



Toledo Tools Series

Rotary Screw Compressors
5 - 50 HP

OPERATING MANUAL



Curtis-Toledo, Inc.
1905 Kienlen, Ave.
St. Louis, MO 63133

+1 314-383-1300
us.fscurtis.com

IMPORTANT

Make a permanent record of the Model and Serial numbers of your machine here. You will save time and expense by including this reference identification on replacement parts.

MODEL #: _____ **SERIAL #:** _____



DANGER



Air used for breathing or food processing must meet OSHA 29CFR 1910.134 or FDA 21CFR 178.3570 Regulations. Failure to do so may cause severe injury or death.



Curtis-Toledo, Inc.
1905 Kienlen, Ave.
St. Louis, MO 63133

+1 314-383-1300
us.fscurtis.com

Table of Contents

01 - General Information.....	5	06 - Interfaces & Function of the Individual Components.....	26
02 - Safety Instructions.....	6	6.1 - Interfaces.....	26
2.1 - Explanation of Symbols.....	6	6.2 - Oil Interfaces.....	27
2.2 - Fundamental Dangers.....	6	07 - Protective & Warning Devices.....	28
2.3 - Proper Use.....	11	7.1 - Motor Overload Protection.....	28
2.4 - Responsibilities of Owner.....	12	7.2 - Compressed Air Final Temperature – Excess Temperature Protection.....	28
2.5 - Description of Safety Devices.....	13	08 - Piping and Instrument Diagrams.....	29
2.6 - Securing Against Restart.....	14	8.1 - TT05-20 Piping & Instrument Diagram.....	29
03 - Design & Function.....	15	8.2 - TT25-50 Piping & Instrument Diagram.....	30
3.1 - Design.....	15	09 - Electrical Circuit Diagram.....	31
3.2 - Introduction to the Compact, Oil-lubricated Screw Compressor.....	16	9.1 - TT05-07 Single Phase.....	31
3.3 - Environmental Protection.....	16	9.2 - TT05-07 3 Phase (DOL).....	40
3.4 - Signage.....	17	9.3 - TT10-50 3 Phase (Y-D).....	51
04 - Technical Data.....	19	10 - Transportation, Packaging, and Storage.....	62
4.1 - Type Plate.....	19	10.1 - Safety Instructions for Transport.....	62
4.2 - General Specifications.....	19	10.2 - Transport Inspection.....	62
05 - Screw Compressor Installation.....	21	10.3 - Packaging.....	62
5.1 - Safety Instructions for Installation and Commissioning.....	21	10.4 - Transportation.....	64
5.2 - Requirements for Installation Location.....	22	10.5 - Storage.....	64
5.3 - Installation.....	23	11 - Operation.....	65
5.4 - Information About Lines and the Foundation...23		11.1 - Operating.....	65
5.5 - General Information and Safety Instructions in Relation to Electric Operating Materials.....	24	11.2 - Commissioning, Starting, and Shut Down.....	66
5.6 - Installation Schematic.....	25		



Curtis-Toledo, Inc.
1905 Kienlen, Ave.
St. Louis, MO 63133

+1 314-383-1300
us.fscurtis.com

12 - Instructions for Operation.....	69
12.1 - Controller.....	69
12.2 - Description of Individual Buttons.....	69
12.3 - Display.....	71
12.4 - Operating the Screw Compressor.....	72
12.5 - Data Overview.....	74
12.6 - Query Interface.....	82
12.7 - Warnings and Fault Messages.....	85
12.8 - Messages About Operating, Alarm and Fault Statuses.....	86
13 - Maintenance.....	88
13.1 - Safety Instructions for Maintenance.....	88
13.2 - Oil and Filter Maintenance.....	91
13.3 - Maintenance Schedule.....	92
13.4 - Measures of Completion.....	93
14 - Troubleshooting.....	94
14.1 - Commissioning After Rectifying a Fault.....	95
15 - Dismantling and Disposal.....	96
15.1 - Safety Instructions.....	96
15.2 - Dismantling.....	97
15.3 - Disposal.....	97
Notes.....	98



01. GENERAL INFORMATION

ABOUT OPERATING INSTRUCTIONS

The instructions enable you to operate the machine safely and effectively. The instructions are part of the machine and must always be available to the staff. Before starting all work, employees must carefully read and understand these instructions. The basic prerequisite for safe work is compliance with all safety instructions and operating instructions contained in this manual. . The local regional occupational health and safety regulations and general safety regulations in accordance with the operation of the machine also apply. The description of the machine does not include the operation of the controller. Therefore, there must be instructions and content about the instructions of the controller.

COPYRIGHT

The instructions are copyrighted and are for internal use only. This instruction must not be provided by a third-party manufacturer, even if it is reproduce as an excerpt, and can only be used internally, otherwise the content may not be used or expressed under the written permission of the manufacturer. Any infringement is subject to damages. We reserve the right to claim further claims.

LIMITATION OF LIABILITY

All information and instructions in this manual are compiled according to applicable standards and regulations, the most advanced technology, and years of knowledge and experience. The manufacturer is not responsible for damage caused by the following reasons:

- Failure to follow the operating instructions
- Improper use
- Operation by unqualified employees
- Unauthorized conversion
- Technical modification
- Use of unapproved spare parts

The actual scope of supply may differ from the descriptions and illustrations in these instructions under special design situations, including the results of other ordering options or the latest technical modifications. The obligations stipulated in the supply contract, the manufacturer's general business conditions and delivery conditions, and the legal provisions in effect at the time the contract is completed.

