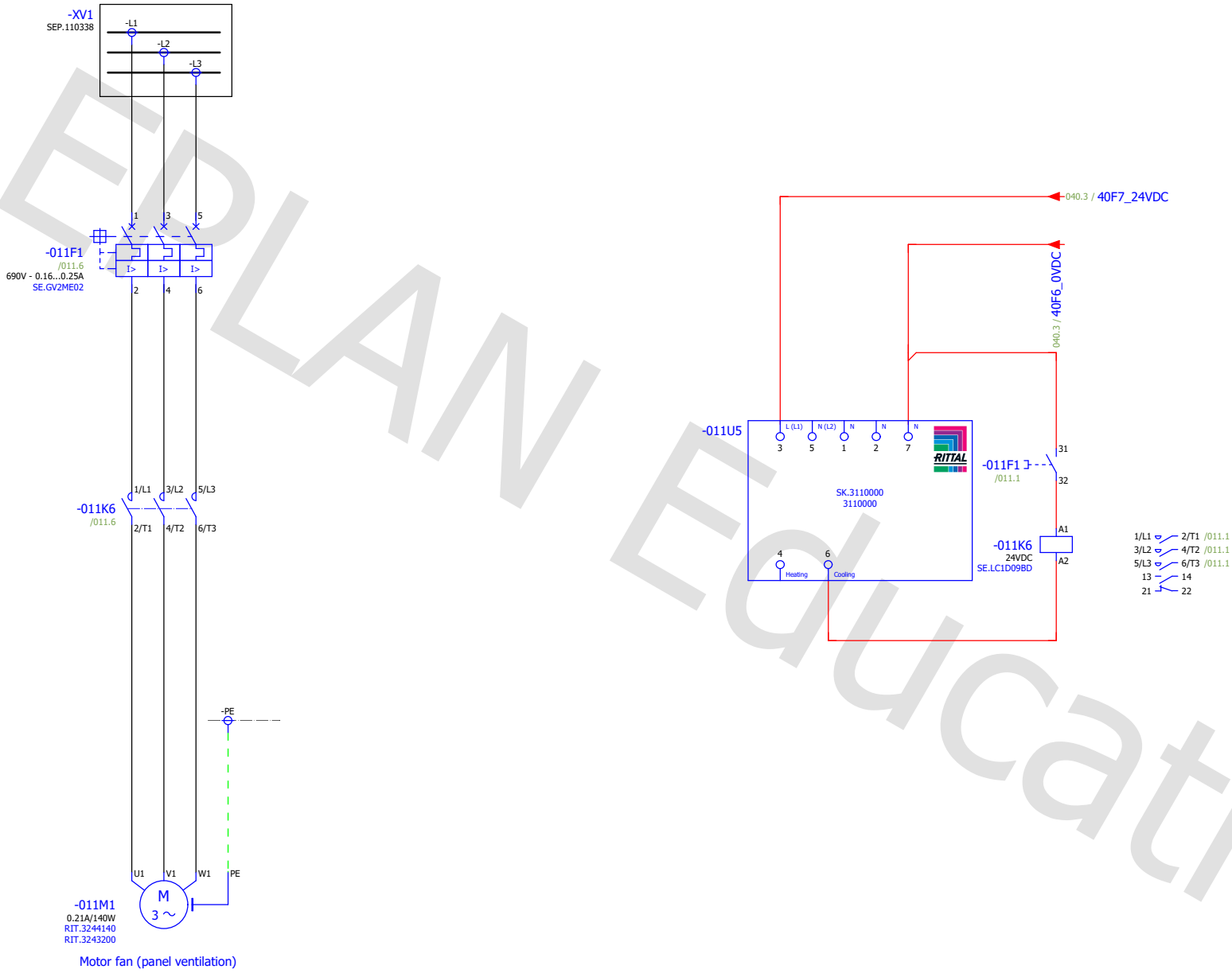
Inhoudsopgave

F06_002



005.a 011

JG SUMMIT PETROCHEMICALS GROUP	Datum 20/05/2021	JGSP	Jongerius Technology NV	J-TEC MATERIAL HANDLING	BB-Station with refill sea-container
	Bew. jorde		Lieven Gevaertstraat 11		
	Gecontr.		2950 Kapellen		JTT 00012 Blad 010
	Oorspr.	Jorden Van Bakel / Vervangen door			Pagina 8 / 32



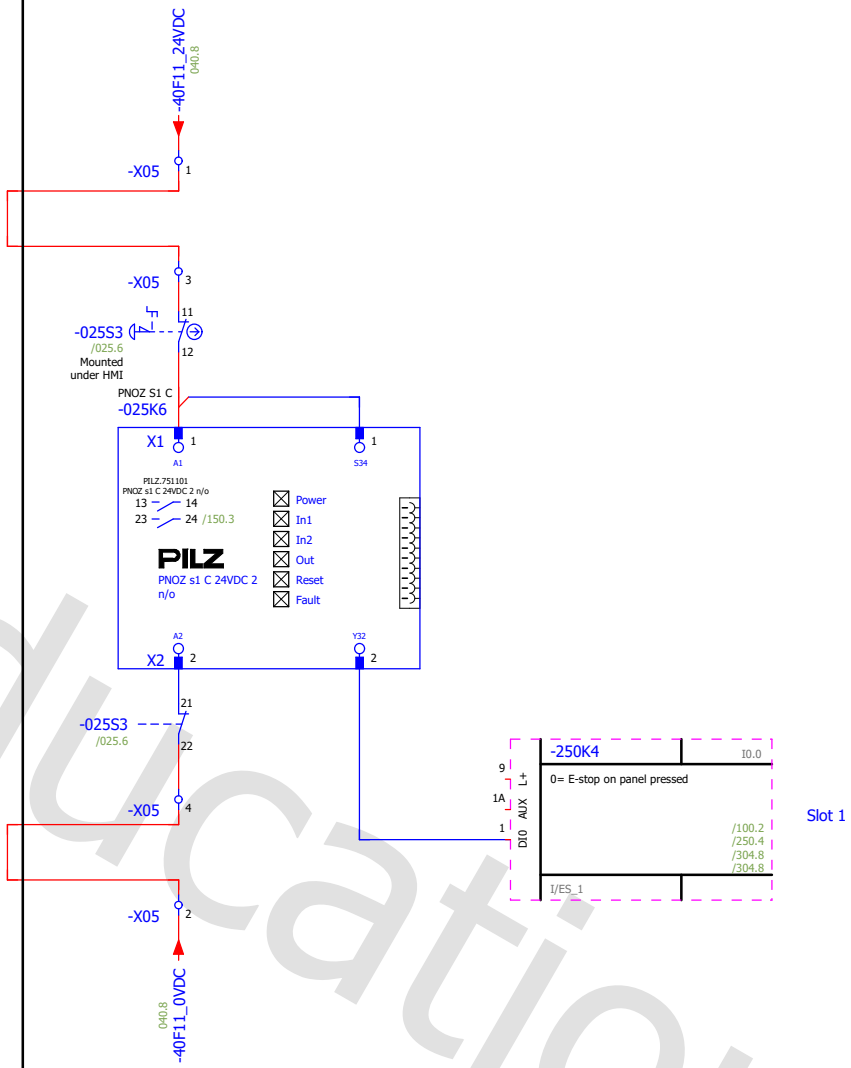
010 025

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	J-TEC MATERIAL HANDLING

Blad 011
Pagina 9 / 32

FIELD

CABINET XE001

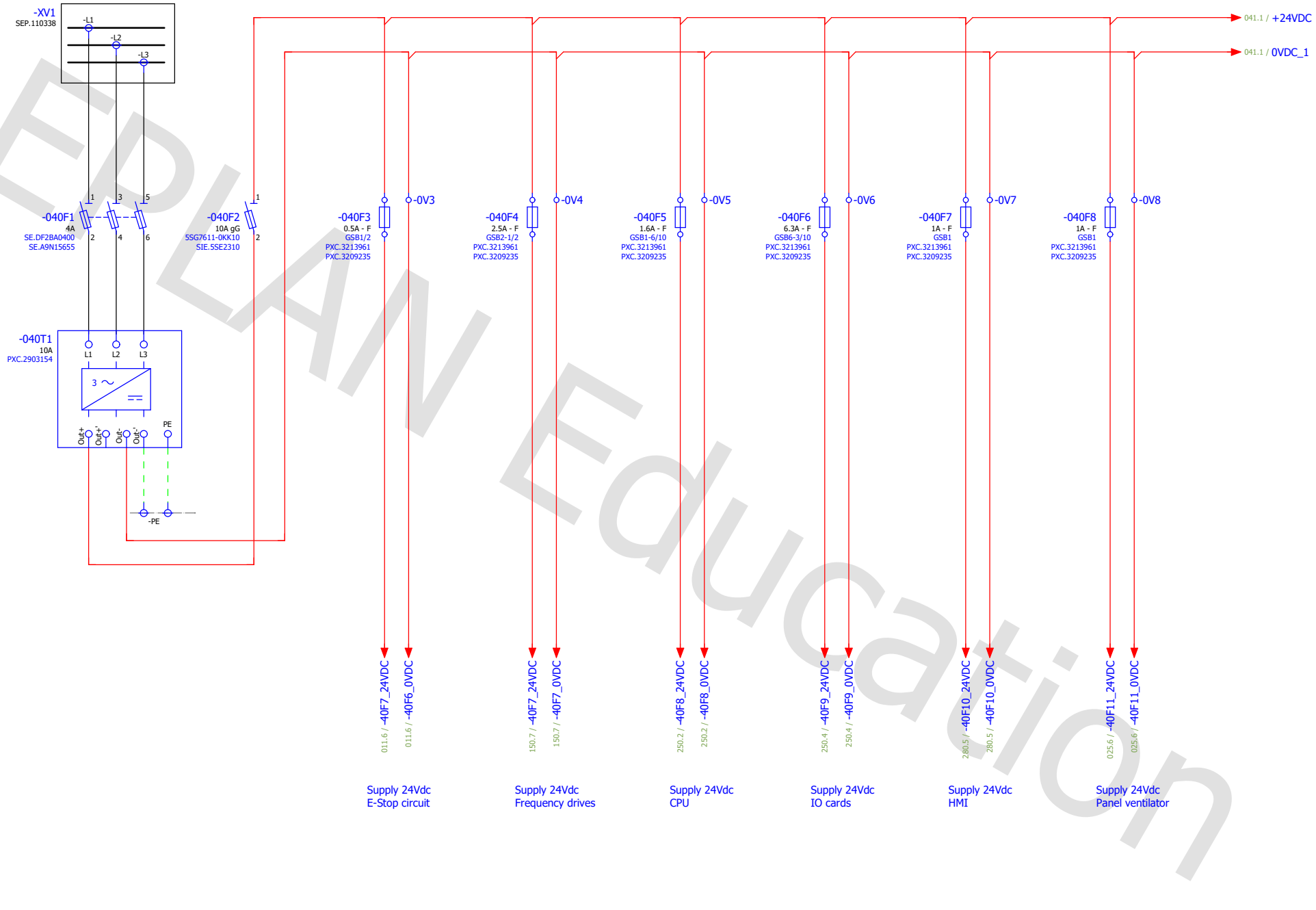


EPLAN Education

011

040

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	
	Oorspr.		Jorden Van Bakel	Vervangen door	
J-TEC MATERIAL HANDLING					JTT 00012
					Blad 025
					Pagina 10 / 32



025 041

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
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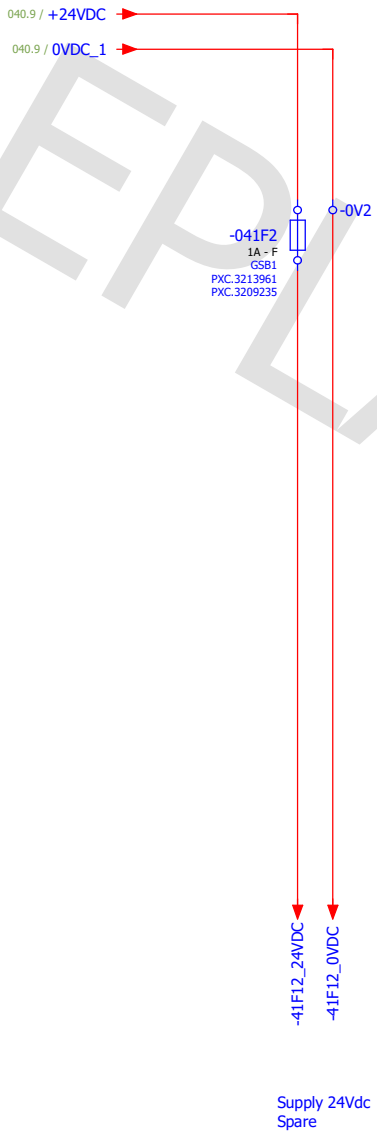
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 040
				J-TEC MATERIAL HANDLING	Pagina 11 / 32



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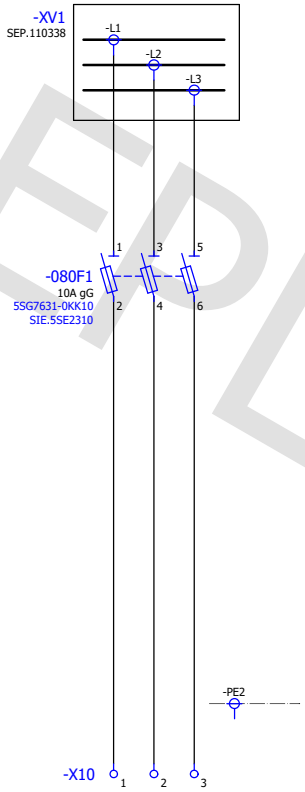
	Bew. jorde		Lieven Gevaertstraat 11		
	Gecontr.		2950 Kapellen		JTT 00012 Blad 041
	Oorspr.	Jorden Van Bakel / Vervangen door			Pagina 12 / 32



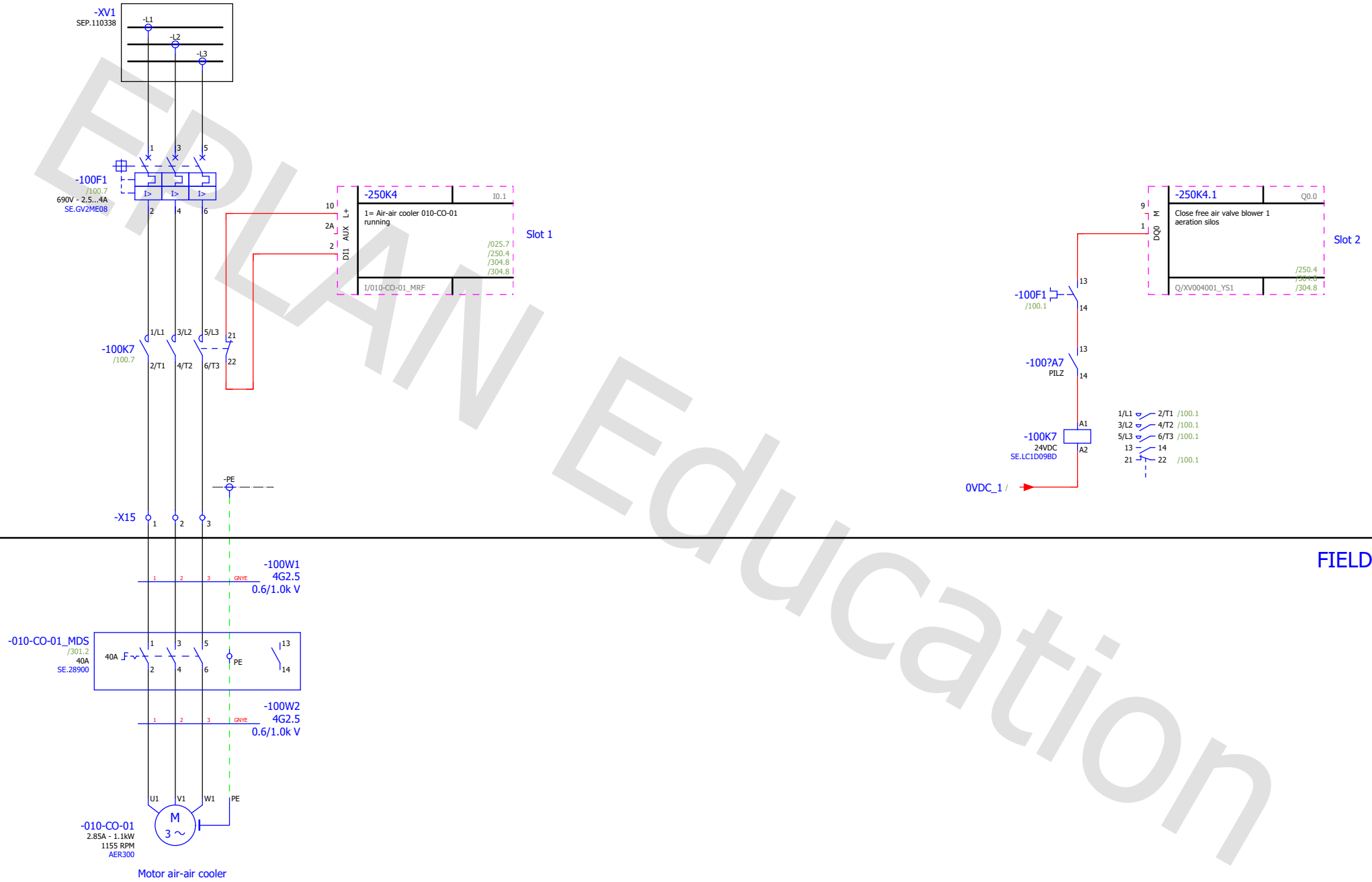
FIELD

Spare for hoist

041

100

JG SUMMIT PETROCHEMICALS GROUP	Datum	25/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	J-TEC MATERIAL HANDLING



080 150

JG SUMMIT PETROCHEMICALS GROUP	Datum 20/05/2021	JGSP	Jongerius Technology NV	J-TEC MATERIAL HANDLING	BB-Station with refill sea-container
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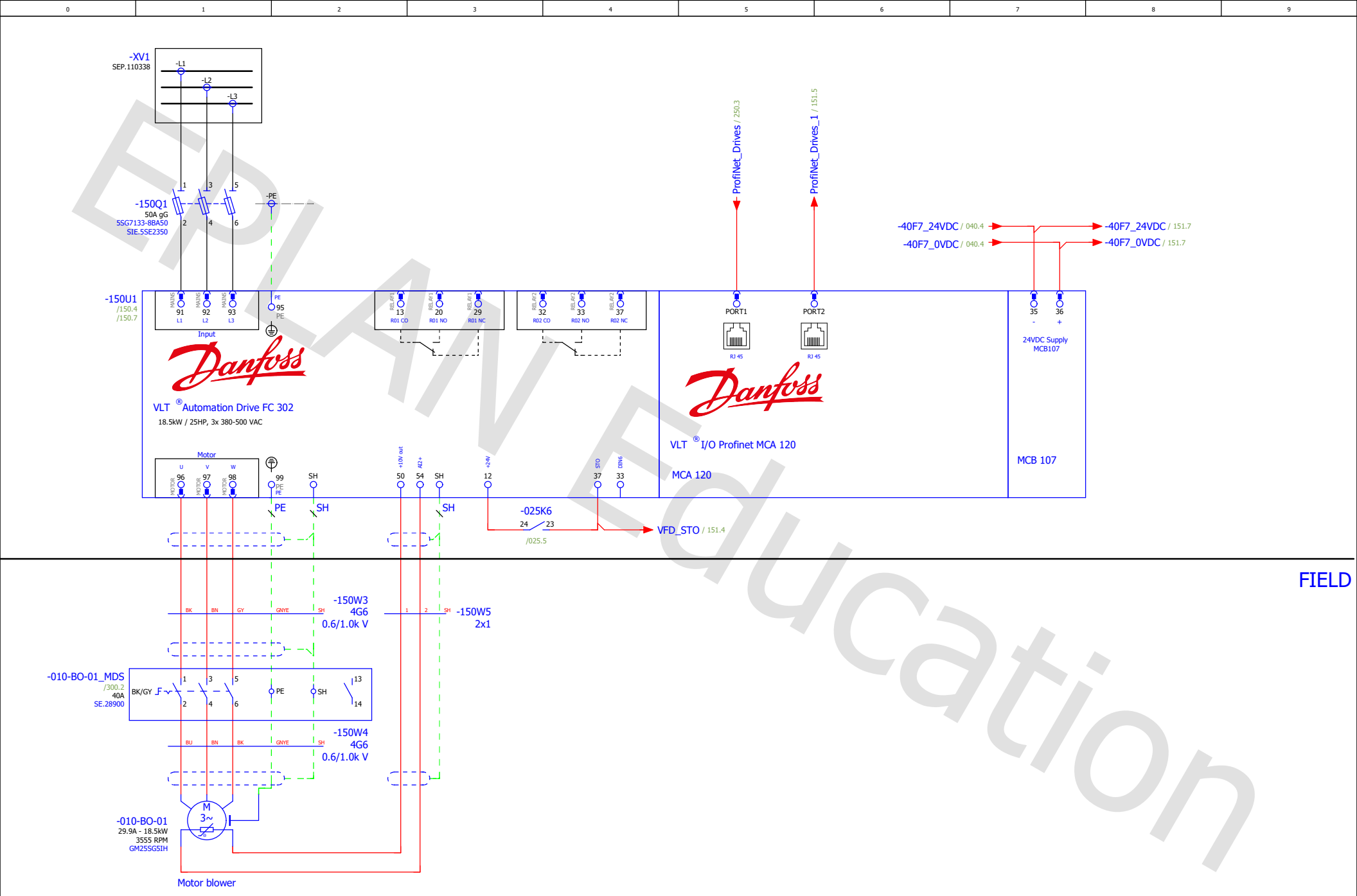
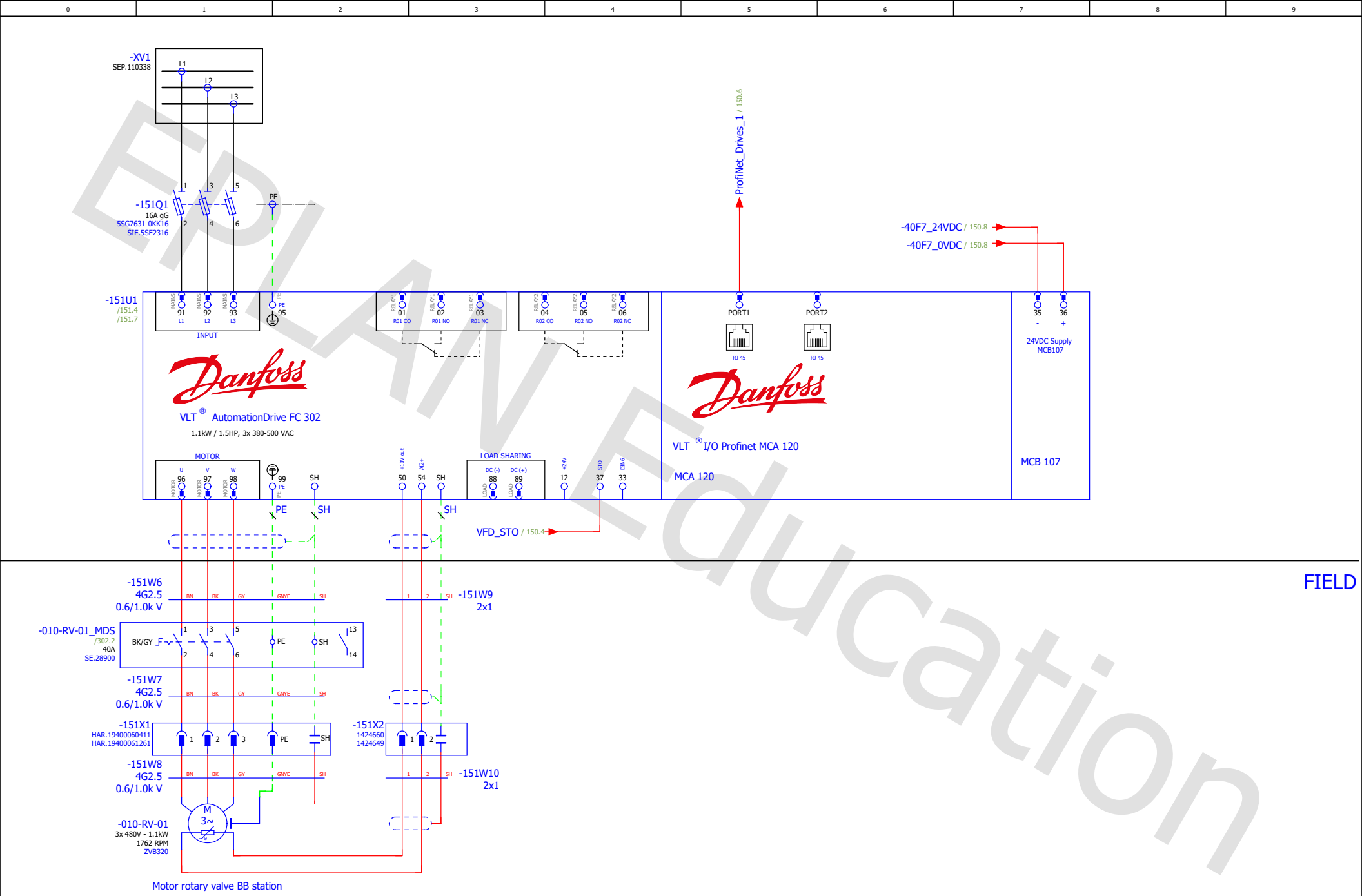
	Gecontr.		2950 Kapellen		JTT 00012
	Oorspr.	Jorden Van Bakel / Vervangen door			Blad 100
					Pagina 14 / 32



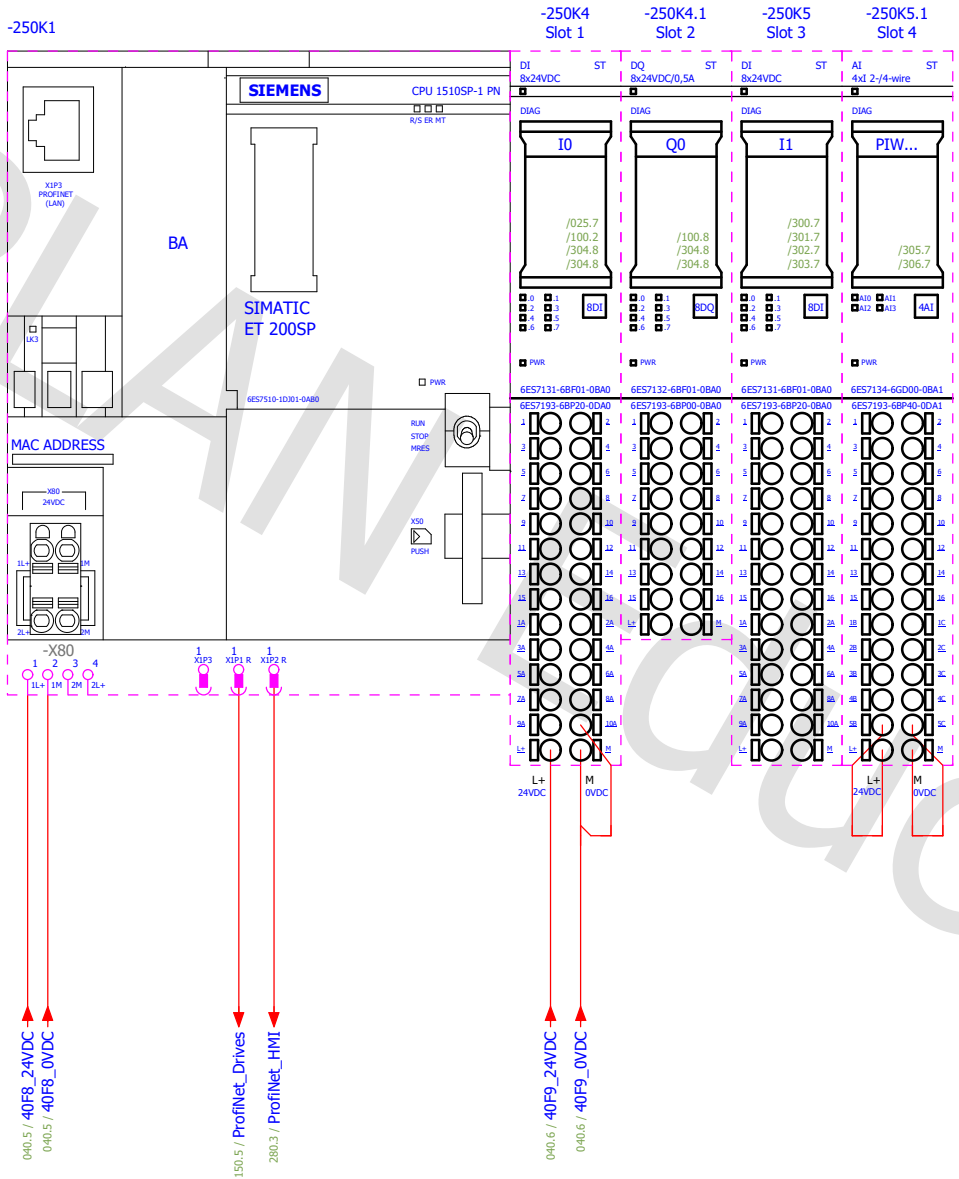
100 151

JG SUMMIT PETROCHEMICALS GROUP	Datum 20/05/2021	JGSP	Jongerius Technology NV	J-TEC MATERIAL HANDLING	BB-Station with refill sea-container
	Bew. jorde		Lieven Gevaertstraat 11		
	Gecontr.		2950 Kapellen		JTT 00012
	Oorspr.	Jorden Van Bakel	Vervangen door		Blad 150
					Pagina 15 / 32



150 250

JG SUMMIT PETROCHEMICALS GROUP	Datum 20/05/2021	JGSP	Jongerius Technology NV	J-TEC MATERIAL HANDLING	BB-Station with refill sea-container
	Bew. jorde		Lieven Gevaertstraat 11		
	Gecontr.		2950 Kapellen		JTT 00012
	Oorspr.	Jorden Van Bakel	Vervangen door		Blad 151
					Pagina 16 / 32

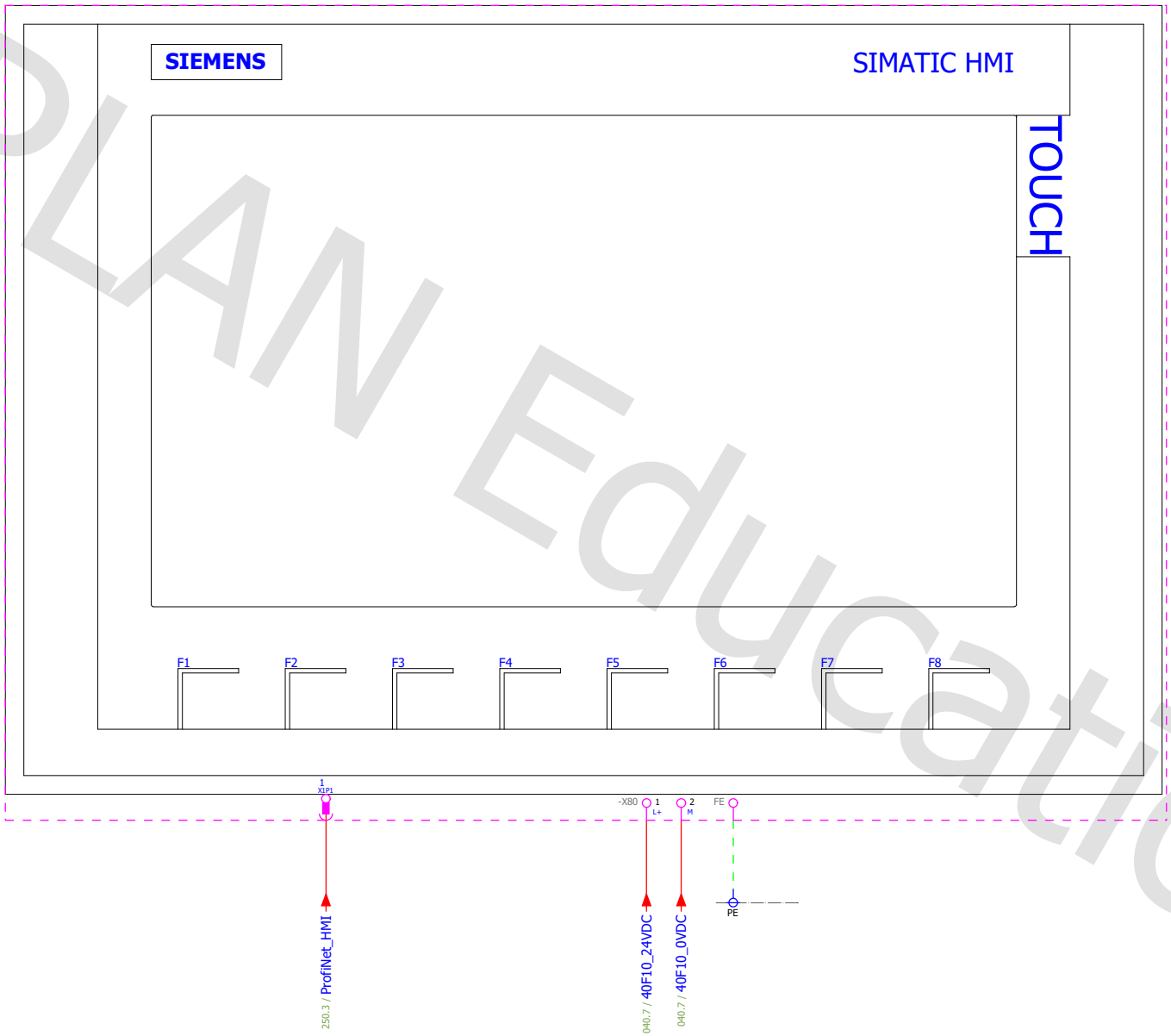


151 280

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	J-TEC MATERIAL HANDLING

Blad 250
Pagina 17 / 32

-280K1



250

300

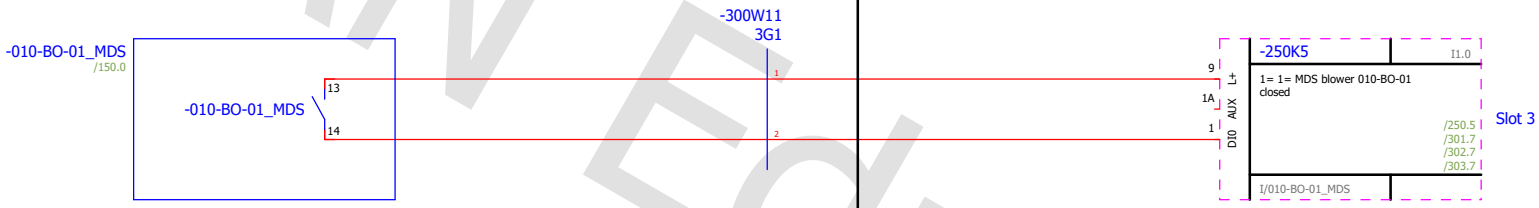
JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	J-TEC MATERIAL HANDLING

Blad 280

Pagina 18 / 32

FIELD

CABINET XE001

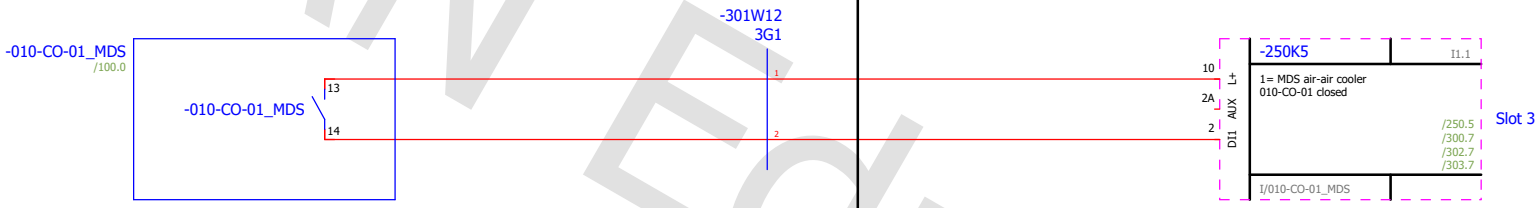


280

301

FIELD

CABINET XE001



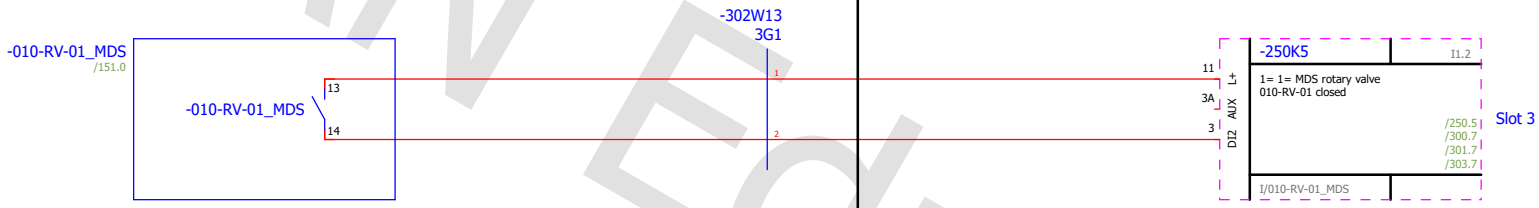
300

302

JG SUMMIT PETROCHEMICALS GROUP	Datum	26/04/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 301
J-TEC MATERIAL HANDLING					Pagina 20 / 32

FIELD

CABINET XE001



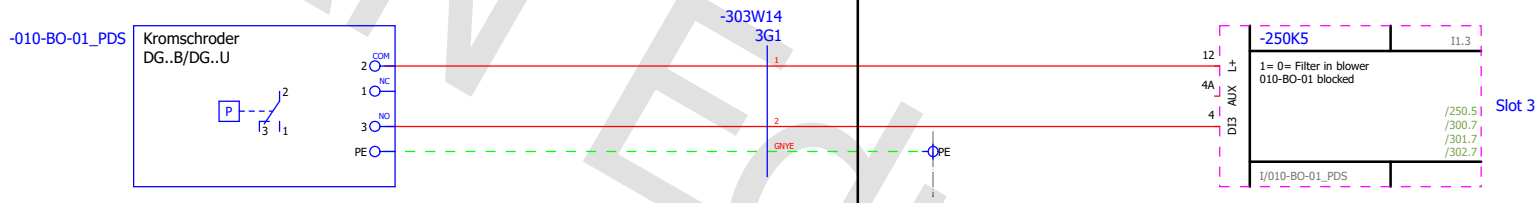
301

303

JG SUMMIT PETROCHEMICALS GROUP	Datum	26/04/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 302
J-TEC MATERIAL HANDLING					Pagina 21 / 32

FIELD

CABINET XE001



302

304

JG SUMMIT PETROCHEMICALS GROUP	Datum	26/04/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 303
J-TEC MATERIAL HANDLING					Pagina 22 / 32

FIELD

CABINET XE001

-010-XV-1

Sodeco electrical actuator
24V DC ENL 90

Motor connections

1 Close Command from valve
2 Open Command from valve
8 Open Feedback from valve
12 Heater / Anit-condensation
4 Closed Feedback from valve
9
10 Open Command to valve
11 Close Command to valve
PE

-304W15
12G1

-X30

-305K7 /304.6
-305K7.1 /304.7
-305K7 /304.6
-305K7.1 /304.7

Contact rating:
Inrush current: 4,1A
Holding current: 3,5A

NC /304.6 /304.6 /304.6
NO /304.6 /304.6 /304.6

NC /304.7 /304.7 /304.6
NO /304.7 /304.7 /304.6

-305K7.1 /304.7
-305K7
24VDC
Close 010-XV-01

-305K7 /304.6
-305K7.1
24VDC
open 010-XV-01

-250K4 I0.2
1= 1= Free air valve for blower 010-BO-01 opened
/025.7 /100.2 /250.4 /304.8
I/010-XV-01_ZSO
Slot 1

-250K4 I0.3
1= 1= Free air valve for blower 010-BO-01 closed
/025.7 /100.2 /250.4 /304.8
I/010-XV-01_ZSC
Slot 1

-250K4.1 Q 0.1
Open free air valve for blower 010-BO-01
/100.8 /304.8
Q/010-XV-01_SVO
Slot 2

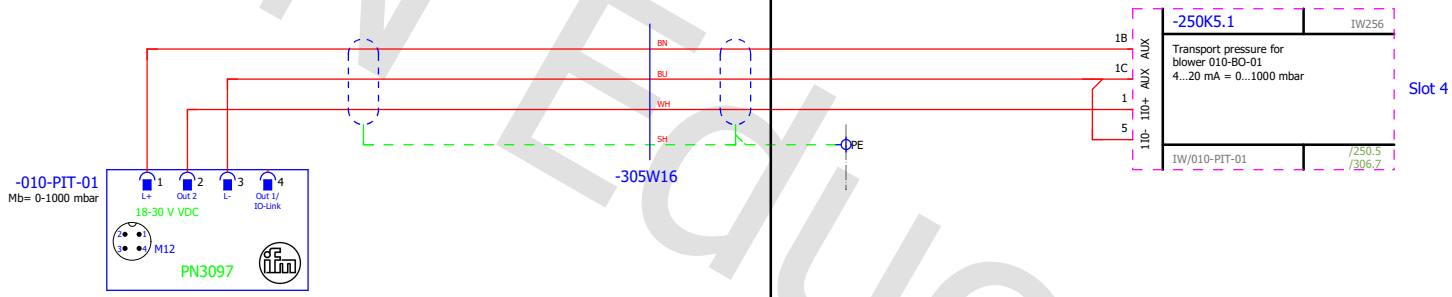
-250K4.1 Q 0.2
Close free air valve for blower 010-BO-01
/100.8 /304.8
Q/010-XV-01_SVC
Slot 2

303 305

JG SUMMIT PETROCHEMICALS GROUP	Datum 7/06/2021	JGSP	Jongerius Technology NV	J-TEC MATERIAL HANDLING	BB-Station with refill sea-container
	Bew. jorde		Lieven Gevaertstraat 11		
	Gecontr.		2950 Kapellen		JTT 00012
	Oorspr.	Jorden Van Bakel	Vervangen door		Blad 304
					Pagina 23 / 32

FIELD

CABINET XE001



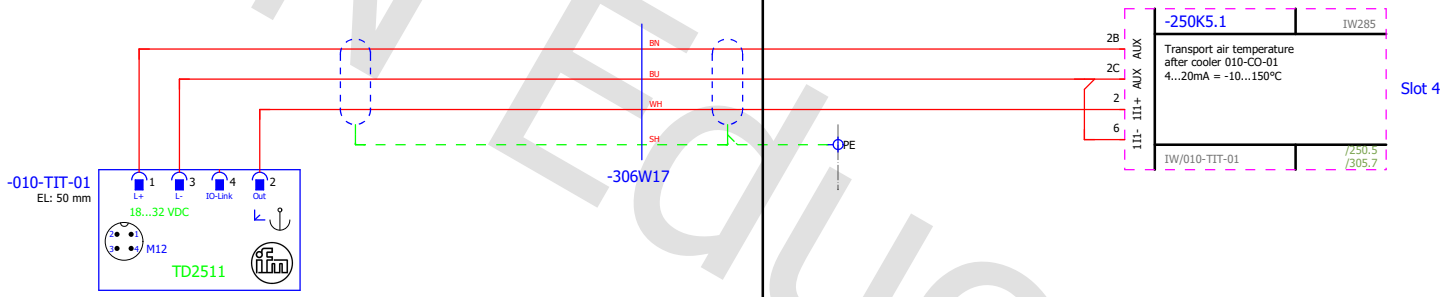
304

306

JG SUMMIT PETROCHEMICALS GROUP	Datum	23/04/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 305
J-TEC MATERIAL HANDLING					Pagina 24 / 32

FIELD

CABINET XE001



305

1000

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	Blad 306
					Pagina 25 / 32

J-TEC MATERIAL HANDLING

Cable diagram

Cabinet: XE001

Kabelnaam	-100W1			Kabeltype	ÖLFLEX CLASSIC 110 Black 0,6/1kV 4G2,5			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/100.1	-X15	1	1	-010-CO-01_MDS	1	/100.1	
	/100.1	-X15	2	2	-010-CO-01_MDS	3	/100.1	
	/100.1	-X15	3	3	-010-CO-01_MDS	5	/100.1	
	/100.1	-PE		GNYE	-010-CO-01_MDS	PE	/100.1	
Kabelnaam	-100W2			Kabeltype	ÖLFLEX CLASSIC 110 Black 0,6/1kV 4G2,5			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/100.1	-010-CO-01	U1	1	-010-CO-01_MDS	2	/100.1	
	/100.1	-010-CO-01	V1	2	-010-CO-01_MDS	4	/100.1	
	/100.1	-010-CO-01	W1	3	-010-CO-01_MDS	6	/100.1	
	/100.1	-010-CO-01	PE	GNYE	-010-CO-01_MDS	PE	/100.1	
Kabelnaam	-150W3			Kabeltype	ÖLFLEX SERVO 2YSLCY-JB BK 4G6			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
				BU				
	/150.1	-010-BO-01_MDS	3	BN	-150U1	MOTOR:97	/150.1	
	/150.1	-010-BO-01_MDS	1	BK	-150U1	MOTOR:96	/150.1	
	/150.2	-010-BO-01_MDS	PE	GNYE	-150U1	PE:99	/150.2	
	/151.3	-151U1	PE:SH	SH	-151X2		/151.3	
	/150.1	-010-BO-01_MDS	5	GY	-150U1	MOTOR:98	/150.1	
	/150.2	-010-BO-01_MDS	SH	SH	-150U1	PE:SH	/150.2	
Kabelnaam	-150W4			Kabeltype	ÖLFLEX SERVO 2YSLCY-JB BK 4G6			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/150.1	-010-BO-01		BU	-010-BO-01_MDS	2	/150.1	
	/150.1	-010-BO-01		BN	-010-BO-01_MDS	4	/150.1	
	/150.1	-010-BO-01		BK	-010-BO-01_MDS	6	/150.1	
	/150.1	-010-BO-01		GNYE	-010-BO-01_MDS	PE	/150.2	
	/150.2	-010-BO-01_MDS	SH	SH	-010-BO-01_MDS	SH	/150.2	

Cable diagram

Cabinet: XE001

Kabelnaam	-150W5			Kabeltype	ÖLFLEX CLASSIC 110 CH 2X1			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/150.1	-010-BO-01		1	-150U1	PE:50	/150.2	
	/150.1	-010-BO-01		2	-150U1	PE:54	/150.3	
	/150.3	-150U1	PE:SH	SH	-150U1	PE:SH	/150.3	
	/151.2	-151X2	1	1	-151U1	PE:50	/151.2	
	/151.3	-151X2	2	2	-151U1	PE:54	/151.3	

Kabelnaam	-151W6			Kabeltype	ÖLFLEX SERVO 2YSLCY-JB 4G2,5			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/151.1	-010-RV-01_MDS	1	BN	-151U1	MOTOR:96	/151.1	
	/151.1	-010-RV-01_MDS	3	BK	-151U1	MOTOR:97	/151.1	
	/151.1	-010-RV-01_MDS	5	GY	-151U1	MOTOR:98	/151.1	
	/151.2	-010-RV-01_MDS	PE	GNYE	-151U1	PE:99	/151.2	
				SH				
	/151.2	-010-RV-01_MDS	SH	SH	-151U1	PE:SH	/151.2	

Kabelnaam	-151W7			Kabeltype	ÖLFLEX SERVO 2YSLCY-JB 4G2,5			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/151.1	-151X1	1	BN	-010-RV-01_MDS	2	/151.1	
	/151.1	-151X1	2	BK	-010-RV-01_MDS	4	/151.1	
	/151.1	-151X1	3	GY	-010-RV-01_MDS	6	/151.1	
	/151.2	-151X1	PE	GNYE	-010-RV-01_MDS	PE	/151.2	
				SH				
	/151.2	-151X1		SH	-010-RV-01_MDS	SH	/151.2	

JG SUMMIT PETROCHEMICALS GROUP
Datum 26/04/2021
Bew. jorde
Gecontr.
Oorspr.
JGSP
Jorden Van Bakel
Vervangen door
Jongerius Technology NV
Lieven Gevaertstraat 11
2950 Kapellen
J-TEC MATERIAL HANDLING