CUSTOMER SERVICE

Our technical department can provide technical information. In addition, our employees are always interested in receiving new information and listening to your experience, which is valuable for improving our products.

GUARANTEE CONDITIONS

The guarantee conditions are included in the General Terms and Conditions issued by the manufacturer.



02. SAFETY INSTRUCTIONS

2.1 - EXPLANATION OF SYMBOLS

- **Safety Instructions.** The safety instructions and safety information in these instructions are denoted by symbols. The safety instructions are prefaced by signal words which express the extent of the risk.

To prevent accidents, personal injury and property damage, comply with the safety instructions at all times and proceed with caution.



DANGER!

This combination of symbol and signal word indicates an immediate, hazardous situation which will lead to serious or even fatal injuries if not avoided.



WARNING!

This combination of symbol and signal word indicates a potentially hazardous situation which may lead serious or even fatal injuries if not avoided.



CAUTION!

This combination of symbol and signal word indicates a potentially hazardous situation which may cause minor or light injuries if not avoided.



NOTE!

This combination of symbol and signal word indicates a potentially hazardous situation which may cause property damage and environmental damage if not avoided.

2.2 - FUNDAMENTAL DANGERS

The following section describes residual risks that can arise from the machine and were determined by a risk assessment.

To minimize health hazards and avoid dangerous situations, follow the safety instructions specified here as well as in the following chapters of these instructions.

General Dangers at the Workplace

- **Noise**



WARNING!

Danger of injury from noise!

The noise level in the work area can cause severe hearing loss.

- Always wear ear protection when working.
- Only stay in the danger zone as long as necessary.



- Accumulation of Fluids

**CAUTION!*****Danger of injury due to slipping in accumulated fluids!***

Slipping in fluids that have accumulated on the floor may result in a fall. A fall may result in injuries.

- Absorb any accumulations of fluids using suitable means.
- Wear non-slip safety shoes.
- Affix warnings and mandatory signs on or near any area in which fluids can accumulate on the floor.

Dangers Due to Electric Energy

- Electric Power

**DANGER!*****Danger to life due to electric current!***

Imminent risk of fatal injury from electric shock in the event of in contact with live parts. Damage to insulation or individual components can present a danger to life.

- Any work on the electrical system must be performed by qualified electricians.
- In the event of damage to insulation, shut down power supply immediately and have repairs performed.
- Before working on active parts of electrical systems and equipment, always disconnect these from the mains supply and ensure they remain disconnected for the duration of the work. In doing so, observe the 5 safety rules:
 - Isolate from electrical supply.
 - Secure against restart.
 - Check for absence of voltage.
 - Ground and short-circuit.
 - Cover or shield any adjacent live parts.
- Never bypass fuses or disable fuses. When replacing fuses, observe the correct amperage.
- Protect energized parts from moisture. This could cause a short circuit.



- **Stored Charges**

**DANGER!*****Danger to life due to stored charges!***

Electric charges may be stored in electrical components; these charges may be retained even after the system has been switched off and disconnected from the power supply. Contact with these components may result in serious or fatal injury.

- Before working on the components named, ensure that they have been completely disconnected from the power supply. Allow 10 minutes to elapse to ensure that the internal capacitors have been fully discharged.

Dangers Due to Mechanical Elements

- **Moving Parts**

**WARNING!*****Danger of injury due to moving components!***

Rotating parts or parts making linear motions can cause serious injuries.

- Never reach into moving parts or handle moving parts during operation.
- Do not open covers during operation.
- Be aware of the stop delay: Make sure that all parts have stopped moving before opening any covers.
- Wear close-fitting work clothing with low resistance to tearing in the danger area.

- **Sharp Edges and Pointed Corners**

**CAUTION!*****Danger of injury due to sharp edges and pointed corners!***

Sharp edges and pointed corners may cause grazing and cuts to the skin.

- Proceed with caution when working near sharp edges and pointed corners.
- If in doubt, wear protective gloves.



Dangers Due to Hydraulic Energy

- **Jets of Liquid**



WARNING!

Danger to life due to jets of liquid escaping under high pressure!

In the event of defective lines or components, a jet of liquid can escape under high pressure. The jet of liquid can cause extremely severe injuries or even death.

- Never hold body parts or objects in the jet of liquid. Keep people out of the danger zone. In the event of accidental contact with the jet of liquid, initiate first aid measures and consult a doctor immediately.
- Initiate an immediate emergency stop. If necessary, take additional measures in order to reduce the pressure and stop the jet of liquid.
- Collect and dispose of escaping liquids properly.
- Have faulty components repaired immediately.

- **Air Receiver**



WARNING!

Danger to life in the event of improperly performed work on the air receiver!

Improper handling of air receivers can cause a sudden release of pressure and thereby cause serious or even fatal injuries and considerable material damage.

- Never carry out welding or soldering work on the air receiver tank.
- Do not carry out any mechanical work on the air receiver tank.
- Fully vent the air receiver tank via the fitted vent screw after connecting the pneumatic line.
- Do not start work on compressors with a air receiver before the pressure has been completely relieved and checking that there is no pressure.
- Do not start any work on the air receiver until the gas pre-load pressure has been completely relieved.

- **Compressed Air**



WARNING!

Danger of injury due to compressed air!

Compressed air can escape from compressed air hoses or components under pressure in the event of improper handling or in the event of a fault. This can result in eye injuries, dust being raised, or hoses making uncontrolled movements.



Pressurized components can move in uncontrolled manner and can cause injuries if handled incorrectly.

- Before removing pressurized hoses or components, depressurize them.
- Have any faulty pressurized components replaced immediately by specialist personnel.
- Before all work, ensure that the compressor is depressurized; wait at least 5 minutes.

- **Oil Mist**



CAUTION!

Danger of injury due to oil mist!

In the event of high temperatures or mechanical spray dispersion, Oil mist can form. Oil mist can irritate eyes and the respiratory system.

- When working on the oil system and an oil mist forms, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

Dangers Due to High Temperatures

- **Hot Surfaces**



WARNING!

Danger of injury due to hot surfaces!

The surfaces of components, and operating materials (e.g. oil or cooling water) may heat up considerably during operation. Contact between the skin and hot surfaces and liquids cause serious burns to the skin.

- When performing any work near hot surfaces, heat-resistant occupational safety clothing and protective gloves must be worn.
- When performing any work with operating materials, heat-resistant occupational safety clothing and protective gloves must be worn.
- Before any work, make sure that all surfaces have cooled to ambient temperature; wait at least 30 minutes.
- Have faulty components repaired immediately.



- Hot Operating Materials

**WARNING!*****Danger of injury due to hot operating materials!***

Operating materials can reach high temperatures during operation. Skin contact with hot operating materials causes severe skin scalding..

- When performing any work with operating materials, heat-resistant occupational safety clothing and protective gloves must be worn.
- Before performing any work with operating materials, check whether they are hot. If necessary, allow them to cool down.

2.3 - PROPER USE

The machine is designed and constructed for proper use as described here only.

The screw compressor is only used to generate compressed air in a non-explosive environment. The screw compressor may be only supplied with cool, dry and dust-free cooling air.

Proper use also includes compliance with all the information and specifications in these instructions. Any use going beyond the proper use or other type of use is regarded as misuse.

**WARNING!*****Danger due to misuse!***

Misuse of the compressor can cause dangerous situations.

- The compressed air may not be used for respiration without prior treatment.
- The compressed air may not be used directly for pharmaceutical or sanitary purposes, or for direct treatment of food, without appropriate after-treatment.
- The screw compressor may not be operated outdoors.
- The screw compressor or individual components may not be converted, modified or re-equipped.
- The screw compressor may not be used in an explosive atmosphere.
- The intake of media other than cool, dry and dust-free cooling air is prohibited.

No claims of any kind can be asserted for damage resulting from misuse.



2.4 - RESPONSIBILITY OF THE OWNER

- **Owner.** The owner is the person who operates the machine for commercial or business purposes themselves, or hands it over to a third party for use/application, and who assumes the legal product responsibility for the protection of the user, the personnel or third parties during operation.
- **Owner Obligations.** The machine is used for commercial purposes. Therefore, the owner of the machine is subject to legal occupational safety regulations.

In addition to the safety instructions in these instructions, the safety instructions, the regulations for the prevention of accidents and environmental protection regulations applicable at the site of the machine, must also be adhered to.

The following applies in particular:

- The owner must keep informed of the applicable occupational health and safety regulations and identify any additional hazards, resulting from the specific local operating conditions, by performing a risk assessment. These must be implemented in the form of operating instructions for the operation of the machine.
- During the full period of machine use, the owner must check whether the operating instructions created correspond to the current status of rules and regulations and adapt the operating instructions if necessary.
- The owner must clearly regulate and specify responsibilities for installation, operation, repair of malfunctions, maintenance, and cleaning.
- The owner must ensure that all employees who work with the machine have read and understood these instructions. In addition, the owner must train staff at regular intervals and inform the staff of the dangers.
- The owner must provide staff with the required safety clothing and equipment and instruct them that wearing the required protective equipment is mandatory.

Furthermore, the owner is responsible for ensuring that the machine is always in a technically perfect working condition. The following requirements therefore apply:

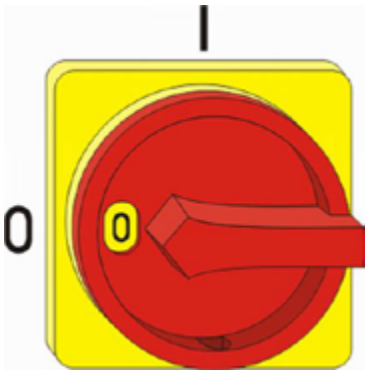
- The owner must ensure that the maintenance intervals described in these operating instructions are adhered to.
- The owner must have all safety equipment checked regularly to make sure it is fully functional and complete.
- The owner must ensure that the appropriate media connections are provided.



- The owner must ensure that the supply of the required quantity of cooling medium (air/water) is guaranteed.
- The owner must make sure that the required heat extraction is guaranteed.

2.5 - DESCRIPTION OF THE INSTALLED SAFETY DEVICES

- **Main Switch with Emergency Stop Function**



The main switch is also designed as an emergency stop switch. By turning the main switch to the “0” position, the machine is stopped by switching off the power immediately, thereby triggering an emergency stop.



WARNING!

Danger to life due to restarting in an uncontrolled manner!

Restarting the machine in an uncontrolled manner can cause serious or fatal injuries.

- Before restarting, ensure that the reason for the emergency stop has been rectified and that all safety devices are installed and in working order.
- Only turn the main switch to the “I” position when there is no more danger.

- **Emergency Stop Button**



Pressing the emergency stop button stops the machine by switching off the power supply with immediate effect. After an emergency stop button has been pressed, it must be unlocked by turning it to allow a restart.