BB-Station with refill sea-container

JTT 00012

Blad 1001
Pagina 27 / 32

Cable diagram

Cabinet: XE001

Kabelnaam	-151W8			Kabeltype	ÖLFLEX SERVO 2YSLCY-JB 4G2,5			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/151.1	-151X1	1	BN	-010-RV-01		/151.1	
	/151.1	-151X1	2	BK	-010-RV-01		/151.1	
	/151.1	-151X1	3	GY	-010-RV-01		/151.1	
	/151.2	-151X1	PE	GNYE	-010-RV-01		/151.1	
				SH				
	/151.2	-151X1		SH			/151.2	

Kabelnaam	-151W9			Kabeltype	ÖLFLEX CLASSIC 110 CH 2X1			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
				1				
				2				
				SH				
	/151.3	-151U1	PE:SH	SH	-151X2		/151.3	

Kabelnaam	-151W10			Kabeltype	ÖLFLEX CLASSIC 110 CH 2X1			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/151.2	-151X2	1	1	-010-RV-01		/151.1	
	/151.3	-151X2	2	2	-010-RV-01		/151.1	
	/151.3	-151X2		SH	-151W10	SH	/151.3	

Kabelnaam	-300W11			Kabeltype				
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/300.2	-010-BO-01_MDS	13	1	-250K5	9	/300.7	Reserve
	/300.2	-010-BO-01_MDS	14	2	-250K5	1	/300.7	1= 1= MDS blower 010-BO-01 closed

Kabelnaam	-301W12			Kabeltype				
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/301.2	-010-CO-01_MDS	13	1	-250K5	10	/301.7	Reserve
	/301.2	-010-CO-01_MDS	14	2	-250K5	2	/301.7	1= MDS air-air cooler 010-CO-01 closed

Cable diagram

Cabinet: XE001

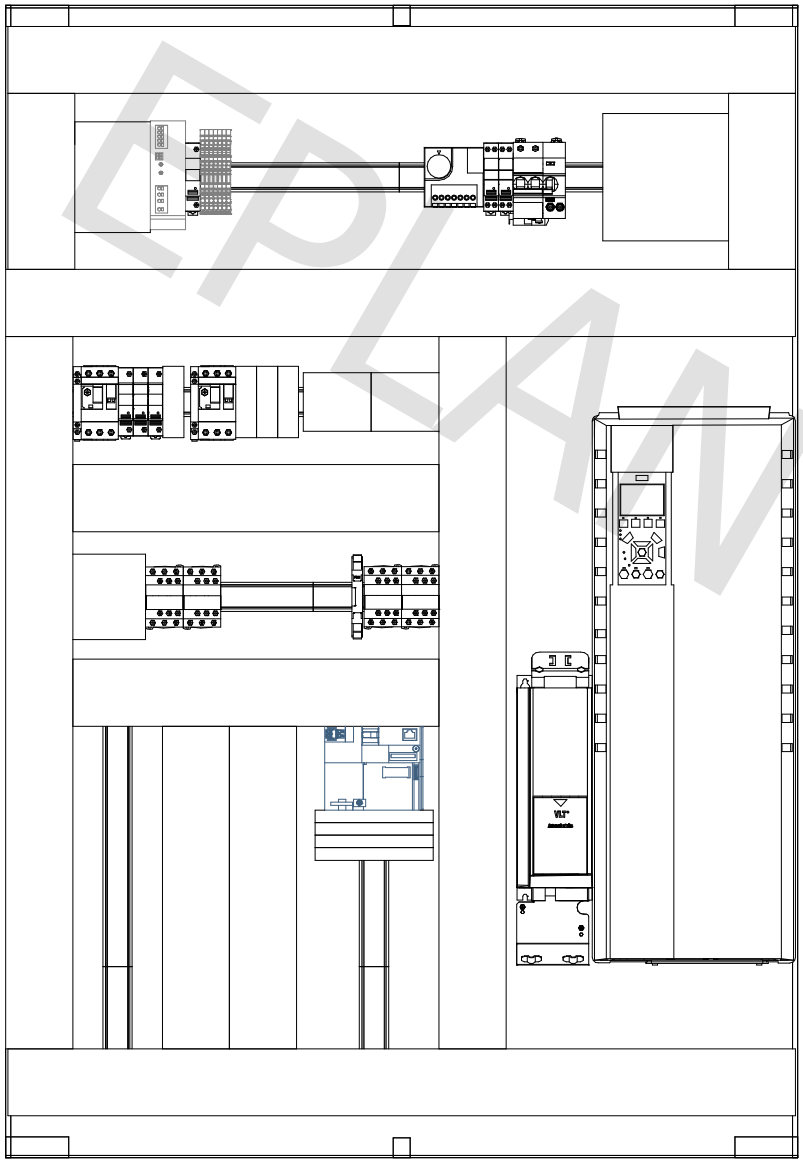
Kabelnaam -302W13					Kabeltype			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/302.2	-010-RV-01_MDS	13	1	-250K5	11	/302.7	Reserve
	/302.2	-010-RV-01_MDS	14	2	-250K5	3	/302.7	1= 1= MDS rotary valve 010-RV-01 closed
Kabelnaam -303W14					Kabeltype			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/303.3	-010-BO-01_PDS	2	1	-250K5	12	/303.7	Reserve
	/303.3	-010-BO-01_PDS	3	2	-250K5	4	/303.7	1= 0= Filter in blower 010-BO-01 blocked
	/303.3	-010-BO-01_PDS	PE	GNYE	-PE		/303.5	
Kabelnaam -304W15					Kabeltype	ÖLFLEX CLASSIC 110 12G1		
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/304.5	-X30	1	1	-010-XV-1	1	/304.2	
	/304.5	-X30	2	2	-010-XV-1	2	/304.2	
	/304.5	-X30	3	3	-010-XV-1	5	/304.2	
	/304.5	-X30	4	4	-010-XV-1	6	/304.2	
	/304.5	-X30	5	5	-010-XV-1	8	/304.2	
	/304.5	-X30	6	6	-010-XV-1	12	/304.2	
	/304.5	-X30	7	7	-010-XV-1	4	/304.2	
	/304.5	-X30	8	8	-010-XV-1	9	/304.2	
	/304.5	-X30	9	9	-010-XV-1	10	/304.2	
	/304.5	-X30	10	10	-010-XV-1	11	/304.2	
				11				
	/304.5	-X30	PE	GNYE	-010-XV-1	PE	/304.2	

Cable diagram

Cabinet: XE001

Kabelnaam -305W16					Kabeltype			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/305.2	-010-PIT-01	1	BN	-250K5.1	1B	/305.7	Reserve
	/305.2	-010-PIT-01	3	BU	-250K5.1	1C	/305.7	=
	/305.4	-305W16		SH	-PE		/305.5	
	/305.2	-010-PIT-01	2	WH	-250K5.1	1	/305.7	Transport pressure for blower 010-BO-01 4...20 mA = 0...1000 mbar

Kabelnaam -306W17					Kabeltype			
Functietekst	Pagina / kolom	Cable from	Aansluiting	Ader	Cable to	Aansluiting	Pagina / kolom	Functietekst
	/306.2	-10-TIT-01	1	BN	-250K5.1	2B	/306.7	Reserve
	/306.2	-10-TIT-01	3	BU	-250K5.1	2C	/306.7	=
	/306.4	-306W17		SH	-PE		/306.5	
	/306.3	-10-TIT-01	2	WH	-250K5.1	2	/306.7	Transport air temperature after cooler 010-CO-01 4...20mA = -10...150°C



Schakelkastlegenda

F18_005

Positienummer	Onderdeelcode	Typenummer
45	250K1	6ES7510-1DJ01-0AB0
46	250K4	6ES7131-6BF01-0BA0 / 6ES7193-6BP20-0DA0
47	250K4.1	6ES7132-6BF01-0BA0 / 6ES7193-6BP00-0BA0
48	250K5	6ES7131-6BF01-0BA0 / 6ES7193-6BP20-0BA0
49	250K5.1	6ES7134-6GD01-0BA1 / 6ES7193-6BP40-0DA1
50	150U1	FC-302P18KT5E21H2XGCXXXSXXXXAXBXCXXXXDX
51	151U1	FC-302P1K1T5E20H1XXXXXXSXXXXA0BXCXXXXDX
56	011U5	SK.3110000
57	040T1	TRIO-PS-2G/3AC/24DC/10
58	010T4	ABL6TS63U
59	010S1	P3-63/EA/SVB
60	011K6	LC1-D 3P 9A
61	100K7	LC1-D 3P 9A
62	025K6	PNOZ s1 C 24VDC 2 n/o
63	305K7	LC1-D 3P 9A
64	305K7.1	LC1-D 3P 9A
65	L1	CVT415
66	010F4.1	A9N15635
69	040F3	PTI 2,5-L/TG
70	040F4	PTI 2,5-L/TG
71	040F5	PTI 2,5-L/TG
72	040F6	PTI 2,5-L/TG
73	040F7	PTI 2,5-L/TG
74	040F8	PTI 2,5-L/TG
75	041F2	PTI 2,5-L/TG
76	010F4	A9N15645
77	010F4	A9N15645
78	011F1	GV2ME02
79	011F1	GVAN11
80	040F1	A9N15655
81	040F2	5SE2310
82	100F1	GV2ME08
83	100F1	GVAN11
84	080F1	5SE2310
85	080F1	5SE2310
86	080F1	5SE2310
87	150Q1	5SG7133-8BA50
88	151Q1	5SG7631-0KK16
89	010Q7	A9F74602
90	010Q7	A9Q01225

1004

1006

JG SUMMIT PETROCHEMICALS GROUP	Datum	20/05/2021	JGSP	Jongerius Technology NV	BB-Station with refill sea-container
	Bew.	jorde		Lieven Gevaertstraat 11	
	Gecontr.			2950 Kapellen	JTT 00012
	Oorspr.		Jorden Van Bakel	Vervangen door	J-TEC MATERIAL HANDLING

Blad 1005

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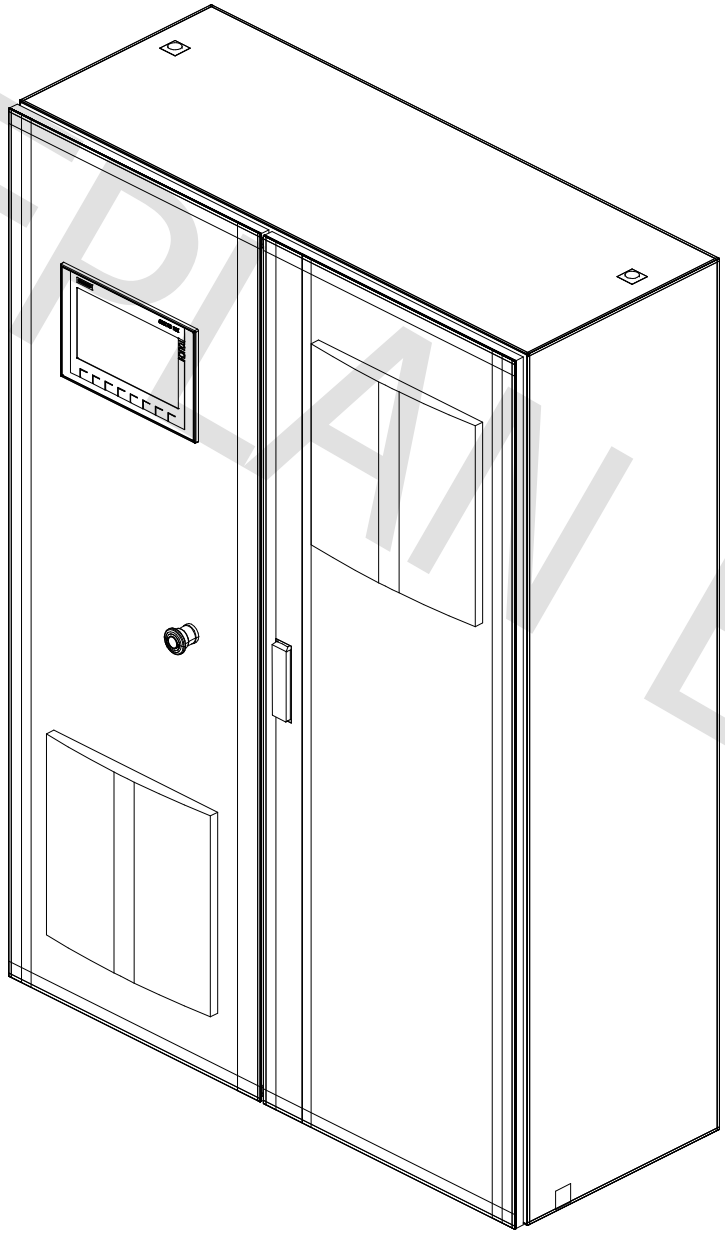


1005

JG SUMMIT PETROCHEMICALS GROUP	Datum	25/05/2021	JGSP		Jongerius Technology NV	BB-Station with refill sea-container	
	Bew.	jorde			Lieven Gevaertstraat 11		
	Gecontr.				2950 Kapellen	JTT 00012	Blad 1006
	Oorspr.		Jorden Van Bakel	Vervangen door			Pagina 32 / 32

OUR PEOPLE MAKE THE DIFFERENCE
J-TEC MATERIAL HANDLING

Risk analysis - risk ranking - risk assessment

Installation :	**pneumatic Bigbag-station**
Date :	**27/05/2021**
Version :	**1**

Estimation of the Risk :

- A = Not acceptable Risk
- B = Acceptable, subject to measures
- C = Acceptable

Consequences :	seriousness (SE)	Class (Cl = Fr + Pr + Av)				
		3-4	5-7	8-10	11-13	14-15
Death, Amputation	4	B	A	A	A	A
Irreversible, loss of fingers	3	C	B	A	A	A
reversible, medical treatment required	2	C	C	B	A	A
Reversible, first aid required	1	C	C	C	B	A

Quantification of the Risk

Frequency (Fr)		Probability (Pr)		Avoidability (Av)	
5	Several times an hour	5	Very high	5	Impossible
4	Several times an day	4	Possible	3	Possible
3	Every 2 weeks	3	Maybe	1	Probably
2	Every other year	2	Rare		
1	Less than once a year	1	Negligible		

- This risk analysis only concerns the project as mentioned above and is not valid for the whole building if it is part of a larger building complex.
- The table includes both the detection of the Risk - the evaluation of the Risk and the evaluation of the risk reduction with the corresponding residual risks.
- If a probable is placed at 0, the item is not applicable in the current project, but the risk was discussed.
- The risk analysis covers only the electrical installation
- The risk analysis covers only the electrical installation
- In addition to the analysis, EN12 100 - TR 14 121-2 works to allow an assessment and to propose appropriate measures so that the risks can be eliminated (or reduced).
- The risk analysis is only valid according to the state of the installation at the date indicated above.

	Description of the Risk	Ranking of Risk Fr	Pr	Av	Cl	Se	Actions to be taken - decisions for design	Evaluation of the Reduction Fr	Pr	Av	Cl	Se
1	A forklift truck transports bags of granules and loads these bags onto a big bag station. Danger : chain breakage, causing the load to fall suddenly to the operator's level. Risk : This causes the bags to explode, which can hit the operator.	4	2	3	9	2	**Collective (CBM) and individual (PPE) protective equipment:** ° Provide the operator's operating environment with additional - metallic - shielding (CBM) ° Hanging pictogram with warning of falling objects (PPE) ° Operator must wear safety goggles (PPE) **Organisational measures :** Only operator may be present in this environment (create a protected workplace) ° In his training, the operator receives the residual risks of the installation and learns how to deal with them. Monthly inspection by forklift maintenance department.	5	1	3	9	1
2	Large and therefore heavy filling bags are used to supply the plant. These are loaded by the operator by means of a hoist or crane. Danger : The bag is secured by means of moving clamps and valves. Risk : This could cause gagging or crushing.	4	4	3	11	3	**Collective (CBM) and individual (PPE) protective equipment:** ° Place a trap fence, which prevents a bag from falling on an operator. (CBM) ° Light curtain in place where the operator stands during fixing and supply. Operator must wear work shoes and safety goggles (PPE) **Organisational measures:** Only the operator may be present in this environment (create a protected workplace) ° In his training, the operator receives the residual risks of the installation and learns how to deal with them. Monthly inspection by the maintenance department of the supply section of the installation.	4	2	1	7	2

	Description of the Risk	Ranking of Risk					Actions to be taken - decisions for design	Evaluation of the Reduction				
		Fr	Pr	Av	Cl	Se		Fr	Pr	Av	Cl	Se
3	The installation can be used to transport milk & baby powder. Danger : These substances, in vapour form, are highly flammable. Risk : Explotion	4	3	5	12	4	**Reduce hazard at source :** ° Use EX-components in areas where these substances are used. **Collective (CBM) and individual (PPE) means of protection:** ° hanging up pictogram warning of flammable substances (CBM) ° Hanging up pictogram forbidden use of mobile devices (CMB) ° Hanging pictogram with no smoking (CBM) ° Creating an EX zone around the installation (CBM) **Organisational measures :** ° Only the operator may be present in this area (create a protected workplace) ° In his training, the operator receives the residual risks of the installation and learns how to deal with them. Monthly inspection by the maintenance department of the ex-component part of the installation. ° Cleaning cycle and aeration pogramming to prevent vapour interference and saturation. ° Use of EX lighting, or normal lighting and hang it behind screen or glass.	4	1	3	8	2
4	Because the system is based on skid construction, the entire system is subject to vibration. Danger: A contact in the switch box may become loose and the box may become partly or completely live. Risk : Electrocution.	3	2	5	10	3	**Collective (CBM) and individual (PPE) protective equipment:** ° Hanging up pictogram with electrocution warning (CBM) **Organisational measures:** ° Only the operator may be present in this environment (create a protected workplace) ° In his training, the operator receives the residual risks of the installation and learns how to deal with them. ° Monthly inspection by maintenance department of electrical components in the installation. ° Provision of correct earthing method ° Ensuring proper sizing of all electrical protection components	1	1	5	7	3

Production Area

XE001: Main Panel
Location:

PLC
Siemens S7-1510 SP1
Name: XE001-PLC

LAN
IP: 192.168.100.001

HMI
Siemens TP1500
Name: XE001-HMI

LAN
IP: 192.168.100.005

*6

*6

*21

Drive
Danfoss FC302

Drives

TAG	Type	Name	IP
150U1	131B2014	XE001-150U1	192.168.100.020
151U1	131B0514	XE001-151U1	192.168.100.025

Equipment/Network

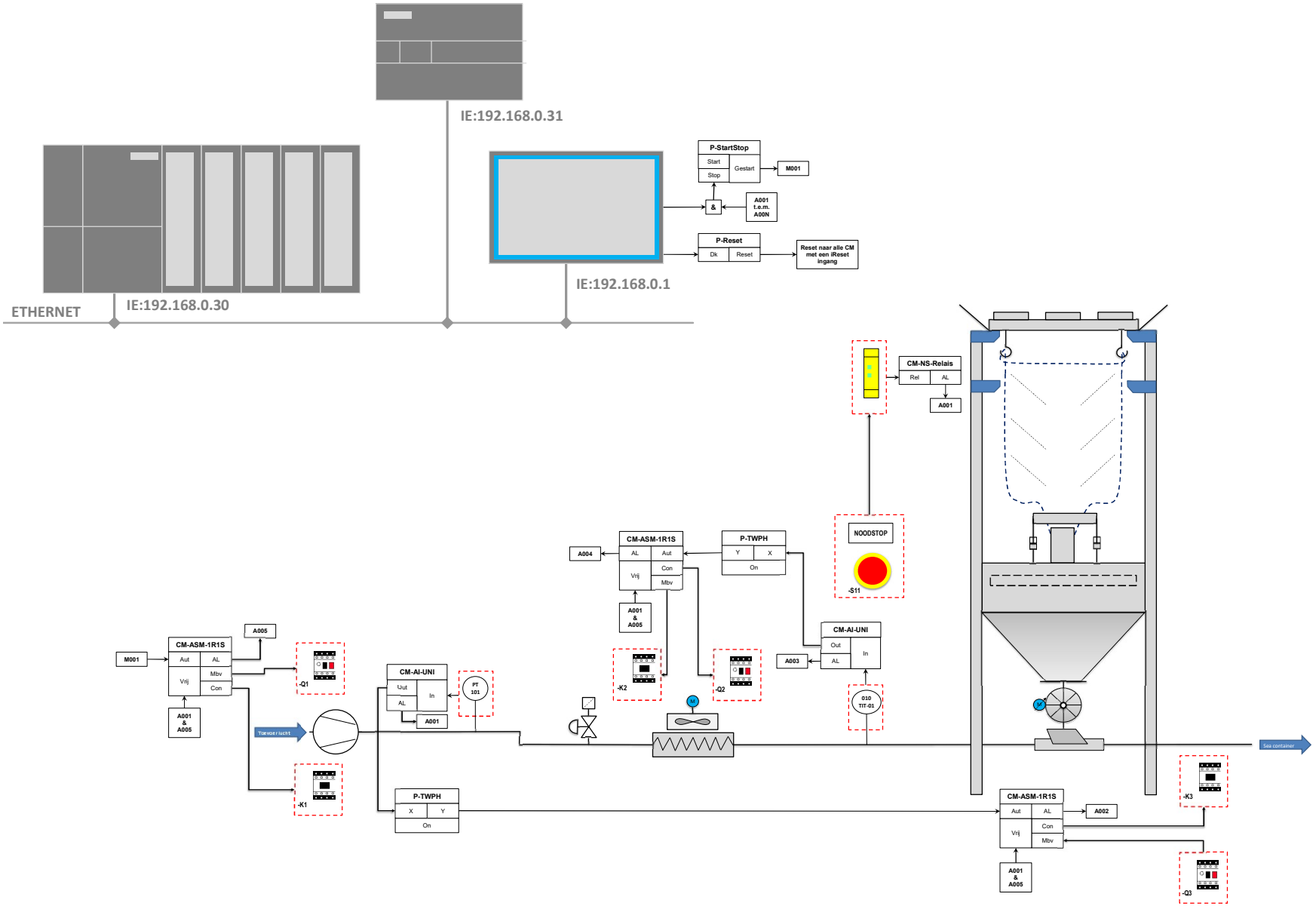
*1 *Equipment delivered and installed by customer. Internet account and connection by customer. VPN pass through enabled.*
*2 *Equipment delivered and installed by customer.*
*3 *CU CAT6 Shielded; Cable delivered and installed by Customer*
*4 *CU CAT6 Shielded*
*5 *CU CAT6 Shielded Patch cable*
*6 *ProfiNET Cable*
*7 *Profibus DP Cable*
*8 *Hardwired to dry contacts*
*9 *FO cable*
*10
*11
*12
*13
*14
*15

Ethernet
Ethernet/IP
ProfiNET
ProfiBUS
IO-link

Power

*21 *Power Supply xxxVAC: Directly connected to the panel; delivered and fed by customer (See electrical drawings for more info)*
*22 *Power Supply xxxVAC: Directly connected to the panel; fed From XE001*
*23 *Power Supply 24VDC: Directly connected to the panel; fed From XE001*
*24
*25
*26
*27
*28
*29
*30
*31
*32
*33
*34
*35

Template revision date: 11/Jan/2021


IE:192.168.0.31
IE:192.168.0.30
IE:192.168.0.1
ETHERNET
P-StartStop
Start
Stop
Gestart
M001
&
A001 t.e.m. A00N
P-Reset
Dk
Reset
Reset naar alle CM met een iReset ingang
CM-NS-Relais
Rel
AL
A001
NOODSTOP
-S11
CM-ASM-1R1S
AL
Aut
Vrij
Con
Mbv
A004
A001 & A005
P-TWPH
Y
X
On
CM-AI-UNI
Out
In
AL
A003
010 TIT-01
M001
A005
-Q1
-K1
Toevoer lucht
Uut
PT 101
A001
-K2
-Q2
-K3
-Q3
A002
Sea container

StartConditions

1 No stopcondition active
2 No tripcondition active
3 No manual or simulation active
4 Not started
5
6
7
8
9
10
11
12
13
14
15

StopConditions

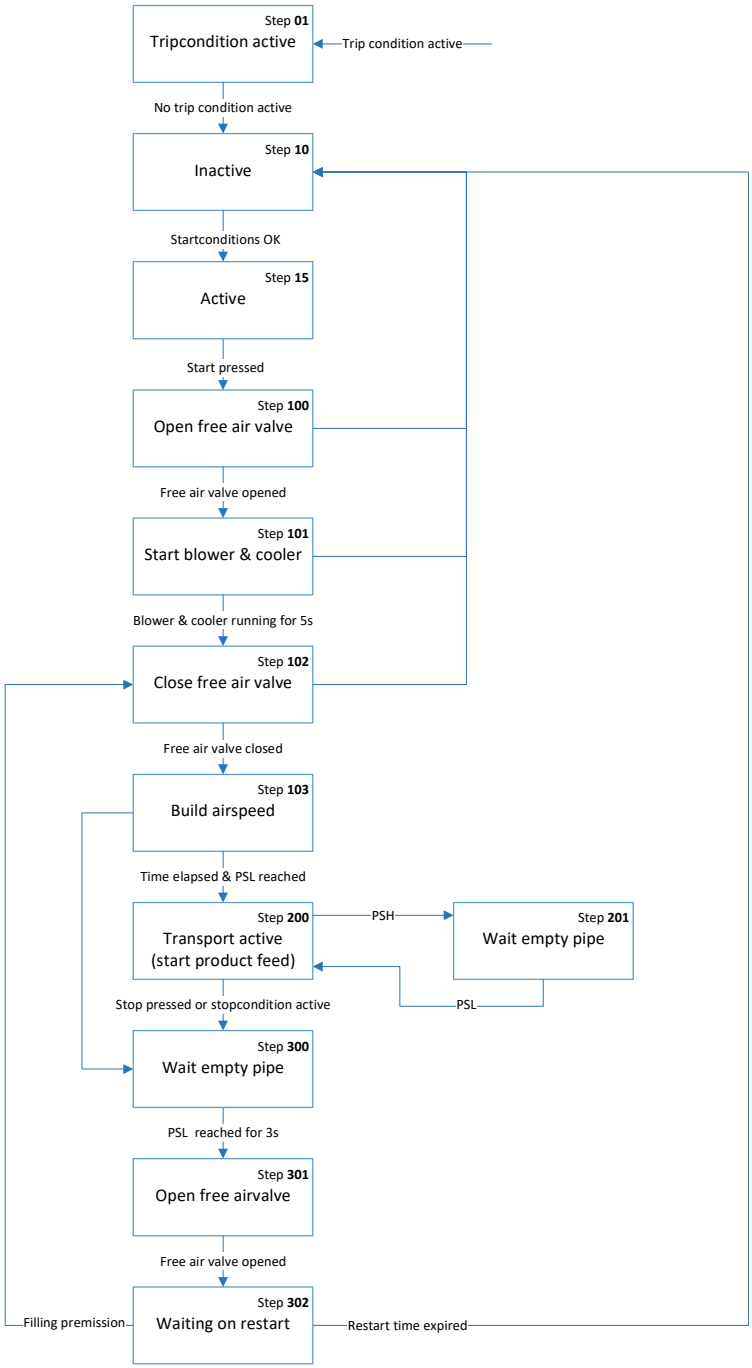
1 No filling premission
2 Alarm Rotary valve
3 Temp. To long above high limit
4
5
6
7
8
9
10
11
12
13
14
15

TripConditions

1 Emergency stop
2 Alarm blower
3 Alarm free air valve blower
4 PSL Pipe not empty while stopping
5 PSH To long above high pressure
6
7
8
9
10
11
12
13
14
15

Control modules

Blower	Steps 101, 102, 103, 200, 201, 300, 301, 302
Cooler	Steps 101, 102, 103, 200, 201, 300, 301, 302
FAV closed	Steps 102, 103, 200, 201, 300
FAV opend	Steps 100, 101, 301, 302
Rotary valve	Step 200



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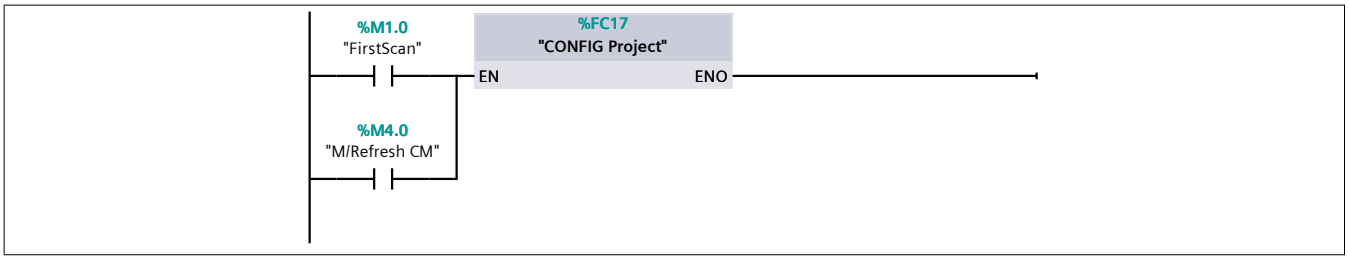
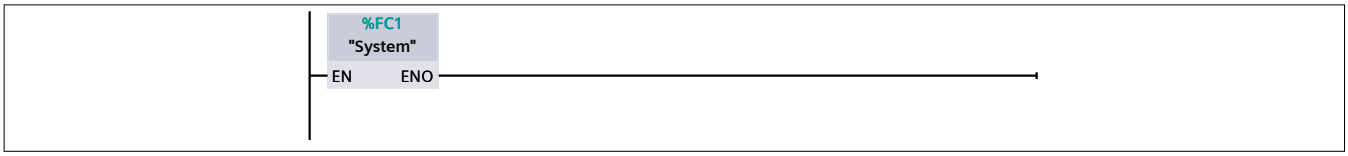
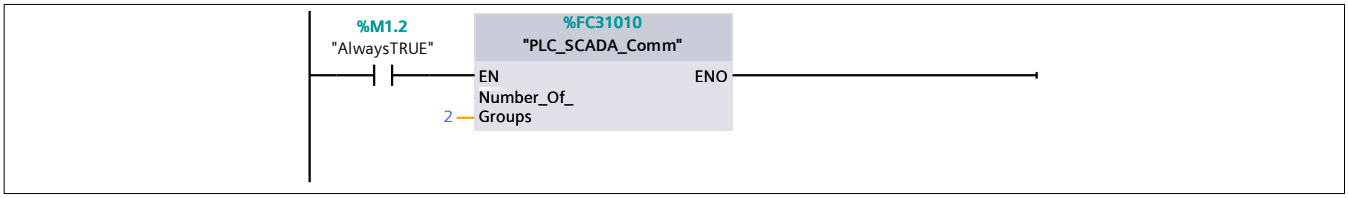
BP_BB-Station-JTT00012



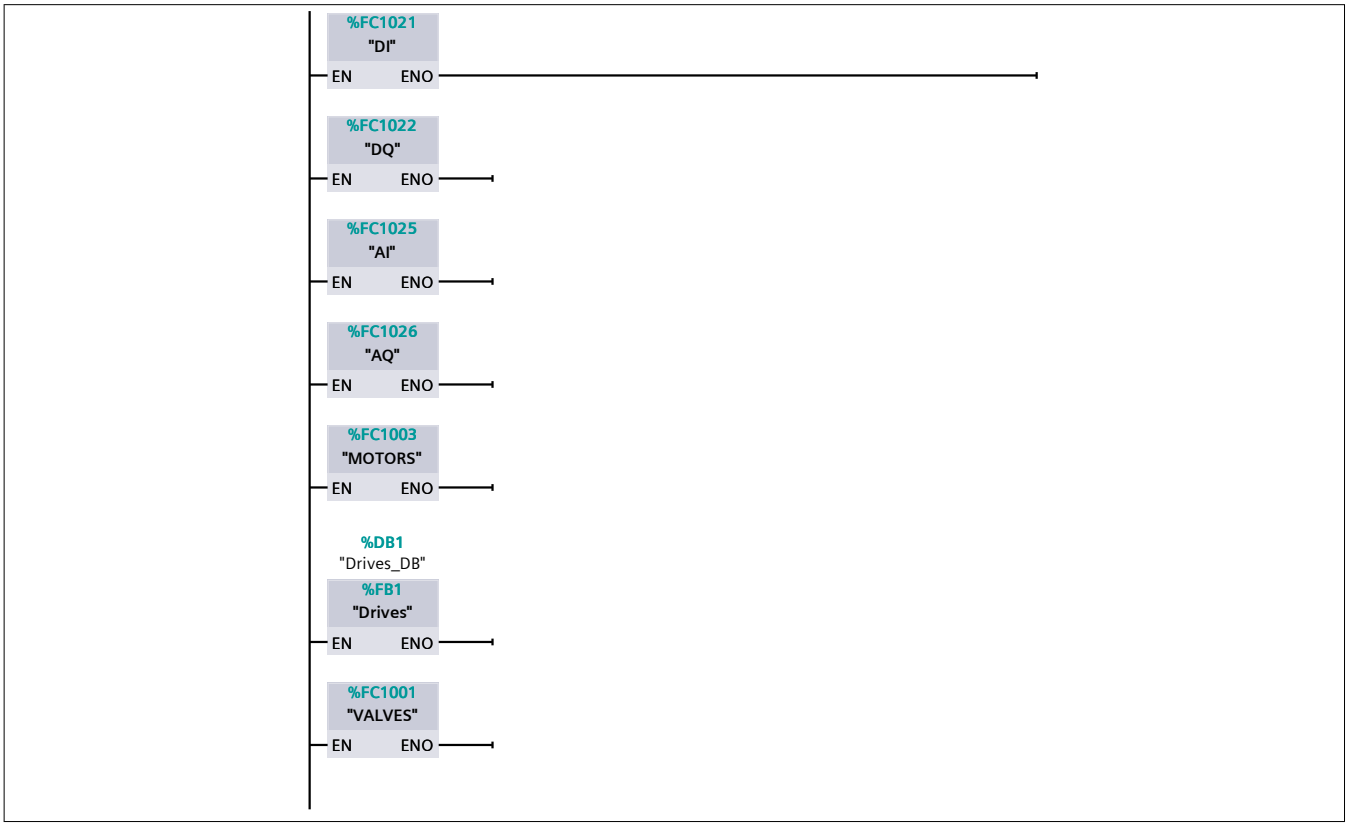
Network 2: System



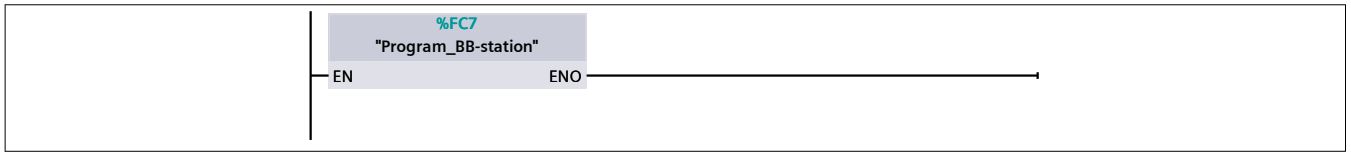
Network 3: HMI/SCADA



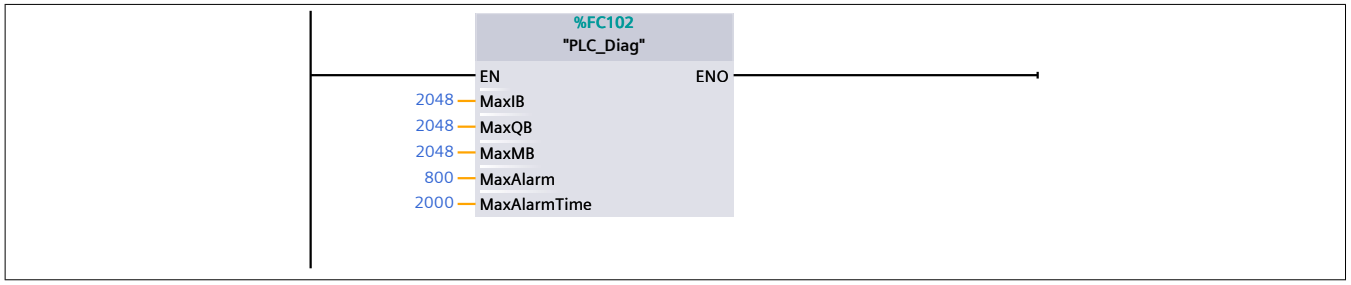
Network 4: Control Modules



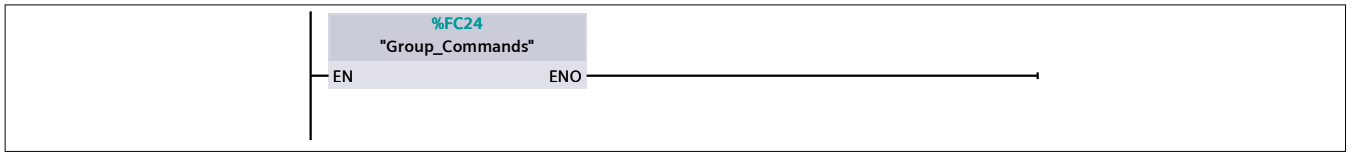
Network 5: Program



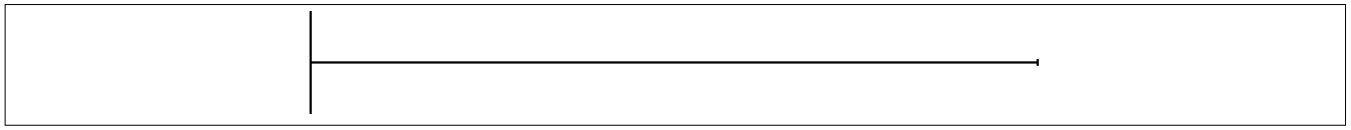
Network 6: PLC diagnostics



Network 7:



Network 8:



BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 04) Visualisation

PLC_TO_SCADA [FC2]

PLC_TO_SCADA Properties					
General					
Name	PLC_TO_SCADA	**Number**	2	**Type**	FC
Language	SCL	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
Temp		
Constant		
▼ Return		
PLC_TO_SCADA	Void	

```
0001 REGION reset manual control 010-BO-01
0002
0003   IF "MOTOR_DB"."010-BO-01".STAT.Alarm_Present OR "ALARM_DB".Alarm[9503] THEN
0004     "ManualControls"."Q/010-BO-01_MSF" := FALSE;
0005   END_IF;
0006
0007 END_REGION
0008
0009 REGION reset manual control 010-RV-01
0010
0011   IF "MOTOR_DB"."010-RV-01".STAT.Alarm_Present OR "ALARM_DB".Alarm[9503] THEN
0012     "ManualControls"."Q/010-RV-01_MSF" := false;
0013   END_IF;
0014
0015 END_REGION
0016
0017 REGION reset manual control 010-CO-01
0018
0019   IF "MOTOR_DB"."010-CO-01".STAT.Alarm_Present OR "ALARM_DB".Alarm[9503] THEN
0020     "ManualControls"."Q/010-CO-01_MSF" := false;
0021   END_IF;
0022
0023 END_REGION
0024
0025 REGION reset manual control 010-XV-01
0026
0027     IF "VALVE_DB"."010-XV-01".STAT.Alarm_Present OR "ALARM_DB".Alarm[9503]
     THEN
0028       "ManualControls"."Q/010-XV-01_ZSC" := false;
0029       "ManualControls"."Q/010-XV-01_ZSO" := FALSE;
0030     END_IF;
0031
0032   END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 07) Control Modules / 07.01) Digital In

DI [FC1021]

DI Properties					
General					
Name	DI	**Number**	1021	**Type**	FC
Language	SCL	**Numbering**	Manual		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
▼ Temp		
nummer	Int	
Constant		
▼ Return		
DI	Void	

```
0001 REGION 010-BO-01_PDS
0002   //Config
0003   "DI_DB"."010-BO-01_PDS".CONFIG.Type := 112;
0004   "DI_DB"."010-BO-01_PDS".CONFIG.Alarm_Nr := 1000;
0005   "DI_DB"."010-BO-01_PDS".HMI.Label := 'PDS';
0006   "DI_DB"."010-BO-01_PDS".CONFIG.Simulation_Enable := FALSE;
0007   //Input
0008   "DI_DB"."010-BO-01_PDS".CTRL.ZS1_IN := "I/010-BO-01_PDS";
0009   //Alarm
0010   "DI_DB"."010-BO-01_PDS".CTRL.Enable_Alarm := TRUE;
0011   "DI_DB"."010-BO-01_PDS".ALARMTIME.Preset := 3;
0012 END_REGION
0013 REGION ES_1
0014   //Config
0015   "DI_DB".ES_1.CONFIG.Type := 112;
0016   "DI_DB".ES_1.CONFIG.Alarm_Nr := 1001;
0017   "DI_DB".ES_1.HMI.Label := 'ES';
0018   "DI_DB".ES_1.CONFIG.Simulation_Enable := FALSE;
0019   //Input
0020   "DI_DB".ES_1.CTRL.ZS1_IN := "I/ES_1" ;
0021   //Alarm
0022   "DI_DB".ES_1.CTRL.Enable_Alarm := TRUE;
0023   "DI_DB".ES_1.ALARMTIME.Preset := 3;
0024 END_REGION
0025 REGION CM_DI CALL
0026   "CM_DI"(Number_Of_Inputs := "CONFIG_PROJECT_DB".CM_Nmb_Of_Elements.DI,
0027       Digital_Input := "CM_DI_DB".Control);
0028 END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 07) Control Modules / 07.05) Valves

VALVES [FC1001]

VALVES Properties					
General					
Name	VALVES	**Number**	1001	**Type**	FC
Language	SCL	**Numbering**	Manual		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
Temp		
Constant		
▼ Return		
VALVES	Void	

```
0001 REGION 010-XV-01
0002   //Config
0003   "VALVE_DB"."010-XV-01".CONFIG.Type := 620;
0004   "VALVE_DB"."010-XV-01".CONFIG.Alarm_Nr := 6000;
0005   "VALVE_DB"."010-XV-01".CONFIG.Simulation_Enable := TRUE;
0006   "VALVE_DB"."010-XV-01".CONFIG.Manual_Enable := true;
0007   "VALVE_DB"."010-XV-01".HMI.Unit := '%';
0008   //InOut
0009   "VALVE_DB"."010-XV-01".CTRL.ZS1_IN := "I/010-XV-01_ZSO";
0010   "VALVE_DB"."010-XV-01".CTRL.ZS2_IN := "I/010-XV-01_ZSC";
0011   "Q/010-XV-01_SVO" := "VALVE_DB"."010-XV-01".STAT.Req_1_On;
0012   "Q/010-XV-01_SVC" := "VALVE_DB"."010-XV-01".STAT.Req_2_On;
0013   //Interlock
0014   "VALVE_DB"."010-XV-01".CTRL.Interlock_1 := "I/ES_1"; //Interlock Emergency
     stop
0015   "VALVE_DB"."010-XV-01".CTRL.Interlock_2 := true; //Interlock Safety
0016   "VALVE_DB"."010-XV-01".CTRL.Interlock_3 := true; //Interlock Process
0017   "VALVE_DB"."010-XV-01".ALARMTIME.Preset := 10;
0018 END_REGION
0019 REGION VALVE CALL
0020   "CM_VALVE"(Number_Of_Valves := "CONFIG_PROJECT_DB".CM_Nmb_Of_Elements.Valve,
0021          Valve := "CM _VALVE_DB".Control);
0022 END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 07) Control Modules / 07.03) Analog In

AI [FC1025]

AI Properties					
General					
Name	AI	**Number**	1025	**Type**	FC
Language	SCL	**Numbering**	Manual		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
Temp		
Constant		
▼ Return		
AI	Void	

```
0001 REGION 010-PIT-01
0002   //Config
0003   "AI_DB"."010-PIT-01".CONFIG.Type := 300;
0004   "AI_DB"."010-PIT-01".CONFIG.Alarm_Nr := 3000;
0005   "AI_DB"."010-PIT-01".HMI.Unit := 'mBar';
0006   "AI_DB"."010-PIT-01".CONFIG.Simulation_Enable := TRUE;
0007   "AI_DB"."010-PIT-01".CONFIG.Value_Min :=0;
0008   "AI_DB"."010-PIT-01".CONFIG.Value_Max :=1000;
0009   //Input
0010   "AI_DB"."010-PIT-01".CONFIG.PIW_Adress := "IW/010-PIT-01";
0011   //Alarm & Limits
0012   "AI_DB"."010-PIT-01".CTRL.Negative_Value := FALSE;
0013   "AI_DB"."010-PIT-01".CTRL.LL_Alarm_Enable := FALSE;
0014   "AI_DB"."010-PIT-01".CTRL.L_Alarm_Enable := false;
0015   "AI_DB"."010-PIT-01".CTRL.H_Alarm_Enable := TRUE;
0016   "AI_DB"."010-PIT-01".CTRL.HH_Alarm_Enable := FALSE;
0017   //"AI_DB"."010-PIT-01".LIMITS.LL_Value := 0.0;
0018   //"AI_DB"."010-PIT-01".LIMITS.L_Value := 0.02;
0019   //"AI_DB"."010-PIT-01".LIMITS.H_Value := 450;
0020   //"AI_DB"."010-PIT-01".LIMITS.HH_Value := 0.0;
0021   "AI_DB"."010-PIT-01".LIMITS.Hysteresis := 0.01;
0022   "AI_DB"."010-PIT-01".ALARMTIME.LL.Preset := 0;
0023   "AI_DB"."010-PIT-01".ALARMTIME.L.Preset := 0;
0024   "AI_DB"."010-PIT-01".ALARMTIME.H.Preset := 0;
0025   "AI_DB"."010-PIT-01".ALARMTIME.HH.Preset := 0;
0026 END_REGION
0027 REGION 010-TIT-01
0028   //Config
0029   "AI_DB"."010-TIT-01".CONFIG.Type := 300;
0030   "AI_DB"."010-TIT-01".CONFIG.Alarm_Nr := 3005;
0031   "AI_DB"."010-TIT-01".HMI.Unit := '°C';
0032   "AI_DB"."010-TIT-01".CONFIG.Simulation_Enable := TRUE;
0033   "AI_DB"."010-TIT-01".CONFIG.Value_Min :=-10;
0034   "AI_DB"."010-TIT-01".CONFIG.Value_Max :=150;
```

```
0035    //Input
0036    "AI_DB"."010-TIT-01".CONFIG.PIW_Adress := "IW/010-TIT-01";
0037    //Alarm & Limits
0038    "AI_DB"."010-TIT-01".CTRL.Negative_Value := FALSE;
0039    "AI_DB"."010-TIT-01".CTRL.LL_Alarm_Enable := FALSE;
0040    "AI_DB"."010-TIT-01".CTRL.L_Alarm_Enable := FALSE;
0041    "AI_DB"."010-TIT-01".CTRL.H_Alarm_Enable := TRUE;
0042    "AI_DB"."010-TIT-01".CTRL.HH_Alarm_Enable := FALSE;
0043    //"AI_DB"."010-TIT-01".LIMITS.LL_Value := 0.0;
0044    //"AI_DB"."010-TIT-01".LIMITS.L_Value := 50.0;
0045    //"AI_DB"."010-TIT-01".LIMITS.H_Value := 65.0;
0046    //"AI_DB"."010-TIT-01".LIMITS.HH_Value := 0.0;
0047    "AI_DB"."010-TIT-01".LIMITS.Hysteresis := 0.01;
0048    "AI_DB"."010-TIT-01".ALARMTIME.LL.Preset := 0;
0049    "AI_DB"."010-TIT-01".ALARMTIME.L.Preset := 0;
0050    "AI_DB"."010-TIT-01".ALARMTIME.H.Preset := 5;
0051    "AI_DB"."010-TIT-01".ALARMTIME.HH.Preset := 0;
0052  END_REGION
0053  REGION CM_AI CALL
0054    "CM_AI"(Number_Of_Inputs := "CONFIG_PROJECT_DB".CM_Nmb_Of_Elements.AI,
0055        "Analog Input" := "CM_AI_DB".Control);
0056  END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 07) Control Modules / 07.06) Motors

MOTORS [FC1003]

MOTORS Properties					
General					
Name	MOTORS	**Number**	1003	**Type**	FC
Language	SCL	**Numbering**	Manual		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
Temp		
Constant		
▼ Return		
MOTORS	Void	

```
0001 REGION 010-BO-01
0002   //Config
0003   "MOTOR_DB"."010-BO-01".CONFIG.Type := 560;
0004   "MOTOR_DB"."010-BO-01".CONFIG.Alarm_Nr := 5000;
0005   "MOTOR_DB"."010-BO-01".CONFIG.Simulation_Enable := TRUE;
0006   "MOTOR_DB"."010-BO-01".CONFIG.Manual_Enable := TRUE;
0007   "MOTOR_DB"."010-BO-01".HMI.Unit := '%';
0008   "MOTOR_DB"."010-BO-01".ANALOG.SP_Min := 20;
0009   "MOTOR_DB"."010-BO-01".ANALOG.SP_Max := 100;
0010   //Input
0011   "MOTOR_DB"."010-BO-01".CTRL.ZS1_IN := "Drives_DB"."010-BO-01".STW_Drive.Run-
     ning;
0012   "MOTOR_DB"."010-BO-01".CTRL.DRIVE_Alarm_IN := TRUE;
0013   "MOTOR_DB"."010-BO-01".CTRL.DRIVE_Ready_IN := "Drives_DB"."010-
     BO-01".STW_Drive.Drive_Ready;
0014   "MOTOR_DB"."010-BO-01".CTRL.DRIVE_At_Speed_IN := "Drives_DB"."010-
     BO-01".STW_Drive.At_Speed;
0015   "MOTOR_DB"."010-BO-01".CTRL.MDS_IN := "I/010-BO-01_MDS";
0016   "MOTOR_DB"."010-BO-01".CTRL.Fuse_IN := TRUE;
0017   "MOTOR_DB"."010-BO-01".CTRL.Coasting_Al_OFF := FALSE;
0018   //Output
0019   // "Q/010-BO-01_MSF" := "MOTOR_DB"."010-BO-01".STAT.Req_1_ON;
0020   //Interlock
0021   "MOTOR_DB"."010-BO-01".CTRL.Interlock_1 := "I/ES_1"; //Interlock Emergency
     stop
0022   "MOTOR_DB"."010-BO-01".CTRL.Interlock_2 := TRUE; //Interlock Safety
0023   "MOTOR_DB"."010-BO-01".CTRL.Interlock_3 := TRUE; //Interlock Process
0024   //Alarm
0025   "MOTOR_DB"."010-BO-01".ALARMTIME.Preset := 11;
0026 END_REGION
0027 REGION 010-RV-01
0028   //Config
0029   "MOTOR_DB"."010-RV-01".CONFIG.Type := 560;
0030   "MOTOR_DB"."010-RV-01".CONFIG.Alarm_Nr := 5012;
```

```
0031    "MOTOR_DB"."010-RV-01".CONFIG.Simulation_Enable := TRUE;
0032    "MOTOR_DB"."010-RV-01".CONFIG.Manual_Enable := TRUE;
0033    "MOTOR_DB"."010-RV-01".HMI.Unit := '%';
0034    "MOTOR_DB"."010-RV-01".ANALOG.SP_Min := 20;
0035    "MOTOR_DB"."010-RV-01".ANALOG.SP_Max := 100;
0036    //Input
0037    "MOTOR_DB"."010-RV-01".CTRL.ZS1_IN := "Drives_DB"."010-RV-01".STW_Drive.Run-
      ning;
0038    "MOTOR_DB"."010-RV-01".CTRL.DRIVE_Alarm_IN := TRUE;
0039    "MOTOR_DB"."010-RV-01".CTRL.DRIVE_Ready_IN := "Drives_DB"."010-
      RV-01".STW_Drive.Drive_Ready;
0040    "MOTOR_DB"."010-RV-01".CTRL.DRIVE_At_Speed_IN := "Drives_DB"."010-
      RV-01".STW_Drive.At_Speed;
0041    "MOTOR_DB"."010-RV-01".CTRL.MDS_IN := "I/010-RV-01_MDS";
0042    "MOTOR_DB"."010-RV-01".CTRL.Fuse_IN := TRUE;
0043    "MOTOR_DB"."010-RV-01".CTRL.Coasting_Al_OFF := FALSE;
0044    //Output
0045    // "Q/010-RV-01_MSF" := "MOTOR_DB"."010-RV-01".STAT.Req_1_ON;
0046    //Interlock
0047    "MOTOR_DB"."010-RV-01".CTRL.Interlock_1 := "I/ES_1"; //Interlock Emergency
      stop
0048    "MOTOR_DB"."010-RV-01".CTRL.Interlock_2 := TRUE; //Interlock Safety
0049    "MOTOR_DB"."010-RV-01".CTRL.Interlock_3 := TRUE; //Interlock Process
0050    //Alarm
0051    "MOTOR_DB"."010-RV-01".ALARMTIME.Preset := 5;
0052  END_REGION
0053  REGION 010-CO-01
0054    //Config
0055    "MOTOR_DB"."010-CO-01".CONFIG.Type := 502;
0056    "MOTOR_DB"."010-CO-01".CONFIG.Alarm_Nr := 5018;
0057    "MOTOR_DB"."010-CO-01".CONFIG.Simulation_Enable := TRUE;
0058    "MOTOR_DB"."010-CO-01".CONFIG.Manual_Enable := TRUE;
0059    "MOTOR_DB"."010-CO-01".HMI.Unit := '%';
0060    //Input
0061    "MOTOR_DB"."010-CO-01".CTRL.ZS1_IN := "I/010-CO-01_MRF";
0062    "MOTOR_DB"."010-CO-01".CTRL.MDS_IN := "I/010-CO-01_MDS";
0063    "MOTOR_DB"."010-CO-01".CTRL.Fuse_IN := TRUE;
0064    "MOTOR_DB"."010-CO-01".CTRL.Coasting_Al_OFF := FALSE;
0065    //Output
0066    "Q/010-CO-01_MSF" := "MOTOR_DB"."010-CO-01".STAT.Req_1_ON;
0067    //Interlock
0068    "MOTOR_DB"."010-CO-01".CTRL.Interlock_1 := "I/ES_1"; //Interlock Emergency
      stop
0069    "MOTOR_DB"."010-CO-01".CTRL.Interlock_2 := TRUE; //Interlock Safety
0070    "MOTOR_DB"."010-CO-01".CTRL.Interlock_3 := TRUE; //Interlock Process
0071    //Alarm
0072    "MOTOR_DB"."010-CO-01".ALARMTIME.Preset := 0;
0073  END_REGION
0074  REGION CM_MOTOR CALL
0075    "CM_MOTOR"(Number_Of_Motors := "CONFIG_PROJECT_DB".CM_Nmb_Of_Elements.Motor,
0076               Motor := "CM_MOTOR_DB".Control);
0077  END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 07) Control Modules / 07.06) Motors

Drives [FB1]

Drives Properties					
General					
Name	Drives	**Number**	1	**Type**	FB
Language	SCL	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
010-BO-01	"FB/Danfoss FC300"		
010-RV-01	"FB/Danfoss FC300"		
▼ Temp			
Temp_Bool	Bool		
Temp_Out	Bool		
Constant			

```
0001 REGION 010-BO-01
0002
0003   #"010-BO-01"(Start_Address:=4500,
0004          Q_Run_Enable=>#Temp_Out,
0005          Request_Speed:="MOTOR_DB"."010-BO-01".ANALOG.SP_AUTO,
0006          Request_Start_FW:="MOTOR_DB"."010-BO-01".STAT.Req_1_ON,
0007          Request_Start_RV:=#Temp_Bool);
0008
0009 END_REGION
0010
0011 REGION
0012
0013   #"010-RV-01"(Start_Address:=4512,
0014          Q_Run_Enable=>#Temp_Out,
0015          Request_Speed:="MOTOR_DB"."010-RV-01".ANALOG.SP_AUTO,
0016          Request_Start_FW:="MOTOR_DB"."010-RV-01".STAT.Req_1_ON,
0017          Request_Start_RV:=#Temp_Bool);
0018
0019
0020 END_REGION
```

BP_BB-Station-JTT00012 / PLC_1 [CPU 1510SP-1 PN] / Program blocks / 08) Program

Program_BB-station [FC7]

Program_BB-station Properties					
General					
Name	Program_BB-station	**Number**	7	**Type**	FC
Language	SCL	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
▼ Temp		
temp_bool	Bool	
temp_out	Bool	
tempreal	Real	
Constant		
▼ Return		
Program_BB-station	Void	

```
0001 //call Transport MAIN
0002
0003 "Transport_Ma!n_DB"(Manual_ON := "mMan_ok");
0004
0005 "Transport_SEQ_DB"(StartConditions_OK := "Transport_Ma!n_DB".StartCondi-
     tions_OK ,
0006             StopConditions_OK := "Transport_Ma!n_DB".StopConditions_OK,
0007             PauseConditions_OK := TRUE,
0008             TripConditions_OK := "Transport_Ma!n_DB".TripConditions_OK,
0009             FAVopened := "VALVE_DB"."010-XV-01".STAT.ZS1_On,
0010             FAVclosed := "VALVE_DB"."010-XV-01".STAT.ZS2_On,
0011             Blower_run := "MOTOR_DB"."010-BO-01".STAT.ZS1_ON,
0012             Cooler_MRF := "MOTOR_DB"."010-CO-01".STAT.ZS1_ON,
0013             RV_run := "MOTOR_DB"."010-RV-01".STAT.ZS1_ON,
0014             PSH_ok := NOT "AI_DB"."010-PIT-01".STAT.H,
0015             PSL_ok :=  "AI_DB"."010-PIT-01".STAT.L);
0016
0017
0018
0019 REGION Blower
0020
0021   "MOTOR_DB"."010-BO-01".CTRL.Auto_Req_1 := "Transport_SEQ_DB".Outputs.Blower
     OR "ManualControls"."Q/010-BO-01_MSF";
0022 END_REGION
0023
0024 REGION Rotary valve
0025
0026   "MOTOR_DB"."010-RV-01".CTRL.Auto_Req_1 := "Transport_SEQ_DB".Outputs.Rotary-
     Valve OR "ManualControls"."Q/010-RV-01_MSF";
0027 END_REGION
```

```
0028
0029 REGION Air cooler
0030   "MOTOR_DB"."010-CO-01".STAT.Req_1_ON := "Transport_SEQ_DB".Outputs.Cooler OR
      "ManualControls"."Q/010-CO-01_MSF";
0031 END_REGION
0032
0033 REGION Free air valve
0034   "VALVE_DB"."010-XV-01".CTRL.Auto_Req_1 := ("Transport_SEQ_DB".Outputs.Valve-
     Open OR "ManualControls"."Q/010-XV-01_ZSO")
0035                            AND NOT "VALVE_DB"."010-XV-01".STAT.ZS1_On;
0036   "VALVE_DB"."010-XV-01".CTRL.Auto_Req_2 := ("Transport_SEQ_DB".Outputs.Valve-
     Closed OR "ManualControls"."Q/010-XV-01_ZSC")
0037                            AND NOT "VALVE_DB"."010-XV-01".STAT.ZS2_On;
0038 END_REGION
0039
0040 "TSH_TON".TON(IN:="AI_DB"."010-TIT-01".STAT.H,
0041             PT:=t#10s);
0042
0043
0044
0045
0046
```

Transport_SEQ [FB5]

Transport_SEQ Properties					
General					
Name	Transport_SEQ	**Number**	5	**Type**	FB
Language	SCL	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
▼ Input			
StartConditions_OK	Bool	false	Non-retain
StopConditions_OK	Bool	false	Non-retain
PauseConditions_OK	Bool	false	Non-retain
TripConditions_OK	Bool	false	Non-retain
FAVopened	Bool	false	Non-retain
FAVclosed	Bool	false	Non-retain
Blower_run	Bool	false	Non-retain
Cooler_MRF	Bool	false	Non-retain
RV_run	Bool	false	Non-retain
PSH_ok	Bool	false	Non-retain
PSL_ok	Bool	false	Non-retain
Output			
InOut			
▼ Static			
CMD_HMI	DInt	0	Non-retain
CMD_Bits	"UDT_Seq_CMD_Bits"		Non-retain
StepNr	Int	0	Non-retain
SepTimer	TON_TIME		Non-retain
Memory_Step	Int	0	Non-retain
Return_Step	Int	0	Non-retain
Outputs	Struct		Non-retain
▼ Temp			
Temp_Dword	DWord		
Temp_EDGE	DWord		
Temp_Ack	Bool		
Temp_Mem	Bool		
Start_StepTimer	Bool		
Constant			

```
0001 REGION CMD control
0002     // Edge detection CMD
0003   #Temp_EDGE := (#CMD_HMI XOR #Temp_Dword) AND #CMD_HMI;
0004   #Temp_Dword := #CMD_HMI;
0005
0006   IF #Temp_EDGE <> 0
0007   THEN
0008     (*
0009  IN: Dword for commands (from HMI)
0010  OUT: UDT for command bits
0011  #CMD_Bits.Start
```

```
0012  #CMD_Bits.Stop
0013  #CMD_Bits.Hold
0014  #CMD_Bits.Pause
0015  #CMD_Bits.Abort
0016  #CMD_Bits.Restart
0017  #CMD_Bits.Reset
0018  #CMD_Bits.Resume
0019 *)
0020      "CMD_HMI"(IN := #CMD_HMI,
0021                OUT := #CMD_Bits);
0022    END_IF;
0023 END_REGION
0024
0025 REGION TRIP by Conditions
0026    IF NOT #TripConditions_OK THEN
0027      #StepNr := 1;
0028      #Start_StepTimer := false;
0029      #SepTimer(IN := #Start_StepTimer,
0030                PT := t#10ms);
0031    END_IF;
0032 END_REGION
0033
0034 REGION STOP by Conditions
0035    IF NOT #StopConditions_OK AND ((#StepNr >= 100 AND #StepNr <= 299) OR
      (#StepNr >= 600 AND #StepNr <= 999)) THEN
0036      #CMD_Bits.Stop := true;
0037      #Memory_Step := #StepNr;
0038      #StepNr := 300;
0039      #Return_Step := 30;
0040      #SepTimer(IN := false,
0041                PT := t#1s);
0042    END_IF;
0043 END_REGION
0044
0045 REGION Fixed states (0- 99)
0046    CASE #StepNr OF
0047      0:
0048        REGION 0: No Step active
0049          REGION Actions
0050            ;
0051          END_REGION
0052          REGION Transition
0053            #StepNr := 1;
0054          END_REGION
0055          REGION Actions
0056            ;
0057          END_REGION
0058        END_REGION
0059      1:
0060        REGION 1: Tripped
0061          REGION Actions
0062            ;
0063          END_REGION
0064          REGION Transition
0065            IF #TripConditions_OK AND #CMD_Bits.Reset THEN
0066              #StepNr := 10;
0067            END_IF;
0068          END_REGION
0069          REGION Actions
```

```
0070            ;
0071          END_REGION
0072        END_REGION
0073      10:
0074        REGION 10: Idle / Not ready,
0075          REGION Actions
0076            ;
0077          END_REGION
0078          REGION Transition
0079            IF #StartConditions_OK THEN
0080              #StepNr := 15;
0081            END_IF;
0082          END_REGION
0083          REGION Actions
0084            ;
0085          END_REGION
0086        END_REGION ;
0087      15:
0088        REGION 15: Idle / Ready,
0089          REGION Actions
0090            ;
0091          END_REGION
0092          REGION Transition
0093            // Not ready
0094            IF NOT #StartConditions_OK THEN
0095              #StepNr := 10;
0096            END_IF;
0097            // Start
0098            IF #CMD_Bits.Start AND #StartConditions_OK THEN
0099              #StepNr := 100;
0100            END_IF;
0101          END_REGION
0102          REGION Actions
0103            ;
0104          END_REGION
0105        END_REGION ;
0106      30:
0107        REGION 30: Stopped
0108          REGION Actions
0109            ;
0110          END_REGION
0111          REGION Transition
0112            // Reset
0113            IF #StepNr = 30
0114              AND #CMD_Bits.Reset
0115            THEN
0116              #StepNr := 10;
0117            END_IF;
0118          END_REGION
0119          REGION Actions
0120            ;
0121          END_REGION
0122        END_REGION
0123      40:
0124        REGION 40: Held
0125          REGION Actions
0126            ;
0127          END_REGION
0128          REGION Transition
```

```
0129            // Stop
0130            IF #StepNr = 40 AND #CMD_Bits.Stop
0131            THEN
0132              #StepNr := 300;
0133            END_IF;
0134            // abort
0135            IF #StepNr = 40 AND #CMD_Bits.Abort
0136            THEN
0137              #StepNr := 500;
0138            END_IF;
0139            // Restart
0140            IF #StepNr = 40 AND #CMD_Bits.Restart THEN
0141              #StepNr := 700;
0142            END_IF;
0143          END_REGION
0144          REGION Actions
0145            ;
0146          END_REGION ;
0147        END_REGION
0148      50:
0149        REGION 50: Aborted
0150          IF #CMD_Bits.Reset AND #StepNr = 50 THEN
0151            #StepNr := 10;
0152          END_IF;
0153          #SepTimer(IN := #StepNr = 5,
0154                    PT := t#1s);
0155        END_REGION
0156      60:
0157        REGION 60: Paused
0158          // Stop
0159          IF #StepNr = 60 AND #CMD_Bits.Stop
0160          THEN
0161            #StepNr := 300;
0162          END_IF;
0163          // abort
0164          IF #StepNr = 60 AND #CMD_Bits.Abort
0165          THEN
0166            #StepNr := 500;
0167          END_IF;
0168          // Restart
0169          IF #StepNr = 60 AND #CMD_Bits.Resume AND #PauseConditions_OK
0170          THEN
0171            #StepNr := 800;
0172          END_IF;
0173        END_REGION
0174      99:
0175        REGION 99: Completed
0176          IF #StepNr = 99 AND #CMD_Bits.Reset
0177          THEN
0178            #StepNr := 10;
0179          END_IF;
0180        END_REGION
0181    END_CASE;
0182  END_REGION
0183
0184  REGION Starting (100-199)
0185    REGION Actions during 'Starting' state
0186    IF #StepNr >= 100 AND #StepNr <= 199 THEN
0187      REGION Stop
```

```
0188        IF #CMD_Bits.Stop THEN
0189          #Memory_Step := #StepNr;
0190          #StepNr := 300;
0191          #Return_Step := 10;  // Idle
0192          #SepTimer(IN := false,
0193                    PT := t#1s);
0194        END_IF;
0195      END_REGION
0196      REGION Abort
0197        IF #CMD_Bits.Abort THEN
0198          #Memory_Step := #StepNr;
0199          #StepNr := 500;
0200          #Return_Step := 10;  // Idle
0201          #SepTimer(IN := false,
0202                    PT := t#1s);
0203        END_IF;
0204      END_REGION
0205    END_IF;
0206  END_REGION;
0207  //Sequence steps
0208    CASE #StepNr OF
0209      100:
0210        REGION 100: Step 100
0211          REGION actions
0212             // tijdens stap ;
0213          END_REGION
0214          REGION transition
0215            IF  #StepNr = 100
0216              AND #FAVopened = TRUE
0217            THEN
0218              #StepNr := 101;
0219            ELSIF NOT #StartConditions_OK = TRUE
0220              OR NOT #StopConditions_OK = TRUE
0221            THEN
0222              #StepNr := 10;
0223            END_IF;
0224
0225
0226          END_REGION
0227          REGION actions
0228             // flank functie na stap ;
0229          END_REGION
0230        END_REGION
0231      101:
0232        REGION 101: Step 101
0233          REGION actions
0234            ;
0235          END_REGION
0236          REGION transition
0237            IF #SepTimer.Q = true
0238              AND #StepNr = 101
0239              AND #Blower_run = TRUE
0240              AND #Cooler_MRF = TRUE
0241            THEN
0242              #StepNr := 102;
0243            ELSIF NOT #StartConditions_OK = TRUE
0244              OR NOT #StopConditions_OK = TRUE
0245            THEN
0246              #StepNr := 10;
```

```
0247
0248            END_IF;
0249
0250            #Start_StepTimer := #StepNr = 101 AND #Blower_run AND #Cooler_MRF;
0251            #SepTimer(IN := #Start_StepTimer,
0252                  PT := t#12s);
0253          END_REGION
0254          REGION actions
0255            ;
0256          END_REGION
0257        END_REGION
0258      102:
0259        REGION 102: Step 102
0260          REGION actions
0261            ;
0262          END_REGION
0263          REGION transition
0264            IF  #StepNr = 102
0265              AND #FAVclosed = TRUE
0266            THEN
0267              #StepNr := 103;
0268            ELSIF NOT #StartConditions_OK = TRUE
0269              OR NOT #StopConditions_OK = TRUE
0270            THEN
0271              #StepNr := 10;
0272            END_IF;
0273
0274          END_REGION
0275          REGION actions
0276            ;
0277          END_REGION
0278        END_REGION
0279      103: // has to go to running after
0280        REGION 103: Step 103
0281          REGION actions
0282            ;
0283          END_REGION
0284          REGION transition
0285            IF #SepTimer.Q = true
0286              AND #StepNr = 103
0287              AND #PSL_ok = TRUE
0288            THEN
0289              #StepNr := 200;
0290            ELSIF #SepTimer.Q = TRUE
0291              AND #StepNr = 103
0292              AND #PSL_ok = FALSE
0293            THEN
0294              #StepNr := 300;
0295            END_IF;
0296
0297            #Start_StepTimer := #StepNr = 103;
0298            #SepTimer(IN := #Start_StepTimer,
0299                  PT := t#10s);
0300          END_REGION
0301          REGION actions
0302            ;
0303          END_REGION
0304        END_REGION
0305    END_CASE;
```

```
0306 END_REGION
0307
0308 REGION Running (200-299)
0309   REGION Actions during 'Running' state
0310     IF #StepNr >= 200 AND #StepNr <= 299 THEN
0311       REGION Stop
0312         IF #CMD_Bits.Stop THEN
0313           #Memory_Step := #StepNr;
0314           #StepNr := 300;
0315           #Return_Step := 10;  // Idle
0316           #SepTimer(IN := false,
0317                     PT := t#1s);
0318         END_IF;
0319       END_REGION
0320       REGION Pause
0321         IF #CMD_Bits.Pause OR NOT #PauseConditions_OK THEN
0322           #Memory_Step := #StepNr;
0323           #StepNr := 600;
0324           #Return_Step := #Memory_Step;  // Return to actual step
0325           #SepTimer(IN := false,
0326                     PT := t#1s);
0327         END_IF;
0328       END_REGION
0329       REGION Hold
0330         IF #CMD_Bits.Hold THEN
0331           #Memory_Step := #StepNr;
0332           #StepNr := 400;
0333           #Return_Step := #Memory_Step;
0334           #SepTimer(IN := false,
0335                     PT := t#1s);
0336         END_IF;
0337       END_REGION
0338       REGION Abort
0339         IF #CMD_Bits.Abort THEN
0340           #Memory_Step := #StepNr;
0341           #StepNr := 500;
0342           #Return_Step := 10;  // Idle
0343           #SepTimer(IN := false,
0344                     PT := t#1s);
0345         END_IF;
0346       END_REGION
0347     END_IF;
0348   END_REGION ;
0349   //Sequence steps
0350   CASE #StepNr OF
0351     200: // step 07, when done goes to stopping
0352       REGION 200: Step 200
0353         REGION actions
0354           ;
0355         END_REGION
0356         REGION transition
0357           IF #StepNr = 200
0358             AND NOT #StopConditions_OK OR #CMD_Bits.Stop = TRUE
0359           THEN
0360             #StepNr := 300;
0361           ELSIF #StepNr = 200
0362             AND NOT #PSH_ok
0363           THEN
0364             #StepNr := 201;
```

```
0365            END_IF;
0366
0367          END_REGION
0368          REGION actions
0369            ;
0370          END_REGION
0371        END_REGION
0372      201: // step 20
0373        REGION 201: Step 201
0374          REGION actions
0375            ;
0376          END_REGION
0377          REGION transition
0378            IF #StepNr = 201
0379              AND #PSL_ok = TRUE
0380            THEN
0381              #StepNr := 200;
0382            ELSIF #SepTimer.Q = TRUE
0383              AND #StepNr = 200
0384              AND #PSL_ok = FALSE
0385            THEN
0386              #StepNr := 1;
0387            END_IF;
0388
0389            #Start_StepTimer := #StepNr = 201;
0390            #SepTimer(IN := #Start_StepTimer,
0391                  PT := t#5s);
0392          END_REGION
0393          REGION actions
0394            ;
0395          END_REGION
0396        END_REGION
0397    END_CASE;
0398  END_REGION
0399
0400  REGION Stopping (300-399)
0401    // Return step to last step before stop
0402    REGION Actions
0403      // Actions during stopping state
0404      IF #StepNr >= 300 AND #StepNr <= 399 THEN
0405        REGION Abort
0406          IF #CMD_Bits.Abort THEN
0407            // Statement section IF
0408            #Memory_Step := #StepNr;
0409            #StepNr := 500;
0410            #Return_Step := 10;  // Idle
0411            #SepTimer(IN := false,
0412                  PT := t#1s);
0413           END_IF;
0414         END_REGION ;
0415         //
0416         // REGION Reset
0417         // IF #CMD_Bits.Reset AND #StepNr = 1099 THEN
0418         // // Statement section IF
0419         // #Memory_Step := #StepNr;
0420         // #StepNr := 10;
0421         // #SepTimer(IN := false,
0422         // PT := t#1s);
0423         // END_IF;
```

```
0424          // END_REGION
0425        END_IF;
0426      END_REGION
0427      REGION Sequence steps
0428
0429          CASE #StepNr OF
0430            300:
0431              REGION 300:
0432                REGION actions
0433                  ;
0434                END_REGION
0435                REGION transition
0436                  IF #StepNr = 300
0437                    AND #PSL_ok
0438                    AND #SepTimer.Q = true
0439                  THEN
0440                    #StepNr := 301;
0441                  END_IF;
0442
0443                  #Start_StepTimer := #StepNr = 300;
0444                  #SepTimer(IN := #Start_StepTimer,
0445                            PT := t#10s);
0446
0447                END_REGION
0448                REGION actions
0449                  ;
0450                END_REGION
0451              END_REGION
0452            301:
0453              REGION 301:
0454                REGION actions
0455                  ;
0456                END_REGION
0457                REGION transition
0458                  IF  #StepNr = 301
0459                    AND #FAVopened
0460                  THEN
0461                    #StepNr := 302;
0462                  END_IF;
0463
0464                END_REGION
0465                REGION actions
0466                  ;
0467                END_REGION
0468              END_REGION
0469            302:
0470              REGION 302:
0471                REGION actions
0472                  ;
0473                END_REGION
0474                REGION transition
0475                  IF #SepTimer.Q = true
0476                    AND #StepNr = 302
0477                  THEN
0478                    #StepNr := 305;
0479                  ELSIF
0480                    #CMD_Bits.Start AND #StartConditions_OK = TRUE
0481                  THEN
0482                    #StepNr := 102;
```

```
0483                END_IF;
0484
0485                #Start_StepTimer := #StepNr = 302;
0486                #SepTimer(IN := #Start_StepTimer,
0487                      PT := t#300s);
0488              END_REGION
0489              REGION actions
0490                ;
0491              END_REGION
0492            END_REGION
0493          305: // final stop
0494            REGION 305:
0495              REGION actions
0496                ;
0497              END_REGION
0498              REGION transition
0499                #StepNr := 30;
0500              END_REGION
0501              REGION actions
0502                ;
0503              END_REGION
0504            END_REGION
0505        END_CASE;
0506      END_REGION
0507    END_REGION
0508
0509  REGION Holding (400-499)
0510    REGION Actions during 'Holding' state
0511      IF #StepNr >= 400 AND #StepNr <= 499 THEN
0512        REGION Abort
0513          IF #CMD_Bits.Abort THEN
0514            #Memory_Step := #StepNr;
0515            #StepNr := 500;
0516            #Return_Step := 50;  // Aborted
0517            #SepTimer(IN := false,
0518                  PT := t#1s);
0519          END_IF;
0520        END_REGION
0521        REGION Stop
0522          IF #CMD_Bits.Stop THEN
0523            #Memory_Step := #StepNr;
0524            #StepNr := 300;
0525            #Return_Step := 30;  // Stopped
0526            #SepTimer(IN := false,
0527                  PT := t#1s);
0528          END_IF;
0529        END_REGION
0530      END_IF;
0531    END_REGION
0532    REGION Sequence steps
0533      CASE #StepNr OF
0534        400:
0535          REGION 400:
0536            REGION actions
0537              ;
0538            END_REGION
0539            REGION transition
0540              #StepNr := 40;
0541            END_REGION
```

```
0542            REGION actions
0543              ;
0544            END_REGION
0545          END_REGION
0546      END_CASE;
0547    END_REGION
0548  END_REGION
0549
0550  REGION Aborting (500-599)
0551    REGION Actions during Aborting state
0552      IF #StepNr >= 500 AND #StepNr <= 599 THEN
0553        ;
0554      END_IF;
0555    END_REGION
0556    REGION Sequence steps
0557
0558      CASE #StepNr OF
0559        500:
0560          REGION 500:
0561            REGION actions
0562              ;
0563            END_REGION
0564            REGION transition
0565              #StepNr := 50;
0566            END_REGION
0567            REGION actions
0568              ;
0569            END_REGION
0570          END_REGION
0571      END_CASE;
0572    END_REGION
0573  END_REGION
0574
0575  REGION Pausing (600-699)
0576    REGION Actions during Pausing state
0577      IF #StepNr >= 600 AND #StepNr <= 699 THEN
0578        REGION Abort
0579          IF #CMD_Bits.Abort THEN
0580            #Memory_Step := #StepNr;
0581            #StepNr := 500;
0582            #Return_Step := 10;  // Idle
0583            #SepTimer(IN := false,
0584                      PT := t#1s);
0585          END_IF;
0586        END_REGION
0587        REGION Stop
0588          IF #CMD_Bits.Stop THEN
0589            #Memory_Step := #StepNr;
0590            #StepNr := 300;
0591            #Return_Step := 30;  // Stopped
0592            #SepTimer(IN := false,
0593                      PT := t#1s);
0594          END_IF;
0595        END_REGION
0596      END_IF;
0597    END_REGION
0598    REGION Sequence steps
0599      CASE #StepNr OF
0600        600:
```

```
0601          REGION 600:
0602            REGION actions
0603              ;
0604            END_REGION
0605            REGION transition
0606              #StepNr := 60;
0607            END_REGION
0608            REGION actions
0609              ;
0610            END_REGION
0611          END_REGION
0612          ;
0613      END_CASE;
0614    END_REGION
0615  END_REGION
0616
0617  REGION Restarting from Held (700-799)
0618    REGION Actions during Restarting state
0619      IF #StepNr >= 700 AND #StepNr <= 799 THEN
0620        REGION Abort
0621          IF #CMD_Bits.Abort THEN
0622            #Memory_Step := #StepNr;
0623            #StepNr := 500;
0624            #Return_Step := 10;  // Idle
0625            #SepTimer(IN := false,
0626                      PT := t#1s);
0627          END_IF;
0628        END_REGION
0629        REGION Stop
0630          IF #CMD_Bits.Stop THEN
0631            #Memory_Step := #StepNr;
0632            #StepNr := 300;
0633            #Return_Step := 30;  // Stopped
0634            #SepTimer(IN := false,
0635                      PT := t#1s);
0636          END_IF;
0637        END_REGION
0638      END_IF;
0639    END_REGION
0640    REGION Sequence steps
0641      CASE #StepNr OF
0642        700:
0643          REGION 700:
0644            REGION actions
0645              ;
0646            END_REGION
0647            REGION transition
0648              #StepNr := 200;
0649            END_REGION
0650            REGION actions
0651              ;
0652            END_REGION
0653          END_REGION
0654      END_CASE;
0655    END_REGION
0656  END_REGION
0657
0658  REGION Resuming from Pause (800-899)
0659    REGION Actions during Restarting state
```

```
0660      IF #StepNr >= 800 AND #StepNr <= 899 THEN
0661        REGION Abort
0662          IF #CMD_Bits.Abort THEN
0663            #Memory_Step := #StepNr;
0664            #StepNr := 500;
0665            #Return_Step := 10;  // Idle
0666            #SepTimer(IN := false,
0667                      PT := t#1s);
0668          END_IF;
0669        END_REGION
0670        REGION Stop
0671          IF #CMD_Bits.Stop THEN
0672            #Memory_Step := #StepNr;
0673            #StepNr := 300;
0674            #Return_Step := 30;  // Stopped
0675            #SepTimer(IN := false,
0676                      PT := t#1s);
0677          END_IF;
0678        END_REGION
0679      END_IF;
0680    END_REGION
0681    REGION Sequence steps
0682      CASE #StepNr OF
0683        800:
0684          REGION 805: Restart (after Pause)
0685            REGION actions
0686              ;
0687            END_REGION
0688            REGION transition
0689              IF #PauseConditions_OK
0690                AND #StepNr = 800
0691              THEN
0692                #StepNr := 200;
0693              END_IF;
0694
0695            END_REGION
0696            REGION actions
0697              ;
0698            END_REGION
0699          END_REGION
0700      END_CASE;
0701    END_REGION
0702  END_REGION
0703
0704  REGION Completing (900-999)
0705    REGION Actions during Completing state
0706      IF #StepNr >= 900 AND #StepNr <= 999 THEN
0707        REGION Abort
0708          IF #CMD_Bits.Abort THEN
0709            #Memory_Step := #StepNr;
0710            #StepNr := 500;
0711            #Return_Step := 10;  // Idle
0712            #SepTimer(IN := false,
0713                      PT := t#1s);
0714          END_IF;
0715        END_REGION
0716        REGION Stop
0717          IF #CMD_Bits.Stop THEN
0718            #Memory_Step := #StepNr;
```

```
0719            #StepNr := 300;
0720            #Return_Step := 30;  // Stopped
0721            #SepTimer(IN := false,
0722                      PT := t#1s);
0723          END_IF;
0724        END_REGION
0725      END_IF;
0726    END_REGION
0727    REGION Sequence steps
0728      CASE #StepNr OF
0729        900:
0730          REGION 900:
0731            REGION actions
0732              ;
0733            END_REGION
0734            REGION transition
0735              #StepNr := 99;
0736            END_REGION
0737            REGION actions
0738              ;
0739            END_REGION
0740          END_REGION
0741      END_CASE;
0742    END_REGION
0743  END_REGION
0744
0745  REGION Outputs
0746    REGION 010-XV-01-ZSC
0747      #Outputs.ValveClosed := (#StepNr >= 102 AND #StepNr <= 300);
0748    END_REGION
0749    REGION 010-XV-01-ZSO
0750      #Outputs.ValveOpen := (#StepNr = 100)
0751      OR (#StepNr = 101)
0752      OR (#StepNr = 301)
0753      OR (#StepNr = 302);
0754    END_REGION
0755    REGION 010-BO-01
0756      #Outputs.Blower := (#StepNr >= 101 AND #StepNr <= 302); // or ... (comman-
      do maueel);
0757    END_REGION
0758    REGION 010-CO-01
0759      #Outputs.Cooler := (#StepNr >= 101 AND #StepNr <= 302);
0760    END_REGION
0761    REGION 010-RV-01
0762      #Outputs.RotaryValve := (#StepNr = 200);
0763    END_REGION
0764    REGION alarms
0765
0766      // PSH pipe blocked
0767      "SINGLE_ALARM"(Alarm_Nr := 9500,
0768                Condition := #StepNr = 201 AND #SepTimer.Q, //aanpassen aan re-
      eel,
0769                Enable := TRUE,
0770                Auto_Ack := TRUE,
0771                Ack := #Temp_Ack,
0772                Reset := "ManualControls".mReset,
0773                Reset_Group := "GROUPS_DB".ResetAlarmGroup[1].General,
0774                Mem_Ack := #Temp_Mem);
0775
```