WARNING!

Danger to life due to restarting in an uncontrolled manner!

Restarting the machine in an uncontrolled manner can cause serious or fatal injuries.

- Before restarting, ensure that the reason for the emergency stop has been rectified and that all safety devices are installed and in working order.
- Do not unlock the emergency stop button until there is no more danger.



- Safety Valves



Safety valves are safety components and are pressure-relief equipment for the areas under pressure such as the boiler, pressure tank, pipes and transport container. In the event of an impermissible pressure increase, safety valves discharge gases, vapors or liquids into the atmosphere.

2.6 - SECURING AGAINST RESTART

**WARNING!**

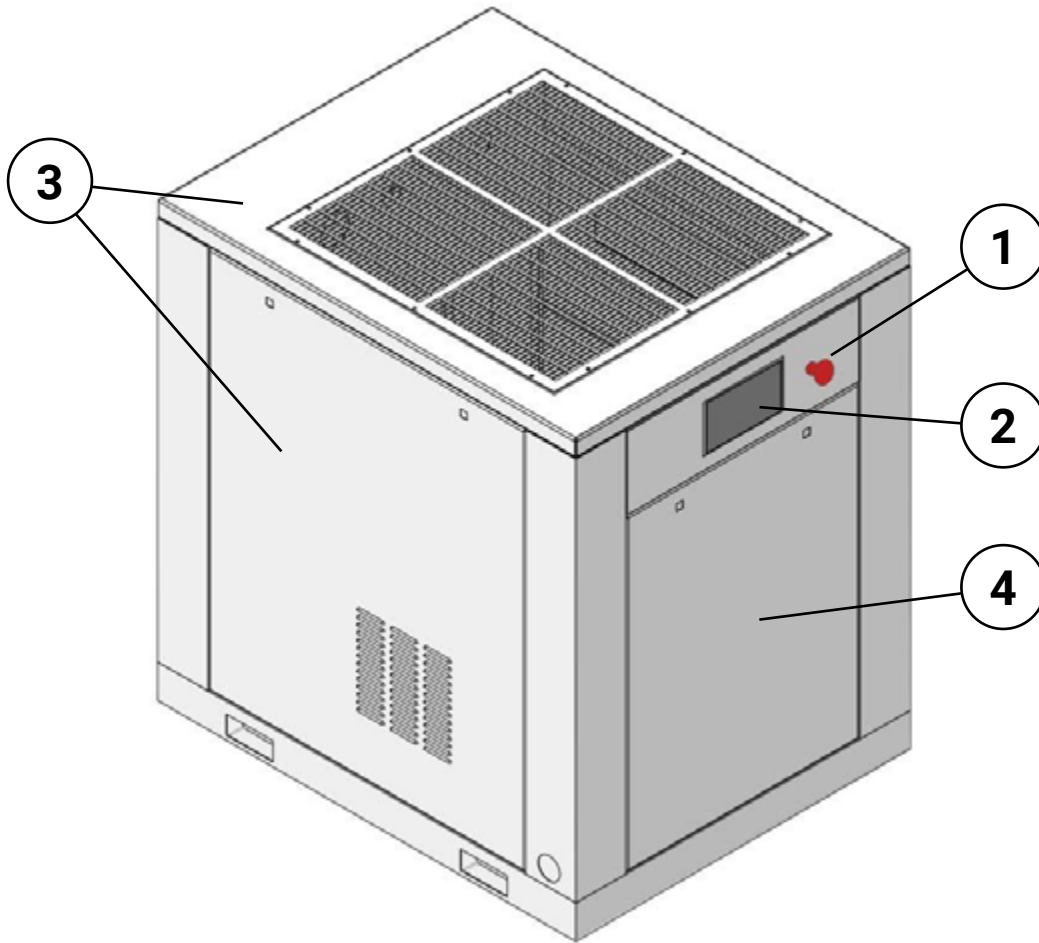
Risk of fatal injury if the machine is restarted without authorization or in an uncontrolled manner!

An uncontrolled or unauthorized restart of the machine can cause severe or fatal injuries.

- Before restarting, ensure that all safety devices have been fitted and are fully functional, and that there are no hazards for personnel.
- Always adhere to the procedure described below to secure against restart.

03. DESIGN AND FUNCTION

3.1 - DESIGN



Item #	Description
1	Emergency Stop Button
2	Control Panel
3	Noise Insulation Covers
4	Switch Cabinet

Note: The dimensions and configuration of different models may vary, however share the same basic structure.



3.2 - INTRODUCTION TO THE COMPACT, OIL-LUBRICATED SCREW COMPRESSOR

The compact, oil-lubricated screw compressor is characterized by its reliability, low wear, low vibration properties, smooth running operation and high efficiency.

BRIEF DESCRIPTION OF THE FUNCTION

The fresh air supplied by the installed cooling air ventilator is filtered through the intake filter. The air flows over the intake regulator into the compressor stage, where it is compressed together with the injected oil to the final pressure. The compressed air is largely separated from the oil in the oil pressure tank. The subsequent oil separator removes the remaining oil from the compressed air. The compressed air then flows over the minimum pressure valve and return valve into the compressed air aftercooler and is cooled down before it leaves the screw compressor through the compressed air connection.

The oil is separated from the compressed air in the oil pressure tank and the oil separator and flows to the oil cooler. The oil temperature regulator adds the cooled oil to the hot oil via the oil cooler bypass in accordance with the temperature set point. Finally, the oil filter cleans the oil before it is injected into the compressor stage once again.

3.3 - ENVIRONMENTAL PROTECTION



NOTE!

Danger to the environment due to incorrect handling of environmentally hazardous substances!

If environmentally hazardous substances are handled incorrectly, in particular if they are disposed of incorrectly, there is a risk of considerable harm to the environment.

- Always adhere to the instructions below when handling and disposing of environmentally hazardous substances.
- If environmentally hazardous substances are accidentally released into the environment, take suitable measures immediately. If there are any doubts, inform the responsible community authorities about the damage and inquire about suitable measures to take.

The following environmentally hazardous substances are used:

- **Oil.** Oils can contain toxic substances and substances that are harmful to the environment. They must not be released into the environment. Disposal must be carried out by a specialist disposal company.
- **Lubricants.** Lubricants such as grease, oil and condensate contain toxic sub-stances. They must not be released into the environment. Disposal must be carried out by a specialist disposal company.



3.4 - SIGNAGE

The following symbols and information signs are posted in the work area. They refer to the immediate surroundings in which they are posted.



WARNING!

Danger of injury due to illegible symbols!

Stickers and signs may become dirty or unidentifiable over time, preventing dangers from being recognized and the necessary operating instructions from being followed. This results in a danger of injury.

- All safety, warning and operating information must be kept in a legible condition at all times.
- Damaged signs or stickers must be replaced immediately.

Warning Signs

- **Electric Voltage**



Only qualified electricians may work in a room marked with this sign.

Unauthorized persons may not enter workplaces marked with this sign, nor open a cabinet marked with this sign.

- **Automatic Start-up**



Maintain sufficient distance from all parts that can move; they present a danger of crush injuries or being pulled in.

- **Hot Surface**



Hot surfaces, such as machine parts, containers or materials, but also hot liquids, are not always apparent. Do not touch these without protective gloves.



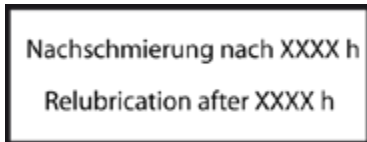
Instructions on the Machine

- **Direction of Rotation**



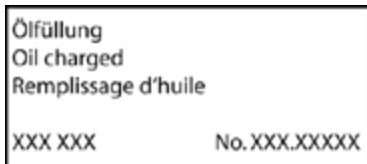
There is a direction of rotation sticker on the drive unit and on the cooling air fan. This sticker shows the respective direction of rotation.

- **Re-lubrication**



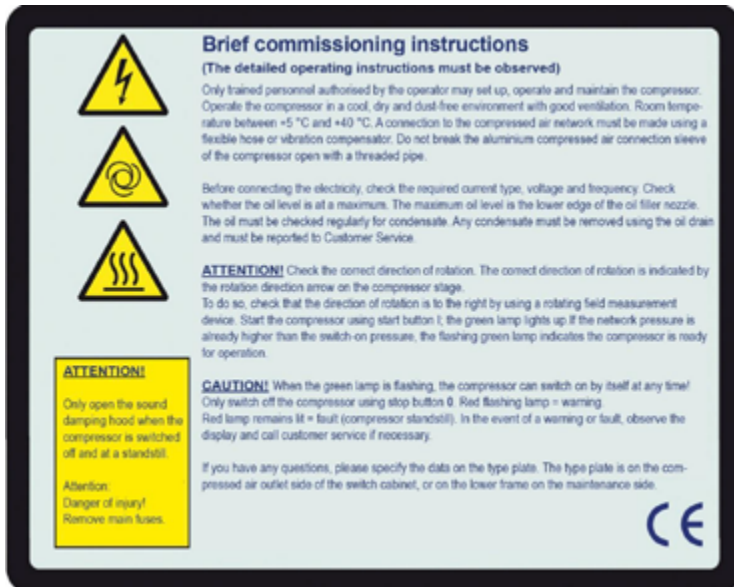
The sticker for re-lubrication is affixed to the drive unit.

- **Oil Filling**



The sticker for Oil filling is affixed to the oil tank and next to the installed controller.

- **Brief Commissioning Instructions**

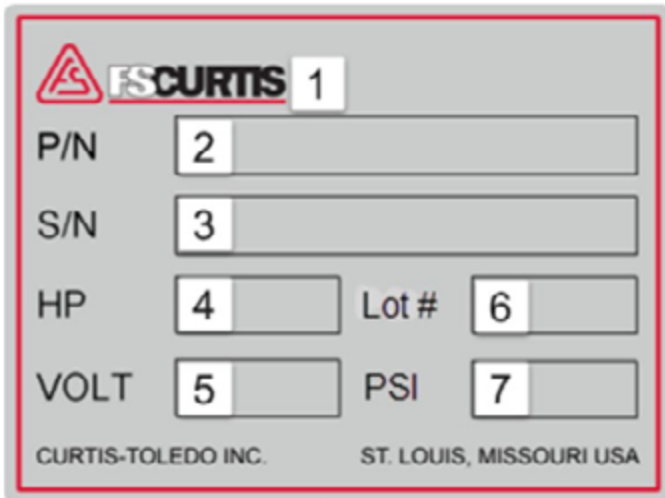


The sticker is affixed to the switch cabinet and contains brief commissioning instructions.