```
0776      // PSL not reached while emptying, dus nog single alarm
0777      "SINGLE_ALARM"(Alarm_Nr:= 9501,
0778               Condition:= #StepNr = 300 AND #SepTimer.Q,
0779               Enable:=TRUE,
0780               Auto_Ack:=TRUE,
0781               Ack:=#Temp_Ack,
0782               Reset:="ManualControls".mReset,
0783               Reset_Group:="GROUPS_DB".ResetAlarmGroup[1].General,
0784               Mem_Ack:=#Temp_Mem);
0785
0786      // temperature to long above high limit
0787      "SINGLE_ALARM"(Alarm_Nr:=9502,
0788               Condition:= #StepNr > 100 AND #StepNr < 306 AND "TSH_TON".Q,
0789               Enable:=TRUE,
0790               Auto_Ack:=TRUE,
0791               Ack:=#Temp_Ack,
0792               Reset:="ManualControls".mReset,
0793               Reset_Group:="GROUPS_DB".ResetAlarmGroup[1].General,
0794               Mem_Ack:=#Temp_Mem);
0795
0796      // emergency stop active
0797      "SINGLE_ALARM"(Alarm_Nr:=9503,
0798               Condition:= "I/ES_1" = FALSE,
0799               Enable:=true,
0800               Auto_Ack:=TRUE,
0801               Ack:=#Temp_Ack,
0802               Reset:="ManualControls".mReset,
0803               Reset_Group:="GROUPS_DB".ResetAlarmGroup[1].General,
0804               Mem_Ack:=#Temp_Mem);
0805
0806
0807
0808    END_REGION
0809  END_REGION
0810
0811  REGION reset cmd
0812     FILL_BLK(IN:=false,
0813        COUNT:=32,
0814        OUT=>#CMD_Bits.Start);
0815    (*
0816   #CMD_Bits.Start
0817   := #CMD_Bits.Stop
0818   := #CMD_Bits.Hold
0819   := #CMD_Bits.Pause
0820   := #CMD_Bits.Abort
0821   := #CMD_Bits.Restart
0822   := #CMD_Bits.Reset
0823   := false;
0824  *)
0825       END_REGION
0826
```

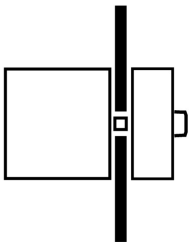
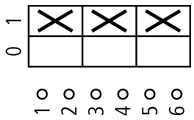
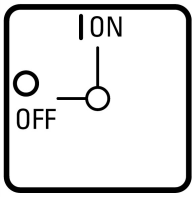
SPECIFICATIEBLAD - P3-63/EA/SVB

Hoofdschakelaar, P3, 63 A, inbouw, 3-polig, NOOD-UIT-functie, Met rode draaigreep en gele plaat, Afsluitbaar in 0-stand

Powering Business Worldwide™

Type P3-63/EA/SVB
Catalog No. 031607

Leveringsprogramma

Assortiment			Hoofdschakelaar Werkschakelaars Werkschakelaars
Typekenner			P3
STOP-functie			NOOD-UIT-functie
			Met rode draaigreep en gele plaat
Informatie over de uitlevering			Hulpschakelaarcontact of nulleider naderhand monteerbaar.
Aantal polen			3-polig
hulpstroombanen			
		Maakcontact	0
		Verbreekcontact	0
Afsluitbaarheid			Afsluitbaar in 0-stand
beschermingsgraad			Front IP65
Bouwvorm			inbouw
			
Schakelsymbool			
functie			
Nom. vermogen AC-23A, 50 - 60 Hz			
400 V	P	kW	30
nominale continu stroom	I_u	A	63
Opmerking betreffende nominale continu stroom I_u			De nominale continu stroom I_u is bij max. doorsnede gegeven.

Technische gegevens

Algemeen

normen en bepalingen			IEC/EN 60947, VDE 0660, IEC/EN 60204, CSA, UL Lastscheider conform IEC/EN 60947-3 NEMA12
Klimaatbestendigheid			Vochtige warmte, constant, conform IEC 60068-2-78 Vochtige warmte, cyclisch, conform IEC 60068-2-30
omgevingstemperatuur			
open		°C	-25 - +50
In kast		°C	-25 - +40

Overspanningscategorie/vervuilingsgraad			III/3
Nom. stootspanningsvastheid	U_{imp}	V AC	6000
Schokbestendigheid		g	15
inbouwpositie			willekeurig

Stroombanen

Mechanische specificaties			
Aantal polen			3-polig
hulpstroombanen			
		Maakcontact	0
		Verbreekcontact	0
elektrische specificaties			
nominale bedrijfsspanning	U_e	V AC	690
nominale continu stroom	I_u	A	63
Opmerking betreffende nominale continu stroom I_u			De nominale continu stroom I_u is bij max. doorsnede gegeven.
Belastbaarheid bij intermitterend bedrijf, klasse 12			
AB 25 % ID		x I_e	2
AB 40 % ID		x I_e	1.6
AB 60 % ID		x I_e	1.3
kortsluitvastheid			
smeltzekering		A gG/gL	80
nom. piekstroom (1-s-stroom)	I_{cw}	A_{eff}	1260
Opmerking betreffende nominale piekstroom Icw			1 seconde stroom
Voorwaardelijke kortsluitstroom	I_q	kA	4

Schakelvermogen

Nominaal inschakelvermogen cos φ conform IEC 60947-3		A	800
nominale bedrijfskortsluitafschakelvermogen cos φ conform IEC 60947-3		A	
230 V		A	640
400/415 V		A	600
500 V		A	590
690 V		A	340
Zekere scheiding conform EN 61140			
tussen de contacten		V AC	440
stroomwarmteverlies per stroombaan bij I_e		W	4.5
levensduur, mechanisch	schakelingen	x 10^6	> 0.1
max. schakelfrequentie	Schakelingen/h		1200
wisselspanning			
AC-3			
nom. vermogen motorschakelaar	P	kW	
220 V 230 V	P	kW	15
400 V 415 V	P	kW	30
500 V	P	kW	30
690 V	P	kW	30
Nominale bedrijfsstroom motorschakelaar			
230 V	I_e	A	51
400V 415 V	I_e	A	55
500 V	I_e	A	44
690 V	I_e	A	22.1
AC-21A			
Nominale bedrijfsstroom lastschakelaar			
440 V	I_e	A	63
AC-23A			
Nom. vermogen AC-23A, 50 - 60 Hz	P	kW	
230 V	P	kW	18.5
400 V 415 V	P	kW	30

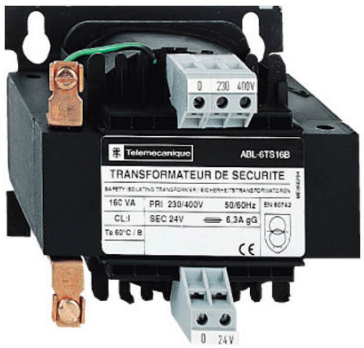
Uitvoering als noodstopinrichting		Ja
Uitvoering als omkeerschakelaar		Nee
Aantal schakelaars		1
Max. nom. bedrijfsspanning Ue bij AC	Volt	690
Bedrijfsspanning (meetspanning)	Volt	690 - 690
Nom. continustroom Iu	Amp	63
Nom. continustroom, AC-23, 400 V	Amp	63
Nom. continustroom, AC-21, 400 V	Amp	63
Nom. vermogen bij AC-3, 400 V	Kilowatt	30
Toegelaten korte-duur stroom Icw	Kiloamp	1.26
Nom. vermogen, AC-23, 400 V	Kilowatt	30
Schakelvermogen bij 400 V	Kilowatt	30
Voorwaardelijke nom. kortsluitstroom Iq	Kiloamp	4
Aantal polen		3
Aantal hulpcontacten als verbreekcontact		0
Aantal hulpcontacten als maakcontact		0
Aantal hulpcontacten als wisselcontact		0
Motoraandrijving optioneel		Nee
Motoraandrijving geïntegreerd		Nee
Uitschakelspoel optioneel		Nee
Apparaatbouwvorm		Inbouwapparaat vaste inbouw techniek
Geschikt voor bodemmontage		Nee
Geschikt voor frontmontage 4-gats		Ja
Geschikt voor frontmontage centraal		Nee
Geschikt voor verdelerinbouw		Nee
Geschikt voor tussenbouw		Nee
Kleur bedieningselement		Rood
Uitvoering van het bedieningselement		Deurkoppelingsdraaiaandrijving
Vergrendelbaar		Ja
Aansluitwijze hoofdstroomcircuit		Schroefaansluiting
Beschermingsgraad frontzijde (IP)		IP65
Beschermingsgraad (NEMA)		12

Goedkeuringen

Product Standards		UL 60947-4-1;CSA - C22.2 No. 60947-4-1-14; CSA-C22.2 No. 94; IEC/EN 60947-3; CE marking
UL File No.		E36332
UL Category Control No.		NLRV
CSA File No.		12528
CSA Class No.		3211-05
North America Certification		UL listed, CSA certified
Suitable for		Branch circuits, suitable as motor disconnect
Degree of Protection		IEC: IP65; UL/CSA Type 1, 12

Product data sheet
Characteristics

ABL6TS63U
voltage transformer - 230..400 V - 1 x 230 V - 630 VA



Main

Range of product	Phaseo Optimum
Product or component type	Safety and isolation transformer
Rated power in VA	630 VA
Input voltage	230 V AC single phase , terminal(s): N-L1 400 V AC phase to phase , terminal(s): L1-L2
Output voltage	230 V AC
Secondary winding	Single
Protective cover	Without

Complementary

Input voltage limits	207...253 V 360...440 V
Network frequency limits	47...63 Hz
Input voltage tolerance	+/- 15 V
Efficiency	93 %
Power dissipation in W	47.4 W
Output sustained overvoltage	3 % (no load, hot state)
Voltage drop at rated load	0.4 %
No load losses	18.9 W
Short-circuit voltage	3.68 %
Output protection type	Against overload , protection technology: external Against overvoltage , protection technology: external Against short-circuits , protection technology: external
Connections - terminals	Screw type terminals for input connection , connection capacity: 5 x 4 mm² AWG gauge11 Screw type terminals for input ground connection , connection capacity: 1 x 4 mm² AWG gauge11 Screw type terminals for output connection , connection capacity: 2 x 4 mm² AWG gauge11
Marking	CE
Fixing mode	By 4 screws , screw(s) # = 7 mm on vertical panel , operating position: vertical By 4 screws , screw(s) # = 7 mm on vertical panel , operating position: horizontal By 4 screws , screw(s) # = 7 mm on horizontal panel with derating to 90 %
Electrical insulation class	Class B
Product weight	9.8 kg

Environment

Product certifications	UR
IP degree of protection	IP20 conforming to EN/IEC 60529
Protective treatment	TC
Ambient air temperature for operation	-20...50 °C
Ambient air temperature for storage	-40...80 °C
Class of protection against electric shock	Class I conforming to VDE 0106-1
Dielectric strength	2000 V between winding and ground 4000 V between primary and secondary
RoHS EUR conformity date	0623
RoHS EUR status	Compliant

Productinformatieblad
Kenmerken

DF2BA0200
buiszekering NFC 8,5 x 31,5 mm buisvormig - aM 2 A - zonder controlelamp

Hoofdkenmerken

Productgamma	TeSys zekering-onderbreker
Type product of component	Smeltpatroon
Korte naam apparaat	DF2
[Ue] nominale bedrijfspanning	400 V AC
Formaat smeltveiligheid	8,5 x 31,5 mm
Type zekering	NFC
Hoeveelheid per set	Set van 10

Complementaire kenmerken

[In] nominale stroom	2 A 400 V
Curve zekering	AM
Gewicht product	0,01 kg

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	4 g
Hoogte verpakking 1	1,1 cm
Breedte verpakking 1	4,6 cm
Lengte verpakking 1	7 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	10
Gewicht verpakking 2	44 g
Hoogte verpakking 2	1,1 cm
Breedte verpakking 2	4,6 cm

Lengte verpakking 2	7 cm
Type verpakking 3	S01
Aantal gebruikseenheden in verpakking 3	1000
Gewicht verpakking 3	4,649 kg
Hoogte verpakking 3	15 cm
Breedte verpakking 3	15 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
PVC-vrij	Ja

Contractuële waarborg

Garantie	18 months

Productinformatieblad
Kenmerken

DF2BN0200
buiszekering NFC 8,5 x 31,5 mm buisvormig - gG 2 A - zonder controlelamp

Hoofdkenmerken

Productgamma	TeSys zekering-onderbreker
Type product of component	Smeltpatroon
Korte naam apparaat	DF2
[Ue] nominale bedrijfspanning	400 V AC
[In] nominale stroom	2 A 400 V
Formaat smeltveiligheid	8,5 x 31,5 mm
Type zekering	NFC
Hoeveelheid per set	Set van 10

Complementaire kenmerken

Curve zekering	GG
Gewicht product	0,01 kg

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	4 g
Hoogte verpakking 1	1,1 cm
Breedte verpakking 1	3,4 cm
Lengte verpakking 1	9 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	10
Gewicht verpakking 2	45 g
Hoogte verpakking 2	1,1 cm
Breedte verpakking 2	3,4 cm

Lengte verpakking 2	9 cm
Type verpakking 3	S01
Aantal gebruikseenheden in verpakking 3	1000
Gewicht verpakking 3	4,679 kg
Hoogte verpakking 3	15 cm
Breedte verpakking 3	15 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
PVC-vrij	Ja

Contractuële waarborg

Garantie	18 months

Productinformatieblad
Kenmerken

A9F89206
modulaire automaat - iC60H - 2 polen - 6 A - C curve

Hoofdkenmerken

Apparaattoepassing	Distributie
Gamma	Acti 9
Productnaam	Acti 9 iC60
Type product of component	Miniatuur vermogensschakelaar
Korte naam apparaat	IC60H
Beschrijving polen	2P
Aantal beveiligde polen	2
[In] nominale stroom	6 A
Type net	DC AC
Technologie uitschakeleenheid	Thermisch-magnetisch
Uitschakelcurve	C
Uitschakelvermogen	10000 A Icn at 400 V AC 50/60 Hz conforming to EN/IEC 60898-1 42 kA Icu at 12...60 V AC 50/60 Hz conforming to EN/IEC 60947-2 10 kA Icu at 440 V AC 50/60 Hz conforming to EN/IEC 60947-2 15 kA Icu at 380...415 V AC 50/60 Hz conforming to EN/IEC 60947-2 30 kA Icu at 220...240 V AC 50/60 Hz conforming to EN/IEC 60947-2 15 kA Icu at <= 125 V DC conforming to EN/IEC 60947-2 42 kA Icu at 100...133 V AC 50/60 Hz conforming to EN/IEC 60947-2
Gebruikscategorie	Categorie A conform EN 60947-2 Categorie A conform IEC 60947-2
Geschiktheid voor isolatie	Yes conforming to EN 60898-1 Ja conform EN 60947-2 Yes conforming to IEC 60898-1 Yes conforming to IEC 60947-2
Normen	EN 60947-2 IEC 60947-2 EN 60898-1 IEC 60898-1

Complementaire kenmerken

Netfrequentie	50/60 Hz
Magnetische uitschakellimiet	8 x In +/- 20 %
[Ics] nominaal service kortsluitvermogen	15 kA 50 % conform EN 60947-2 - 220...240 V AC 50/60 Hz 7,5 kA 50 % conform EN 60947-2 - 380...415 V AC 50/60 Hz 5 kA 50 % conform EN 60947-2 - 440 V AC 50/60 Hz 15 kA 50 % conform IEC 60947-2 - 220...240 V AC 50/60 Hz 7,5 kA 50 % conform IEC 60947-2 - 380...415 V AC 50/60 Hz 5 kA 50 % conform IEC 60947-2 - 440 V AC 50/60 Hz 7500 A 75 % conforming to EN 60898-1 - 400 V AC 50/60 Hz 7500 A 75 % conforming to IEC 60898-1 - 400 V AC 50/60 Hz 21 kA 50 % conforming to IEC 60947-2 - 12...133 V AC 50/60 Hz 21 kA 50 % conforming to EN 60947-2 - 12...133 V AC 50/60 Hz 15 kA 100 % conforming to IEC 60947-2 - 72...125 V DC 15 kA 100 % conforming to EN 60947-2 - 72...125 V DC
Begrenzingsklasse	3 conform EN 60898-1 3 conform IEC 60898-1
[Ui] nominale isolatiespanning	500 V AC 50/60 Hz conform EN 60947-2 500 V AC 50/60 Hz conforming to IEC 60947-2
[Uimp] nominale stoothoudspanning	6 kV conform EN 60947-2 6 kV conforming to IEC 60947-2
Contacpositietindicatie	Ja
Type bediening	Omschakelen
Lokale signalering	Uitschakelindicator
Montagemodus	Vast
Montagesteun	DIN-rail
Verdeelblok	Top or bottom: YES
Stap van 9 mm	4
Hoogte	85 mm
Breedte	36 mm
Diepte	78,5 mm
Gewicht product	0,25 kg
Kleur	White
Mechanische levensduur	20000 cycli
Elektrische levensduur	10000 cycles
Aansluitingen - klemmen	Single terminal (top or bottom) 1…25 mm² rigid Single terminal (top or bottom) 1…16 mm² flexible
Draadstriplengte	14 mm for top or bottom connection
Aandraaimoment	2 N.m top or bottom
Differentieelfunctie	Apart blok

Omgeving

IP-beschermingsgraad	IP20 conforming to IEC 60529 IP20 conforming to EN 60529
Vervuilingsgraad	3 conform EN 60947-2 3 conforming to IEC 60947-2
Overspanningscategorie	IV
Tropicalisatie	2 conforming to IEC 60068-1
Relatieve vochtigheid	95 % at 55 °C
Werkingshoogte	0...2000 m
Omgevingstemperatuur bij werking	-35…70 °C
Omgevingstemperatuur bij opslag	-40…85 °C

Packing Units

Type verpakking 1	PCE
Aant. eenh./verp.	1

Verpakkingsgewicht (lb)	215 g
Hoogte verpakking 1	3,6 cm
Breedte verpakking 1	7,5 cm
Lengte verpakking 1	9,4 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	6
Gewicht verpakking 2	1,352 kg
Hoogte verpakking 2	8,5 cm
Breedte verpakking 2	10 cm
Lengte verpakking 2	22 cm
Type verpakking 3	S03
Aantal gebruikseenheden in verpakking 3	66
Gewicht verpakking 3	15,454 kg
Hoogte verpakking 3	30 cm
Breedte verpakking 3	30 cm
Lengte verpakking 3	40 cm

Offer Sustainability

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Product buiten toepassingsbereik RoHS China. Vermelding van stof ter informatie.
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
Aanwezigheid van halogeen	Halogeenvrij product

Contractuële waarborg

Garantie	18 months

Productinformatieblad
Kenmerken

A9Q21225
Vigi iC60 - aardlek hulpblok - 2P - 25A - 30mA - A type

Hoofdkenmerken

Gamma	Acti 9
Type product of component	Uitbreiding vermogenschakelaars
Korte naam apparaat	Vigi iC60
Beschrijving polen	2P
[In] nominale stroom	25 A
Aardlekgevoeligheid	30 mA
Tijdvertraging differentieelfunctie	Onmiddellijk
Earth leakage protection type	Type A
Type net	AC
Netfrequentie	50/60 Hz
[Ue] nominale bedrijfspanning	230...240 V AC 50/60 Hz conforming to EN 61009-1 230...240 V AC 50/60 Hz conforming to IEC 61009-1
Normen	IEC 61009-1 EN 61009-1
Stap van 9 mm	3

Complementaire kenmerken

Locatie eenheid in systeem	Uitgang
Technologie uitschakeling differentiëel	Spanningsonafhankelijk
[Ui] nominale isolatiespanning	500 V AC 50/60 Hz conforming to IEC 60947-2
[Uimp] nominale stoothoudspanning	6 kV conform IEC 60947-2
Bereik compatibiliteit	Acti 9 iC60 Acti 9 Reflex iC60
Compatibiliteit product	Enkelvoudige klem
Lokale signalering	Uitschakelindicator
Montagemodus	Opklikbaar
Montagesteun	DIN-rail

Elektrische aansluiting op MCB	Plug in
Verdeelblok	Onder: JA
Hoogte	91 mm
Breedte	27 mm
Diepte	73,5 mm
Gewicht product	0,165 kg
Aansluitingen - klemmen	Tunnelaansluitklem onderkant voor 1 kabel(s) 1…25 mm² stijve zonder kabelhuls Tunnelaansluitklem onderkant voor 1 kabel(s) 1…16 mm² flexibel zonder kabelhuls Tunnelaansluitklem onderkant voor 1 kabel(s) 1…16 mm² flexibel met kabelhuls
Draadstriplengte	14 mm voor onder aansluiting
Aandraaimoment	2 N.m bottom

Omgeving

IP-beschermingsgraad	IP20 conform IEC 60529 IP40 (modulaire behuizing) conform IEC 60529
Vervuilingsgraad	3 conforming to IEC 60947-2
Elektromagnetische compatibiliteit	8/ 20 µs impulsweerstand, 250 A conform IEC 61009-1
Omgevingstemperatuur bij werking	-25…60 °C
Omgevingstemperatuur bij opslag	-40…85 °C

Packing Units

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	158 g
Hoogte verpakking 1	8,6 cm
Breedte verpakking 1	8,6 cm
Lengte verpakking 1	12 cm

Offer Sustainability

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Product buiten toepassingsbereik RoHS China. Vermelding van stof ter informatie.
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
Aanwezigheid van halogeen	Product met halogeenvrije kunststof onderdelen

Contractuële waarborg

Garantie	18 months

Productinformatieblad
Kenmerken

A9N15645
Acti 9-zekering-lastscheider STI-1 pool + N-10 A-voor zekering 8,5 x 31,5 mm

Hoofdkenmerken

Gamma	Acti 9
Productnaam	Acti 9 STI
Type product of component	Zekering-onderbreker
Korte naam apparaat	STI
Beschrijving polen	1P + N

Complementaire kenmerken

[In] nominale stroom	2 A 4 A 6 A 10 A
Curve zekering	AM GG
Formaat smeltveiligheid	8,5 x 31,5 mm
[Ue] nominale bedrijfspanning	400 V AC
[Ui] nominale isolatiespanning	500 V AC 50/60 Hz
Montagemodus	Opklikbaar
Montagesteun	DIN-rail
Stap van 9 mm	2
Hoogte	81 mm
Breedte	18 mm
Diepte	75 mm
Kleur	Wit
Aansluitingen - klemmen	Schroefklem aansluitingen1 kabel(s) 0,75…10 mm² stijve Schroefklem aansluitingen1 kabel(s) 0,5…6 mm² flexibel Schroefklem aansluitingen2 kabel(s) 0,75…4 mm² stijve Schroefklem aansluitingen2 kabel(s) 0,5…6 mm² flexibel
Draadstriplengte	12 mm

Aandraaimoment	2 N.m

Omgeving

Normen	IEC EN 60947-3 IEC 60269-1/2
IP-beschermingsgraad	IP20
Vervuilingsgraad	3
Omgevingstemperatuur bij werking	-20…60 °C
Omgevingstemperatuur bij opslag	-40…80 °C

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	76 g
Hoogte verpakking 1	7,8 cm
Breedte verpakking 1	8,4 cm
Lengte verpakking 1	1,8 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	12
Gewicht verpakking 2	939 g
Hoogte verpakking 2	2,87 cm
Breedte verpakking 2	30 cm
Lengte verpakking 2	20 cm
Type verpakking 3	S03
Aantal gebruikseenheden in verpakking 3	144
Gewicht verpakking 3	11,6 kg
Hoogte verpakking 3	30 cm
Breedte verpakking 3	30 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
Aanwezigheid van halogeen	Halogeenvrij product

Contractuële waarborg

Garantie	18 maanden

Productinformatieblad
Kenmerken

A9N15635
Acti 9 - zekering-lastscheider STI - 1 pool - 10 A - voor zekering 8,5 x 31,5 mm

Hoofdkenmerken

Gamma	Acti 9
Productnaam	Acti 9 STI
Type product of component	Zekering-onderbreker
Korte naam apparaat	STI
Beschrijving polen	1P

Complementaire kenmerken

[In] nominale stroom	2 A 4 A 6 A 10 A
Curve zekering	AM GG
Formaat smeltveiligheid	8,5 x 31,5 mm
[Ue] nominale bedrijfspanning	400 V AC
[Ui] nominale isolatiespanning	500 V AC 50/60 Hz
Montagemodus	Opklikbaar
Montagesteun	DIN-rail
Stap van 9 mm	2
Hoogte	81 mm
Breedte	18 mm
Diepte	75 mm
Kleur	White
Aansluitingen - klemmen	Schroefklem aansluitingen1 kabel(s) 0,75…10 mm² stijve Schroefklem aansluitingen1 kabel(s) 0,5…6 mm² flexibel Schroefklem aansluitingen2 kabel(s) 0,75…4 mm² stijve Schroefklem aansluitingen2 kabel(s) 0,5…6 mm² flexibel
Draadstriplengte	12 mm

Aandraaimoment	2 N.m

Omgeving

Normen	IEC EN 60947-3 IEC 60269-1/2
IP-beschermingsgraad	IP20
Vervuilingsgraad	3
Omgevingstemperatuur bij werking	-20…60 °C
Omgevingstemperatuur bij opslag	-40…80 °C

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	55 g
Hoogte verpakking 1	1,8 cm
Breedte verpakking 1	7,5 cm
Lengte verpakking 1	8,5 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	12
Gewicht verpakking 2	716 g
Hoogte verpakking 2	2,9 cm
Breedte verpakking 2	30 cm
Lengte verpakking 2	20 cm
Type verpakking 3	S03
Aantal gebruikseenheden in verpakking 3	144
Gewicht verpakking 3	9,112 kg
Hoogte verpakking 3	30 cm
Breedte verpakking 3	30 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
Aanwezigheid van halogeen	Halogeenvrij product

Contractuële waarborg

Garantie	18 maanden

Led-kastverlichting - PLD E 608 W 315/B - 2702227

Houd er a.u.b. rekening mee dat de hier aangegeven gegevens uit de online catalogus afkomstig zijn. De volledige informatie en gegevens vindt u in de gebruikersdocumentatie. De Algemene gebruiksvoorwaarden voor internet-downloads zijn van toepassing. (http://phoenixcontact.nl/download)

Led-kastverlichting, breed AC-ingangsbereik, kleurtemperatuur: 4000 K, met bewegingsmelder, contactdoostype B (bijv. voor USA)

Artikelomschrijving

De led-verlichting is bestemd voor toepassing in schakelkasten. De geïntegreerde optica zorgt hierbij voor een optimale verlichting van de schakelkast. De verlichting kan zonder gereedschap met het geïntegreerd vergrendelingshaaksysteem worden gemonteerd. Daarbij kunnen ook meerdere lampen achter elkaar worden geschakeld. Het in- en uitschakelen van de verlichting vindt plaats via een geïntegreerde bewegingsmelder.

Uw voordelen

- montage zonder gereedschap dankzij gepatenteerd vergrendelingshaaksysteem
- wereldwijde toepassing dankzij het brede AC-ingangsbereik
- de geïntegreerde bewegingsmelder bespaart dispositie- en installatiekosten voor een deurschakelaar
- dankzij de contactdoos kunnen externe apparaten ook bij spanningsvrije schakelkast functioneren
- besparing op bekabelingskosten bij gekoppelde schakelkasten dankzij serieschakeling
- optimale verlichting van de schakelkast dankzij geïntegreerde optica
- dankzij de led-levensduur van 50.000 uur (L70-waarde) is het vervangen van lampen niet nodig

RoHS

Commerciële gegevens

Verpakkingseenheid	1 stk
GTIN	4 055626 057514
GTIN	4055626057514
Gewicht per stuk (exclusief verpakking)	770,000 g
Douanetariefnummer	94054039
Land van herkomst	Duitsland
Verkoopcode	DRL235

Technische gegevens

Opmerking

gebruiksbeperking	EMC: klasse A-product, zie fabrikantverklaring in het downloadbereik

Led-kastverlichting - PLD E 608 W 315/B - 2702227

Technische gegevens

afmetingen

breedte	91 mm
hoogte	44 mm
lengte	315,4 mm

Omgevingsomstandigheden

omgevingstemperatuur (bedrijf)	-25 °C ... 60 °C
Omgevingstemperatuur (opslag/transport)	-40 °C ... 85 °C
Toelaatbare luchtvochtigheid (bedrijf)	5 % ... 95 %
toelaatbare luchtvochtigheid (opslag/transport)	5 % ... 95 %
Luchtdruk (bedrijf)	70 kPa ... 106 kPa (tot max. 3000 m boven zeeniveau)
luchtdruk (opslag/transport)	70 kPa ... 106 kPa (tot max. 3000 m boven zeeniveau)
beschermklasse	IP20

Algemeen

contactdoos	type B
materiaal behuizing	kunststof
montage-instructie	Magneetbevestiging als toebehoren leverbaar
	Schroefbevestiging als toebehoren leverbaar
kleur	verkeersgrijs A RAL 7042
nettogewicht	770 g
montagetechniek	vergrendelingshaaksysteem
inbouwpositie	niet van invloed
landspecifiek te gebruiken	USA
	Canada
	Brazilië
	Japan

voeding van de moduulelektronica

Aansluitmethode	installatieconnector
aantal polen	3
voedingsspanningsbereik	100 V AC ... 125 V AC (50/60 Hz)
	100 V AC ... 125 V AC (50/60 Hz, nominale spanning)
stroomopname	max. 12 A (vanuit contactdoos)
opgenomen vermogen	9,8 W

Lichteigenschappen

type lamp	LED
aantal led's	23
levensduur lichtbundel	50000 h (L70)
lichtkleur	neutraal wit
kleurtemperatuur / golflengte	4000 K
kleurweergave-index	85
lichtstroom	685 lm (netto-lichtstroom)

Led-kastverlichting - PLD E 608 W 315/B - 2702227

Technische gegevens

Lichteigenschappen

verlichtingssterkte	max. 1255 lx (Afstand 50 cm)

Bewegingsmelder

Registratie-afstand	1,5 m ±0,25 m
Registratiehoek	35 ° ±5° (horizontaal en verticaal)
Verlichtingsduur	180 s (getriggerd)

Normen en bepalingen

stoorimmuniteit EF	controle van de stoorimmuniteit volgens EN 61000-6-2 Elektromagnetische velden EN 61000-4-3/IEC 61000-4-3 Criterium A, veldsterkte: 10 V/m
stoorimmuniteit Burst	controle van de stoorimmuniteit volgens EN 61000-6-2 Snelle transiënten (Burst) EN 61000-4-4/IEC 61000-4-4 Criterium A, ± 4 kV
stoorimmuniteit Surge	controle van de stoorimmuniteit volgens EN 61000-6-2 Transiënte overspanning (Surge) EN 61000-4-5/IEC 61000-4-5 Criterium A, ± 1 kV (symmetrisch), ± 2 kV (asymmetrisch)
stoorvastheid bij storingen via voedingsleidingen	controle van de stoorimmuniteit volgens EN 61000-6-2 Storingen via voedingsleidingen EN 61000-4-6/IEC 61000-4-6 Criterium A; isolatiespanning 10 V
stooremissie	controle van de stooremissie volgens EN 61000-6-3 Klasse B
mechanische tests	trilbestendig volgens EN 60068-2-6/IEC 60068-2-6 5g
	schokbestendig volgens EN 60068-2-27/IEC 60068-2-27 25g, 11 ms duur, halfsinus-schokimpuls
	Continue schoktest volgens EN 60068-2-27/IEC 60068-2-27 10g
beveiligingsklasse	I

Environmental Product Compliance

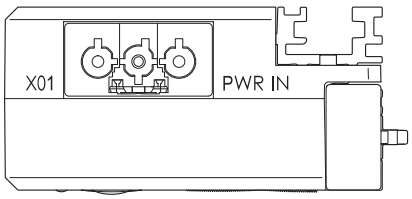
China RoHS	Periode voor reglementair gebruik: onbegrensd = EFUP-e
	Gevaarlijke stoffen boven de drempelwaarden

Tekeningen

schematekening

contactdoos type B (NEMA 5-15)

aansluitschema



aansluiting voedingsspanning van een lamp

Product datasheet
Characteristics

GV2ME02
Motor circuit breaker, TeSys GV2, 3P, 0.16-0.25 A, thermal magnetic, screw clamp terminals

Main

Range	TeSys
Product name	TeSys GV2
Product or component type	Circuit breaker
Device short name	GV2ME
Device application	Motor
Trip unit technology	Thermal-magnetic

Complementary

Poles description	3P
Network type	AC
Utilisation category	AC-3 conforming to IEC 60947-4-1 Category A conforming to IEC 60947-2
Network frequency	50/60 Hz conforming to IEC 60947-4-1
Fixing mode	35 mm symmetrical DIN rail: clipped Panel: screwed (with adaptor plate)
Operating position	Any position
Motor power kW	0.06 kW at 400/415 V AC 50/60 Hz
Breaking capacity	100 kA Icu at 230/240 V AC 50/60 Hz conforming to IEC 60947-2 100 kA Icu at 400/415 V AC 50/60 Hz conforming to IEC 60947-2 100 kA Icu at 440 V AC 50/60 Hz conforming to IEC 60947-2 100 kA Icu at 500 V AC 50/60 Hz conforming to IEC 60947-2 100 kA Icu at 690 V AC 50/60 Hz conforming to IEC 60947-2
[Ics] rated service short-circuit breaking capacity	100 % at 690 V AC 50/60 Hz conforming to IEC 60947-2 100 % at 500 V AC 50/60 Hz conforming to IEC 60947-2 100 % at 230/240 V AC 50/60 Hz conforming to IEC 60947-2 100 % at 440 V AC 50/60 Hz conforming to IEC 60947-2 100 % at 400/415 V AC 50/60 Hz conforming to IEC 60947-2
Control type	Push-button
[In] rated current	0.25 A

Thermal protection adjustment range	0.16…0.25 A
Magnetic tripping current	2.4 A
[Ue] rated operational voltage	690 V AC 50/60 Hz conforming to IEC 60947-2
[Ui] rated insulation voltage	690 V AC 50/60 Hz conforming to IEC 60947-2
[Ith] conventional free air thermal current	0.25 A conforming to IEC 60947-4-1
[Uimp] rated impulse withstand voltage	6 kV IEC 60947-2
Power dissipation per pole	2.5 W
Mechanical durability	100000 cycles
Electrical durability	100000 cycles for AC-3 at 440 V
Maximum operating rate	25 cyc/h
Rated duty	Continuous conforming to IEC 60947-4-1
Tightening torque	1.7 N.m on screw clamp terminals
Suitability for isolation	Yes conforming to IEC 60947-1
Phase failure sensitivity	Yes conforming to IEC 60947-4-1
Height	89 mm
Width	45 mm
Depth	78.5 mm
Net weight	0.26 kg

Environment

Standards	EN/IEC 60947-2 EN/IEC 60947-4-1 CSA C22.2 No 60947-4-1 UL 60947-4-1
Product certifications	IECEE CB Scheme UL CSA CCC EAC ATEX BV LROS (Lloyds register of shipping) DNV-GL RINA
Protective treatment	TH
IP degree of protection	IP20 conforming to IEC 60529
IK degree of protection	IK04
Ambient air temperature for operation	-20…60 °C
Ambient air temperature for storage	-40…80 °C
Fire resistance	960 °C conforming to IEC 60695-2-1
Operating altitude	2000 m

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	231 g
Package 1 Height	4.8 cm
Package 1 width	8.5 cm
Package 1 Length	9.3 cm
Unit Type of Package 2	S02
Number of Units in Package 2	24
Package 2 Weight	5.872 kg
Package 2 Height	15 cm
Package 2 width	30 cm
Package 2 Length	40 cm

Unit Type of Package 3	P06
Number of Units in Package 3	384
Package 3 Weight	109.691 kg
Package 3 Height	80 cm
Package 3 width	80 cm
Package 3 Length	60 cm

Offer Sustainability

Sustainable offer status	Green Premium product
REACh Regulation	REACh Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information
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

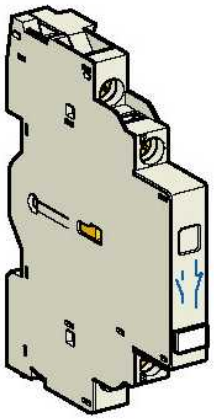
Contractual warranty

Warranty	18 months

Product data sheet
Characteristics

GVAN11
TeSys GV2 & GV3 - auxiliary contact block - 1 NO + 1 NC

Product availability: Stock - Normally stocked in distribution facility



Main

Commercial Status	Commercialised
Range of product	TeSys GV2 TeSys GV3
Device short name	GVAN
Product or component type	Auxiliary contact block
Product compatibility	GV2L GV2LE GV2ME GV2P GV2RT GV3L GV3P
Pole contact composition	1 NO + 1 NC
Connections - terminals	Screw clamp terminals 1 cable 0...0 in² (0.75...1.5 mm²) - cable stiffness: flexible - with cable end Screw clamp terminals 2 cable 0...0 in² (0.75...1.5 mm²) - cable stiffness: flexible - with cable end Screw clamp terminals 2 cable 0...0 in² (0.75...2.5 mm²) - cable stiffness: flexible - without cable end Screw clamp terminals 1 cable 0...0 in² (0.75...2.5 mm²) - cable stiffness: flexible - without cable end Screw clamp terminals 2 cable 0...0 in² (1...2.5 mm²) - cable stiffness: solid Screw clamp terminals 1 cable 0...0 in² (1...2.5 mm²) - cable stiffness: solid

Complementary

Mounting location	Left side
[Ui] rated insulation voltage	600 V - conforming to CSA C22.2 No 14 690 V - conforming to IEC 60947-1 600 V - conforming to UL 508
[Ue] rated operational voltage	24...240 V DC 48...690 V AC
[Ith] conventional free air thermal current	6 A
Protection type	GG fuse <= 10 A GB2CB... circuit breaker rating according to operational current for Ue <= 415 V
Mechanical durability	100000 cycles
Minimum switching current	5 mA
Minimum switching voltage	17 V
Rated operational power in VA	850 VA at 380...415 V AC-15 - electrical durability: 100000 cycles 720 VA at 230...240 V AC-15 - electrical durability: 100000 cycles 650 VA at 440 V AC-15 - electrical durability: 100000 cycles 500 VA at 500 V AC-15 - electrical durability: 100000 cycles 500 VA at 110...127 V AC-15 - electrical durability: 100000 cycles 400 VA at 690 V AC-15 - electrical durability: 100000 cycles 300 VA at 48 V AC-15 - electrical durability: 100000 cycles
Rated operational power in W	240 W at 48 V DC-13 - electrical durability: 100000 cycles 180 W at 60 V DC-13 - electrical durability: 100000 cycles 140 W at 24 V DC-13 - electrical durability: 100000 cycles 140 W at 110 V DC-13 - electrical durability: 100000 cycles 120 W at 240 V DC-13 - electrical durability: 100000 cycles
Tightening torque	<= 12.39 lbf.in (1.4 N.m) - on screw clamp terminals
Height	3.5 in (89 mm)
Width	0.37 in (9.3 mm)
Depth	2.6 in (66 mm)
Product weight	0.11 lb(US) (0.05 kg)

Environment

Environmental characteristic	Normal environment

Ordering and shipping details

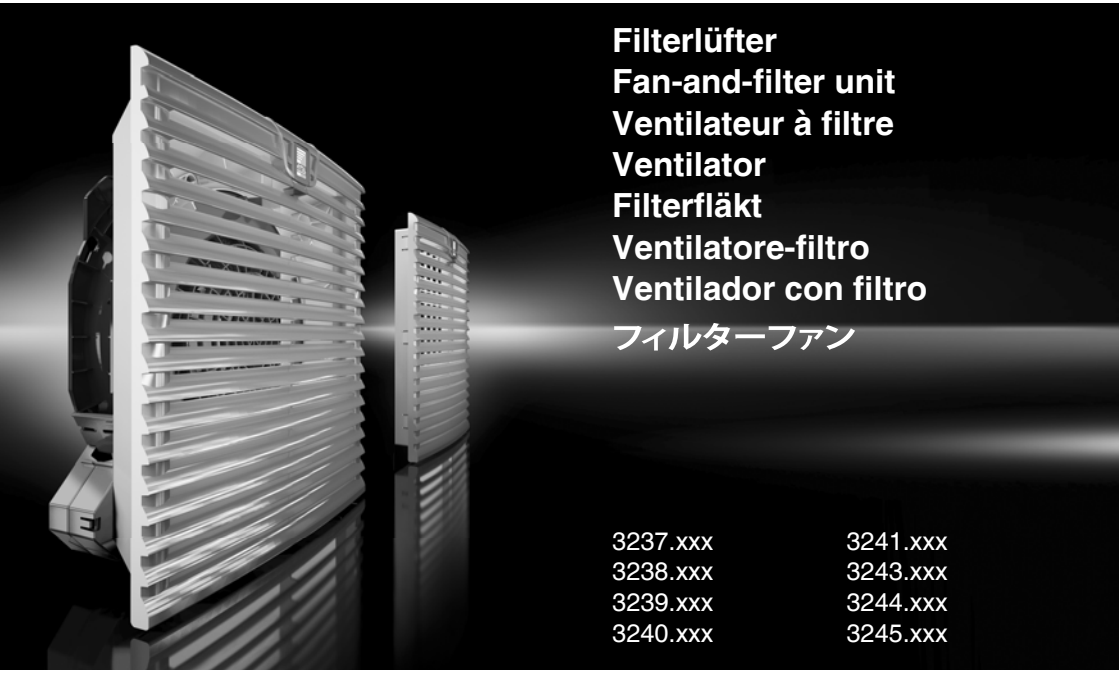
Category	22367 - MANUAL STR PROTECTOR - GV2
Discount Schedule	I11
GTIN	00785901212430
Nbr. of units in pkg.	1
Package weight(Lbs)	0.10
Product availability	Stock - Normally stocked in distribution facility
Returnability	Y
Country of origin	CZ

Contractual warranty

Period	18 months

Rittal – The System.

Faster – better – everywhere.



Filterlüfter
Fan-and-filter unit
Ventilateur à filtre
Ventilator
Filterfläkt
Ventilatore-filtro
Ventilador con filtro
フィルターファン

3237.xxx
3238.xxx
3239.xxx
3240.xxx
3241.xxx
3243.xxx
3244.xxx
3245.xxx

Montage-, Installations- und Bedienungsanleitung
Assembly and operating instructions
Notice d'emploi, d'installation et de montage
Montage- en bedieningshandleiding
Montage- och hanteringsanvisning
Istruzioni di montaggio e funzionamento
Instrucciones de montaje y funcionamiento
取扱説明書

4.4.2 Overvoltage protection and supply line load

The unit does not have its own overvoltage protection. Measures must be taken by the operator at the supply end to ensure effective lightning and overvoltage protection. The mains voltage must not exceed a tolerance of ±10%.

4.4.3 PE conductor connection

The PE conductor connection must be connected to the PE conductor system of the overall system.

5 Carrying out the electrical connection

5.1 Connecting the power supply

- Complete the electrical connection by following the wiring plans.

Note:
For technical data, refer to the rating plate.

- Remove the red cover from the electrical connection.

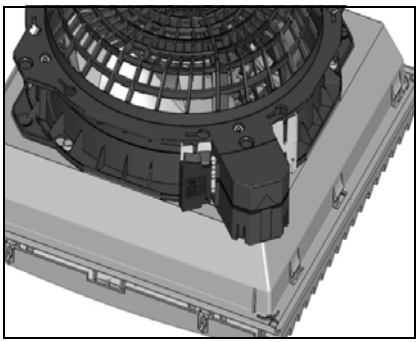


Fig. 3: Access the electrical connection

- Insert the connection cable with wire end ferrules into the screwless spring terminals. Choose an appropriate pre-fuse according to the line cross-section (2 x 0.75 – 2.5 mm² multi-wire, 2 x 1.5 – 2.5 mm² fine-wire soldered).

Caution!
If no wire end ferrules are used, the insulation of the individual wires should be stripped to a max. of 9 mm (to comply with clearance and creepage distances).

- Re-attach the electrical connection cover.

Note:
Fan-and-filter unit 3237.xxx is connected by way of two single wires which are led out of the unit.

5.2 Rotating the voltage connection

If the position of the voltage connection is not ideally accessible, it may be rotated through 90° and snapped into position. To this end, press down on the release button of the bayonet connection at the rear of the fan. Units 3238.xxx to 3239.xxx are released by pulling out the clip (see fig. 4) of the bayonet connection.

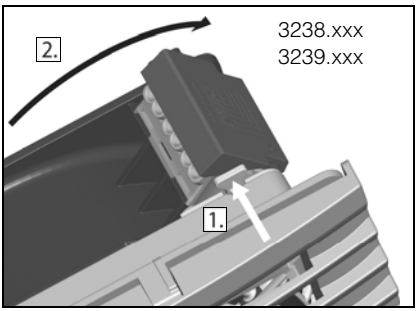


Fig. 4: Release the bayonet connection

Units 3240.xxx, 3241.xxx, 3243.xxx to 3245.xxx are released by pressing the release button of the bayonet connection (see fig. 5), located on the opposite corner from the connection terminal.

EN

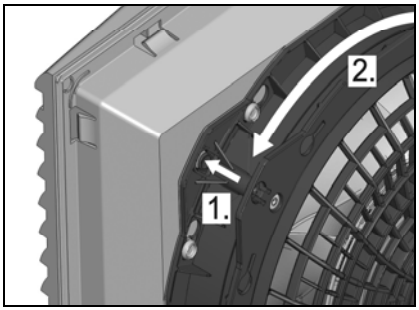


Fig. 5: Release the bayonet connection

5.3 Changing the direction of airflow

The direction of airflow blows into the enclosure from the outside as standard. Should it become necessary to change the direction of airflow for technical reasons (space, specific component air routing etc.), this is easily achieved. Simply release the fan housing and rotate it through 180°. To release, please follow the same procedure as described under “5.2 Rotating the voltage connection”, page 9.
Please also observe the instructions outlined under “4.2.1 General”, page 7.

6 Commissioning

The fan-and-filter unit operates automatically, in other words, the fan will start up once the power has been switched on.
Depending on the model, the following voltage variants are supported:

– 24 V DC
– 115 V, 1~
– 230 V, 1~
– 400/460 V, 3-phase

7 Installing and changing the filter

The fan-and-filter unit and outlet filter are supplied as standard with a standard filter mat for the pre-filtering of dry, coarse dust and lint. In order to increase the protection category, and in the case of dust with a grain size of < 10 µm, we recommend the use of fine filter mats (optionally available). The filter should be checked at regular intervals in accordance with the level of dust exposure (recommended: at the latest after 2,000 operating hours) and replaced as necessary.

Note:
Use only original Rittal filters which bear the Rittal logo in order to safeguard the designated protection category, air throughout and operating approvals.

Risk of injury!
Only change the filter mat while the fan rotor is stationary.
Never insert your fingers into the fan rotor.

To insert or replace the filter, proceed as follows (direction of airflow: drawing from outside and blowing into the enclosure):

- First press the catch of the louvred grill (Rittal logo) up slightly with one finger (see fig. 6)
- Once it is released, the louvred grille can be dropped open by approx. 70° or 90°
- If necessary, first place the fine filter mat into the housing
- Ensure that the open (roughened) side faces towards the louvred grille
- Then insert the enclosed standard filter mat
- Here again, ensure that the open side (without Rittal logo) faces towards the louvred grille (see fig. 7)
- Now push the louvred grille back onto the enclosure until it snaps audibly into position.

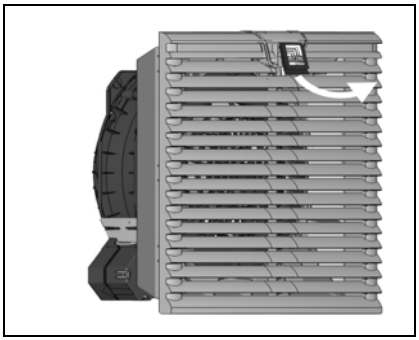


Fig. 6: Release the louvred grille

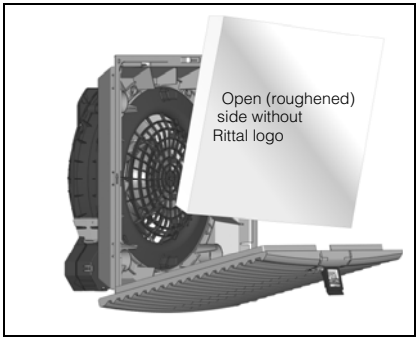


Fig. 7: Installing the standard filter mat

Note:
If it becomes necessary to change the direction of the airflow (see 5.3 “Changing the direction of airflow”, page 10), the installation is reversed accordingly.

8 Inspection and maintenance

Risk of electric shock!
The unit is live.
Switch off the power supply before opening, and take suitable precautions against it being accidentally switched back on.

The built-in, maintenance-free fan is mounted on a friction bearing (3237.xxx, 3238.xxx and 3239.xxx) or ball bearing (3240.xxx, 3241.xxx, 3243.xxx to 3245.xxx), and is protected against humidity and dust, and equipped with a temperature monitor.
The life expectancy is at least 40,000 operating hours (L10, 40°C). The fan-and-filter unit is thus largely maintenance free.
From time to time, the components may need to be cleaned using a vacuum cleaner or compressed air if they become visibly dirty.
Any stubborn, oily stains may be removed using a non-flammable detergent, such as degreaser.

Caution!
Risk of fire!
Never use flammable liquids for cleaning.

Sequence of maintenance measures:
- Check the level of dirt.
- Filter soiling?
  Replace the filter.
- Fan membranes soiled?
  Clean.
- Check the noise generation of the fan.
- Compressed air cleaning

9 Storage and disposal

Caution!
Risk of damage!
The fan unit must not be stored at temperatures above +70°C or below -30°C.

Disposal can be performed at the Rittal plant.
Please contact us for advice.

Rittal - RIT SK VENTILATIEROOSTER

Artikelnummer	2700271038
Fabrikaat	Rittal
Typenummer	3243200
Artikelnummer Leverancier	3243200
EAN Code	4028177652149
Minimale afname	1

Product omschrijving

Voor ventilatie en convectie kunnen onder- en bovenin de behuizing ventilatieroosters worden geplaatst.

Technische specificaties

Breedte	323 mm
Hoogte	323 mm
Voor max. aantal ventilatoren	1
Materiaal	Kunststof
Uitvoering oppervlakte	Geen (onbehandeld)
Met ingebouwd filter	Ja
Montagewijze	Snapbevestiging
Beschermingsgraad (IP)	IP54

Rittal - RIT SK VENTILATOR

Artikelnummer	2700185139
Fabrikaat	Rittal
Typenummer	3244140
Artikelnummer Leverancier	3244140
EAN Code	4028177652200
Minimale afname	1

Product omschrijving

Er is geen product omschrijving beschikbaar

Technische specificaties

Aantal ventilatoren	1
Bedrijfsspanning bij AC 50 Hz	400 - 400 V
Bedrijfsspanning bij AC 60 Hz	400 - 400 V
Bedrijfsspanning bij DC	400 - 400 V
Spanningstype	AC
Wandinbouw	Ja
Uitgevoerd als inschuifventilator	Nee
Recirculatieventilator	Nee
Dakventilator	Nee
Met filter	Ja
Debiet, vrijuitblazend	700 m3/h
Meetvermogen	93 W
EMC-uitvoering	Nee
Beschermingsgraad (IP)	IP54
Montagewijze	Snapbevestiging
Geschikt voor 19 inch inbouw	Nee
Kleur	Grijs
RAL-nummer	7035
Breedte	323 mm
Hoogte	323 mm
Diepte	155.5 mm

Product datasheet
Characteristics

LC1D09BD
TeSys D contactor - 3P(3 NO) - AC-3 - <= 440 V 9 A - 24 V DC coil

Main

Range	TeSys
Product name	TeSys D
Product or component type	Contactor
Device short name	LC1D
Contactor application	Motor control Resistive load
Utilisation category	AC-4 AC-1 AC-3
Poles description	3P
Power pole contact composition	3 NO
[Ue] rated operational voltage	Power circuit: <= 690 V AC 25...400 Hz Power circuit: <= 300 V DC
[Ie] rated operational current	9 A (at <60 °C) at <= 440 V AC AC-3 for power circuit 25 A (at <60 °C) at <= 440 V AC AC-1 for power circuit
Motor power kW	2.2 kW at 220...230 V AC 50/60 Hz (AC-3) 4 kW at 380...400 V AC 50/60 Hz (AC-3) 4 kW at 415...440 V AC 50/60 Hz (AC-3) 5.5 kW at 500 V AC 50/60 Hz (AC-3) 5.5 kW at 660...690 V AC 50/60 Hz (AC-3) 2.2 kW at 400 V AC 50/60 Hz (AC-4)
Motor power HP (UL / CSA)	1 hp at 230/240 V AC 50/60 Hz for 1 phase motors 2 hp at 200/208 V AC 50/60 Hz for 3 phases motors 2 hp at 230/240 V AC 50/60 Hz for 3 phases motors 5 hp at 460/480 V AC 50/60 Hz for 3 phases motors 7.5 hp at 575/600 V AC 50/60 Hz for 3 phases motors 0.33 hp at 115 V AC 50/60 Hz for 1 phase motors
Control circuit type	DC standard
[Uc] control circuit voltage	24 V DC
Auxiliary contact composition	1 NO + 1 NC
[Uimp] rated impulse withstand voltage	6 kV conforming to IEC 60947

Overvoltage category	III
[Ith] conventional free air thermal current	25 A (at 60 °C) for power circuit 10 A (at 60 °C) for signalling circuit
Irms rated making capacity	250 A at 440 V for power circuit conforming to IEC 60947 140 A AC for signalling circuit conforming to IEC 60947-5-1 250 A DC for signalling circuit conforming to IEC 60947-5-1
Rated breaking capacity	250 A at 440 V for power circuit conforming to IEC 60947
[Icw] rated short-time withstand current	105 A 40 °C - 10 s for power circuit 210 A 40 °C - 1 s for power circuit 30 A 40 °C - 10 min for power circuit 61 A 40 °C - 1 min for power circuit 100 A - 1 s for signalling circuit 120 A - 500 ms for signalling circuit 140 A - 100 ms for signalling circuit
Associated fuse rating	10 A gG for signalling circuit conforming to IEC 60947-5-1 25 A gG at <= 690 V coordination type 1 for power circuit 20 A gG at <= 690 V coordination type 2 for power circuit
Average impedance	2.5 mOhm - Ith 25 A 50 Hz for power circuit
[Ui] rated insulation voltage	Power circuit: 690 V conforming to IEC 60947-4-1 Power circuit: 600 V CSA certified Power circuit: 600 V UL certified Signalling circuit: 690 V conforming to IEC 60947-1 Signalling circuit: 600 V CSA certified Signalling circuit: 600 V UL certified
Electrical durability	0.6 Mcycles 25 A AC-1 at Ue <= 440 V 2 Mcycles 9 A AC-3 at Ue <= 440 V
Power dissipation per pole	1.56 W AC-1 0.2 W AC-3
Front cover	With
Mounting support	Plate Rail
Standards	CSA C22.2 No 14 EN 60947-4-1 EN 60947-5-1 IEC 60947-4-1 IEC 60947-5-1 UL 508
Product certifications	LROS (Lloyds register of shipping) CSA UL GOST DNV CCC GL BV RINA
Connections - terminals	Power circuit: screw clamp terminals 1 cable(s) 1…4 mm²flexible without cable end Power circuit: screw clamp terminals 2 cable(s) 1…4 mm²flexible without cable end Power circuit: screw clamp terminals 1 cable(s) 1…4 mm²flexible with cable end Power circuit: screw clamp terminals 2 cable(s) 1…2.5 mm²flexible with cable end Power circuit: screw clamp terminals 1 cable(s) 1…4 mm²solid without cable end Power circuit: screw clamp terminals 2 cable(s) 1…4 mm²solid without cable end Control circuit: screw clamp terminals 1 cable(s) 1…4 mm²flexible without cable end Control circuit: screw clamp terminals 2 cable(s) 1…4 mm²flexible without cable end Control circuit: screw clamp terminals 1 cable(s) 1…4 mm²flexible with cable end Control circuit: screw clamp terminals 2 cable(s) 1…2.5 mm²flexible with cable end Control circuit: screw clamp terminals 1 cable(s) 1…4 mm²solid without cable end Control circuit: screw clamp terminals 2 cable(s) 1…4 mm²solid without cable end
Tightening torque	Power circuit: 1.7 N.m - on screw clamp terminals - with screwdriver flat Ø 6 mm Power circuit: 1.7 N.m - on screw clamp terminals - with screwdriver Philips No 2 Control circuit: 1.7 N.m - on screw clamp terminals - with screwdriver flat Ø 6 mm Control circuit: 1.7 N.m - on screw clamp terminals - with screwdriver Philips No 2
Operating time	53.55...72.45 ms closing 16...24 ms opening
Safety reliability level	B10d = 1369863 cycles contactor with nominal load conforming to EN/ISO 13849-1 B10d = 20000000 cycles contactor with mechanical load conforming to EN/ISO 13849-1
Mechanical durability	30 Mcycles

Maximum operating rate	3600 cyc/h 60 °C

Complementary

Coil technology	Built-in bidirectional peak limiting diode suppressor
Control circuit voltage limits	0.1...0.25 Uc (-40…70 °C):drop-out DC 0.7...1.25 Uc (-40…60 °C):operational DC 1...1.25 Uc (60…70 °C):operational DC
Time constant	28 ms
Inrush power in W	5.4 W (at 20 °C)
Hold-in power consumption in W	5.4 W at 20 °C
Auxiliary contacts type	type mechanically linked 1 NO + 1 NC conforming to IEC 60947-5-1 type mirror contact 1 NC conforming to IEC 60947-4-1
Signalling circuit frequency	25...400 Hz
Minimum switching current	5 mA for signalling circuit
Minimum switching voltage	17 V for signalling circuit
Non-overlap time	1.5 ms on de-energisation between NC and NO contact 1.5 ms on energisation between NC and NO contact
Insulation resistance	> 10 MOhm for signalling circuit

Environment

IP degree of protection	IP20 front face conforming to IEC 60529
Protective treatment	TH conforming to IEC 60068-2-30
Pollution degree	3
Ambient air temperature for operation	-40…60 °C 60…70 °C with derating
Ambient air temperature for storage	-60…80 °C
Operating altitude	0...3000 m
Fire resistance	850 °C conforming to IEC 60695-2-1
Flame retardance	V1 conforming to UL 94
Mechanical robustness	Vibrations contactor open: 2 Gn, 5...300 Hz Vibrations contactor closed: 4 Gn, 5...300 Hz Shocks contactor open: 10 Gn for 11 ms Shocks contactor closed: 15 Gn for 11 ms
Height	77 mm
Width	45 mm
Depth	95 mm
Net weight	0.48 kg

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	532 g
Package 1 Height	5 cm
Package 1 width	9.2 cm
Package 1 Length	11.2 cm

Offer Sustainability

Sustainable offer status	Green Premium product
REACh Regulation	REACh Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration

Rittal - RIT KASTTHERMOSTAAT

Artikelnummer	2700344363
Fabrikaat	Rittal
Typenummer	3110000
Artikelnummer Leverancier	3110000
EAN Code	4028177036598
Minimale afname	1

Product omschrijving

Deze thermostaat is speciaal geschikt voor de regeling van ventilatoren, verwarmingen en warmtewisselaars, maar ook als sensor voor de bewaking van de kastbinnentemperatuur.

Technische specificaties

Nom. (meet)spanning	230 V
Instelbereik temperatuur	5 - 60 gr C
Montagewijze	Klembevestiging
Uitvoering schakelelement	Wisselcontact
Met digitale aflezing	Nee
Met hygrostaat	Nee

PNOZ s1

PILZ
THE SPIRIT OF SAFETY

- Safety relays

Operating Manual-21393-EN-10

Block diagram/terminal configuration

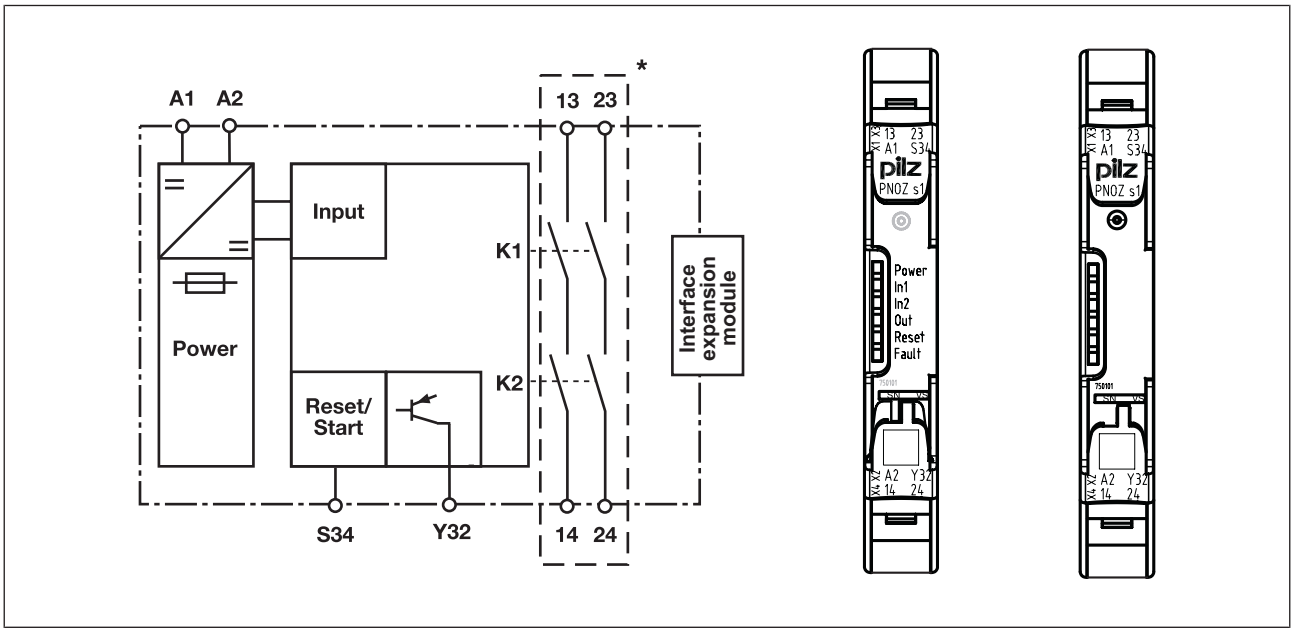


Fig.: Centre: Front view with cover, right: Front view without cover

*Insulation between the non-marked area and the relay contacts: Basic insulation (overvoltage category III), Protective separation (overvoltage category II)

Function description

- Single-channel operation: No redundancy in the input circuit, earth faults in the start and input circuit are detected.
- Automatic start: Unit is active once the input circuit has been closed.
- Manual start: Unit is active once the input circuit and the start circuit are closed.
- Increase in the number of available instantaneous safety contacts by connecting contact expander modules or external contactors/relays;
  A connector can be used to connect 1 PNOZsigma contact expander module.

Wiring

Please note:

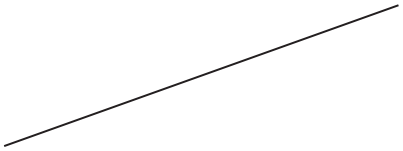
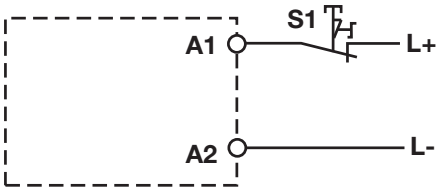
- Information given in the "Technical details [15]" must be followed.
- Outputs 13-14 and 23-24 are safety contacts, the semiconductor output Y32 is an auxiliary output (e.g. for display).
- Semiconductor output Y32 should **not** be used for safety circuits!
- To prevent contact welding, a fuse should be connected before the output contacts (see Technical details [15]).
- Calculation of the max. cable length l_{max} in the input circuit:

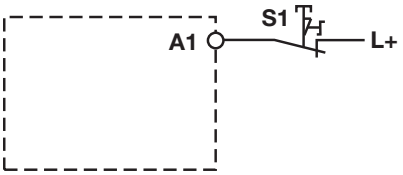
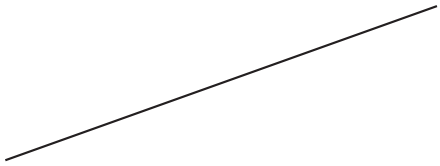
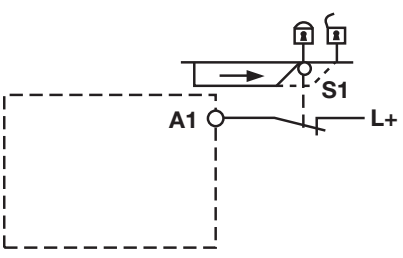
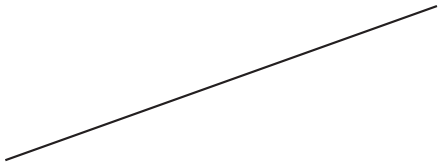
$$l_{max} = \frac{R_{lmax}}{R_l / km}$$

R_{lmax} = max. overall cable resistance (see Technical details [15])
R_l / km = cable resistance/km

- Use copper wire that can withstand 60/75 °C.
- Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.
- Ensure the wiring and EMC requirements of EN 60204-1 are met.
- The power supply must comply with the regulations for extra low voltages with protective electrical separation (SELV, PELV) in accordance with VDE 0100, Part 410.

Preparing for operation

Supply voltage	AC	DC
		

Input circuit	Single-channel	Dual-channel
E-STOP **without** detection of shorts across contacts		
Safety gate **without** detection of shorts across contacts		

Technical Details

General	750101	751101
Approvals	**CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed**	**CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed**
Electrical data	**750101**	**751101**
Supply voltage		
Voltage	**24 V**	**24 V**
Kind	**DC**	**DC**
Voltage tolerance	**-15 %/+10 %**	**-15 %/+10 %**
Output of external power supply (DC)	**2 W**	**2 W**
Residual ripple DC	**20 %**	**20 %**
Duty cycle	**100 %**	**100 %**
Inputs	**750101**	**751101**
Number	**1**	**1**
Voltage at		
Input circuit DC	**24 V**	**24 V**
Start circuit DC	**24 V**	**24 V**
Feedback loop DC	**24 V**	**24 V**
Current at		
Input circuit DC	**60 mA**	**60 mA**
Start circuit DC	**20 mA**	**20 mA**
Feedback loop DC	**20 mA**	**20 mA**
Max. inrush current impulse		
Current pulse, input circuit	**1 A**	**1 A**
Pulse duration, input circuit	**5 ms**	**5 ms**
Current pulse, feedback loop	**0,2 A**	**0,2 A**
Pulse duration, feedback loop	**0,5 ms**	**0,5 ms**
Current pulse, start circuit	**0,2 A**	**0,2 A**
Pulse duration, start circuit	**0,5 ms**	**0,5 ms**
Max. overall cable resistance Rl-max		
Single-channel at UB DC	**30 Ohm**	**30 Ohm**
Semiconductor outputs	**750101**	**751101**
Number	**1**	**1**
Voltage	**24 V**	**24 V**
Current	**20 mA**	**20 mA**
Relay outputs	**750101**	**751101**
Number of output contacts		
Safety contacts (N/O), instantaneous	**2**	**2**
Max. short circuit current IK	**1 kA**	**1 kA**
Utilisation category		
In accordance with the standard	**EN 60947-4-1**	**EN 60947-4-1**

Relay outputs	750101	751101
Utilisation category of safety contacts		
AC1 at	**240 V**	**240 V**
Min. current	**0,02 A**	**0,02 A**
Max. current	**3 A**	**3 A**
Max. power	**720 VA**	**720 VA**
DC1 at	**24 V**	**24 V**
Min. current	**0,02 A**	**0,02 A**
Max. current	**3 A**	**3 A**
Max. power	**72 W**	**72 W**
Utilisation category		
In accordance with the standard	**EN 60947-5-1**	**EN 60947-5-1**
Utilisation category of safety contacts		
AC15 at	**230 V**	**230 V**
Max. current	**1,5 A**	**1,5 A**
DC13 (6 cycles/min) at	**24 V**	**24 V**
Max. current	**1,5 A**	**1,5 A**
Utilisation category in accordance with UL		
Voltage	**240 V AC G. P.**	**240 V AC G. P.**
With current	**3 A**	**3 A**
Voltage	**24 V DC G. P.**	**24 V DC G. P.**
With current	**3 A**	**3 A**
Pilot Duty	**B300, R300**	**B300, R300**
External contact fuse protection, safety contacts		
In accordance with the standard	**EN 60947-5-1**	**EN 60947-5-1**
Blow-out fuse, quick	**4 A**	**4 A**
Blow-out fuse, slow	**2 A**	**2 A**
Blow-out fuse, gG	**4 A**	**4 A**
Circuit breaker 24V AC/DC, characteristic B/C	**2 A**	**2 A**
Conventional thermal current	**3 A**	**3 A**
Contact material	**AgSnO2**	**AgSnO2**
Times	**750101**	**751101**
Switch-on delay		
With automatic start typ.	**100 ms**	**100 ms**
With automatic start max.	**150 ms**	**150 ms**
With automatic start after power on typ.	**100 ms**	**100 ms**
With automatic start after power on max.	**150 ms**	**150 ms**
With manual start typ.	**50 ms**	**50 ms**
With manual start max.	**60 ms**	**60 ms**

Productinformatieblad
Kenmerken

A9N15655
Acti 9-zekering-lastscheider STI-3 polen-10 A-voor zekering 8,5 x 31,5 mm

Hoofdkenmerken

Gamma	Acti 9
Productnaam	Acti 9 STI
Type product of component	Zekering-onderbreker
Korte naam apparaat	STI
Beschrijving polen	3P

Complementaire kenmerken

[In] nominale stroom	2 A 4 A 6 A 10 A
Curve zekering	GG AM
Formaat smeltveiligheid	8,5 x 31,5 mm
[Ue] nominale bedrijfspanning	400 V AC
[Ui] nominale isolatiespanning	500 V AC 50/60 Hz
Montagemodus	Opklikbaar
Montagesteun	DIN-rail
Stap van 9 mm	6
Hoogte	81 mm
Breedte	54 mm
Diepte	75 mm
Kleur	Wit
Aansluitingen - klemmen	Schroefklem aansluitingen1 kabel(s) 0,75…10 mm² stijve Schroefklem aansluitingen1 kabel(s) 0,5…6 mm² flexibel Schroefklem aansluitingen2 kabel(s) 0,75…4 mm² stijve Schroefklem aansluitingen2 kabel(s) 0,5…6 mm² flexibel
Draadstriplengte	12 mm

Aandraaimoment	2 N.m

Omgeving

Normen	IEC EN 60947-3 IEC 60269-1/2
IP-beschermingsgraad	IP20
Vervuilingsgraad	3
Omgevingstemperatuur bij werking	-20…60 °C
Omgevingstemperatuur bij opslag	-40…80 °C

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	164 g
Hoogte verpakking 1	5,4 cm
Breedte verpakking 1	7,5 cm
Lengte verpakking 1	8,5 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	4
Gewicht verpakking 2	720 g
Hoogte verpakking 2	10 cm
Breedte verpakking 2	8 cm
Lengte verpakking 2	23 cm
Type verpakking 3	S03
Aantal gebruikseenheden in verpakking 3	48
Gewicht verpakking 3	9,127 kg
Hoogte verpakking 3	30 cm
Breedte verpakking 3	30 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
Aanwezigheid van halogeen	Halogeenvrij product

Contractuële waarborg

Garantie	18 maanden

Productinformatieblad
Kenmerken

DF2BA0400
buiszekering NFC 8,5 x 31,5 mm buisvormig - aM 4 A - zonder controlelamp

Hoofdkenmerken

Productgamma	TeSys zekering-onderbreker
Type product of component	Smeltpatroon
Korte naam apparaat	DF2
[Ue] nominale bedrijfspanning	400 V AC
Formaat smeltveiligheid	8,5 x 31,5 mm
Type zekering	NFC
Hoeveelheid per set	Set van 10

Complementaire kenmerken

[In] nominale stroom	4 A 400 V
Curve zekering	AM
Gewicht product	0,01 kg

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	4 g
Hoogte verpakking 1	1 cm
Breedte verpakking 1	3,5 cm
Lengte verpakking 1	9 cm
Type verpakking 2	BB1
Aantal gebruikseenheden in verpakking 2	10
Gewicht verpakking 2	45 g
Hoogte verpakking 2	1 cm
Breedte verpakking 2	4,6 cm

Lengte verpakking 2	7 cm
Type verpakking 3	S01
Aantal gebruikseenheden in verpakking 3	1000
Gewicht verpakking 3	4,674 kg
Hoogte verpakking 3	15 cm
Breedte verpakking 3	15 cm
Lengte verpakking 3	40 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Pro-actieve RoHS-verklaring China (buiten juridisch toepassingsbereik RoHS China)
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.
PVC-vrij	Ja

Contractuële waarborg

Garantie	18 months

Power supply unit - TRIO-PS-2G/3AC/24DC/10 - 2903154

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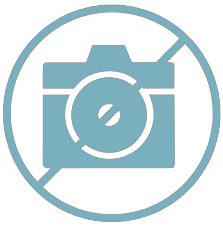


Primary-switched TRIO POWER power supply with push-in connection for DIN rail mounting, input: 3-phase, output: 24 V DC/10 A

Product Description

TRIO POWER power supplies with standard functionality
The TRIO POWER power supply range with push-in connection has been perfected for use in machine building. All functions and the space-saving design of the single and three-phase modules are optimally tailored to the stringent requirements. Under challenging ambient conditions, the power supply units, which feature an extremely robust electrical and mechanical design, ensure the reliable supply of all loads.

Your advantages

- Save time and costs, thanks to the Push-in connection and narrow design
- Increase system availability, thanks to dynamic boost with 150% of the nominal current for five seconds
- Maximum flexibility due to the wide temperature range from -25°C to +70°C and device startup at -40°C
- Rugged design

Key Commercial Data

Packing unit	1 pc
GTIN	4 046356 960953
GTIN	4046356960953
Weight per Piece (excluding packing)	1,095.000 g
Custom tariff number	85044030
Country of origin	China
Sales Key	CMPO33

Technical data

Dimensions

Width	42 mm
Height	130 mm
Depth	160 mm
Installation distance right/left	0 mm / 0 mm

Power supply unit - TRIO-PS-2G/3AC/24DC/10 - 2903154

Technical data

Dimensions

Installation distance top/bottom	50 mm / 50 mm

Ambient conditions

Degree of protection	IP20
Inflammability class in acc. with UL 94 (housing / terminal blocks)	V0
Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C Derating: 2.5 %/K)
Ambient temperature (start-up type tested)	-40 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	≤ 95 % (at 25 °C, non-condensing)
Climatic class	3K3 (in acc. with EN 60721)
Degree of pollution	2
Installation height	≤ 5000 m (> 2000 m, Derating: 10 %/1000 m)

Input data

Nominal input voltage range	3x 400 V AC ... 500 V AC
	2x 400 V AC ... 500 V AC
Input voltage range	3x 400 V AC ... 500 V AC -20 % ....+15 %
	2x 400 V AC ... 500 V AC -10 % ... +15 %
AC frequency range	50 Hz ... 60 Hz
Discharge current to PE	< 3.5 mA
Current consumption	3x 0.6 A (400 V AC)
	3x 0.6 A (500 V AC)
	2x 1.1 A (400 V AC)
	2x 1.1 A (500 V AC)
Nominal power consumption	451.7 VA
Inrush current	≤ 26 A (typical)
Mains buffering time	typ. 10 ms (400 V AC)
	typ. 20 ms (500 V AC)
Input fuse	3.15 A (internal (device protection), slow-blow)
Recommended breaker for input protection	6 A ... 16 A (Characteristics B, C, D, K)
Power factor (cos phi)	0.58
Type of protection	Transient surge protection
Protective circuit/component	Varistor

Output data

Nominal output voltage	24 V DC ±1 %
Setting range of the output voltage (U_{Set})	24 V DC ... 28 V DC (> 24 V DC, constant capacity restricted)
Nominal output current (I_N)	10 A
Dynamic Boost ($I_{Dyn.Boost}$)	15 A (5 s)
Derating	> 60 °C ... 70 °C (2.5%/K)
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	yes

Power supply unit - TRIO-PS-2G/3AC/24DC/10 - 2903154

Technical data

Output data

Protection against overvoltage at the output (OVP)	≤ 30 V DC
Control deviation	< 1 % (change in load, static 10 % ... 90 %)
	< 3 % (Dynamic load change 10 % ... 90 %, 10 Hz)
	< 0.1 % (change in input voltage ±10 %)
Residual ripple	≤ 20 mV_{PP}
Output power	240 W
Typical response time	< 1 s
Maximum power dissipation in no-load condition	< 1.1 W (400 V AC)
Power loss nominal load max.	< 22 W (480 V AC)

General

Net weight	0.9 kg
Efficiency	> 92 % (at 400 V AC and nominal values)
MTBF (IEC 61709, SN 29500)	> 2100000 h (25 °C)
	> 1200000 h (40 °C)
	> 590000 h (60 °C)
Insulation voltage input/output	3 kV AC (type test)
	1.5 kV AC (routine test)
Degree of protection	IP20
Protection class	I (in closed control cabinet)
Inflammability class in acc. with UL 94 (housing / terminal blocks)	V0
Mounting position	horizontal DIN rail NS 35, EN 60715
Assembly instructions	alignable: horizontally 0 mm (≤ 40 °C) 10 mm (≤ 70 °C), vertically 50 mm

Connection data, input

Connection method	Push-in connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	4 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Stripping length	10 mm

Connection data, output

Connection method	Push-in connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	4 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12

SIEMENS

Data sheet 5SG7611-0KK10

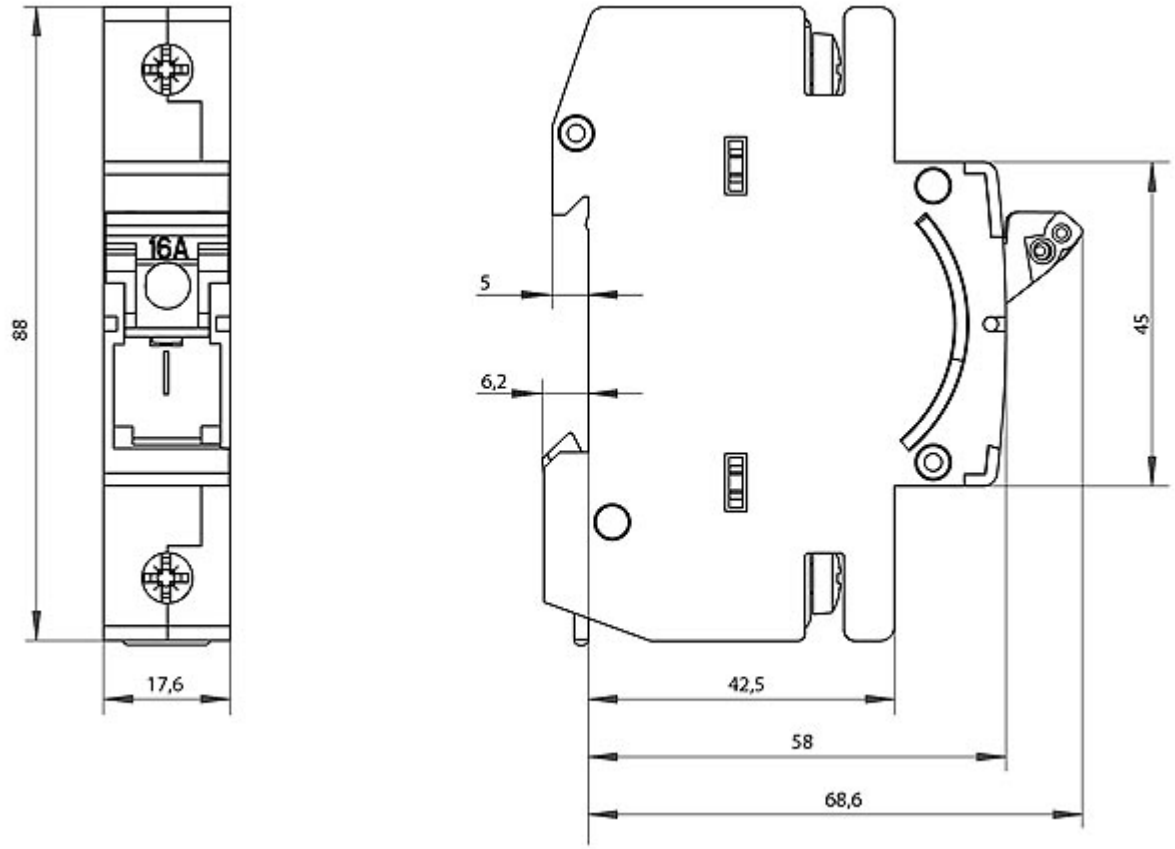
MINIZED, fuse switch disconnector, D01, 1-pole, In: 10 A, Un AC: 230 V

Model	
product brand name	MINIZED
product designation	Fuse switch disconnector
General technical data	
number of poles	1
size of fuse system / acc. to DIN EN 60269-1	D01
overvoltage category	4
Voltage	
surge voltage resistance / rated value	6 kV
Supply voltage	
operating voltage / at AC / rated value	230 V
Protection class	
protection class IP	IP20, with connected conductors
Dissipation	
power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	0.1 W
Current	
operational current / at AC / rated value	10 A
Product details	
product feature / sealable	Yes
Connections	
tightening torque / with screw-type terminals	
● minimum	2.5 N·m
● maximum	3 N·m
Mechanical Design	
height	70 mm
width	18 mm
depth	88 mm
mounting position	any, preferably vertical
net weight	67 g
Certificates	
reference code	
● acc. to DIN EN 61346-2	F
● acc. to IEC 81346-2	F

General Product Approval	**Declaration of Conformity**

Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SG7611-0KK10
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SG7611-0KK10
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SG7611-0KK10
Tender specifications
http://www.siemens.com/specifications



SIEMENS

Data sheet 5SE2310

[NEOZED-Sicherungseinsatz], D01, 10 A, [gG], Un AC: 400 V, Un DC: 250 V, [mit verzinnten Kontaktkappen]

Model	
product brand name	SENTRON
product designation	NEOZED fuse link
design of the product	With tin-coated contact caps
product variations	Pack of 10
design of the fuse link	NEOZED fuse link
General technical data	
size of fuse system / acc. to DIN EN 60269-1	D01
operating class of the fuse link	gG
Supply voltage	
supply voltage	
• at AC / rated value	400 V
• at DC	250 V
operating voltage / rated value	400 V
protection class IP	IP20, with connected conductors
switching capacity current / acc. to IEC 60947-2 / rated value	50 kA
Dissipation	
power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	1 W
operational current	
• at 30 °C / rated value	9.8 A
• at 40 °C / rated value	9.5 A
• at 45 °C / rated value	9.2 A
• at 50 °C / rated value	9 A
• at 55 °C / rated value	8.8 A
• at 60 °C / rated value	8.6 A
• at AC / rated value	10 A
Main circuit	
operational current / rated value	10 A
Appearance	
color coding of the fuse link	Red
breaking capacity maximum short-circuit current (Icu) / at AC / rated value	50 kA
Mechanical Design	
mounting position	Any, preferably vertical
net weight	7 g
ambient temperature / during operation	

● minimum	40 °C
● maximum	40 °C
environmental category	Up to 45°C at 95 % rel. humidity

Certificates

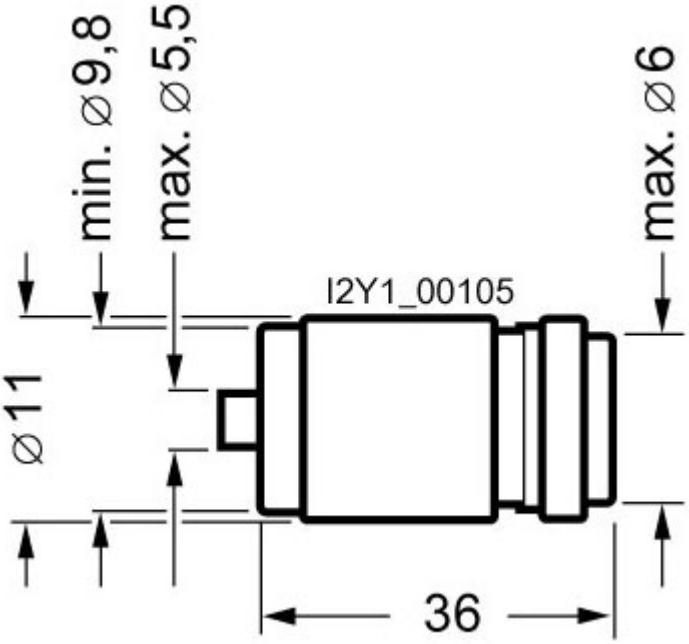
reference code	
● acc. to DIN EN 61346-2	F
● acc. to IEC 81346-2	F

General Product Approval			Declaration of Conformity	Test Certificates	
ÖVE	VDE	EAC	EG-Konf.	Miscellaneous	Type Test Certificates/Test Report

Test Certificates	other
Special Test Certificate	Environmental Confirmations

Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SE2310
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SE2310
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SE2310
Tender specifications
http://www.siemens.com/specifications



Fuse plug - P-FU 5X20-5 - 3209235

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Fuse plug, connection method: Plug connection, nominal current: 6.3 A, nom. voltage: 400 V, width: 6.2 mm, fuse type: G / 5 x 20, mounting type: Plug-in mounting, color: black

Your advantages

- Large-surface labeling option
- Versions with bipolar error display
- Test contacts on both sides of the fuse
- Can be used for overload/short-circuit protection

RoHS COMPLETE line

Key Commercial Data

Packing unit	10 pc
Minimum order quantity	10 pc
GTIN	4 046356 548335
GTIN	4046356548335
Weight per Piece (excluding packing)	4.619 g
Custom tariff number	85369095
Country of origin	China
Sales Key	BE2Z3X

Technical data

General

Note	Suitable for terminal blocks with a width of 5.2 mm and above with TG zone
	Prior to replacing the cartridge fuse, disconnect the fuse connector from the basic terminal block.
Color	black
Insulating material	PA
Flammability rating according to UL 94	V0
Maximum power dissipation for nominal condition	1.6 W

Fuse plug - P-FU 5X20-5 - 3209235

Technical data

Dimensions

Width	6.2 mm
Length	25 mm
Pitch	5.2 mm
Height	57.7 mm

General

Degree of pollution	3
Maximum load current	6.3 A (the current is determined by the fuse used)
Nominal current I_N	6.3 A (the current is determined by the fuse used)
Nominal voltage U_N	400 V (The voltage is determined by the fuse or selected LED display)
Fuse	G / 5 x 20
Relative insulation material temperature index (Elec., UL 746 B)	130 °C
Temperature index of insulation material (DIN EN 60216-1 (VDE 0304-21))	130 °C
Static insulating material application in cold	-60 °C
Surface flammability NFPA 130 (ASTM E 162)	passed
Specific optical density of smoke NFPA 130 (ASTM E 662)	passed