04. TECHNICAL DATA

4.1 - TYPE PLATE



The type plate is affixed to the rear of the system and contains the following information:

- License number
- Model
- Capacity
- Maximum pressure
- Motor power
- Net weight
- Dimensions
- Manufacturer no.
- Manufacture date

4.2 - GENERAL SPECIFICATIONS

TT05 - 50 Operating Conditions: Environment

Physical Variable	Value
Temperature Range	41° - 113 °F (5° - 45° C)
Maximum Relative Humidity	60%
Maximum Installation Altitude Above Sea Level	3,281 ft (1,000 m)

TT05 - 50 Operating Materials

Model	Lubricant	Oil Quantity (gal)
TT05	Oil	1.6
TT07	Oil	1.6
TT10	Oil	2.0
TT15	Oil	2.0
TT20	Oil	2.0
TT25	Oil	3.0
TT30	Oil	3.0
TT40	Oil	5.0
TT50	Oil	5.0



TT05 - 50 Air Supply and Cooling

Model	Compressed Air Outlet (G/DN)	Cooling Air Volume (CFM)
TT05	G 1/2	500 (850M3/H)
TT07	G 1/2	500 (850M3/H)
TT10	G 3/4	706 (1200M3/H)
TT15	G 3/4	706 (1200M3/H)
TT20	G 3/4	706 (1200M3/H)
TT25	G 1 1/4	3119 (5300M3/H)
TT30	G 1 1/4	3119 (5300M3/H)
TT40	G 1 1/2	6180 (10500M3/H)
TT50	G 1 1/2	6180 (10500M3/H)

TT05 - 50 Service Factor

Model	1/60/230V	3/60/230V	3/60/460V
TT05	27.5	17.7	8.8
TT07	34.6	22.9	11.5
TT10	—	28.2	14.2
TT15	—	40.9	20.5
TT20	—	61.0	30.4
TT25	—	74.4	37.1
TT30	—	83.8	41.9
TT40	—	115.0	57.5
TT50	—	138.8	69.4

TT05 - 50 Power and Dimensions

Model	Rated Motor Output (HP)	Base Mounted		Tank Mounted			Ultrapack		
		L x W x H (in)	Weight (lbs)	Tank (gal)	L x W x H (in)	Weight (lbs)	Tank (gal)	L x W x H (in)	Weight (lbs)
TT5	5	26 x 24 x 35	507	53	54 x 24 x 57	959	53	54 x 24 x 57	1012
TT7	7.5	26 X 24 X 35	529	53	54 x 24 x 57	981	53	54 x 24 x 57	1034
TT10	10	31 x 31 x 39	617	71	59 x 32 x 63	1234	71	59 x 32 x 63	1287
TT15	15	35 x 33 x 42	661	71	59 x 33 x 66	1279	71	59 x 33 x 66	1366
TT20	20	35 x 33 x 42	881	71	59 x 33 x 66	1500	71	59 x 33 x 66	1587
TT25	25	41 x 33 x 50	1102	—	—	—	—	—	—
TT30	30	41 x 33 x 50	1256	—	—	—	—	—	—
TT40	40	39 x 49 x 52	1873	—	—	—	—	—	—
TT50	50	39 x 49 x 52	1940	—	—	—	—	—	—



05. SCREW COMPRESSOR INSTALLATION

5.1 - SAFETY INSTRUCTIONS FOR INSTALLATION AND COMMISSIONING

- Electrical System



DANGER!

Danger to life due to electric current!

Danger to life in the event of contact with live components. Active electrical components may make uncontrolled movements and result in severe injuries or even death.

- Switch off the electric power and secure it against a restart before starting work.

- Improper Commissioning



WARNING!

Danger of injury due to improper commissioning!

Improper commissioning may result in serious injuries and considerable property damage.

- Ensure that all installation work has been performed and completed according to the information and instructions in these instructions before commissioning.
- Before commissioning, ensure that there is nobody in the danger area.

- Securing Against a Restart



WARNING!

Danger of fatal injury due to unauthorized restart!

Switching the power supply back on without authorization during installation presents a danger of severe injuries, or even death, for persons working in the danger zone.

- Switch off all power supplies and secure them against a restart before starting work.

- Improper Installation and Commissioning



WARNING!

Danger of injury due to improper installation and initial commissioning!

Improper installation and initial commissioning can cause serious injuries and considerable property damage.

- Before starting work, ensure sufficient installation space.
- Use caution when handling exposed sharp-edged components.
- Make sure that installation area is organized and clean! Loosely stacked components, or components and tools left lying around, are a source of accidents.



- Install components correctly. Comply with all specified screw tightening torques.
- Ensure components cannot be dropped or cannot fall over. - Prior to initial commissioning, observe the following:
 - Ensure that all installation work has been performed and completed according to the information and instructions included in these instructions.
 - Ensure that there is nobody in the danger area.

5.2 - REQUIREMENTS FOR THE INSTALLATION LOCATION

Set up the screw compressor so that the following conditions are complied with:

- The installation location is level.
- The stability of the machine is guaranteed.
- The machine is easily accessible and can be accessed from all sides.
- There is sufficient lighting.
- There is sufficient ventilation.
- A power supply is available.
- Escape routes and rescue equipment are freely accessible.
- The machine is not exposed to an explosive atmosphere.
- The machine is not exposed to a corrosive atmosphere.
- The machine is not exposed to direct sunlight.
- There is no external heat from surrounding sources of heat.
- No dust can accumulate.
- Fire protection measures have been taken.
- The machine is not exposed to vibrations.
- The surface is resistant to solvents, impermeable to liquids, is anti-static and easy to clean.
- There are no machines in the vicinity which cause electrical or electromagnetic interference,



5.3 - INSTALLATION

If the screw compressor is installed in a location which does not comply with the requirements and without specific planning, and operation starts as soon as the lines have been connected, this will, in most cases, be the cause of problems with maintenance as well as a poor quality of the compressed air generated by the screw compressor.