Smoke gas toxicity NFPA 130 (SMP 800C)	passed
Calorimetric heat release NFPA 130 (ASTM E 1354)	28 MJ/kg
Fire protection for rail vehicles (DIN EN 45545-2) R22	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R23	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R24	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R26	HL 1 - HL 3

Connection data

Connection method	Plug connection

Ambient conditions

Operating temperature	-60 °C ... 105 °C (max. short-term operating temperature 130°C)
Ambient temperature (storage/transport)	-25 °C ... 60 °C (for a short time, not exceeding 24 h, -60 °C to +70 °C)
Permissible humidity (storage/transport)	30 % ... 70 %
Ambient temperature (assembly)	-5 °C ... 70 °C
Ambient temperature (actuation)	-5 °C ... 70 °C

Standards and Regulations

Connection in acc. with standard	CSA
Flammability rating according to UL 94	V0

Environmental Product Compliance

China RoHS	Environmentally friendly use period: unlimited = EFUP-e
	No hazardous substances above threshold values

Drawings

Fuse plug - P-FU 5X20-5 - 3209235

Classifications

UNSPSC

UNSPSC 21.0	39121629

Approvals

Approvals

Approvals

CSA / UL Recognized / cUL Recognized / EAC / cULus Recognized

Ex Approvals

Approval details

CSA		http://www.csagroup.org/services-industries/product-listing/	13631

Nominal voltage UN	300 V
Nominal current IN	10 A

UL Recognized		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 60425

Nominal voltage UN	300 V
Nominal current IN	10 A

cUL Recognized		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 60425

Nominal voltage UN	300 V
Nominal current IN	10 A

EAC		RU C-DE.BL08.B.00714

Installation level terminal block - PTI 2,5-L/TG - 3213961

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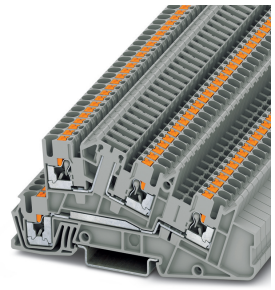


Installation level terminal block, Push-in connection, cross section: 0.14 mm² - 4 mm², AWG: 26 - 12, width: 5.2 mm, color: gray, mounting type: NS 35/7,5, NS 35/15

Your advantages

- The terminal blocks with knife disconnect zone in the upper level meet the safety requirement regarding individual circuit isolation of DIN VDE 0100-718

RoHS COMPLETE line

Key Commercial Data

Packing unit	50 pc
Minimum order quantity	50 pc
GTIN	4 046356 609531
GTIN	4046356609531
Weight per Piece (excluding packing)	15.643 g
Custom tariff number	85369010
Country of origin	Germany
Sales Key	BE2253

Technical data

General

Number of levels	3
Number of connections	4
Potentials	2
Nominal cross section	4 mm²
Color	gray
Insulating material	PA
Flammability rating according to UL 94	V0
Rated surge voltage	4 kV
	6 kV

Installation level terminal block - PTI 2,5-L/TG - 3213961

Technical data

General

Degree of pollution	3
Overvoltage category	III
Insulating material group	I
Maximum power dissipation for nominal condition	1.02 W (the value is multiplied when connecting multiple levels)
Maximum load current	30 A (with 4 mm² conductor cross section and 3-pos. terminal block)
Nominal current I_N	24 A (with 4 mm² conductor cross section)
Nominal voltage U_N	400 V (phase conductor/phase conductor)
	250 V (phase conductor/PE)
	phase conductor/N
Maximum load current	16 A (with 4 mm² conductor cross section)
Nominal current I_N	16 A
Nominal voltage U_N	250 V
Open side panel	Yes
Relative insulation material temperature index (Elec., UL 746 B)	130 °C
Temperature index of insulation material (DIN EN 60216-1 (VDE 0304-21))	125 °C
Static insulating material application in cold	-60 °C
Surface flammability NFPA 130 (ASTM E 162)	passed
Specific optical density of smoke NFPA 130 (ASTM E 662)	passed
Calorimetric heat release NFPA 130 (ASTM E 1354)	27,5 MJ/kg
Smoke gas toxicity NFPA 130 (SMP 800C)	passed
Fire protection for rail vehicles (DIN EN 45545-2) R22	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R23	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R24	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R26	HL 1 - HL 3

Dimensions

Width	5.2 mm
End cover width	2.2 mm
Length	101 mm
Height NS 35/7,5	50.5 mm
Height NS 35/15	58 mm

Connection data

Connection method	Push-in connection
Stripping length	8 mm ... 10 mm
Conductor cross section solid min.	0.14 mm²
Conductor cross section solid max.	4 mm²
Conductor cross section AWG min.	26
Conductor cross section AWG max.	12
Conductor cross section flexible min.	0.14 mm²
Conductor cross section flexible max.	4 mm²

Installation level terminal block - PTI 2,5-L/TG - 3213961

Technical data

Ambient conditions

Ambient temperature (storage/transport)	-25 °C ... 60 °C (for a short time, not exceeding 24 h, -60 °C to +70 °C)
Permissible humidity (storage/transport)	30 % ... 70 %
Ambient temperature (assembly)	-5 °C ... 70 °C

Standards and Regulations

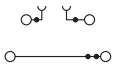
Connection in acc. with standard	CUL
Flammability rating according to UL 94	V0

Environmental Product Compliance

China RoHS	Environmentally friendly use period: unlimited = EFUP-e
	No hazardous substances above threshold values

Drawings

Circuit diagram



Classifications

eCl@ss

eCl@ss 10.0.1	27141125
eCl@ss 11.0	27141125
eCl@ss 4.0	27141100
eCl@ss 4.1	27141100
eCl@ss 5.0	27141100
eCl@ss 5.1	27141100
eCl@ss 6.0	27141100
eCl@ss 7.0	27141125
eCl@ss 9.0	27141125

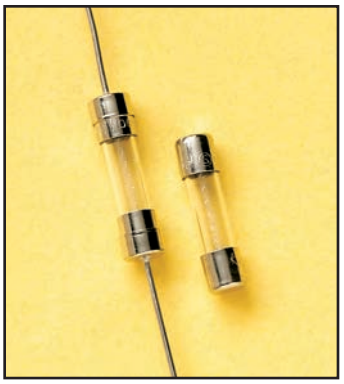
ETIM

ETIM 4.0	EC000897
ETIM 6.0	EC001329
ETIM 7.0	EC001329

UNSPSC

UNSPSC 6.01	30211811
UNSPSC 7.0901	39121410
UNSPSC 11	39121410
UNSPSC 12.01	39121410
UNSPSC 13.2	39121410
UNSPSC 18.0	39121410

ELECTRONIC/GLASS FUSES



GSB / GSB-V

Glass Body
Fast Acting
5mm x 20mm
1-1/2" Axial Leads Optional

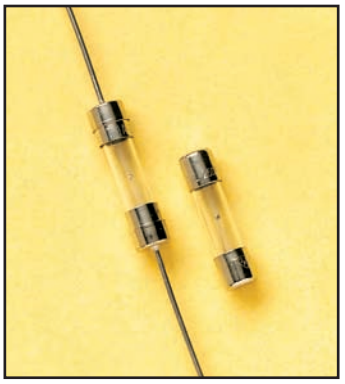
1/6A through 10A, 250VAC, UL and CSA Recognized
1/16A through 6-3/10A, 250VAC, SEMKO Approved
1/16A through 6-3/10A, 250VAC, VDE Approved
IEC-127-2 Standard Sheet 2*

Standard Fuse Ampere Ratings

CATALOG NUMBER	AXIAL LEAD CAT. NO	AMPERE RATING	VOLTS	I.R.
GSB1/16	GSB-V1/16	1/16A	250V	1
GSB8/100	GSB-V8/100	8/100A	250V	1
GSB1/10	GSB-V1/10	1/10A	250V	1
GSB1/8	GSB-V1/8	1/8A	250V	1
GSB16/100	GSB-V16/100	16/100A	250V	1
GSB2/10	GSB-V2/10	2/10A	250V	1
GSB1/4	GSB-V1/4	1/4A	250V	1
GSB315/1000	GSB-V315/1000	315/1000A	250V	1
GSB4/10	GSB-V4/10	4/10A	250V	1
GSB1/2	GSB-V1/2	1/2A	250V	1
GSB630/1000	GSB-V630/1000	630/1000A	250V	1
GSB8/10	GSB0-V8/10	8/10A	250V	1
GSB1	GSB-V1	1A	250V	1
GSB1-1/4	GSB-V1-1/4	1-1/4A	250V	1
GSB1-6/10	GSB-V1-6/10	1-6/10A	250V	1
GSB2	GSB-V2	2A	250V	1
GSB2-1/2	GSB-V2-1/2	2-1/2A	250V	1
GSB3-15/100	GSB-V3-15/100	3-15/100A	250V	1
GSB4	GSB-V4	4A	250V	2
GSB5	GSB-V5	5A	250V	3
GSB6-3/10	GSB-V6-3/10	6-3/10A	250V	4
GSB8	GSB-V8	8A	250V	5
GSB10	GSB-V10	10A	250V	6

1. 250VAC @ 35A I.R.
2. 250VAC @ 40A I.R.
3. 250VAC @ 50A I.R.
4. 250VAC @ 63A I.R.
5. 250VAC @ 80A I.R.
6. 250VAC @ 100A I.R.

* IEC Standards for 5x20mm fuses do not include ratings above 6.3 amperes.



GDG / GDG-V

Glass Body
Time Delay
5mm x 20 mm
1-1/2" Axial Leads Optional

1/16A through 10A, 250VAC, UL and CSA Recognized
1/16A through 6-3/10A, 250VAC, SEMKO Approved
1/16A through 6-3/10A, 250VAC, VDE Approved
IEC-127-2 Standard Sheet 3*

Standard Fuse Ampere Ratings

CATALOG NUMBER	AXIAL LEAD CAT. NO	AMPERE RATING	VOLTS	I.R.
GDG1/16	GDG-V1/16	1/16A	250V	1
GDG8/100	GDG-V8/100	8/100A	250V	1
GDG1/10	GDG-V1/10	1/10A	250V	1
GDG1/8	GDG-V1/8	1/8A	250V	1
GDG16/100	GDG-V16/100	16/100A	250V	1
GDG2/10	GDG-V2/10	2/10A	250V	1
GDG1/4	GDG-V1/4	1/4A	250V	1
GDG315/1000	GDG-V315/1000	315/1000A	250V	1
GDG4/10	GDG-V4/10	4/10A	250V	1
GDG1/2	GDG-V1/2	1/2A	250V	1
GDG630/1000	GDG-V630/1000	630/1000A	250V	1
GDG8/10	GDG-V8/10	8/10A	250V	1
GDG1	GDG-V1	1A	250V	1
GDG1-1/4	GDG-V1-1/4	1-1/4A	250V	1
GDG1-6/10	GDG-V1-6/10	1-6/10A	250V	1
GDG2	GDG-V2	2A	250V	1
GDG2-1/2	GDG-V2-1/2	2-1/2A	250V	1
GDG3-15/100	GDG-V3-15/100	3-15/100A	250V	1
GDG4	GDG-V4	4A	250V	2
GDG5	GDG-V5	5A	250V	3
GDG6-3/10	GDG-V6-3/10	6-3/10A	250V	4
GDG8	GDG-V8	8A	250V	5
GDG10	GDG-V10	10A	250V	6

1. 250VAC @ 35A I.R.
2. 250VAC @ 40A I.R.
3. 250VAC @ 50A I.R.
4. 250VAC @ 63A I.R.
5. 250VAC @ 80A I.R.
6. 250VAC @ 100A I.R.

* IEC Standards for 5x20mm fuses do not include ratings above 6.3 amperes.

SIEMENS

Gegevensblad 5SG7631-0KK10

Versie	
productmerknaam	MINIZED
productbenaming	mespatroonlastscheider
Algemene technische gegevens	
aantal polen	3
bouwgrootte van het beveiligingssysteem / volgens EN 60269-1	D01
overspanningscategorie	4
Voltage	
stootspanningsvastheid / nominale waarde	6 kV
Voedingsspanning	
bedrijfsspanning / bij AC / nominale waarde	400 V
Beschermingsklasse	
beschermingsklasse IP	IP20, met aangesloten geleiders
Losbandigheid	
vermogensverlies [W] / bij nominale waarde stroom / bij AC / bij warme bedrijfstoestand / per pool	0,3 W
Elektriciteit	
bedrijfsstroom / bij AC / nominale waarde	10 A
Product Details	
producteigenschap / verzegelbaar	Ja
Aansluitingen	
aanhaalmoment / bij schroefaansluiting	
● minimaal	2,5 N·m
● maximaal	3 N·m
Mechanical Design	
hoogte	70 mm
breedte	54 mm
diepte	88 mm
inbouwpositie	willekeurig, bij voorkeur verticaal
nettogewicht	135 g
Certificaten	
referentiemarkering	
● volgens EN 61346-2	F
● volgens IEC 81346-2:2009	F
General Product Approval	**Declaration of Conformity**

Verdere informatie

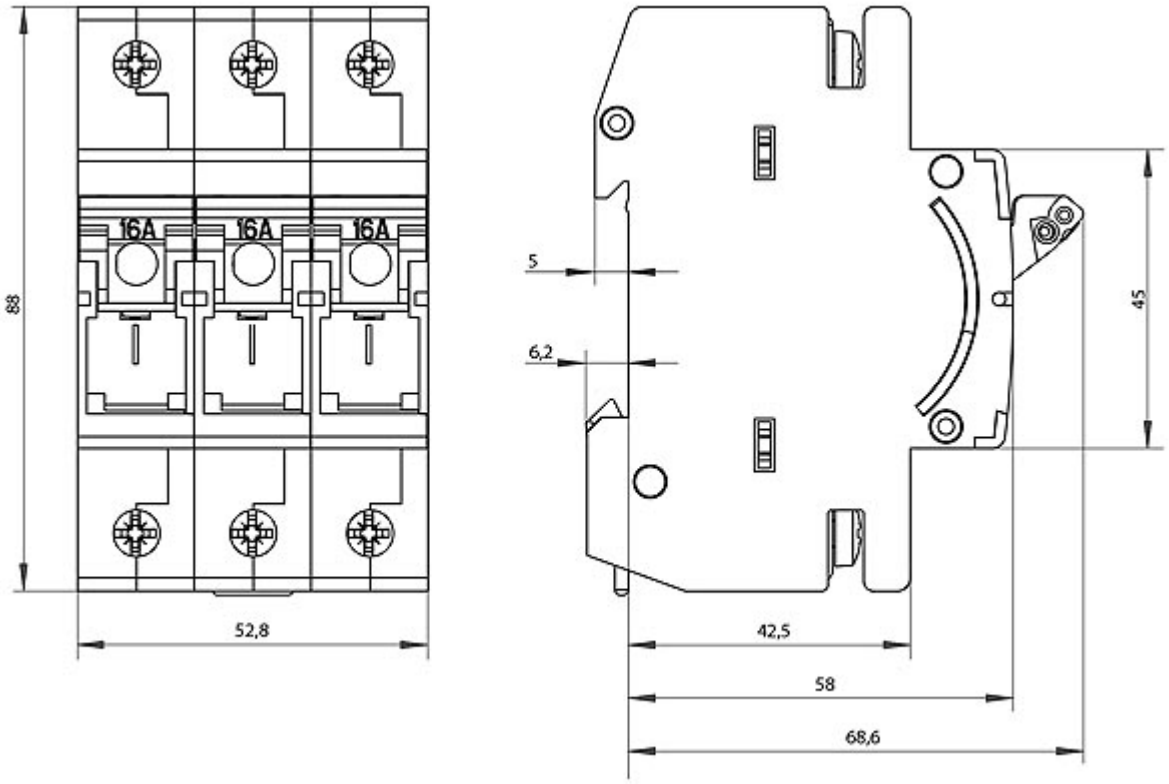
Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs

Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/nl/nl/Catalog/product?mlfb=5SG7631-0KK10

Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/nl/ps/5SG7631-0KK10

Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SG7631-0KK10

Tender specifications
http://www.siemens.com/specifications



Productinformatieblad
Kenmerken

GV2ME08
motorbeveiligingsschakelaar GV2-ME - 2,5..4 A - 3P 3d - thermomagnetisch

Hoofdkenmerken

Gamma	TeSys
Productnaam	TeSys GV2
Type product of component	Beveiligingsschakelaar
Korte naam apparaat	GV2ME
Apparaattoepassing	Motor
Technologie uitschakeleenheid	Thermisch-magnetisch

Complementaire kenmerken

Beschrijving polen	3P
Type net	AC
Gebruikscategorie	AC-3 conform IEC 60947-4-1 Categorie A conform IEC 60947-2
Netfrequentie	50/60 Hz conform IEC 60947-4-1
Bevestigingsmethode	35 mm symmetrische DIN-rail: afgesneden Paneel: geschroefd (with adaptor plate)
Bedieningspositie	Eender welke positie
Motorvermogen kW	1,1 kW bij 400/415 V AC 50/60 Hz 1,5 kW bij 400/415 V AC 50/60 Hz 1,5 kW bij 500 V AC 50/60 Hz 3 kW bij 690 V AC 50/60 Hz 2,2 kW bij 500 V AC 50/60 Hz 2,2 kW bij 690 V AC 50/60 Hz
Uitschakelvermogen	100 kA Icu bij 230/240 V AC 50/60 Hz conform IEC 60947-2 100 kA Icu bij 400/415 V AC 50/60 Hz conform IEC 60947-2 100 kA Icu bij 440 V AC 50/60 Hz conform IEC 60947-2 100 kA Icu bij 500 V AC 50/60 Hz conform IEC 60947-2 3 kA Icu bij 690 V AC 50/60 Hz conform IEC 60947-2
Ics kortsluitvermogen in dienst	100 % bij 500 V AC 50/60 Hz conform IEC 60947-2 100 % bij 230/240 V AC 50/60 Hz conform IEC 60947-2 100 % bij 440 V AC 50/60 Hz conform IEC 60947-2 100 % bij 400/415 V AC 50/60 Hz conform IEC 60947-2

	75 % bij 690 V AC 50/60 Hz conform IEC 60947-2
Type bediening	Drukknop
[In] nominale stroom	4 A
Thermal protection adjustment range	2,5…4 A
Magnetische uitschakelstroom	51 A
[Ue] nominale bedrijfspanning	690 V AC 50/60 Hz conform IEC 60947-2
[Ui] nominale isolatiespanning	690 V AC 50/60 Hz conform IEC 60947-2
[Ith] conventionele thermische stroom in vrije lucht	4 A conform IEC 60947-4-1
[Uimp] nominale stoothoudspanning	6 kV conform IEC 60947-2
Vermogensdissipatie per pool	2,5 W
Mechanische levensduur	100000 cycli
Elektrische levensduur	100000 cycli voor AC-3 bij 440 V
Maximale bedrijfsfrequentie	25 cyc/u
Nominale werking	Continu conform IEC 60947-4-1
Aandraaimoment	1,7 N.m op schroefklem aansluitingen
Geschiktheid voor isolatie	Ja conform IEC 60947-1
Gevoeligheid voor afwezigheid fase	Ja conform IEC 60947-4-1
Hoogte	89 mm
Breedte	45 mm
Diepte	78,5 mm
Gewicht product	0,26 kg

Omgeving

Normen	EN/IEC 60947-2 EN/IEC 60947-4-1 CSA C22.2 Nr 60947-4-1 UL 60947-4-1
Productcertificeringen	IECEE CB Scheme UL CSA CCC EAC ATEX BV LROS (Lloyds register of shipping) DNV-GL RINA
Beschermende behandeling	TH
IP-beschermingsgraad	IP20 conform IEC 60529
IK beschermingsgraad	IK04
Omgevingstemperatuur voor werking	-20…60 °C
Omgevingstemperatuur bij opslag	-40…80 °C
Vuurbestendigheid	960 °C conform IEC 60695-2-1
Bedrijfshoogte	2000 m

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	258 g
Hoogte verpakking 1	4,7 cm
Breedte verpakking 1	8,5 cm
Lengte verpakking 1	9 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product

REACh-regelgeving	REACh-verklaring
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China Product buiten toepassingsbereik RoHS China. Vermelding van stof ter informatie.
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.

Contractuële waarborg

Garantie	18 months

Productinformatieblad
Kenmerken

28900
lastscheider - Interpact INS40 - 3P - 40 A

Hoofdkenmerken

Gamma	Compact
Productnaam	Compact INS
Type product of component	Lastscheider
Beschrijving polen	3P
Type net	DC AC
Netfrequentie	50/60 Hz
Ie toegekende bedrijfstroom	AC-22A: 40 A AC 50/60 Hz 220/240 V AC-22A: 40 A AC 50/60 Hz 380/415 V AC-22A: 40 A AC 50/60 Hz 440/480 V AC-22A: 40 A AC 50/60 Hz 500 V AC-23A: 32 A AC 50/60 Hz 500 V AC-23A: 40 A AC 50/60 Hz 220/240 V AC-23A: 40 A AC 50/60 Hz 380/415 V AC-23A: 40 A AC 50/60 Hz 440/480 V DC-22A: 40 A DC 125 V 2 polen in series DC-23A: 40 A DC 125 V 2 polen in series
[Ui] nominale isolatiespanning	690 V AC 50/60 Hz
[Uimp] nominale stoothoudspanning	8 kV
[Ith] conventionele thermische stroom in vrije lucht	40 A at 60 °C
Icm onderbrekingsvermogen	15 kA lastscheider alleen 500 V AC bij 50/60 Hz 75 kA met stroopopwaartse bescherming vermogenschakelaar 500 V AC bij 50/60 Hz
[Ue] nominale bedrijfspanning	125 V DC 500 V AC 50/60 Hz
Geschiktheid voor isolatie	Ja
Contacpositietindicatie	Ja
Zichtbare breuk	Nee
Vervuilingsgraad	3

Complementaire kenmerken

Type bediening	Draaihendel
Kleur hendel	Zwart
Montagemodus	Vast
Montagesteun	DIN-rail Plaat
Aansluiting bovenzijde	Voorzijde
Aansluiting onderaan	Voorzijde
Dwarsdoorsnede kabel	1,5…50 mm²
Max. vermogen	AC-23: 11 kW bij 220/240 V AC 50/60 Hz AC-23: 18,5 kW bij 500/525 V AC 50/60 Hz AC-23: 20 kW bij 380/415 V AC 50/60 Hz AC-23: 22 kW bij 440 V AC 50/60 Hz
Nominale werking	Ononderbroken
Klasse intermitterend bedrijf	Klasse 120 - 60%
Afmetingen kast voor Ithe	190 mm x 115 mm x 55 mm
[Icw] nominale korte-duurpiekstroom	0,067 kA gedurende 20 s conform IEC 60947-3 1,73 kA gedurende 3 s conform IEC 60947-3 3 kA gedurende 1 s conform IEC 60947-3 5,5 kA gedurende 30 s conform IEC 60947-3
Mechanische levensduur	20000 cycli
Elektrische levensduur	AC-22A: 1500 cycli 220/240 V AC 50/60 Hz AC-22A: 1500 cycli 380/415 V AC 50/60 Hz AC-22A: 1500 cycli 440 V AC 50/60 Hz AC-22A: 1500 cycli 500 V AC 50/60 Hz AC-23A: 1500 cycli 220/240 V AC 50/60 Hz AC-23A: 1500 cycli 380/415 V AC 50/60 Hz AC-23A: 1500 cycli 440 V AC 50/60 Hz AC-23A: 1500 cycli 500 V AC 50/60 Hz DC-22A: 1500 cycli 250 V DC 2 polen in series DC-23A: 1500 cycli 250 V DC 2 polen in series
Hartafstand aansluiting	18 mm
Hoogte	85 mm
Breedte	90 mm
Diepte	62,5 mm
Gewicht product	0,5 kg

Omgeving

Normen	IEC 60947-1 IEC 60947-3
Productcertificeringen	KEMA-KEUR CCC
IP-beschermingsgraad	IP40 conforming to IEC 60529
IK beschermingsgraad	IK07 conforming to EN 50102
Omgevingstemperatuur bij werking	-25…70 °C
Omgevingstemperatuur bij opslag	-50…85 °C

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	601 g
Hoogte verpakking 1	0,2 cm
Breedte verpakking 1	9,8 cm
Lengte verpakking 1	10 cm
Type verpakking 2	S03

Aantal gebruikseenheden in verpakking 2	18
Gewicht verpakking 2	11,442 kg
Hoogte verpakking 2	30 cm
Breedte verpakking 2	30 cm
Lengte verpakking 2	40 cm
Type verpakking 3	P12
Aantal gebruikseenheden in verpakking 3	144
Gewicht verpakking 3	102,872 kg
Hoogte verpakking 3	80 cm
Breedte verpakking 3	80 cm
Lengte verpakking 3	120 cm

Duurzaamheid van het aanbod

Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Conform EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China
Milieu-informatie	Milieuprofiel van het product
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.

Contractuële waarborg

Garantie	18 months

SIEMENS

Data sheet 5SG7133-8BA50

MINIZED, Switch disconnector with Fuse, D02, 3-pole, In: 50 A, Un AC: 400 V

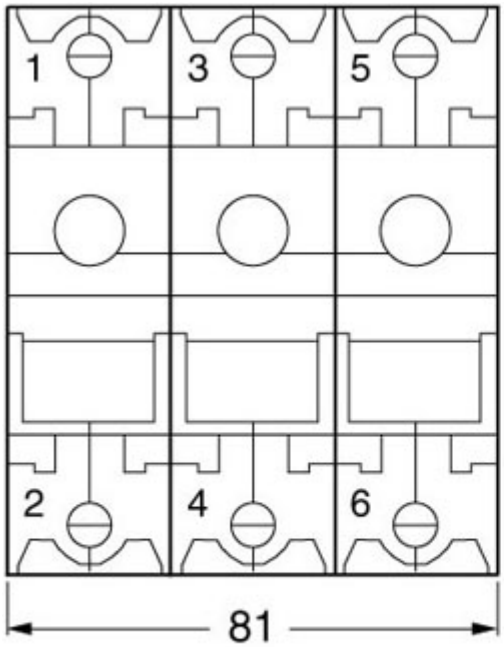
Model	
product brand name	MINIZED
product designation	Switch disconnectors with fuses
General technical data	
number of poles	3
size of fuse system / acc. to DIN EN 60269-1	D02
overvoltage category	4
Voltage	
surge voltage resistance / rated value	6 kV
Supply voltage	
operating voltage / at AC / rated value	400 V
Protection class	
protection class IP	IP20, with connected conductors
Dissipation	
power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	4.7 W
Current	
operational current / at AC / rated value	50 A
Product details	
product feature / sealable	Yes
Connections	
tightening torque / with screw-type terminals	
● minimum	2.5 N·m
● maximum	3 N·m
Mechanical Design	
height	70 mm
width	81 mm
depth	90 mm
mounting position	any, preferably vertical
net weight	426 g
Certificates	
reference code	
● acc. to DIN EN 61346-2	F
● acc. to IEC 81346-2	F

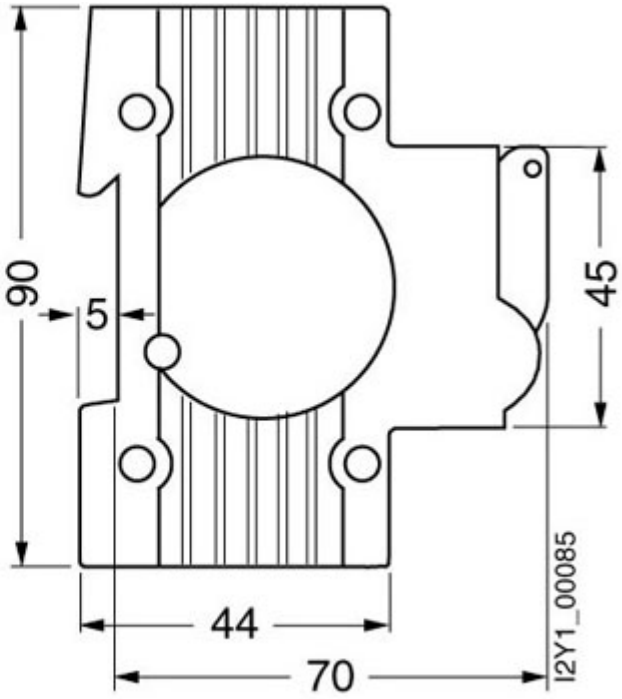
General Product Approval	Declaration of Conformity	Test Certificates

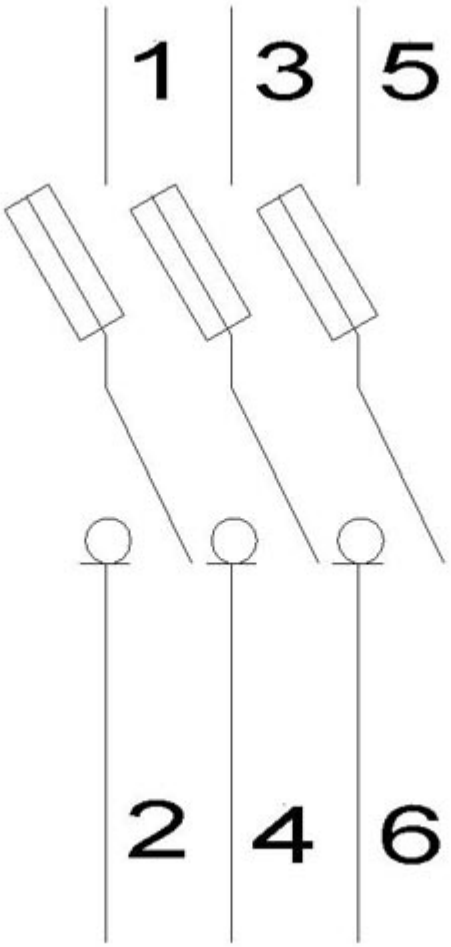
Type Test Certificates/Test Report

Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SG7133-8BA50
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SG7133-8BA50
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SG7133-8BA50
Tender specifications
http://www.siemens.com/specifications







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Data sheet 5SE2350

[NEOZED-Sicherungseinsatz], D02, 50 A, [gG], Un AC: 400 V, Un DC: 250 V, [mit versilberten Kontaktkappen]

Model	
product brand name	SENTRON
product designation	NEOZED fuse link
design of the product	With silver-plated contact caps
product variations	Pack of 10
design of the fuse link	NEOZED fuse link
General technical data	
size of fuse system / acc. to DIN EN 60269-1	D02
operating class of the fuse link	gG
Supply voltage	
supply voltage	
• at AC / rated value	400 V
• at DC	250 V
operating voltage / rated value	400 V
protection class IP	IP20, with connected conductors
switching capacity current / acc. to IEC 60947-2 / rated value	50 kA
Dissipation	
power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	3.1 W
operational current	
• at 30 °C / rated value	49 A
• at 40 °C / rated value	47.5 A
• at 45 °C / rated value	46 A
• at 50 °C / rated value	45 A
• at 55 °C / rated value	44 A
• at 60 °C / rated value	43 A
• at AC / rated value	50 A
Main circuit	
operational current / rated value	50 A
Appearance	
color coding of the fuse link	White
breaking capacity maximum short-circuit current (Icu) / at AC / rated value	50 kA
Mechanical Design	
mounting position	Any, preferably vertical
net weight	14 g
ambient temperature / during operation	

● minimum	40 °C
● maximum	40 °C
environmental category	Up to 45°C at 95 % rel. humidity

Certificates

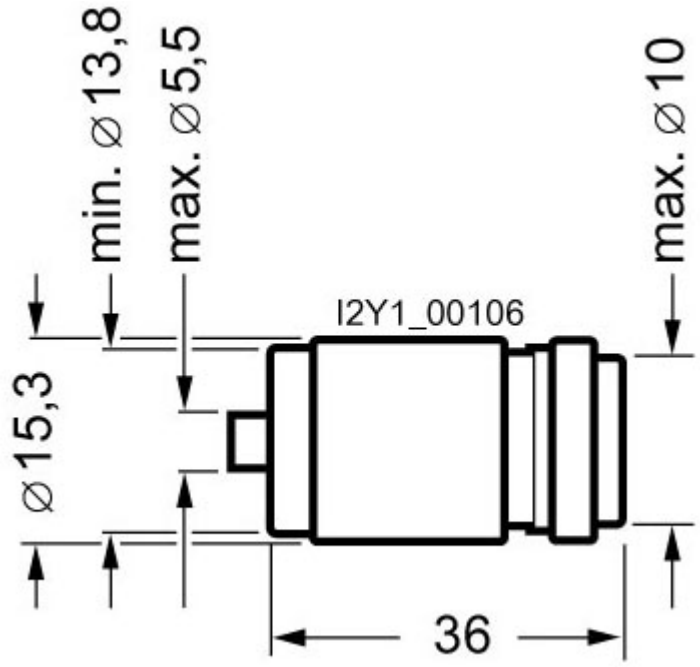
reference code	
● acc. to DIN EN 61346-2	F
● acc. to IEC 81346-2	F

General Product Approval			Declaration of Conformity	Test Certificates	
ÖVE	VDE	EAC	EG-Konf.	Special Test Certific-ate	Miscellaneous

Test Certificates	other
Type Test Certific-ates/Test Report	Environmental Con-firmations

Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SE2350
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SE2350
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SE2350
Tender specifications
http://www.siemens.com/specifications



SIEMENS

Gegevensblad 5SG7631-0KK16

Versie	
productmerknaam	MINIZED
productbenaming	mespatroonlastscheider
Algemene technische gegevens	
aantal polen	3
bouwgrootte van het beveiligingssysteem / volgens EN 60269-1	D01
overspanningscategorie	4
Voltage	
stootspanningsvastheid / nominale waarde	6 kV
Voedingsspanning	
bedrijfsspanning / bij AC / nominale waarde	400 V
Beschermingsklasse	
beschermingsklasse IP	IP20, met aangesloten geleiders
Losbandigheid	
vermogensverlies [W] / bij nominale waarde stroom / bij AC / bij warme bedrijfstoestand / per pool	0,3 W
Elektriciteit	
bedrijfsstroom / bij AC / nominale waarde	16 A
Product Details	
producteigenschap / verzegelbaar	Ja
Aansluitingen	
aanhaalmoment / bij schroefaansluiting	
● minimaal	2,5 N·m
● maximaal	3 N·m
Mechanical Design	
hoogte	70 mm
breedte	54 mm
diepte	88 mm
inbouwpositie	willekeurig, bij voorkeur verticaal
nettogewicht	203 g
Certificaten	
referentiemarkering	
● volgens EN 61346-2	F
● volgens IEC 81346-2:2009	F

General Product Approval	**Declaration of Conformity**

Verdere informatie

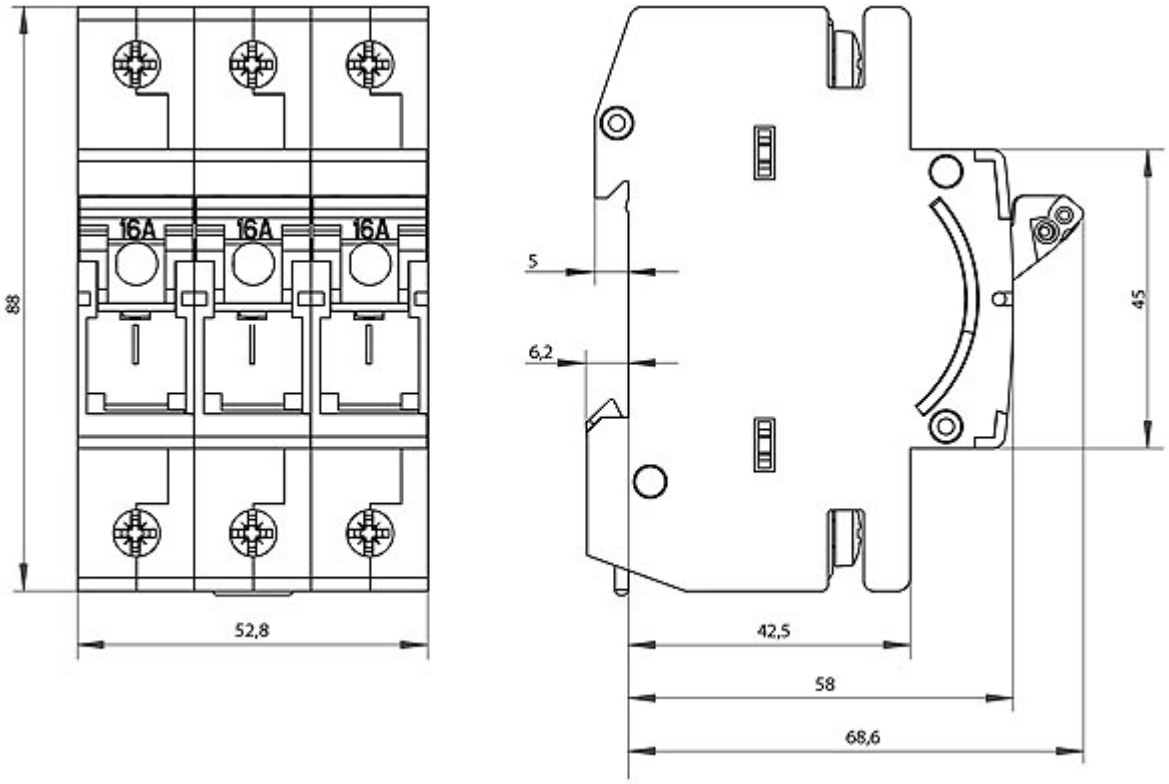
Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs

Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/nl/nl/Catalog/product?mlfb=5SG7631-0KK16

Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/nl/ps/5SG7631-0KK16

Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SG7631-0KK16

Tender specifications
http://www.siemens.com/specifications



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Data sheet 5SE2316

[NEOZED-Sicherungseinsatz], D01, 16 A, [gG], Un AC: 400 V, Un DC: 250 V, [mit verzinnten Kontaktkappen]

Model	
product brand name	SENTRON
product designation	NEOZED fuse link
design of the product	With tin-coated contact caps
product variations	Pack of 10
design of the fuse link	NEOZED fuse link
General technical data	
size of fuse system / acc. to DIN EN 60269-1	D01
operating class of the fuse link	gG
Supply voltage	
supply voltage	
● at AC / rated value	400 V
● at DC	250 V
operating voltage / rated value	400 V
protection class IP	IP20, with connected conductors
switching capacity current / acc. to IEC 60947-2 / rated value	50 kA
Dissipation	
power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	1.6 W
operational current	
● at 30 °C / rated value	15.68 A
● at 40 °C / rated value	15.2 A
● at 45 °C / rated value	14.72 A
● at 50 °C / rated value	14.4 A
● at 55 °C / rated value	14.08 A
● at 60 °C / rated value	13.76 A
● at AC / rated value	16 A
Main circuit	
operational current / rated value	16 A
Appearance	
color coding of the fuse link	Gray
breaking capacity maximum short-circuit current (Icu) / at AC / rated value	50 kA
Mechanical Design	
mounting position	Any, preferably vertical
net weight	7 g
ambient temperature / during operation	

● minimum	40 °C
● maximum	40 °C
environmental category	Up to 45°C at 95 % rel. humidity

Certificates

reference code	
● acc. to DIN EN 61346-2	F
● acc. to IEC 81346-2	F

General Product Approval			Declaration of Conformity	Test Certificates	
ÖVE	VDE	EAC	CE EG-Konf.	Type Test Certificates/Test Report	Special Test Certificate

Test Certificates	other
Miscellaneous	Environmental Confirmations

Further information

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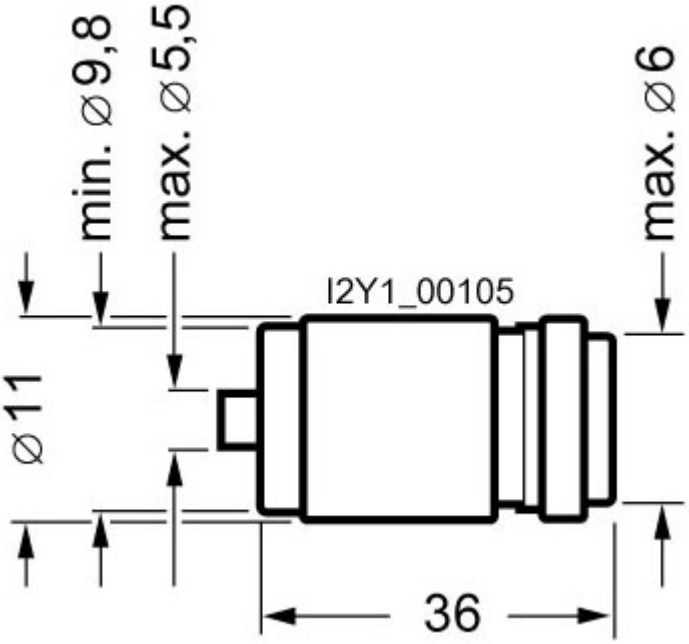
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SE2316
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SE2316
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SE2316
Tender specifications
http://www.siemens.com/specifications



Pushing Performance

Han 6HPR-asg1-SV-M25

Image is for illustration purposes only. Please refer to product description.

Part number	19 40 006 1261
Specification	Han 6HPR-asg1-SV-M25
HARTING eCatalogue	https://b2b.harting.com/19400061261

Identification

Category	Hoods/Housings
Series of hoods/housings	Han® HPR
Type of hood/housing	Surface mounted housing

Version

Locking type	Screw locking
Han-Easy Lock®	0
Size	6 B
Version	Side entry
Cable entry	1x M25
Field of application	Hoods/housings for harsh outdoor environments

Technical characteristics

Tightening torque (screw locking)	4 Nm
Limiting temperature	[-40] ... [+125 °C]
Degree of protection acc. to IEC 60529	IP65 IP68 IP69 / IPX9K acc. to ISO 20653
Type rating acc. to UL 50 / UL 50E	4 4X 12

Material properties

Material (hood/housing)	Aluminium die-cast Corrosion resistant

HARTING Electric GmbH & Co. KG | Wilhelm-Harting-Straße 1 | 32339 Espelkamp | Germany
Phone +49 5772 47-97100 | electric@HARTING.com | www.HARTING.com

Pushing Performance

Material properties

Surface (hood/housing)	Powder-coated
Colour (hood/housing)	RAL 9005 (jet black)
Material (seal)	NBR
Material (locking)	Stainless steel
RoHS	compliant
ELV status	compliant
China RoHS	e
REACH Annex XVII substances	No
REACH ANNEX XIV substances	No
REACH SVHC substances	No

Specifications and approvals

Approvals	DNV GL
UL / CSA	UL 1977 ECBT2.E235076 CSA-C22.2 No. 182.3 ECBT8.E235076
CE	1

Commercial data

Packaging size	1
Net weight	800 g
Country of origin	Germany
European customs tariff number	85389099
eCl@ss	27440202 Shell for industrial connectors

HARTING Electric GmbH & Co. KG | Wilhelm-Harting-Straße 1 | 32339 Espelkamp | Germany
Phone +49 5772 47-97100 | electric@HARTING.com | www.HARTING.com

Pushing Performance

Han 6HPR Hood Top Entry M25 Screw lock

Image is for illustration purposes only. Please refer to product description.

Part number	19 40 006 0411
Specification	Han 6HPR Hood Top Entry M25 Screw lock
HARTING eCatalogue	https://b2b.harting.com/19400060411

Identification

Category	Hoods/Housings
Series of hoods/housings	Han® HPR
Type of hood/housing	Hood

Version

Locking type	Screw locking
Size	6 B
Version	Top entry
Cable entry	1x M25
Field of application	Hoods/housings for harsh outdoor environments

Technical characteristics

Tightening torque (screw locking)	4 Nm
Limiting temperature	-40 ... +125 °C
Degree of protection acc. to IEC 60529	IP65 IP68 IP69 / IPX9K acc. to ISO 20653
Type rating acc. to UL 50 / UL 50E	4 4X 12

Material properties

Material (hood/housing)	Aluminium die-cast Corrosion resistant
Surface (hood/housing)	Powder-coated

HARTING Electric GmbH & Co. KG | Wilhelm-Harting-Straße 1 | 32339 Espelkamp | Germany
Phone +49 5772 47-97100 | electric@HARTING.com | www.HARTING.com

Pushing Performance

Material properties

Colour (hood/housing)	RAL 9005 (jet black)
Material (locking)	Stainless steel
RoHS	compliant
ELV status	compliant
China RoHS	e
REACH Annex XVII substances	No
REACH ANNEX XIV substances	No
REACH SVHC substances	No

Specifications and approvals

Approvals	DNV GL
UL / CSA	UL 1977 ECBT2.E235076 CSA-C22.2 No. 182.3 ECBT8.E235076
CE	Yes

Commercial data

Packaging size	1
Net weight	450 g
Country of origin	Germany
European customs tariff number	85389099
eCl@ss	27440202 Shell for industrial connectors

HARTING Electric GmbH & Co. KG | Wilhelm-Harting-Straße 1 | 32339 Espelkamp | Germany
Phone +49 5772 47-97100 | electric@HARTING.com | www.HARTING.com

Connector - SACC-M12MS-5PL M - 1424649

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Connector, 5-position, Plug straight M12 Screw locking, A-coded, Push-in connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 4 mm ... 8 mm

Why buy this product

- Safe use in the field, thanks to a high degree of protection
- Flexible: connectors for on-site assembly
- Save time, thanks to installation with SPEEDCON fast locking system
- Spring-cage connection: connect more securely, even in the case of shock and vibration, thanks to high contact forces
- Quick and easy installation, thanks to Push-in connection technology
- Easy tool free wiring with the push-in connection

RoHS

Key Commercial Data

Packing unit	1 STK
GTIN	4 055626 374970
GTIN	4055626374970
Weight per Piece (excluding packing)	21.600 g
Custom tariff number	85366990
Country of origin	Germany

Technical data

Dimensions

External cable diameter	4 mm ... 8 mm
Stripping length of the sheath	24 mm
Stripping length of the individual wire	8 mm

Ambient conditions

Ambient temperature (operation)	-40 °C ... 85 °C (Plug / socket)
Degree of protection	IP65
	IP67

Connector - SACC-M12MS-5PL M - 1424649

Technical data

General

Rated current at 40°C	4 A
Rated voltage	60 V DC
	48 V AC
Number of positions	5
Insulation resistance	≥ 100 MΩ
Coding	A - standard
Standards/regulations	M12 connector IEC 61076-2-101
	Shock, vibration EN 50155:2001
Status display	No
Overvoltage category	II
Degree of pollution	3
Connection method	Push-in connection
Conductor cross section	0.14 mm² ... 0.75 mm² (without ferrule)
	0.08 mm² ... 0.5 mm² (with ferrule)
	0.14 mm² ... 0.75 mm² (solid)
Conductor cross section AWG	26 ... 18 (without ferrule)
	28 ... 20 (with ferrule)
Insertion/withdrawal cycles	≥ 100
Torque	0.4 Nm (M12 knurl)
	0.4 Nm (Connector with coupling sleeve)
	1.5 Nm (Pressure nut with coupling sleeve)
Assembly instructions	The wires can be connected both with ferrules and without ferrules

Material

Flammability rating according to UL 94	V0
Contact material	CuSn
Contact surface material	Ni/Au
Contact carrier material	PA 6.6
Material of grip body	PA 66
Material, knurls	Zinc die-cast, nickel-plated
Sealing material	NBR

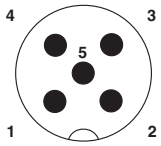
Standards and Regulations

Standard designation	M12 connector
Standards/regulations	IEC 61076-2-101
Standard designation	Shock, vibration
Standards/regulations	EN 50155:2001
Flammability rating according to UL 94	V0

Drawings

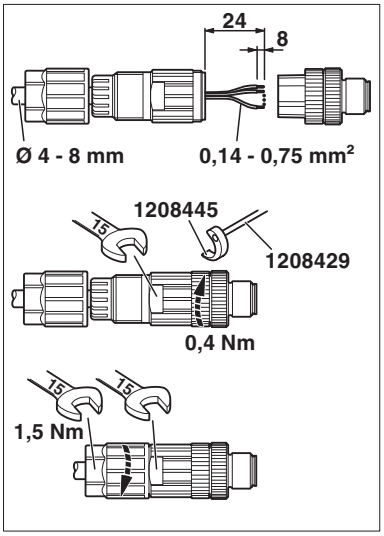
Connector - SACC-M12MS-5PL M - 1424649

Schematic diagram

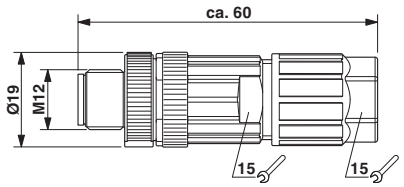


Pin assignment M12 male connector, 5-pos., A-coded, male side

Functional drawing



Dimensional drawing



M12 SPEEDCON plug, straight

Classifications

eCl@ss

eCl@ss 5.1	27143423
eCl@ss 6.0	27279218
eCl@ss 7.0	27440104
eCl@ss 8.0	27440104
eCl@ss 9.0	27440102

ETIM

ETIM 5.0	EC002635
ETIM 6.0	EC002635

Approvals

Approvals

Connector - SACC-M12FS-5PL SH - 1424660

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Connector, 5-position, shielded, Socket straight M12 Screw locking, A-coded, Push-in connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 4 mm ... 8 mm

Why buy this product

- Safe use in the field, thanks to a high degree of protection
- Flexible: connectors for on-site assembly
- Save time, thanks to installation with SPEEDCON fast locking system
- Spring-cage connection: connect more securely, even in the case of shock and vibration, thanks to high contact forces
- Reliable signal transmission - 360° shielding in environments with electromagnetic interference
- Easy tool free wiring with the push-in connection
- Quick and easy installation, thanks to Push-in connection technology

RoHS

Key Commercial Data

Packing unit	1 STK
GTIN	4 055626 375878
GTIN	4055626375878
Weight per Piece (excluding packing)	41.900 g
Custom tariff number	85366990
Country of origin	Germany
Note	Made to Order (non-returnable)

Technical data

Dimensions

External cable diameter	4 mm ... 8 mm
Stripping length of the sheath	29 mm
Stripping length of the individual wire	8 mm

Ambient conditions

Ambient temperature (operation)	-40 °C ... 85 °C (Plug / socket)

Connector - SACC-M12FS-5PL SH - 1424660

Technical data

Ambient conditions

Degree of protection	IP65
	IP67

General

Rated current at 40°C	4 A
Rated voltage	60 V DC
	48 V AC
Number of positions	5
Insulation resistance	≥ 100 MΩ
Coding	A - standard
Standards/regulations	M12 connector IEC 61076-2-101
	Shock, vibration EN 50155:2001
Status display	No
Overvoltage category	II
Degree of pollution	3
Connection method	Push-in connection
Conductor cross section	0.14 mm² ... 0.75 mm² (without ferrule)
	0.08 mm² ... 0.5 mm² (with ferrule)
	0.14 mm² ... 0.75 mm² (solid)
Conductor cross section AWG	26 ... 18 (without ferrule)
	28 ... 20 (with ferrule)
Insertion/withdrawal cycles	≥ 100
Torque	0.4 Nm (M12 knurl)
	0.8 Nm (Connector with coupling sleeve)
	3 Nm (Pressure nut with coupling sleeve)
Assembly instructions	The wires can be connected both with ferrules and without ferrules

Material

Flammability rating according to UL 94	V0
Contact material	CuSn
Contact surface material	Ni/Au
Contact carrier material	PA 6.6
Material of grip body	Zinc die-cast, nickel-plated
Material, knurls	Zinc die-cast, nickel-plated
Sealing material	NBR

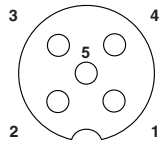
Standards and Regulations

Standard designation	M12 connector
Standards/regulations	IEC 61076-2-101
Standard designation	Shock, vibration
Standards/regulations	EN 50155:2001
Flammability rating according to UL 94	V0

Connector - SACC-M12FS-5PL SH - 1424660

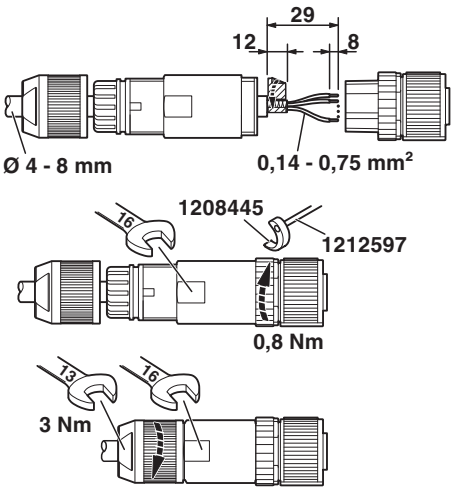
Drawings

Schematic diagram



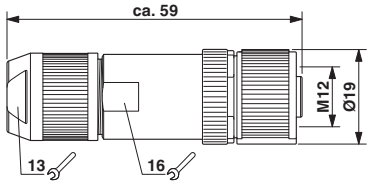
Pin assignment M12 socket, 5-pos., A-coded, socket side view

Functional drawing



Slide the pressure nut and sleeve housing along the cable, strip the cable, shorten the shield, strip the single wires, connect the wires, in the case of a straight sleeve housing gently twist the wires together, stick the shielding foil around the shortened shield, in the case of a cable outside diameter < 6 mm stick an additional shielding foil around the wire pack, screw the sleeve housing to the plug insert, screw the pressure nut tight.

Dimensional drawing



Socket M12-SPEEDCON, straight, shielded

Classifications

eCl@ss

eCl@ss 5.1	27143423
eCl@ss 6.0	27279218
eCl@ss 7.0	27440104
eCl@ss 8.0	27440104
eCl@ss 9.0	27440102

ETIM

ETIM 5.0	EC002635

Productinformatieblad
Kenmerken

XB5AS8445
noodstop rood Ø 22 - vuistslag Ø 40 - draaiontgrendeling

Hoofdkenmerken

Productgamma	Harmony XB5
Type product of component	Noodstopknop Emergency switching off push-button
Korte naam apparaat	XB5
Materiaal kraag	Dark grey plastic
Materiaal bevestigingskraag	Kunststof
Koptype	Standard
Bevestigingsdiameter	22 mm
Verkoop per ondeelbare hoeveelheid	1
Vorm van kop signaleringseenheid	Rond
Type operator	trigger action and mechanical latching
Reset	Draaien om te ontgrendelen
Profiel operator	Red mushroom Ø 40 mm, unmarked
Type en samenstelling contact	1 NO + 1 NC
Werking contacten	Vertraagd afvallend
Aansluitingen - klemmen	Schroefklem aansluitingen, <= 2 x 1,5 mm² met kabelhuls conform EN 60947-1 Schroefklem aansluitingen, >= 1 x 0,22 mm² zonder kabelhuls conform EN 60947-1
Presentatie product	Compleet product

Complementaire kenmerken

Hoogte	43 mm
Breedte	40 mm
Diepte	82 mm
Beschrijving klemmen ISO nr 1	(11-12)NC (13-14)NO
Gewicht product	0,072 kg
Weerstand hoge druk drukring	7000000 Pa bij 55 °C, afstand : 0.1 m

Gebruik contacten	Standaardcontacten
Positieve opening	With conforming to EN/IEC 60947-5-1 appendix K
Bedrijfstraject	1.5 mm (NC changing electrical state) 4.3 mm (total travel)
Mechanische levensduur	300000 cycli
Aandraaimoment	0,8…1,2 N.m conform EN 60947-1
Vorm schroefkop	Cross compatible with Philips no 1 screwdriver Cross compatible with pozidriv No 1 screwdriver Slotted compatible with flat Ø 4 mm screwdriver Slotted compatible with flat Ø 5.5 mm screwdriver
Legering contacten	Zilverlegering (Ag/Ni)
Kortsluitbeveiliging	10 A smeltpatroon type gG conform EN/IEC 60947-5-1
[Ith] conventionele thermische stroom in vrije lucht	10 A conform EN/IEC 60947-5-1
[Ui] nominale isolatiespanning	600 V (pollution degree 3) conforming to EN 60947-1
[Uimp] nominale stoothoudspanning	6 kV conform EN 60947-1
Ie toegekende bedrijfstroom	3 A at 240 V, AC-15, A600 conforming to EN/IEC 60947-5-1 6 A at 120 V, AC-15, A600 conforming to EN/IEC 60947-5-1 0.1 A at 600 V, DC-13, Q600 conforming to EN/IEC 60947-5-1 0.27 A at 250 V, DC-13, Q600 conforming to EN/IEC 60947-5-1 0.55 A at 125 V, DC-13, Q600 conforming to EN/IEC 60947-5-1 1.2 A at 600 V, AC-15, A600 conforming to EN/IEC 60947-5-1
Elektrische levensduur	1000000 cycles, AC-15, 2 A at 230 V, operating rate <3600 cyc/h, load factor: 0.5 conforming to EN/IEC 60947-5-1 appendix C 1000000 cycles, AC-15, 3 A at 120 V, operating rate <3600 cyc/h, load factor: 0.5 conforming to EN/IEC 60947-5-1 appendix C 1000000 cycles, AC-15, 4 A at 24 V, operating rate <3600 cyc/h, load factor: 0.5 conforming to EN/IEC 60947-5-1 appendix C 1000000 cycles, DC-13, 0.2 A at 110 V, operating rate <3600 cyc/h, load factor: 0.5 conforming to EN/IEC 60947-5-1 appendix C 1000000 cycles, DC-13, 0.5 A at 24 V, operating rate <3600 cyc/h, load factor: 0.5 conforming to EN/IEC 60947-5-1 appendix C
Elektrische betrouwbaarheid IEC 60947-5-4	Λ < 10exp(-6) at 5 V, 1 mA in clean environment conforming to EN/IEC 60947-5-4 Λ < 10exp(-8) at 17 V, 5 mA in clean environment conforming to EN/IEC 60947-5-4

Omgeving

Beschermende behandeling	TH
Omgevingstemperatuur bij opslag	-40…70 °C
Omgevingstemperatuur bij werking	-40…70 °C
Overspanningscategorie	Klasse II conform IEC 60536
IP-beschermingsgraad	IP66 conform IEC 60529 IP67 IP69 IP69K
NEMA beschermingsgraad	NEMA 13 NEMA 4X
IK beschermingsgraad	IK03 conform IEC 50102
Normen	UL 508 EN/IEC 60947-5-5 EN/IEC 60947-5-4 EN/IEC 60947-5-1 EN/ISO 13850 IEC 60364-5-53 CSA C22.2 Nr 14 JIS C8201-5-1 EN/IEC 60947-1 EN/IEC 60204-1 JIS C8201-1
Productcertificeringen	CSA RINA GL LROS (Lloyds register of shipping) BV UL listed DNV

Trillingsweerstand	5 gn (f= 2…500 Hz) conform IEC 60068-2-6
Schokbestendigheid	30 gn (duur = 18 ms) voor halve sinusgolf versnelling conform IEC 60068-2-27 50 gn (duur = 11 ms) voor halve sinusgolf versnelling conform IEC 60068-2-27

Verpakkingseenheid

Type verpakking 1	PCE
Aant. eenh./verp.	1
Verpakkingsgewicht (lb)	67 g
Hoogte verpakking 1	8,8 cm
Breedte verpakking 1	5,3 cm
Lengte verpakking 1	4,3 cm
Type verpakking 2	S03
Aantal gebruikseenheden in verpakking 2	80
Gewicht verpakking 2	5,94 kg
Hoogte verpakking 2	30 cm
Breedte verpakking 2	30 cm
Lengte verpakking 2	40 cm
Type verpakking 3	P06
Aantal gebruikseenheden in verpakking 3	640
Gewicht verpakking 3	57,084 kg
Hoogte verpakking 3	77 cm
Breedte verpakking 3	60 cm
Lengte verpakking 3	80 cm

Duurzaamheid van het aanbod

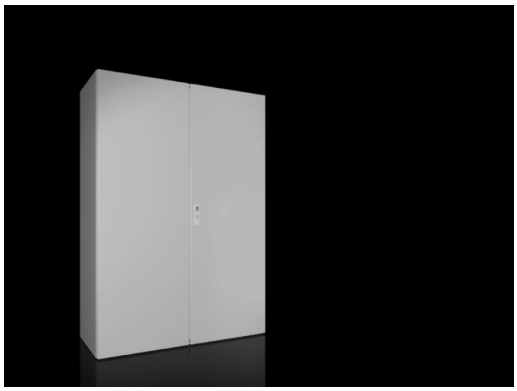
Status handhaafbaar aanbod	Green Premium-product
REACh-regelgeving	REACh-verklaring
REACh vrij van SVHC	Ja
EU-richtlijn RoHS	Pro-actieve naleving (product valt buiten juridisch toepassingsgebied RoHS EU) EU-verklaring RoHS
Vrij van giftige zware metalen	Ja
Kwikvrij	Ja
Informatie over RoHS-vrijstelling	Ja
RoHS-regulering China	RoHS-verklaring China
Milieu-informatie	Milieuprofiel van het product
Circulariteitsprofiel	Informatie over einde levensduur
WEEE	Het product moet op markten van de Europese Unie worden afgevoerd volgens specifieke afvalinzamelingsregels en mag nooit in een gewone vuilnisbak terechtkomen.

Contractuële waarborg

Garantie	18 months

Compact enclosure AX Basic enclosure AX, sheet steel – AX 1115.000

created: 23.04.2021 on www.rittal.com/com-en



Product description

Material:	Enclosure: Sheet steel Door: Sheet steel, all-round foamed-in PU seal
Surface finish:	Enclosure and door: Dipcoat primed, powder-coated on the outside, textured paint Mounting plate: Zinc-plated
Colour:	RAL 7035
Protection category IP to IEC 60 529:	IP 55
Protection category NEMA:	NEMA 1, 12
Type rating to UL 50E:	Type 1, 12
IK Code:	IK10
Supply includes:	Enclosure with door(s) Gland plate(s) in enclosure base Mounting plate Perforated door strip Lock: 3 mm double-bit
Basic material:	Sheet steel

Product description

Dimensions:	Width: 1000 mm Height: 1400 mm

	Depth: 400 mm
Material thickness:	Enclosure: 1.5 mm Door: 2 mm Mounting plate: 2.5 mm
Mounting plate:	Width: 945 mm Height: 1375 mm
Number of doors:	2
Door hinged on the right, may be swapped to the left:	yes
3-point lock system:	yes
Lock version:	3-point lock system
Number of locks:	1
Lock insert:	3 mm double-bit
Gland plate, size:	6
Gland plate, qty.:	2
Packs of:	1 pc(s).
Weight/pack:	100 kg
EAN:	4028177813083
Customs tariff number:	94032080
ETIM 7.0:	EC000261
ETIM 6.0:	EC000261
eCl@ss 8.0/8.1:	27180101
eCl@ss 6.0/6.1:	27180101
Product description:	AX Compact enclosure, WHD: 1000x1400x400 mm, sheet steel, with mounting plate, two-door, with 3-point lock system

Approvals

Approvals:	Bureau Veritas

Omschrijving

Specificaties:

Rijen:	4
Aansluitingen per rij	15
Aansluitingen ø5.5mm per rij	11
Aansluitingen ø7.5mm per rij	2
Aansluitingen ø9mm per rij	2
Frequentie:	50/60Hz
Isolatie spanning:	500V
Piekstroom 1 seconde:	20kA
Vervuilingsgraad:	2
Conform:	IEC60947-1

Hoogtepunten:

- Compacte bouwvorm
- Zichtbare controle op verbinding
- Hoge vulgraad
- Veilig aansluiten

Algemene omschrijving:

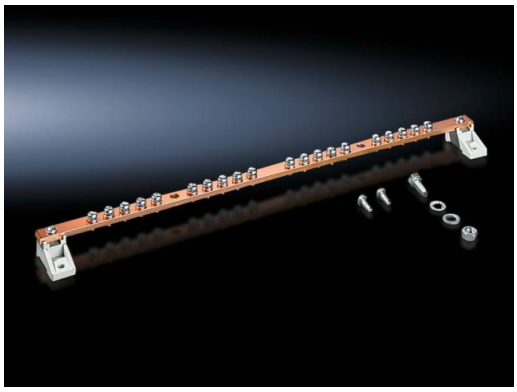
CVT verdeelsets zijn uitermate geschikt om een meervoudige verdeling te maken. De verdeelsets zijn verkrijgbaar in een twee- en een vier- polige uitvoering. De verdeelsets zijn eenvoudig te monteren op een DIN-rail. De transparantie afscherming geeft het verdeelset de professionele uitstraling die het verdient.

Specificaties

Artikelnummer	110338
Merk	SEP
Type	CVT415
Gtin	8718959001581
Hoogte	132mm
Breedte	90mm
Diepte	51mm
Met afdekking	Ja
Aantal polen	4
Max. nom. stroom	125A
Kortsluitvastheid (Icw)	4.5kA

Earth rail, horizontal for TS, TS IT – DK 7113.000

created : 26.08.2014 build on www.rittal.com/uk-en



Product description

Description:	Current carrying capacity approx. 200 A.
Supply includes:	Earth rail made from E-Cu 57 to DIN EN 12 163, DIN EN 13 601, 15 x 5 mm 20 connection points with M5 screws 2 earth connections 25 mm² 2 isolators Assembly parts
Packs of:	1 pc(s).
EAN:	4028177124943
Customs tariff number:	74199990

Product features

To fit:	Enclosure type: TS Width: 600 mm 800 mm
Length:	450 mm
Weight:	0.44 kg

Downloads

CAD drawings:	Request

Technical specifications

5

	6ES7510-1DJ01-0AB0
General information	
Product type designation	CPU 1510SP-1 PN
Hardware function version	FS03
Firmware version	V2.0
Engineering with	
STEP 7 TIA Portal can be configured/integrated as of version	V14
Configuration control	
Via data record	Yes
Operator controls	
Mode selector	1
Supply voltage	
Type of supply voltage	24 V DC
Low limit of permitted range (DC)	19.2 V
High limit of permitted range (DC)	28.8 V
Reverse polarity protection	Yes
Power and voltage failure buffering	
Power/voltage failure buffer time	5 ms
Input current	
Current consumption (rated value)	0.6 A
Inrush current, max.	4.7 A; rated value
I^2t	0.14 A^2s
Power	
Incoming power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	5.6 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
Integrated (for program)	100 KB
Integrated (for data)	750 KB
Load memory	
Plug-in (SIMATIC memory card), max.	32 GB
Buffering	
Maintenance-free	Yes

	6ES7510-1DJ01-0AB0
CPU processing times	
For bit operations, typ.	72 ns
For word operations, typ.	86 ns
For fixed-point arithmetic, typ.	115 ns
For floating-point arithmetic, typ.	461 ns
CPU blocks	
Number of elements (total)	2000; blocks (OB/FB/FC/DB) and UDTs
DB	
Number range	1 ... 60 999; divided into: Number range that can be used by user: 1 ... 59 999 and number range for DBs generated by SFC 86: 60 000 ... 60 999
Size, max.	750 KB; for absolutely addressed DBs, the max. size is 64 KB
FB	
Number range	0 ... 65 535
Size, max.	100 KB
FC	
Number range	0 ... 65 535
Size, max.	100 KB
OB	
Size, max.	100 KB
Number of free-cycle OBs	100
Number of time-of-day interrupt OBs	20
Number of time-delay interrupt OBs	20
Number of cyclic interrupt OBs	20
Number of hardware interrupt OBs	50
Number of DPV1 interrupt OBs	3
Number of isochronous mode OBs	1
Number of technology synchronous interrupt OBs	2
Number of startup OBs	100
Number of asynchronous error OBs	4
Number of synchronous error OBs	2
Number of diagnostic interrupt OBs	1
Nesting depth	
Per priority class	24
Counters, timers and their retentivity	
S7 counters	
Quantity	2048
Retentivity	
• can be set	Yes

	6ES7510-1DJ01-0AB0
Controller	
• PID_Compact	Yes; universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Suitable for safety functions	No
Highest safety class achievable in safety mode	
Performance level according to EN ISO 13849-1:2008	None
SIL according to IEC 61508	No
Ambient conditions	
Ambient temperature during operation	
Horizontal mounting position, min.	0 °C
Horizontal mounting position, max.	60 °C
Vertical mounting position, min.	0 °C
Vertical mounting position, max.	50 °C
Ambient temperature during storage/transport	
Min.	-40 °C
Max.	70 °C
Configuring	
Programming	
Programming language	
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• GRAPH	Yes
Know-how protection	
User program protection	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
Protection level: Write protection	Yes
Protection level: Read/write protection	Yes
Protection level: Complete protection	Yes

Dimension drawing

A

This section contains a dimension drawing of the module mounted on a mounting rail. Always observe the specified dimensions for installation in cabinets, control rooms, etc.

Dimension drawing of the CPU 1510SP-1 PN

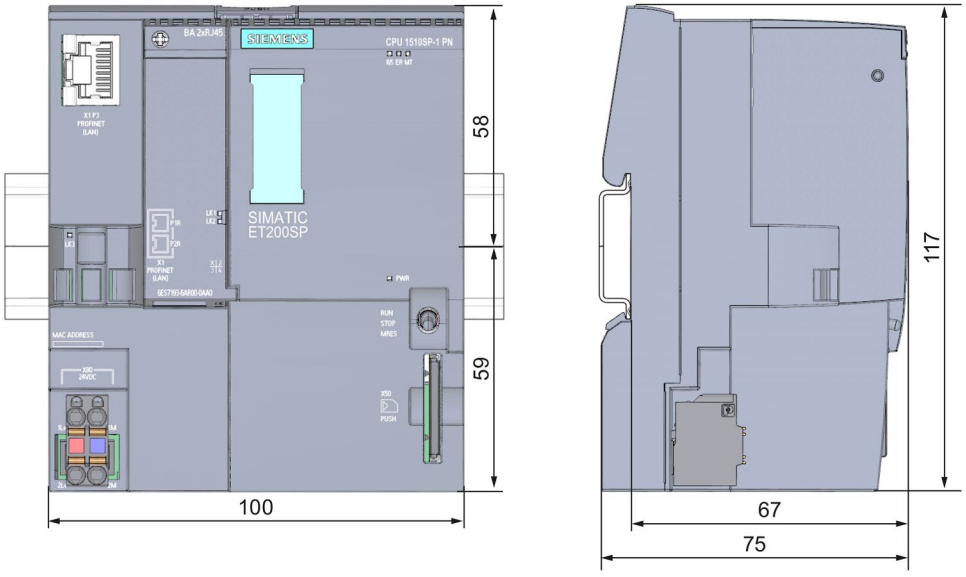


Figure A-1 Dimensional drawing CPU 1510SP-1 PN

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Data sheet 6ES7131-6BF01-0BA0

SIMATIC ET 200SP, Digital input module, DI 8x 24V DC Standard, type 3 (IEC 61131), sink input, (PNP, P-reading), Packing unit: 1 piece, fits to BU-type A0, Colour Code CC01, input delay time 0,05..20ms, module diagnostics for: short-circuit of sensor supply, wire break, supply voltage

General information	
Product type designation	DI 8x24 VDC ST
HW functional status	From FS02
Firmware version	V0.0
● FW update possible	No
usable BaseUnits	BU type A0
Color code for module-specific color identification plate	CC01
Product function	
● I&M data	Yes; I&M0 to I&M3
● Isochronous mode	No
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V14
● STEP 7 configurable/integrated from version	V5.5 SP3 or higher
● PCS 7 configurable/integrated from version	V8.1 SP1
● PROFIBUS from GSD version/GSD revision	One GSD file each, Revision 3 and 5 and higher
● PROFINET from GSD version/GSD revision	GSDML V2.3
Operating mode	
● DI	Yes
● Counter	No
● Oversampling	No
● MSI	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption, max.	50 mA; All channels are supplied from the encoder supply
Encoder supply	
Number of outputs	8
Output voltage, min.	19.2 V
Short-circuit protection	Yes; per module
24 V encoder supply	
● 24 V	Yes
● Short-circuit protection	Yes
● Output current, max.	700 mA
● Output current per channel, max.	700 mA

● Output current per module, max.	700 mA
Power loss	
Power loss, typ.	1 W; 24 V, 8 inputs supplied via encoder supply
Address area	
Address space per module	
● Inputs	1 byte; + 1 byte for QI information
Hardware configuration	
Automatic encoding	Yes
● Mechanical coding element	Yes
● Type of mechanical coding element	Type A
Selection of BaseUnit for connection variants	
● 1-wire connection	BU type A0
● 2-wire connection	BU type A0
● 3-wire connection	BU type A0 with AUX terminals or potential distributor module
● 4-wire connection	BU type A0 + Potential distributor module
Digital inputs	
Number of digital inputs	8
Digital inputs, parameterizable	Yes
Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Input voltage	
● Rated value (DC)	24 V
● for signal "0"	-30 to +5 V
● for signal "1"	+11 to +30V
Input current	
● for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)
— at "0" to "1", min.	0.05 ms
— at "0" to "1", max.	20 ms
— at "1" to "0", min.	0.05 ms
— at "1" to "0", max.	20 ms
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Encoder	
Connectable encoders	
● 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
● Diagnostic alarm	Yes
Diagnoses	
● Diagnostic information readable	Yes
● Monitoring the supply voltage	Yes
— parameterizable	Yes
● Monitoring of encoder power supply	Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm
● Wire-break	Yes; Module-wise
● Short-circuit	Yes; Module-wise
Diagnostics indication LED	
● Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
● Channel status display	Yes; green LED

● for channel diagnostics	No
● for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
● between the channels	No
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C; < 0 °C as of FS02
● horizontal installation, max.	60 °C
● vertical installation, min.	-30 °C; < 0 °C as of FS02
● vertical installation, max.	50 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	28 g

last modified: 12/19/2020

SIEMENS

Data sheet 6ES7193-6BP20-0DA0

SIMATIC ET 200SP, BaseUnit BU15-P16+A10+2D, BU type A0, Push-in terminals, with 10 AUX terminals, New load group, WxH: 15 mmx141 mm

General information	
Product type designation	BU type A0
HW functional status	From FS07
Supply voltage	
Rated value (DC)	24 V
external protection for power supply lines	Yes; 24 V DC/10 A miniature circuit breaker with type B or C tripping characteristic
Current carrying capacity	
For P1 and P2 bus, max.	10 A
For AUX bus, max.	10 A
For process terminals, max.	2 A
Hardware configuration	
Formation of potential groups	
● New potential group	Yes
● Potential group continued from the left	No
Slots	
● Number of slots	1; Type A0
Potential separation	
between the potential groups	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C
● horizontal installation, max.	60 °C
● vertical installation, min.	-30 °C
● vertical installation, max.	50 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Accessories	
Color coding labels	
● for process terminals	CC00 to CC09
● for AUX terminals	CC71 to CC73
● for add-on terminals	does not exist
Connection method	
Terminals	
● Terminal type	Push-in terminal

● Conductor cross-section, min.	0.14 mm²
● Conductor cross-section, max.	2.5 mm²
● Number of process terminals to I/O module	16
● Number of terminals to AUX bus	10
● Number of add-on terminals	0
● Number of terminals with connection to P1 and P2 bus	2
Dimensions	
Width	15 mm
Height	141 mm
Depth	35 mm
Weights	
Weight, approx.	50 g

last modified: 1/16/2021

SIEMENS

Data sheet 6ES7132-6BF01-0BA0

SIMATIC ET 200SP, Digital output module, DQ 8x 24V DC/0,5A Standard, Source output (PNP,P-switching) Packing unit: 1 piece, fits to BU-type A0, Colour Code CC02, substitute value output, module diagnostics for: short-circuit to L+ and ground, wire break, supply voltage

General information	
Product type designation	DQ 8x24VDC/0.5A ST
HW functional status	From FS02
Firmware version	V0.0
● FW update possible	No
usable BaseUnits	BU type A0
Color code for module-specific color identification plate	CC02
Product function	
● I&M data	Yes; I&M0 to I&M3
● Isochronous mode	No
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V14
● STEP 7 configurable/integrated from version	V5.5 SP3 or higher
● PCS 7 configurable/integrated from version	V8.1 SP1
● PROFIBUS from GSD version/GSD revision	One GSD file each, Revision 3 and 5 and higher
● PROFINET from GSD version/GSD revision	GSDML V2.3
Operating mode	
● DQ	Yes
● DQ with energy-saving function	No
● PWM	No
● Oversampling	No
● MSO	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption, max.	35 mA; without load
Output voltage	
Rated value (DC)	24 V
Power loss	
Power loss, typ.	1 W
Address area	
Address space per module	
● Address space per module, max.	1 byte; + 1 byte for QI information

Hardware configuration	
Automatic encoding	Yes
● Mechanical coding element	Yes
● Type of mechanical coding element	Type A
Selection of BaseUnit for connection variants	
● 1-wire connection	BU type A0
● 2-wire connection	BU type A0
● 3-wire connection	BU type A0 with AUX terminals or potential distributor module
● 4-wire connection	BU type A0 + Potential distributor module
Digital outputs	
Type of digital output	Source output (PNP, current-sourcing)
Number of digital outputs	8
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes
● Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	Typ. L+ (-50 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
● with resistive load, max.	0.5 A
● on lamp load, max.	5 W
Load resistance range	
● lower limit	48 Ω
● upper limit	12 kΩ
Output voltage	
● for signal "1", min.	L+ (-0.8 V)
Output current	
● for signal "1" rated value	0.5 A
● for signal "1" permissible range, max.	0.5 A
● for signal "0" residual current, max.	0.1 mA
Output delay with resistive load	
● "0" to "1", max.	50 µs; at rated load
● "1" to "0", max.	100 µs; at rated load
Parallel switching of two outputs	
● for uprating	No
● for redundant control of a load	Yes
Switching frequency	
● with resistive load, max.	100 Hz
● with inductive load, max.	2 Hz
● on lamp load, max.	10 Hz
Total current of the outputs	
● Current per channel, max.	0.5 A
● Current per module, max.	4 A
Total current of the outputs (per module)	
horizontal installation	
— up to 60 °C, max.	4 A
vertical installation	
— up to 50 °C, max.	4 A
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
● Diagnostic alarm	Yes
Diagnoses	
● Monitoring the supply voltage	Yes

● Wire-break	Yes; Module-wise
● Short-circuit to M	Yes; Module-wise
● Short-circuit to L+	Yes; Module-wise
● Group error	Yes
Diagnostics indication LED	
● Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
● Channel status display	Yes; green LED
● for channel diagnostics	No
● for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
● between the channels	No
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	No
Suitable for safety-related tripping of standard modules	Yes; From FS01
Highest safety class achievable in safety mode	
● Performance level according to ISO 13849-1	PL d
● SIL acc. to IEC 61508	SIL 2
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C; < 0 °C as of FS02
● horizontal installation, max.	60 °C
● vertical installation, min.	-30 °C; < 0 °C as of FS02
● vertical installation, max.	50 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g

last modified: 5/19/2021

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Data sheet 6ES7193-6BP00-0BA0

Figure similar

SIMATIC ET 200SP, BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, bridged to the left, WxH: 15x 117 mm

General information	
Product type designation	BU type A0
HW functional status	From FS06
Supply voltage	
Rated value (DC)	24 V
external protection for power supply lines	Yes; 24 V DC/10 A miniature circuit breaker with type B or C tripping characteristic
Mains filter	
● integrated	No
Current carrying capacity	
For P1 and P2 bus, max.	10 A
For process terminals, max.	2 A
Hardware configuration	
Automatic encoding	Yes
Formation of potential groups	
● New potential group	No
● Potential group continued from the left	Yes
Slots	
● Number of slots	1; Type A0
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C
● horizontal installation, max.	60 °C
● vertical installation, min.	-30 °C
● vertical installation, max.	50 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Accessories	
Color coding labels	
● for process terminals	CC00 to CC09
● for AUX terminals	does not exist
● for add-on terminals	does not exist
Connection method	
Terminals	

● Terminal type	Push-in terminal
● Conductor cross-section, min.	0.14 mm²
● Conductor cross-section, max.	2.5 mm²
● Number of process terminals to I/O module	16; Pro slot
● Number of terminals to AUX bus	0
● Number of add-on terminals	0
● Number of terminals with connection to P1 and P2 bus	2; Pro slot
Dimensions	
Width	15 mm
Height	117 mm
Depth	35 mm
Weights	
Weight, approx.	40 g

last modified: 1/16/2021

SIEMENS

Data sheet 6ES7134-6GD00-0BA1

*** Spare part *** SIMATIC ET 200SP, analog input module, AI 4XI 2-/4-wire standard, suitable for BU type A0, A1, Color code CC03, Module diagnostics, 16 bit, +/-0.3%

General information	
Product type designation	AI 4xI 2-/4-wire ST
Firmware version	V1.1
● FW update possible	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC03
Product function	
● I&M data	Yes; I&M0 to I&M3
● Isochronous mode	No
● Measuring range scalable	No
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V11 SP2 / V13
● STEP 7 configurable/integrated from version	V5.5 SP3 / -
● PCS 7 configurable/integrated from version	V8.1 SP1
● PROFIBUS from GSD version/GSD revision	GSD Revision 5
● PROFINET from GSD version/GSD revision	GSDML V2.3
Operating mode	
● Oversampling	No
● MSI	No
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption, max.	37 mA; without sensor supply
Encoder supply	
24 V encoder supply	
● 24 V	Yes
● Short-circuit protection	Yes
● Output current, max.	20 mA; max. 50 mA per channel for a duration < 10 s
Power loss	
Power loss, typ.	0.85 W; Without encoder supply voltage

Address area	
Address space per module	
● Address space per module, max.	8 byte; + 1 byte for QI information
Hardware configuration	
Automatic encoding	Yes
● Mechanical coding element	Yes
● Type of mechanical coding element	Type A
Analog inputs	
Number of analog inputs	4; Differential inputs
● For current measurement	4
permissible input current for current input (destruction limit), max.	50 mA
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)
Input ranges (rated values), currents	
● 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	100 Ω; + approx. 0.7 V diode forward voltage in 2-wire operation
● -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	100 Ω
● 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	100 Ω; + approx. 0.7 V diode forward voltage in 2-wire operation
Cable length	
● shielded, max.	1 000 m
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/resolution per channel	
● Resolution with overrange (bit including sign), max.	16 bit
● Integration time, parameterizable	Yes
● Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz
● Conversion time (per channel)	180 / 60 / 50 ms
Smoothing of measured values	
● Number of smoothing levels	4; None; 4/8/16 times
● parameterizable	Yes
Encoder	
Connection of signal encoders	
● for voltage measurement	No
● for current measurement as 2-wire transducer	Yes
— Burden of 2-wire transmitter, max.	650 Ω
● for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.01 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, min.	50 dB; Applies to up to ±5 V overvoltage in other channels
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Operational error limit in overall temperature range	
● Current, relative to input range, (+/-)	0.5 %
Basic error limit (operational limit at 25 °C)	
● Current, relative to input range, (+/-)	0.3 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
● Series mode interference (peak value of interference < rated value of input range), min.	70 dB
● Common mode voltage, max.	10 V
● Common mode interference, min.	90 dB
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
● Diagnostic alarm	Yes

● Limit value alarm	No
Diagnoses	
● Monitoring the supply voltage	Yes
● Wire-break	Yes; at 4 to 20 mA
● Short-circuit	Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply
● Group error	Yes
● Overflow/underflow	Yes
Diagnostics indication LED	
● Monitoring of the supply voltage (PWR-LED)	Yes; green LED
● Channel status display	Yes; green LED
● for channel diagnostics	No
● for module diagnostics	Yes; green/red LED
Potential separation	
Potential separation channels	
● between the channels	Yes; channel group-specific between 2-wire current input group and 4-wire voltage input group
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	Yes; only for 4-wire transducer
Permissible potential difference	
between the inputs (UCM)	10 V DC
Isolation	
Isolation tested with	707 V DC (type test)
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	31 g

last modified: 1/24/2021

SIEMENS

Data sheet 6ES7193-6BP40-0BA1

Figure similar

SIMATIC ET 200SP, BaseUnit BU15-P16+A0+12B/T, BU type A1, Push-in terminals, with 2x 5 add-on terminals, bridged to the left, WxH: 15 mm x 141 mm, with temperature acquisition

General information	
Product type designation	BU type A1
HW functional status	FS10 and higher
Supply voltage	
Rated value (DC)	24 V
external protection for power supply lines	Yes; 24 V DC/10 A miniature circuit breaker with type B or C tripping characteristic
Current carrying capacity	
For P1 and P2 bus, max.	10 A
For process terminals, max.	2 A
Hardware configuration	
Additional terminals	Yes
Temperature sensor	Yes
Formation of potential groups	
● New potential group	No
● Potential group continued from the left	Yes
Slots	
● Number of slots	1; Type A1
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C
● horizontal installation, max.	60 °C
● vertical installation, min.	-30 °C
● vertical installation, max.	50 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Accessories	
Color coding labels	
● for process terminals	CC00 to CC09
● for AUX terminals	does not exist
Connection method	
Terminals	
● Terminal type	Push-in terminal
● Conductor cross-section, min.	0.14 mm²

● Conductor cross-section, max.	2.5 mm²
● Number of process terminals to I/O module	16
● Number of terminals to AUX bus	0
● Number of add-on terminals	2x5
● Number of terminals with connection to P1 and P2 bus	2
Dimensions	
Width	15 mm
Height	141 mm
Depth	35 mm
Weights	
Weight, approx.	50 g

last modified: 1/16/2021

SIEMENS

Data sheet 6AV2123-2JB03-0AX0

SIMATIC HMI, KTP900 Basic, Basic Panel, Key/touch operation, 9" TFT display, 65536 colors, PROFINET interface, configurable from WinCC Basic V13/ STEP 7 Basic V13, contains open-source software, which is provided free of charge see enclosed CD

General information	
Product type designation	KTP900 Basic color PN
Display	
Design of display	TFT widescreen display, LED backlighting
Screen diagonal	9 in
Display width	198 mm
Display height	111.7 mm
Number of colors	65 536
Resolution (pixels)	
● Horizontal image resolution	800 pixel
● Vertical image resolution	480 pixel
Backlighting	
● MTBF backlighting (at 25 °C)	20 000 h
● Backlight dimmable	Yes
Control elements	
Keyboard fonts	
● Function keys	
— Number of function keys	8
— Number of function keys with LEDs	0
● Keys with LED	No
● System keys	No
● Numeric keyboard	Yes; Onscreen keyboard
● alphanumeric keyboard	Yes; Onscreen keyboard
Touch operation	
● Design as touch screen	Yes
Installation type/mounting	
Mounting position	vertical
Mounting in portrait format possible	Yes
Mounting in landscape format possible	Yes
maximum permissible angle of inclination without external ventilation	35°
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Input current	

Current consumption (rated value)	230 mA
Starting current inrush I²t	0.2 A²·s
Power	
Active power input, typ.	5.5 W
Processor	
Processor type	ARM
Memory	
Flash	Yes
RAM	Yes
Memory available for user data	10 Mbyte
Type of output	
Acoustics	
● Buzzer	Yes
● Speaker	No
Time of day	
Clock	
● Hardware clock (real-time)	Yes
● Software clock	Yes
● retentive	Yes; Back-up duration typically 6 weeks
● synchronizable	Yes
Interfaces	
Number of industrial Ethernet interfaces	1
Number of RS 485 interfaces	0
Number of RS 422 interfaces	0
Number of RS 232 interfaces	0
Number of USB interfaces	1; Up to 16 GB
Number of 20 mA interfaces (TTY)	0
Number of parallel interfaces	0
Number of other interfaces	0
Number of SD card slots	0
With software interfaces	No
Industrial Ethernet	
● Industrial Ethernet status LED	2
Protocols	
PROFINET	Yes
Supports protocol for PROFINET IO	No
IRT	No
PROFIBUS	No
MPI	No
Protocols (Ethernet)	
● TCP/IP	Yes
● DHCP	Yes
● SNMP	Yes
● DCP	Yes
● LLDP	Yes
WEB characteristics	
● HTTP	No
● HTML	No
Redundancy mode	
Media redundancy	
— MRP	No
Further protocols	
● CAN	No
● EtherNet/IP	Yes
● MODBUS	Yes; Modicon (MODBUS TCP/IP)
Interrupts/diagnostics/status information	
Diagnoses	

● Diagnostic information readable	No
EMC	
Emission of radio interference acc. to EN 55 011	
● Limit class A, for use in industrial areas	Yes
● Limit class B, for use in residential areas	No
Standards, approvals, certificates	
CE mark	Yes
cULus	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
Use in hazardous areas	
● ATEX Zone 2	No
● ATEX Zone 22	No
● IECEx Zone 2	No
● IECEx Zone 22	No