**NOTE!**

Choosing a suitable installation site is a requirement for proper use of the screw compressor system.

5.4 - INFORMATION ABOUT LINES AND THE FOUNDATION

Dangers Due to Mechanical Elements

- **Moving Parts**

**WARNING!*****Danger of injury due to moving components!***

Rotating parts or parts making linear motions can cause serious injuries.

- Never reach into moving parts or handle moving parts during operation.
- Do not open covers during operation.
- Be aware of the stop delay: Make sure that all parts have stopped moving before opening any covers.
- Wear close-fitting work clothing with low resistance to tearing in the danger area.

- **Sharp Edges and Pointed Corners**

**CAUTION!*****Danger of injury due to sharp edges and pointed corners!***

Sharp edges and pointed corners may cause grazing and cuts to the skin.

- Proceed with caution when working near sharp edges and pointed corners.
- If in doubt, wear protective gloves.



5.5 - GENERAL INFORMATION AND SAFETY INSTRUCTIONS IN RELATION TO ELECTRIC OPERATING MATERIALS

Dangers Due to Electric Energy

- Electric Power



DANGER!

Danger to life due to electric current!

Imminent risk of fatal injury from electric shock in the event of in contact with live parts. Damage to insulation or individual components can present a danger to life

- Any work on the electrical system must be performed by qualified electricians.
- In the event of damage to insulation, shut down power supply immediately and have repairs performed.
- Before working on active parts of electrical systems and equipment, always disconnect these from the mains supply and ensure they remain disconnected for the duration of the work. In doing so, observe the 5 safety rules:
 - Isolate from electrical supply.
 - Secure against restart.
 - Check for absence of voltage.
 - Ground and short-circuit.
 - Cover or shield any adjacent live parts.
- Never bypass fuses or disable fuses. When replacing fuses, observe the correct amperage.
- Protect energized parts from moisture. This could cause a short circuit.

- Stored Charges



DANGER!

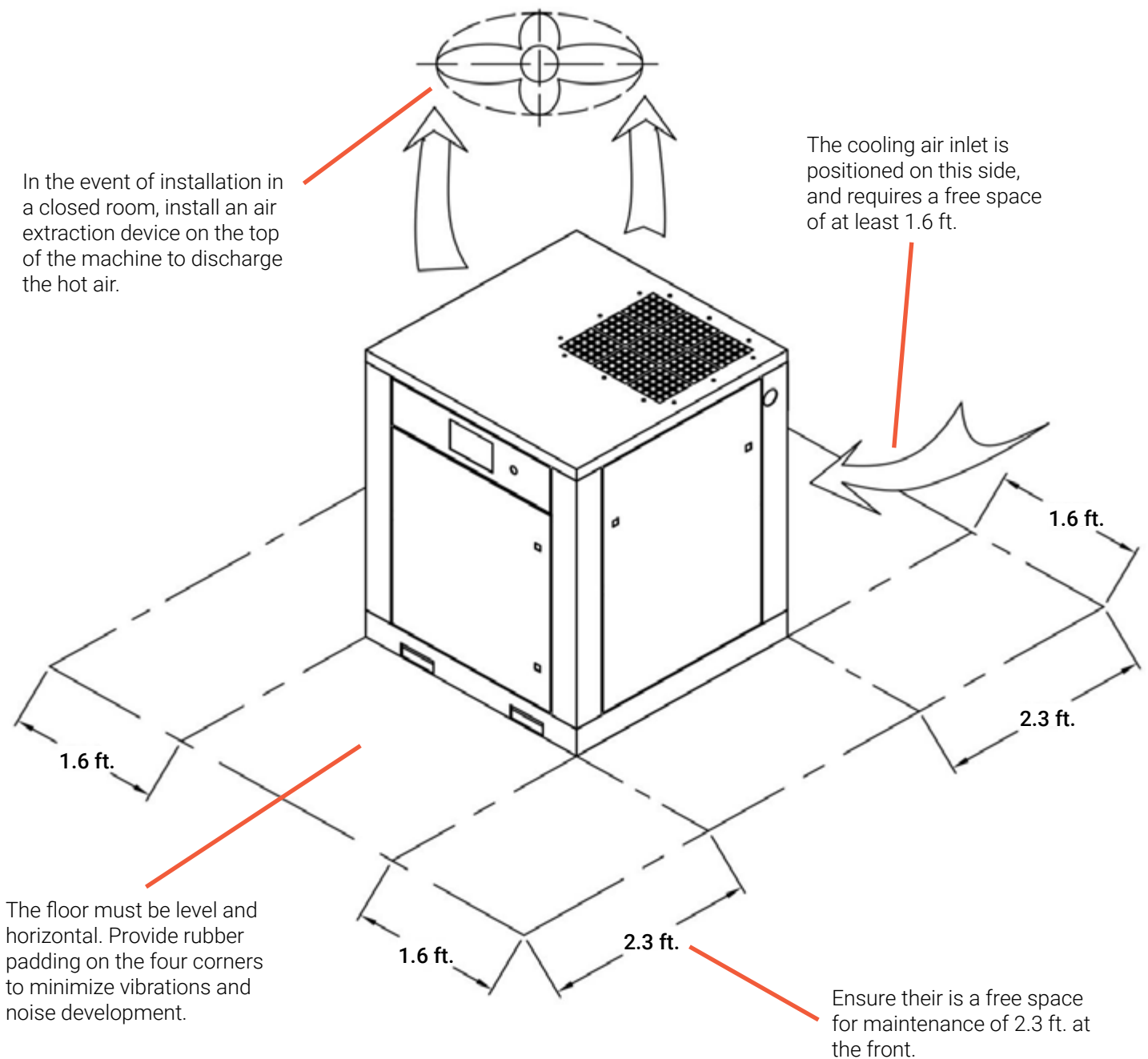
Danger to life due to stored charges!