● cULus Class I Zone 1	No
● cULus Class I Zone 2, Division 2	No
● FM Class I Division 2	No
Marine approval	
● Germanischer Lloyd (GL)	Yes
● American Bureau of Shipping (ABS)	Yes
● Bureau Veritas (BV)	Yes
● Det Norske Veritas (DNV)	Yes
● Lloyds Register of Shipping (LRS)	Yes
● Nippon Kaiji Kyokai (Class NK)	Yes
● Polski Rejestr Statkow (PRS)	No
● Chinese Classification Society (CCS)	No
Ambient conditions	
Ambient temperature during operation	
● Operation (vertical installation)	
— For vertical installation, min.	0 °C
— For vertical installation, max.	50 °C
● Operation (max. tilt angle)	
— At maximum tilt angle, min.	0 °C
— At maximum tilt angle, min.	40 °C
● Operation (vertical installation, portrait format)	
— For vertical installation, min.	0 °C
— For vertical installation, max.	40 °C
● Operation (max. tilt angle, portrait format)	
— At maximum tilt angle, min.	0 °C
— At maximum tilt angle, min.	35 °C
Ambient temperature during storage/transportation	
● min.	-20 °C
● max.	60 °C
Relative humidity	
● Operation, max.	90 %; no condensation
Operating systems	
proprietary	Yes
pre-installed operating system	
● Windows CE	No
Configuration	
Message indicator	Yes
Alarm system (incl. buffer and acknowledgment)	Yes
Process value display (output)	Yes
Process value default (input) possible	Yes
Recipe management	Yes
Configuration software	
● STEP 7 Basic (TIA Portal)	Yes; via integrated WinCC Basic (TIA Portal)

● Number of user groups	50
● Number of user rights	32
● Number of users	50
● Password export/import	Yes
● SIMATIC Logon	No
Character sets	
● Keyboard fonts	
— US English	Yes
Transfer (upload/download)	
● MPI/PROFIBUS DP	No
● USB	No
● Ethernet	Yes
● using external storage medium	Yes
Process coupling	
● S7-1200	Yes
● S7-1500	Yes
● S7-200	Yes
● S7-300/400	Yes
● LOGO!	Yes
● WinAC	Yes
● SINUMERIK	Yes; No access to NCK data
● SIMOTION	Yes
● Allen Bradley (EtherNet/IP)	Yes
● Allen Bradley (DF1)	No
● Mitsubishi (MC TCP/IP)	Yes
● Mitsubishi (FX)	No
● OMRON (FINS TCP)	No
● OMRON (LINK/Multilink)	No
● Modicon (Modbus TCP/IP)	Yes
● Modicon (Modbus)	No
Service tools/configuration aids	
● Backup/Restore manually	Yes
● Backup/Restore automatically	No
● Simulation	Yes
● Device switchover	Yes
Peripherals/Options	
Printer	No
SIMATIC HMI MM memory card: Multi Media Card	No
SIMATIC HMI SD memory card: Secure Digital memory card	No
SIMATIC HMI CF memory card Compact Flash Card	No
USB memory	Yes
SIMATIC IPC USB Flashdrive (USB stick)	Yes
SIMATIC HMI USB stick	Yes
Dimensions	
Width of the housing front	267 mm
Height of housing front	182 mm
Mounting cutout, width	251 mm
Mounting cutout, height	166 mm
Overall depth	55 mm
Weights	
Weight without packaging	1 130 g
Weight incl. packaging	1 393 g

last modified: 3/9/2020

Datenblatt für Drehstrom-Käfigläufermotoren SIMOTICS

Data sheet for three-phase Squirrel-Cage-Motors

Motor Typ / Motor type : 1AV3094C **SIMOTICS GP - 90 L - IM B14 - 6p**

Kunden-Auftrags-Nr. / Client order no.	Item-Nr. / Item-No.	Angebots-Nr. / Offer no.
Siemens-Auftrags-Nr. / Order no.	Komm.-Nr. / Consignment no.	Projekt / project

Bemerkung / Remarks

Elektrische Daten / *Electrical data*

Safe Area

U [V]	Δ / Y	f [Hz]	P [kW]	P [hp]	I [A]	n [1/min]	M [Nm]	η 3) 4/4	η 3) 3/4	η 3) 2/4	cosφ 3) 4/4	cosφ 3) 3/4	cosφ 3) 2/4	I_A/I_N I_I/I_N	M_A/M_N T_I/T_N	M_K/M_N T_B/T_N	IE-CL
480	Y	60	1,10	-/-	2,85	1155	9,1	75,0	74,6	72,1	0,62	0,53	0,41	5,8	3,2	3,7	IE1

IM B14 / IM 3601	FS 90 L	19 kg	IP55	IEC/EN 60034	IEC, DIN, ISO, VDE, EN

Umgebungsbedingungen / *Environmental conditions* : -20 °C - +40 °C / 1000 m

Mechanische Daten / *Mechanical data*

Schallpegel (LpA / LwA) bei 50Hz|60Hz *Sound level (SPL / SWL) at 50Hz|60Hz*	43.0 / 55.0 dB(A) 2)	46.0 / 58.0 dB(A) 2)
Trägheitsmoment *Moment of inertia*	0,0052 kg m²	
Lager AS | BS *Bearing DE | NDE*	6205 2Z C3	6004 2Z C3
Lagerlebensdauer / *bearing lifetime*		
L_{10mh} $F_{Rad\ min}$ bei Kupplungsbetrieb 50|60Hz 1) *L_{10mh} $F_{Rad\ min}$ for coupling operation 50|60Hz 1)*	40000 h	32000 h
Schmiermittel *Lubricants*	Unirex N3	
Nachschmiereinrichtung *Regreasing device*	Nein *No*	
Schmiernippel *Grease nipple*	-/-	
Art der Lagerung *Type of bearing*	Vorgespanntes Lager DE (AS) *Preloaded bearing DE*	
Kondenswasserlöcher *Condensate drainage holes*	Nein *No*	

Äußere Erdungsklemme *External earthing terminal*	Nein *No*
Schwinggrößenstufe *Vibration severity grade*	A *A*
Isolation *Insulation*	155(F) nach 130(B) *155(F) to 130(B)*
Betriebsart *Duty type*	S1
Drehrichtung *Direction of rotation*	bidirektional *bidirectional*
Gehäusematerial *Frame material*	Aluminium *aluminum*
Endanstrich *Coating (paint finish)*	Normalanstrich C2 *Standard paint finish C2*
Farbe, Farbton *Color, paint shade*	RAL7030
Motorschutz *Motor protection*	(B) 1 Kaltleiter PTC - für Abschaltung (2 Klemmen) *(B) 1 PTC thermistor - for tripping (2 terminals)*
Kühlart *Method of cooling*	IC411 - Eigenbelüftet Oberflächengekühlt *IC411 - self ventilated, surface cooled*

Anschlusskasten / *Terminal box*

Klemmenkastenlage *Terminal box position*	oben *top*
Klemmenkastenmaterial *Material of terminal box*	Aluminium *Aluminium*
Klemmenkastentyp *Type of terminal box*	TB1 E00
Gewinde Kontaktschraube *Contact screw thread*	M4

Max. Leiterquerschnitt *Max. cross-sectional area*	1.5 mm²
Kabeldurchmesser von ... bis ... *Cable diameter from ... to ...*	9.0 mm - 17.0 mm
Kabeleinführung *Cable entry*	1xM25x1,5-1xM16x1,5
Kabelverschraubung *Cable gland*	2 Stopfen 2 plugs

Notizen:

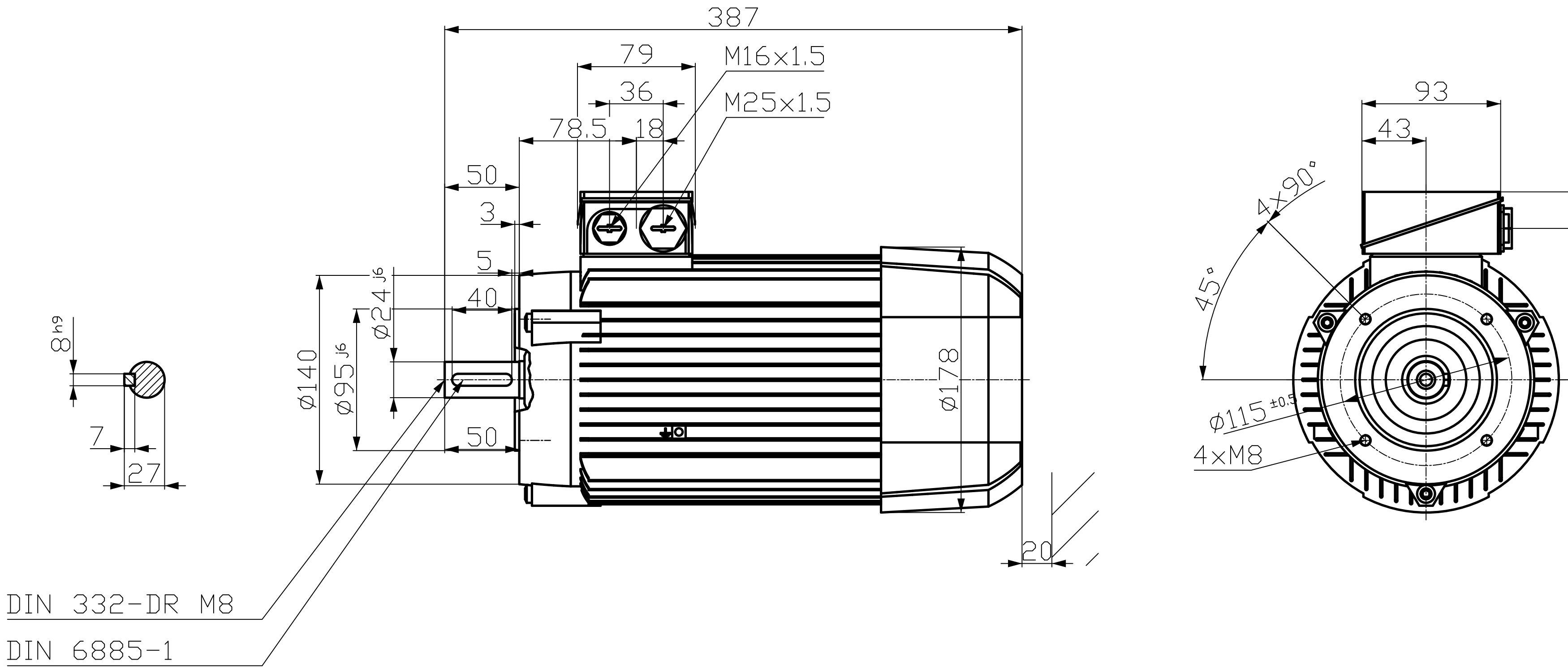
I_A/I_N = Anzugsstrom / Bemessungsstrom
M_A/M_N = Anzugsmoment / Bemessungsmoment
M_K/M_N = Kippmoment / Bemessungsmoment

1) L10mh nach DIN ISO 281 10/2010
2) bei Bemessungsleistung / bei voller Last
3) Nur gültig für DOL Betrieb mit fester Drehzahl im Kühlbetrieb IC411

Verantwortliche Abt.	Technische Referenz	Erstellt von	Genehmigt von	
DI MC LVM		DT-Konfigurator		***Technische Änderungen vorbehalten! Es könnte Unterschiede zwischen Datenblatt und Leistungsschild geben.***

SIEMENS

Dokumenttyp	Dokumentstatus	Kunde		
Datenblatt	freigegeben			
Titel	Dokumentnummer			
1LE1003-0EC49-0KB4				
M2K	Rev.	Erstelldatum	Sprache	Seite
	01	2021-01-12 15:55	de/en	1/2



Tolerance	Surface	Material	Weight	Scale
			-	mm

1LE1003-0EC49-0KB4 M2K	Author	Dimensional drawing MaÇzeichnung	
	Creator DTK		
	Approval		
	Department		
	Change Order	MLFB	Doc Type /
SIEMENS	Doc State 12.01.21	Item No	Paper Size A3
	Revision Index RS	Doc No	1st Language en 2nd Language de
©Siemens AG 2018	Project No -	Ref No -	Sheet 1 of 1

Aerzener Maschinenfabrik GmbH

DATENBLATT LUFT-LUFT-NACHKÜHLER 2000054321

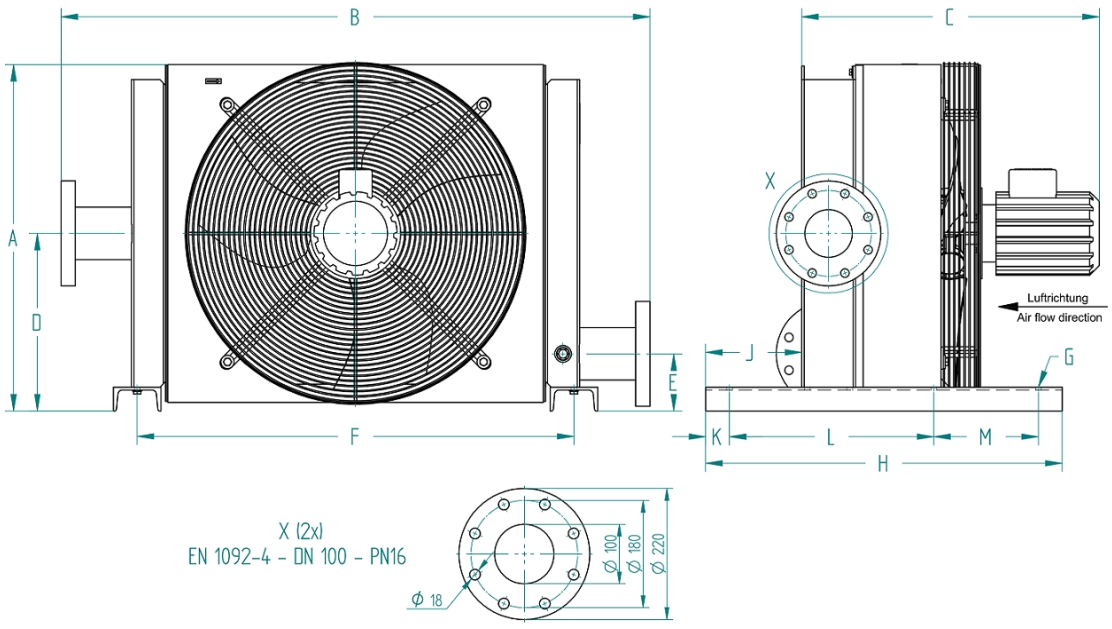
Projektname	VOF-20-00366
Auftragsnummer	J-TEC
Datum	29.10.2020

EINGABEDATEN

Umgebungs-Temp.	40,0 °C
Eintritts-Temperatur	95,0 °C
Massenstrom	900 kg/h
Überdruck (Eintritt)	1,45 bar
Aufstellhöhe ü. NN	0 m (MASL)
Lüfterantrieb	50 Hz
rel. Feuchte	60 %
Austritts-Temp. (Soll)	45,0 °C

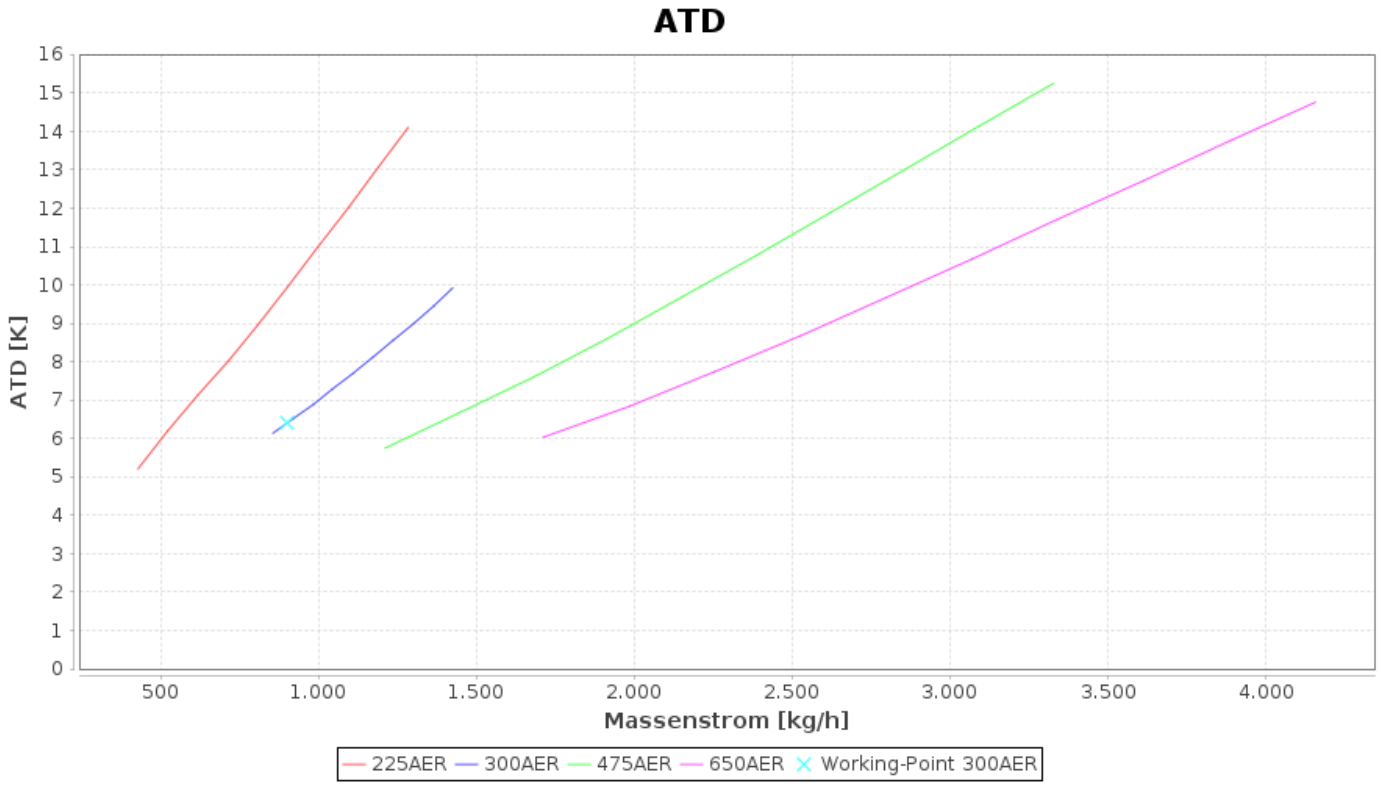
AUSGABEDATEN

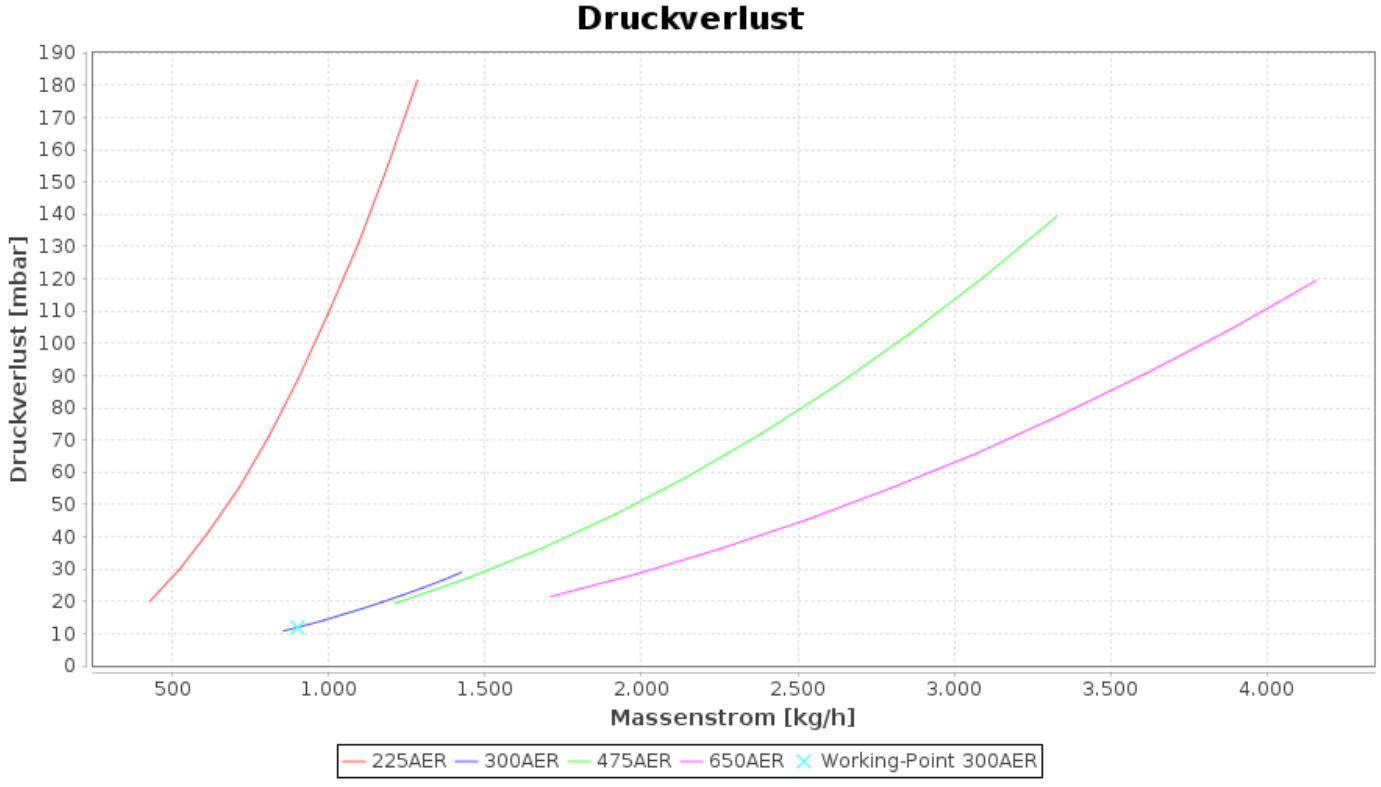
Austritts-Temperatur	46,4 °C
Temperatur-diff. (ATD)	6,4 K
Austrittsdruck (a)	2,451 bar
Druckverlust	11,9 mbar
Volumenstrom (Austritt)	337,6 m³/h
Kondensat-Menge (1)	1,8 l/h
Kühlluftmenge	3753,1 kg/h
Drucktaupunkt	45,7 °C



	mm
A	727
B	1239
C	626
D	372.5
E	120
F	919
G	D12
H	750
J	200
K	50
L	430
M	220

DIAGRAMME


ATD
ATD [K]
Massenstrom [kg/h]
225AER
300AER
475AER
650AER
Working-Point 300AER


Druckverlust
Druckverlust [mbar]
Massenstrom [kg/h]
225AER
300AER
475AER
650AER
Working-Point 300AER

ERSATZTEIL-BESTELLNUMMER: 2000054321

Lüfter	2000054322
Schutzgitter	2000019193
Motor	2000054323
Haube	2000019191
Fuß 1	2000019195
Fuß 2	2000019195
Motorhalter	-
Kühlelement	2000019188

DATENÜBERSICHT

Max. Betriebsdruck	4,5 bar
Max. Betriebstemp.	250 °C
Motorspannung	230/400 V
Motornennleistung	1,10 kW
Frequenz Lüftermotor	50 Hz
Nenndrehzahl Lüftermotor	1000 1/min
Gesamtgewicht Kühlereinheit	102 kg
Schalldruckpegel n. DIN EN 2151	76 db(A)

SONSTIGE DATEN

Kühlleistung	13,8 kW

Aerzener Maschinenfabrik GmbH
Reherweg 28
D-31855 Aerzen
Telefon: +49 5154 81-0
Fax: +49 5154 81-9191
Email: info@aerzener.de
Website: www.aerzen.com

Aerzen Belgium N.V., Kortenberg

AERZEN positive displacement blower GM 25 S

Delta Blower

Arrangement: **Delta Blower G5**

Performance data: frequency converter

Medium	Air							
Volume flow ¹	Q_1	m³/min	13.3	5.29	13.4	5.56	13.6	5.45
Volume flow ¹	Q_1	m³/h	801	318	806	334	815	327
Mass flow	$\dot{m}$	kg/h	888	353	894	371	1031	414
Density at inlet conditions	ρ	kg/m³	1.108	1.108	1.108	1.108	1.265	1.265
Relative humidity	rH	%	60	60	60	60	100	100
Intake pressure (abs.)	p_1	bar	1.013	1.013	1.013	1.013	1.013	1.013
Outlet pressure (abs.)	p_2	bar	1.513	1.513	1.413	1.413	1.413	1.513
Pressure difference	Δp	mbar	500	500	400	400	400	500
Intake temperature	t_1	°C	40	40	40	40	5	5
Discharge temperature	t_2	°C	93	106	82	90	42	62
Male rotor speed	n_{HR}	rpm	2838	1403	2807	1403	2807	1403
Power consumption at coupling	P_k	kW	14.5	6.91	11.7	5.6	11.7	6.92
Motor speed	n_{Mot}	rpm	3595	1778	3555	1778	3555	1778
Motor rating	P_{Mot}	kW	18.5					
Motor frequency	f	cs	60.7	30	60	30	60	30

* Calculated using Aerzen standard drive components

¹ corresponds to the measured delivery volume flow converted to the customer-specific suction conditions

Tolerances

for volume- / mass flow	%	+5 / -5
for power consumption	%	+5 / -5

Machine noise each unit

Sound pressure level without hood approx.	L_p(A)	dB(A)	92
Sound pressure level with hood approx.	L_p(A)	dB(A)	70

Measured in the free field in 1 m distance from the outline of the unit without radiating noise of the pipe (tolerances ± 2 dB(A)), in accordance with DIN EN ISO 2151.
Concerning sound development at place of installation please see TN01184 (please ask for if required).

Pipe connections

Intake side	DN 125, ISO 139.7 mm Ø
Discharge side	DN 125, ISO 139.7 mm Ø

Drawing 4000140410 4900057939

Aerzen Belgium N.V., Kortenberg

Motor data sheet

Your project:

Our Quotation no. / Order number: 0V0458-0V00

Type:	W22
Manufacturer	WEG
Size:	160 L
Rating:	18.5 kW
Speed:	3555 min^{-1}
Rated voltage:	460 V, ± 10 %
Frequency:	60 Hz
Degree of protection:	IP 55
Type of construction:	B3T
Class of insulation:	F
Weight:	139 kg
Rated current:	29.9 A
Pull-in current:	4- bis 8-fold of the nominal current at direct start-up
Efficiency:	92.4 %
Power factor:	0.84
Moment of inertia:	0.0663 kgm²
Diameter of shaft:	42 mm
Start-up:	frequency converter
Motor protection:	with 3 embedded thermistors
Drive:	overhung via narrow V-Belt
Load moment:	constant, across the entire control range

Catalog designation

R57 DRN90S4/TF

Further information online on https://www.sew-eurodrive.de

Reference data

Your material number	: 3135678.0.01 /220000 /80000
Your reference number	: A0201679
Transaction	: 79611772
Item	: 100
Serial number	: 01.7961177201

Product data

Speed [r/min]	: 1762 / 65
Total ratio [i]	: 26,97 / infinite
Ma max [Nm]	: 450
Output torque [Nm]	: 161
Service factor SEW-FB	: 2,80
Mounting position	: M5
Term.box.pos.[°] / cable entry	: 270 (T) / normal
Lubricant / -volume [l]	: CLP 220 Miner.Oil / 1,70
Paint coat	: Top coat RAL7031 (blue gray)
Output shaft end	: 35x70mm lg.
Output shaft design	: with keyway/with key
Documentation no. A	: 25803522
	: 29151449
Parts list	: 012610897
Motor power [kW]	: 1.1
Motor frequency [Hz]	: 60
Cyclic duration factor S1-S10	: S1
Motor voltage [V] / conn. type	: 277/480 delta/star
Rated current [A]	: 3,85 / 2,20
cos phi	: 0,69
Wiring diagram	: R13T / 681510506
Thermal cl.[°C]/Enclosure[IP]	: 155(F) / 55
International efficiency class	: IE3
Efficiency	
at 50/75/100% Pn [%]	: 83,5 / 86,1 / 86,5
CE mark	: Yes
Motor protection	: TF = PTC Temperature sensor
Terminal box	: Terminal box lower part made of aluminum
	: with tapped hole 1xM25, 1xM16
Documentation no. A	: 25957066
Spare parts list	: You can find the SWPL (spare and wearing
	: parts list) under the serial number in
	: the Online Support.
Nameplate	: English
Nameplate position	: 180°
Opera.instr. A lang./quantity	: German / 0
Parts list/language/quantity	: German / 0
Commodity code	: 85015220

ENGINEERING
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VLT® AutomationDrive

The premier, globally supported drive concept for exceptional control of motor driven applications.

Designed for variable speed control of all asynchronous motors and permanent magnet motors, on any industrial machine or production line, a VLT® AutomationDrive helps its owner save energy, increase flexibility, and optimize processes.

Flexible and expandable
Built on a flexible, modular design concept the AutomationDrive is packed with standard, industry features out of the box. These can be expanded with plug-and-play options with additional features, positioning control, fieldbuses, safety functions such as STO, SS1, SLS, SMS and SSM, motor protection and more.

Robust and safe
VLT AutomationDrives are proven performers in all industrial environments and grid voltages, including 690V. Enclosures are available up to IP 66 (depending on model), and integrated DC chokes and RFI filters in all models protect installations by minimizing harmonic distortion and electromagnetic interferences. All drives are fully tested at the factory before they are shipped.

Easy to set up and operate via the user-friendly graphical control panel, a VLT AutomationDrive only requires little maintenance once in operation. The result is an market leading control solution that provides a fast return on investment and a highly competitive cost of ownership.

Power range
3 x 200 – 240 V.....0.25 – 37 kW
3 x 380 – 480/500 V..... 0.37 – 800 kW
3 x 525 – 600 V.....0.75 kW – 75 kW
3 x 525 – 690 V..... 1.1 kW – 1.2 MW
Normal overload.....1.5 kW – 1.4 MW

98%

Energy efficiency

Optmize processes while reducing energy costs. Versatile, flexible, configurable and built to last.

Feature	Benefit
Reliable	**Maximum uptime**
Ambient temperature 50° C without derating	Less need for cooling or oversizing
Available in IP 00, 20, 21, 54, 55 and 66 enclosures	Enclosures for all environments
Resistant to wear and tear	Low lifetime cost
Back-channel cooling for frame D, E and F	Prolonged lifetime of electronics
User-friendly	**Saves commissioning and operating cost**
Plug-and-Play technology	Easy upgrade and changeover
Awarded control panel	User-friendly
Intuitive VLT® interface	Saves time
Pluggable cage clamp connectors	Easy connection
Exchangeable languages	User-friendly
Intelligent	
Intelligent warning systems	Warning before controlled stop
Smart Logic Control	Reduces need for PLC capacity
Advanced plug-in features	Easy commissioning
Safe stop	Safety cat. 3, PL d (ISO 13849-1), Stop cat. 0 (EN 60204-1)
STO: Safe Torque Off (IEC 61800-5-2)	SIL 2 (IEC 61508) SIL CL 2 (IEC 62061)
Intelligent heat management	Intelligent heat management

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Fieldbus options
- VLT® PROFIBUS DP MCA 101
- VLT® DeviceNet MCA 104
- VLT® CanOpen MCA 105
- VLT® Profibus Converter MCA 113
- VLT® Profibus Converter MCA 114
- VLT® PROFINET MCA 120
- VLT® Ethernet/IP MCA 121
- VLT® Modbus TCP MCA 122
- VLT® POWERLINK MCA 123
- VLT® EtherCAT MCA 124
- VLT® DeviceNet Converter MCA 194

I/O and feedback options
- VLT® General Purpose I/O MCB 101
- VLT® Encoder Input MCB 102
- VLT® Resolver Input MCB 103
- VLT® Relay Card MCB 105
- VLT® 24 V External Supply MCB 107
- VLT® Extended Relay Card MCB 113
- VLT® Sensor Input MCB 114

Safety options
- VLT® Safe PLC I/O MCB 108
- VLT® PTC Thermistor Card MCB 112
- VLT® Safe Option MCB 140 Series
- VLT® Safe Option MCB 150 Series

Motion Control Options
- VLT® Motion Control Option MCO 305
- VLT® Synchronizing Controller MCO 350
- VLT® Position Controller MCO 351
- VLT® Center Winder MCO 352

Power options
- VLT® Brake resistors MCE 101
- VLT® Sine-Wave Filters MCC 101
- VLT® dU/dt Filters MCC 102
- VLT® Common Mode Filter MCC 105
- VLT® Advanced Harmonic Filters AHF 005/010

Other accessories
- IP 21/NEMA 1 Kit (convert IP 20 to IP 21)
- PROFIBUS adapter
- Sub-D9 Connector
- Decoupling plate for fieldbus cables
- USB connection cable to PC
- Panel Through option
- LCP panel mounting kit

Specifications

Mains supply (L1, L2, L3)	
Supply voltage	200 – 240 V ±10% FC 301: 380 – 480 V ±10% FC 302: 380 – 500 V ±10%, 525 – 600 V ±10% 525 – 690 V ±10%
Supply frequency	50/60 Hz
True Power Factor (λ)	0.92 nominal at rated load
Displacement Power Factor (cos φ) near unity	(> 0.98)
Switching on input supply L1, L2, L3	Maximum 2 times/min.

Output data (U, V, W)	
Output voltage	0 – 100% of supply voltage
Output frequency	FC 301: 0.2 – 590 Hz (0.25 – 75 kW) FC 302: 0 – 590 Hz (0.25 – 75 kW) 0 – 590 Hz (90 – 1200 kW) 0 – 300 Hz (Flux mode)
Switching on output	Unlimited
Ramp times	1–3600 sec.

Note: 160% current can be provided for 1 minute.
Higher overload rating is achieved by oversizing the drive.

Digital inputs	
Programmable digital inputs	FC 301: 4 (5) / FC 302: 4 (6)
Logic	PNP or NPN
Voltage level	0 – 24 VDC

Note: One/two digital inputs can be programmed as digital output for FC 301/FC 302.

Analogue input	
Analogue inputs	2
Modes	Voltage or current
Voltage level	FC 301: 0 to +10 V FC 302: -10 to +10 V (scaleable)
Current level	0/4 to 20 mA (scaleable)

Pulse/encoder inputs	
Programmable pulse/encoder inputs	FC 301: 1 / FC 302: 2
Voltage level	0 – 24 V DC (PNP positive logic)

Digital output*	
Programmable digital/pulse outputs	FC 301: 1 / FC 302: 2
Voltage level at digital/frequency output	0 – 24 V

Analogue output*	
Programmable analogue outputs	1
Current range	0/4 – 20 mA

Relay outputs*	
Programmable relay outputs	FC 301: 1 / FC 302: 2

Cable lengths	
Max. motor cable lengths	FC 301: 50 m / FC 302: 150 m (screened/armoured) FC 301: 75 m / FC 302: 300 m (unscreened/unarmoured)

**More analogue and digital inputs/outputs can be added with options.*

- Mounting brackets
- Mains disconnect option
- USB Extension
- Interbus gateway MCA 110
- Option Adapter
- RCMB20/RCMB35 Leakage Current Monitor Module

Brake chopper (IGBT) option
Limits the load on the intermediate circuit in the case the motor acts as a generator.

High power options
- Emergency stop with Safety Relay
- Safety Stop with Safety Relay
- RFI Filters
- NAMUR terminals
- Residual Current Device
- Insulation Resistance Monitor
- Mains shielding
- Regen terminals

Please see the VLT® High Power Drive Selection Guide for the complete range of options.

Danfoss VLT Drives, Ulsnaes 1, DK-6300 Graasten, Denmark, Tel. +45 74 88 22 22, Fax +45 74 65 25 80
www.danfoss.com/drives • E-mail: info@danfoss.com

ENGINEERING
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Fact Sheet

VLT® PROFINET MCA 120

Ordering number

Standard	130B1135
Coated	130B1235

MRP
support for high availability

The VLT® PROFINET MCA 120 offers connectivity to PROFINET based networks via the PROFINET Protocol.

PROFINET was introduced in 2003 and is today a proven and complete industrial Ethernet network solution available for manufacturing automation. PROFINET is a member of a family of networks that implement the PROFINET protocol at its upper layers.

PROFINET encompasses a suite of messages and services for a variety of manufacturing automation applications, including control, configuration and information.

The option is able to handle a single connection with an Actual Packet Interval down to 2 ms in both directions, positioning it among the fastest performing PROFINET devices in the market.

Other features

Built-in web server for remote diagnosis and reading out of basic drive parameters. An e-mail notificator can be configured for sending an e-mail message to one or several receivers, if certain warnings or alarms occur, or have cleared again.

The plug and play option can be installed in VLT® AutomationDrive, VLT® HVAC Drive, VLT® Refrigeration Drive and VLT® AQUA Drive.

Application protocols

- PROFINET for controlling and parameter setting
- DCP (Discovery and Configuration Protocol) for configuring network related settings
- LLDP (Link Layer Discovery Protocol) for topology recognition and initial settings of communication parameters
- HTTP (Hypertext Transfer Protocol)for diagnosis via built-in web server
- SMTP (Simple Mail Transfer Protocol) for e-mail notification
- TCP/IP for easy access to Drive configuration data from VLT® Motion Control Tool MCT 10

Feature	Benefit
Connectivity to PROFINET based networks	Connects to Siemens S7, PC7 PLC systems and to various SCADA system
Actual Packet Interval (API) down to 2 ms	High performance
Built-in web server	Remote diagnosis and reading out of basic drive parameters
E-mail notificator	Notifies if warnings or alarms occur
Two Ethernet ports with built-in switch	• Simple cabling • No need for expensive switches or hubs
Certification	Option tested at third party laboratory guarantees interoperability and observance of standards
Same option for all power sizes	Low learning curve and reuse of PLC program
MRP (Media Redundancy Protocol) ring topology	High availability
PROFIsafe	Reduced wiring, flexible configurations, easy and cost-effective system design

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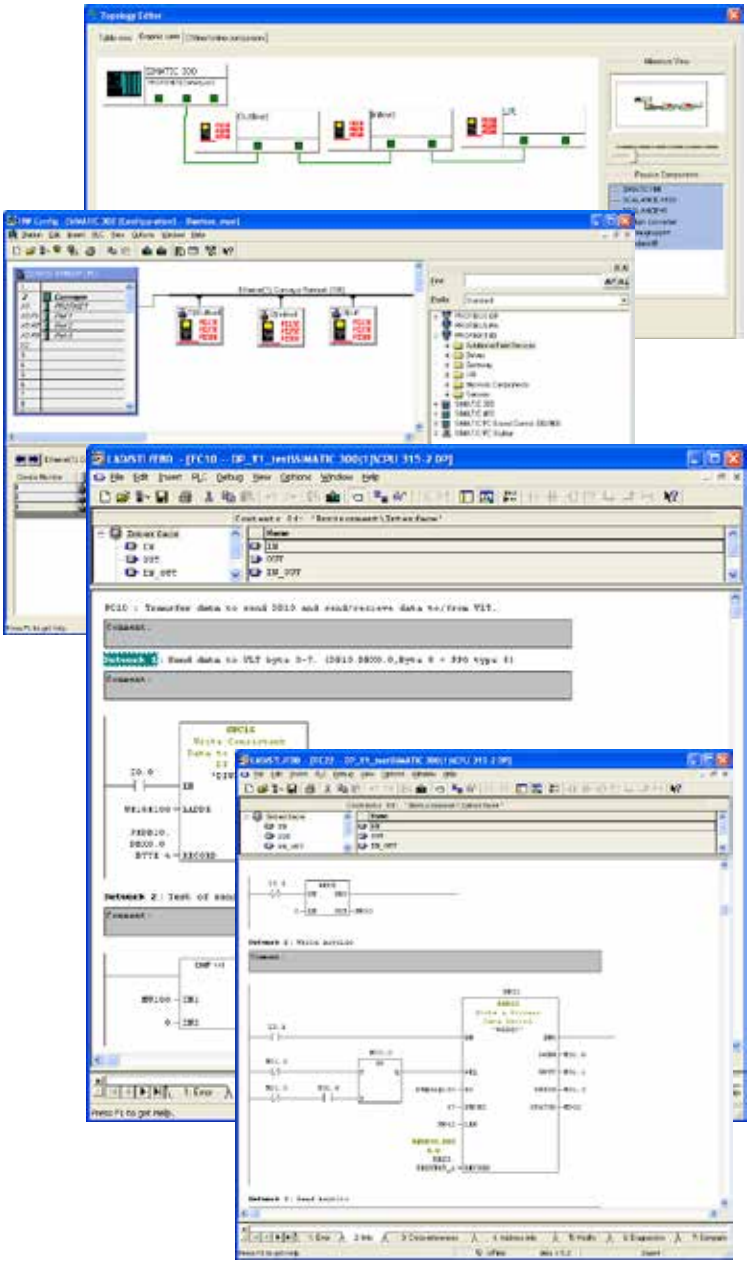
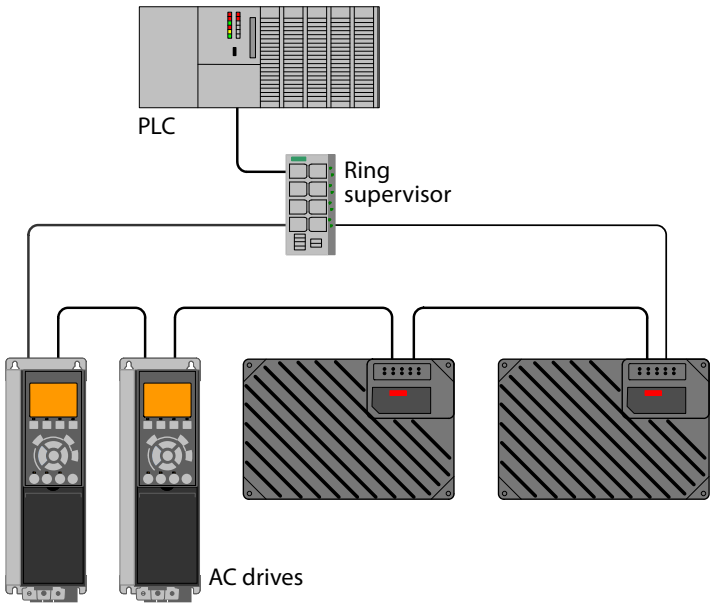
The VLT® PROFINET MCA 120 uses standard function calls and system features. This allows the user to build the PLC program on well-tried PLC functionality.

The VLT® PROFINET MCA120 supports the network topology view in the PLC programming tool.



Media Redundancy Protocol (MRP) topology



Danfoss Drives, Ulsnaes 1, DK-6300 Graasten, Denmark, Tel. +45 74 88 22 22, Fax +45 74 65 25 80, drives.danfoss.com, E-mail: info@danfoss.com

4.2 Communication, parameter setting, evaluation

OUT1 (pin 4)	• Switching signal for system pressure limit • Communication via IO-Link
OUT2 (pin 2)	• Analogue signal 4...20 mA / 0...10 V

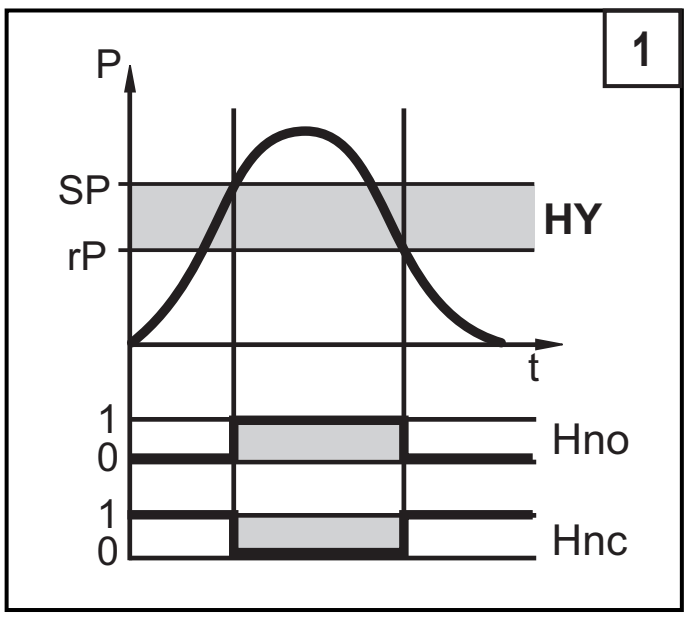
4.3 Switching function

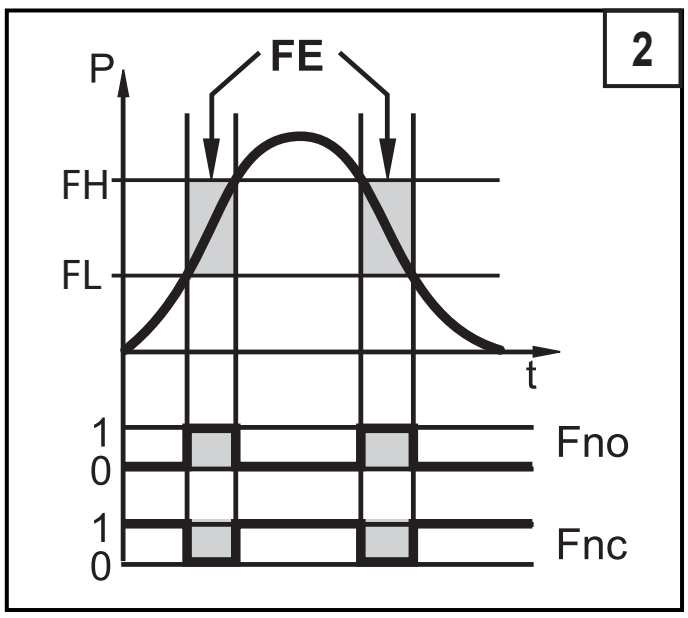
OUT1 changes its switching state if it is above or below the set switching limits (SP1, rP1). The following switching functions can be selected:

- Hysteresis function normally open: [ou1] = [Hno] (→ Fig. 1).
- Hysteresis function normally closed: [ou1] = [Hnc] (→ Fig. 1).

  First set the set point (SP1), then the reset point (rP1).

  The resulting hysteresis remains even if SP1 is changed again.
- Window function normally open: [ou1] = [Fno] (→ Fig. 2).
- Window function normally closed: [ou1] = [Fnc] (→ Fig. 2).
  The width of the window can be set by means of the difference between FH1 and FL1. FH1 = upper value, FL1 = lower value.





P = system pressure; HY = hysteresis; FE = window

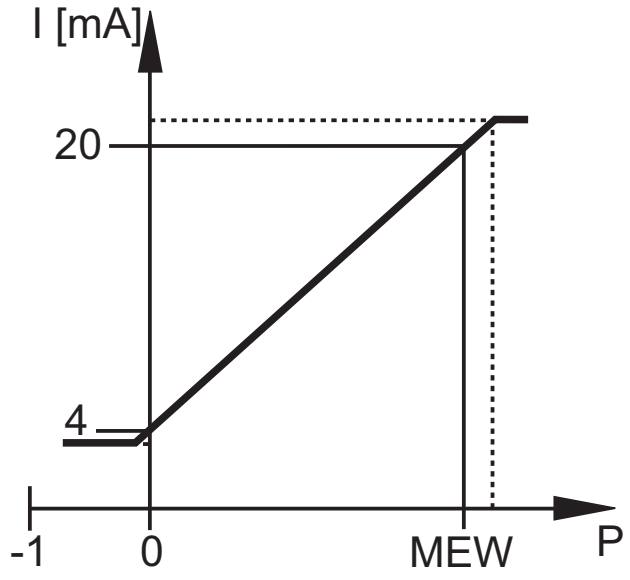
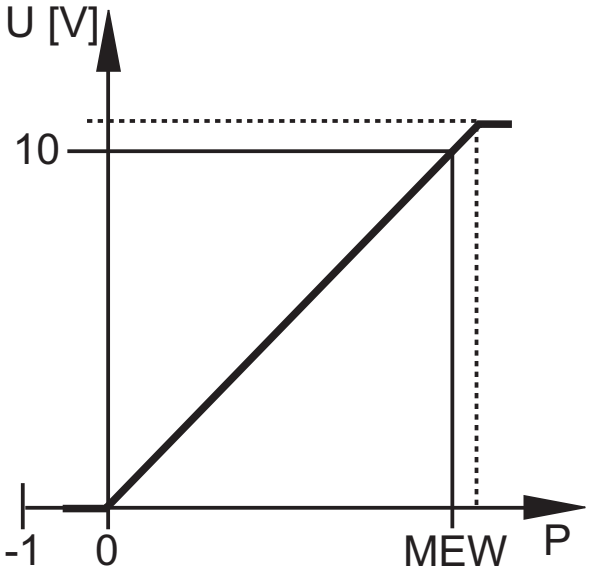
When set to the window function, the set and reset points have a fixed hysteresis of 0.25 % of the measuring span.

4.4 Analogue function

OUT2 is an analogue output:

- [ou2] defines whether the set measuring range is provided as 4...20 mA ([ou2] = [I]) or as 0...10 V ([ou2] = [U]).

PN3094 and PN3594:
Analogue signal 4...20 mA / 0...10 V corresponds with the measuring range of 0...10 bar.
Negative pressure values cannot be represented via the analogue output for the indicated units.

<table>
<tr><th>Current output 4...20 mA</th><th>Voltage output 0 ... 10 V</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td colspan="2">P = System pressure
MEW = final value of the measuring range</td></tr>
<tr><td>In the measuring range of the corresponding unit, the output signal is between 4 and 20 mA.
The green LED also indicates:
• System pressure above the measuring range: 20...20.5 mA
- Fault indication from 21.5 mA.
• System pressure below the measuring range: 4...3.8 mA</td><td>In the measuring range of the corresponding unit, the output signal is between 0 and 10 V.
The green LED also indicates:
• System pressure above the measuring range: 10...10.3 V
- Fault indication from 11 V.</td></tr>
</table>

▶ Tighten firmly. Recommended tightening torque:

Pressure range in bar	Tightening torque in Nm
-1...400	25...35
600	30...50
Depends on lubrication, seal and pressure load.	

The sensor housing can be rotated by 345° with regard to the process connection.

Do not rotate past the end stop!

6 Electrical connection

The device must be connected by a qualified electrician.

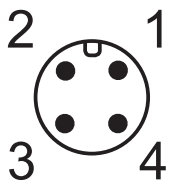
The national and international regulations for the installation of electrical equipment must be adhered to.

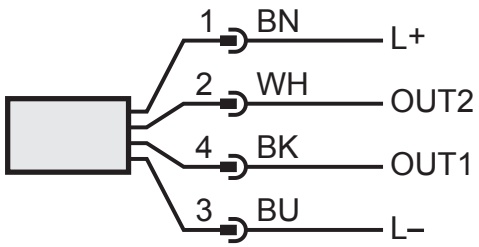
Voltage supply according to EN 50178, SELV, PELV.

▶ Disconnect power.

▶ Connect the device as follows:

Core colours	
BK	black
BN	brown
BU	blue
WH	white





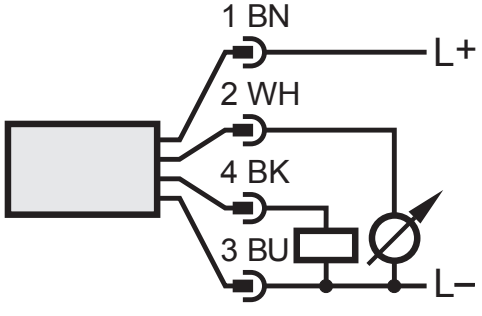
OUT1: switching output or IO-Link

OUT2: analogue output

Colours to DIN EN 60947-5-2

Wiring example

1 x positive switching / 1 x analogue



		rP / SP		cFL / cFH		ΔP
		Setting range	min. distance	Setting range	min. distance	
PN3097 PN3597	mbar	5…1000	5	0…1000	5	5
	psi	0.05…14.5	0.1	0…14.5	0.1	0.05
	kPa	0.5…100	0.5	0…100	0.5	0.5
	inHG	0.1…29.5	0.2	0…29.5	0.2	0.1
PN3129 PN3529	mbar	-995…0	5	-1000…0	5	5
	psi	-14.45…0	0.1	-14.5…0	0.1	0.05
	kPa	-99.5…0	0.5	-100…0	0.5	0.5
	inHG	-29.4…0	0.2	-29.5…0	0.2	0.1

ΔP = step increment

11.1.2 Setting ranges in operating mode 3

		rP / SP		cFL / cFH		ΔP
		Setting range	min. distance	Setting range	min. distance	
PN3160 PN3560	bar	2…600	2	0…600	2	1
	psi	26…8702	21	0…8702	27	1
	MPa	0.2…60	0.2	0…60	0.2	0.1
PN3070 PN3570	bar	1…400	2	0…400	2	1
	psi	20…5802	30	0…5802	30	1
	MPa	0.1…40	0.2	0…40	0.2	0.1
PN3071 PN3571	bar	1…250	2	0…250	2	1
	psi	12…3626	19	0…3626	19	1
	MPa	0.1…25	0.2	0…25	0.2	0.1
PN3092 PN3592	bar	0.3…100	0.5	0…100	0.5	0.1
	psi	5…1450	8	0…1450	8	1
	MPa	0.03…10	0.05	0…10	0.05	0.01
PN3093 PN3593	bar	0.1…25	0.2	0…25	0.2	0.1
	psi	1…363	2	0…363	2	1
	MPa	0.01…2.5	0.02	0…2.5	0.02	0.01

ΔP = step increment

		rP / SP		cFL / cFH		ΔP
		Setting range	min. distance	Setting range	min. distance	
PN3094 PN3594	bar	-0.97…10	0.05	-1…10	0.05	0.01
	psi	-14…145	0.8	-14.5…145	0.8	0.1
	MPa	-0.097…1	0.005	-0.1…1	0.005	0.001
PN3096 PN3596	bar	0.01…2.5	0.02	0…2.5	0.02	0.01
	psi	0.1…36.3	0.2	0…36.3	0.2	0.1
	kPa	1…250	2	0…250	2	1
PN3097 PN3597	mbar	3…1000	5	0…1000	5	1
	psi	0.05…14.5	0.08	0…14.5	0.08	0.01
	kPa	0.3…100	0.5	0…100	0.5	0.1
	inHG	0.1…29.5	0.2	0…29.5	0.2	0.1
PN3129 PN3529	mbar	-997…0	5	-1000…0	5	1
	psi	-14.45…0	0.08	-14.5…0	0.08	0.01
	kPa	-99.7…0	0.5	-100…0	0.5	0.1
	inHg	-29.4…0	0.2	-29.5…0	0.2	0.1

ΔP = step increment

11.2 Further technical data

Further technical data and scale drawings at: www.ifm.com

ifm electronic

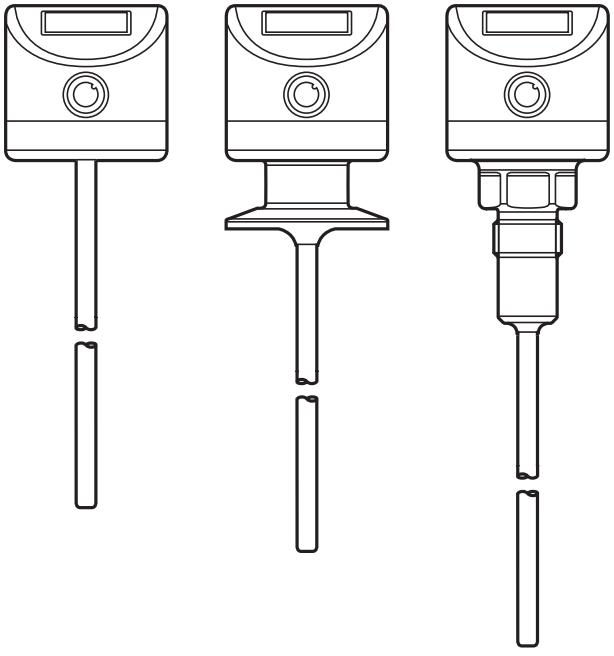
CE

Operating instructions
Temperature transmitter with display

efector600

TDxxxx

UK



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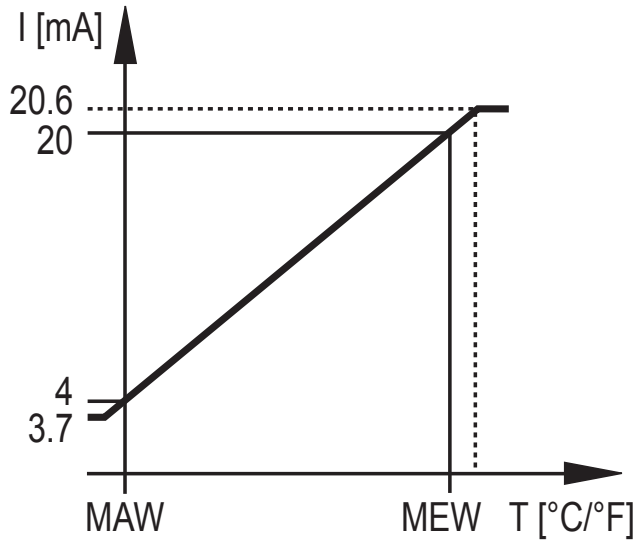
4 Function

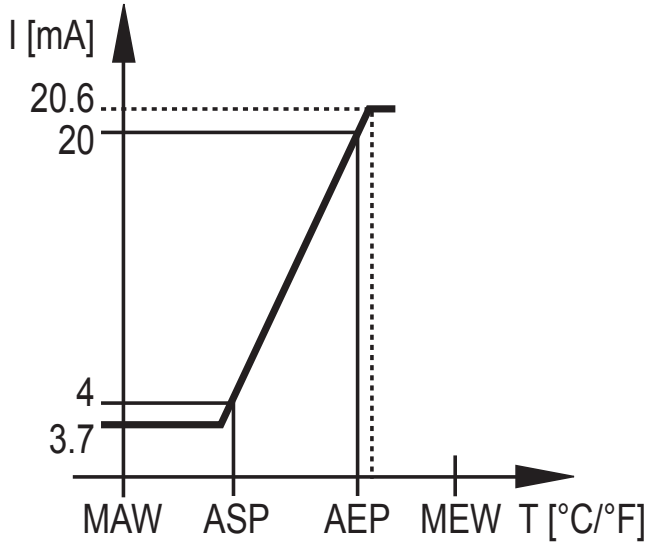
- The unit converts the measured signal into a temperature-proportional analogue signal. Depending on the parameter setting (→ 8) the output signal is at:
  4...20 mA with setting [OU] = [I] or
  20...4 mA with setting [OU] = [Ineg].
- The analogue signal can be scaled. Factory setting → see Technical data at www.ifm.com.

Minimum distance between ASP and AEP = 5 °C or 9 °F.

Maximum measuring range at [OU] = [I]



Measuring range scaled at [OU] = [I]



MAW = initial value of the measuring range
MEW = final value of the measuring range

ASP = analogue start point
AEP = analogue end point

Within the measuring range the output signal is between 4 and 20 mA. If the temperature value is outside the limits of the measuring range, the following output signal is provided:

	Output signal at [OU] = [I]	Output signal at [OU] = (Ineg]
Temperature > AEP	20...20.6 mA	4...3.7 mA
Temperature > MEW	20.6 mA	3.7 mA
Temperature < ASP	4...3.7 mA	20...20.6 mA
Temperature < MAW	3.7 mA	20.6 mA

6 Electrical connection

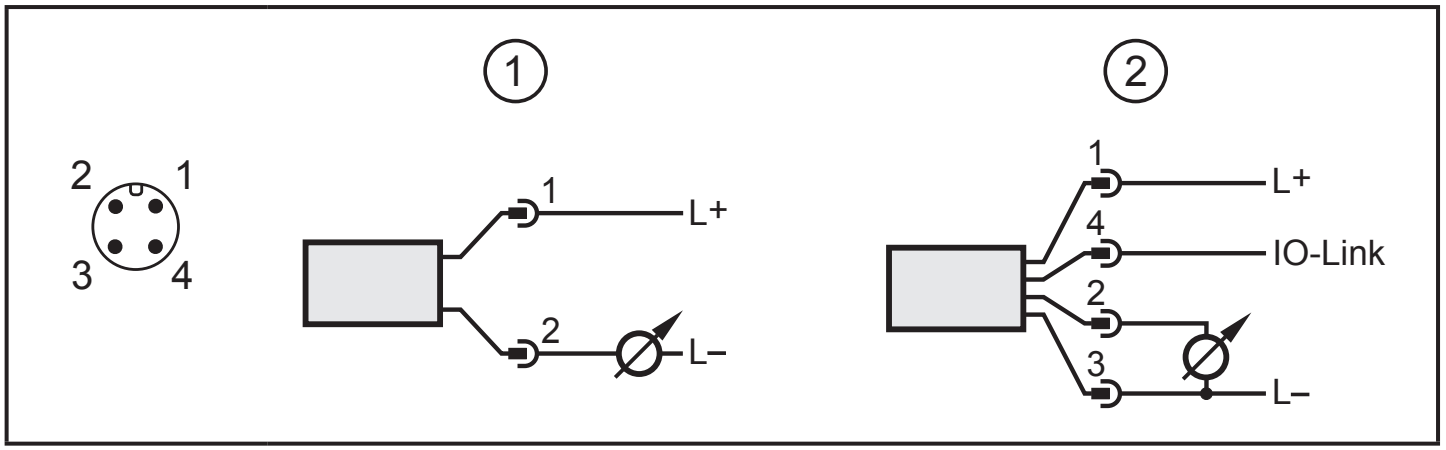
The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply according to EN 50178, SELV, PELV.

▶ Disconnect power.

▶ Connect the unit as follows:



Operation as 2-wire unit (1):

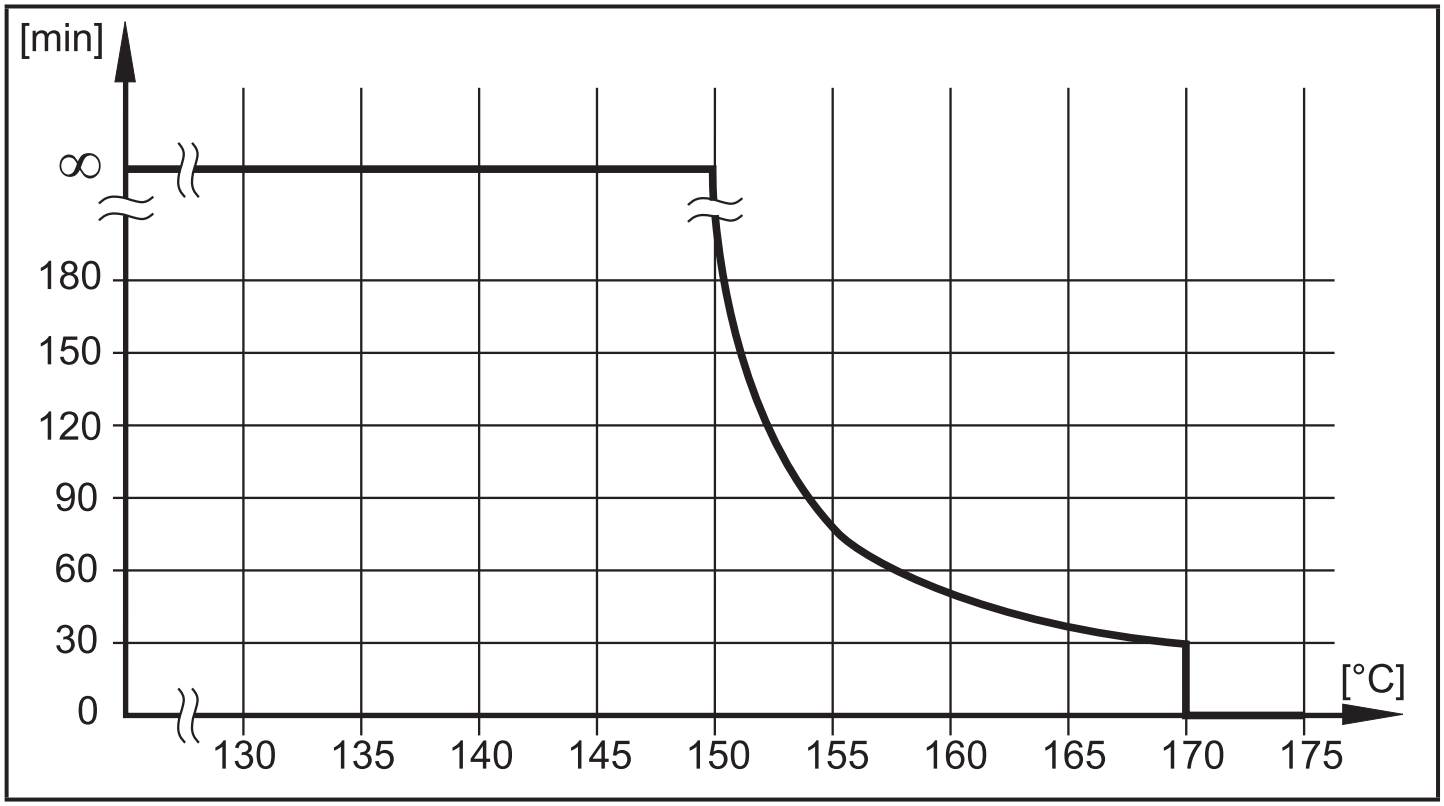
Pin 1	L+
Pin 2	Analogue signal for temperature

Operation as 4-wire unit (2):

Pin 1	L+
Pin 2	Analogue signal for temperature
Pin 3	L-
pin 4	IO-Link

10 Technical data

10.1 Temperature resistance



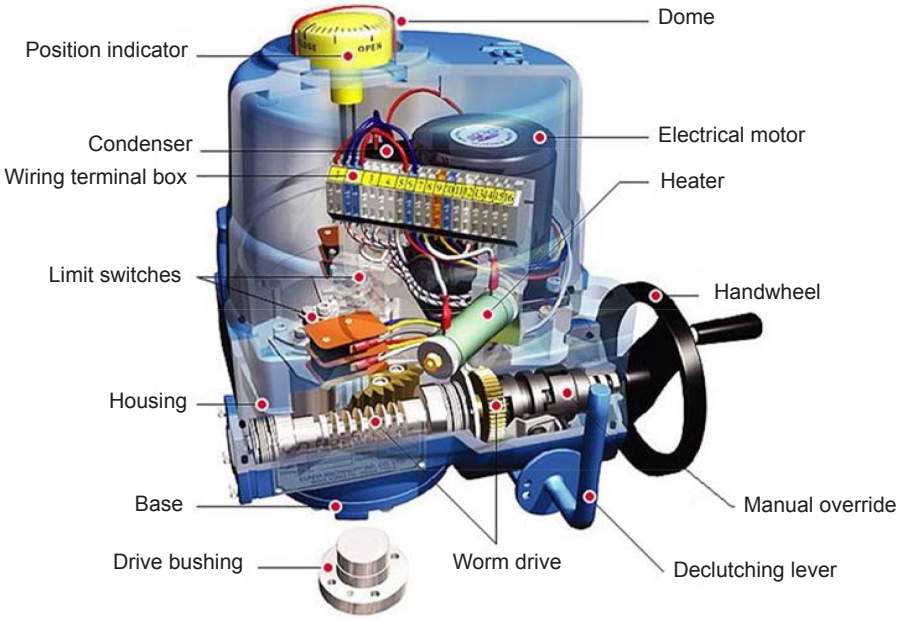
Maximum operation time depending on the medium temperature

Further technical data and scale drawing at www.ifm.com.

11 Factory setting

	Factory setting	User setting
OU	**I**	
COF	**0.0**	
FOU	**OFF**	

Factory settings for the parameters ASP2, AEP2 and Uni → technical data sheet at www.ifm.com.

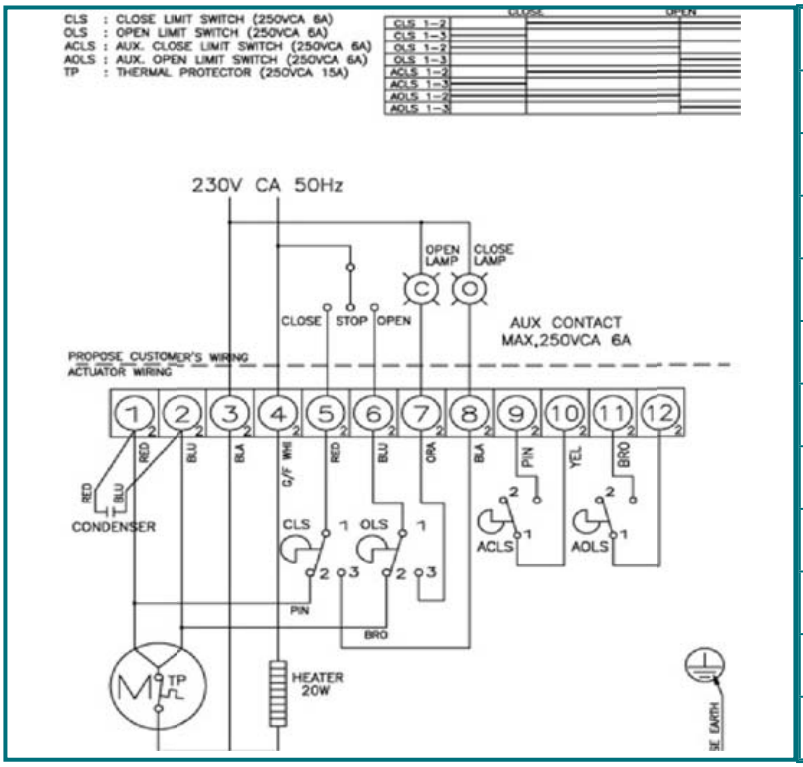


Limits of use	
Protection class	IP 67
Temperature range	-20°C ~ 70°C
Service factor	S2 - 70%
Mechanical features	
Gearbox	Treated steel pinions
Rotation	90° (± 5°)
Emergency override	Handwheel
Declutching	Lever
Electrical features	
Motor protection	Thermal
Limit switches	2 adjustable switches
Auxiliary contacts	2 adjustable dry switches
Anti-condensation	20W heater
Electrical connection	2 x M20 x 1,5

Type	EN 0060	EN 0090	EN 0150	EN 0280	EN 0380	EN 0600	EN 1000	EN 1500	EN 2000	EN 2500
Torque (Nm)	60	90	150	280	380	600	1000	1500	2000	2500
Operating time (s)	17	17	20	24	24	29	29	87	87	87
ISO 5211	F07	F07	F07/F10	F10/F12	F10/F12	F12/F14	F12/F14	F14/F16	F14/F16	F14/F16
Double square	17	17	17	22	27	27	27	36	36	36
Weight (Kg)	11,5	11,5	14,2	18,7	18,9	26	27,2	66	66	65

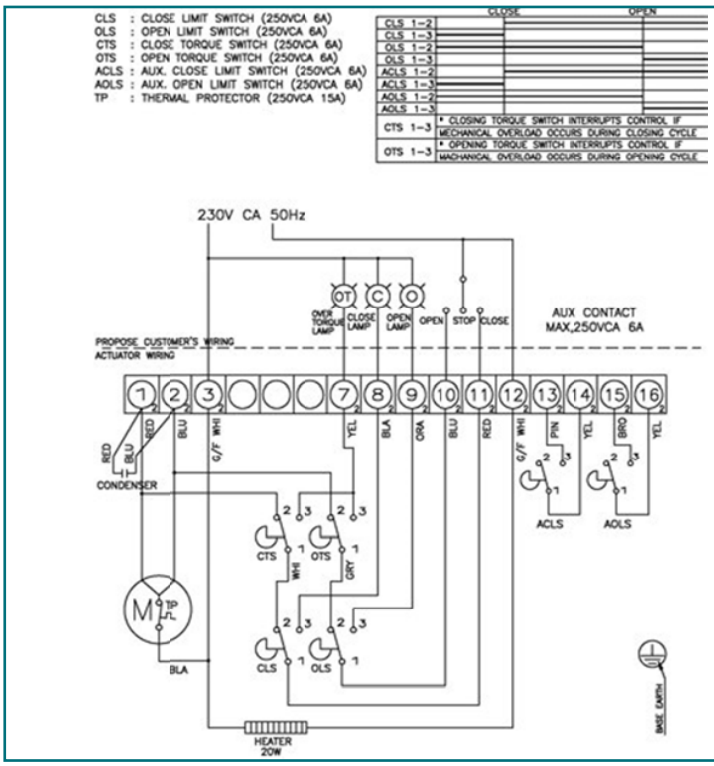
Type	EN 0060	EN 0090	EN 0150	EN 0280	EN 0380	EN 0600	EN 1000	EN 1500	EN 2000	EN 2500
Power (W)	15	25	40	40	60	90	180	98	180	180
3 x 400 V										
Holding current (A)	0,13	0,18	0,3	0,3	0,33	0,52	0,73	0,52	0,73	0,73
Inrush current (A)	0,23	0,36	0,59	0,74	0,78	1,24	1,68	0,78	1,68	1,68
220/230 V										
Holding current (A)	0,45	0,58	0,95	0,95	1,3	1,5	2,15	1,5	2,15	2,15
Inrush current (A)	0,63	0,89	1,12	1,37	1,85	2,34	3,4	2,34	3,4	3,4
24 VDC										
Holding current (A)	2,2	3,5	4,5	6,5						
Inrush current (A)	4,1	4,1	6,6	13,8						

Wiring diagram 220 / 230 V AC (EN 0060 and EN 0090)



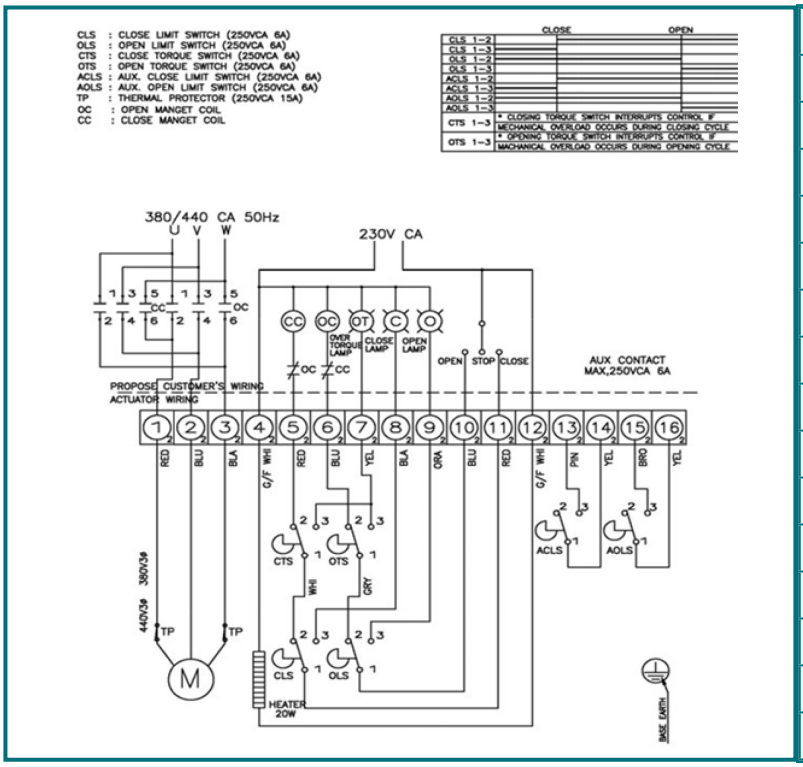
1	Do not use
2	Do not use
3	Common
4	Phase
5	Closing command
6	Opening command
7	Opening indicator light (suggestion)
8	Closing indicator light (suggestion)
9	Closing auxiliary
10	Closing auxiliary
11	Opening auxiliary
12	Opening auxiliary

Wiring diagram 220 / 230 V AC for EN150 and up



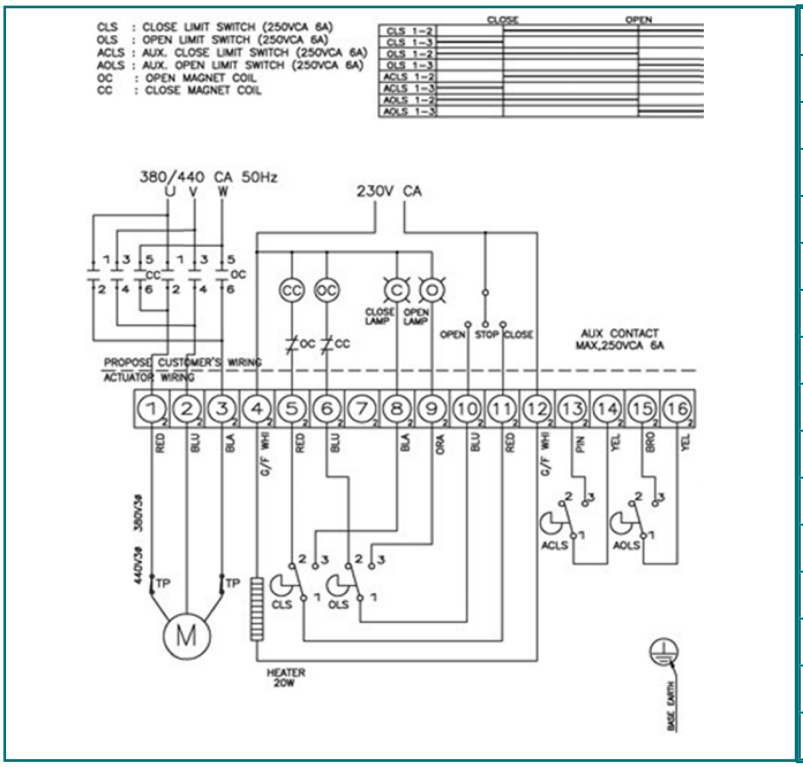
1	Do not use
2	Do not use
3	Common
7	Overheating indicator light (suggestion)
8	Closing indicator light (suggestion)
9	Opening indicator light (suggestion)
10	Opening command
11	Closing command
12	Phase
13	Closing auxiliary
14	Closing auxiliary
15	Opening auxiliary
16	Opening auxiliary

Wiring diagram 400 V AC (EN 0060 and EN 0090)



1	U phase
2	V phase
3	W phase
4	Heater power supply
5	Connected to closing 11
6	Connected to opening 10
7	Not used
8	Closing indicator light (suggestion)
9	Opening indicator light (suggestion)
10	Opening command
11	Closing command
12	Heater power supply
13	Closing auxiliary
14	Closing auxiliary
15	Opening auxiliary
16	Opening auxiliary

Wiring diagram 400 V AC for EN150 and up



1	U phase
2	V phase
3	W phase
4	Heater power supply
5	Connected to closing 11
6	Connected to opening 10
7	Overheating indicator light (suggestion)
8	Closing indicator light (suggestion)
9	Opening indicator light (suggestion)
10	Opening command
11	Closing command
12	Heater power supply
13	Closing auxiliary
14	Closing auxiliary
15	Opening auxiliary
16	Opening auxiliary