Electric charges may be stored in electrical components; these charges may be retained even after the system has been switched off and disconnected from the power supply. Contact with these components may result in serious or fatal injury.

- Before working on the components named, ensure that they have been completely disconnected from the power supply. Allow 10 minutes to elapse in order to ensure that the internal capacitors have been fully discharged.



5.6 - SCHEMATIC DIAGRAM OF THE INSTALLATION REQUIREMENTS FOR THE SCREW COMPRESSOR





06. INTERFACES AND FUNCTION OF THE INDIVIDUAL COMPONENTS

6.1 - INTERFACES

Compressed Air Route

Dust is filtered from the intake air in the intake filter, and is then conducted through the intake regulator to the compressor stage, where it is compressed and mixed with the Oil. It flows from there to the Oil pressure tank. The compressed air enters the consumer network through the oil separator, the minimum pressure valve and the compressed air aftercooler.

Functional Description of the Individual Components in the Compressed Air Circuit

- 1. Intake Filter.** The intake filter is a dry filter made of paper. The maintenance interval is stored in the controller, and can be changed if ambient conditions vary.
- 2. Intake Regulator.** When the system pressure falls, the intake regulator ensures a new supply of air to the compressor.
- 3. Compressor Stage.** The intake air is compressed by the compressor stage and is conducted to the oil pressure tank together with the injected oil.
- 4. Drive.** The compressor stage is driven by an electric motor. This motor is installed on the base frame and drives the main rotor of the compressor stage by means of 2 belt discs with the corresponding transmission ratios.
- 5. Oil Pressure Tank.** The oil pressure tank is comprised of several components. The safety valve protects the oil pressure tank from overpressure. The inspection glass is used to check the oil level. The oil is topped up through the filler nozzle and removed through the oil drain. When at a standstill, the oil level must be between the upper and lower limit value in the inspection glass. Due to the large cross-section of the oil pressure tank, the flow rate of the oil–air mixture is reduced, and this is where the majority of the oil is separated from the compressed air.
- 6. Oil Separator.** The oil separator removes additional oil from the compressed air. The oil separator needs to be removed in specific time intervals. The maintenance interval is stored in the controller, and can be changed if ambient conditions vary.
- 7. Minimum Pressure and Non-return Valve.** The minimum pressure valve is installed above the oil–air tank and only opens when the system pressure increases to 65 PSIG. After switching off the screw compressor, the minimum pressure and non-return valve prevents the compressed air from flowing back out of the network.
- 8. Compressed Air Aftercooler.** The cooling air fan blows cold air through the cooling fins of the air cooler, thereby cooling the compressed air flowing through it. The cooling effect is highly dependent on the ambient temperature when cooling the air. Observe the ventilation conditions when choosing an installation location. If ambient conditions are not good, deposits of dust can quickly form on the air cooler fins, impairing the cooling effect. This can result in high compressed air final temperatures and, ultimately, to the system heating up. Make sure that the surface of the cooler remains clean.



6.2 - OIL INTERFACES

Oil Route

The oil is injected into the compressor stage together with the intake air. After compression, the compressed air, mixed with oil, enters the oil pressure tank. Most of the oil is separated here. The remaining air, which contains oil mist, passes the oil separator. More cooling liquid is separated here, and conveyed back to the oil pressure tank. Due to the pressure in the oil pressure tank, oil is pressed into the oil cooler, and cools down. Contaminants and particles are then removed in the oil filter. The oil flow is then split into two parts: one part is injected into the compression chamber through the bottom end of the system housing in order to cool the compressed air; the other part is used to lubricate the bearings on both ends of the system; both flows are then combined at the base of the compression chamber and discharged with the compressed air into the oil pressure tank.

Functional Description of the Individual Components in the Oil Circuit

- 1. Oil Cooler.** The oil cooler and the compressed air aftercooler function in the same cooling mode. The cooling air fan blows cold air through the cooling fins of the air cooler, thereby cooling the compressed air flowing through it. The cooling effect is highly dependent on the ambient temperature when cooling the air. Observe the ventilation conditions when choosing an installation location. If ambient conditions are not good, deposits of dust can quickly form on the air cooler fins, impairing the cooling effect. This can result in high compressed air final temperatures and, ultimately, to the system overheating. This is why the cooler fins need to be cleaned regularly. Make sure that the surface of the cooler remains clean.
- 2. Intake Regulator.** The oil filter is a paper filter that can filter contaminants out of the oil, such as metal particles. A mesh size of 10 μm ensures bearings and rotors are protected reliably. If the oil filter is not replaced as specified in the maintenance table, there is a danger of an insufficient flow rate of oil, high compressed air final temperatures and a shutdown of the system. The service life of the bearings may also be impaired by an insufficient oil volume.
- 3. Oil Separator.** The filter element of the oil separator is comprised of multiple layers of fine fiberglass, allowing the proportion of oil mist in the compressed air to be reduced significantly after passing the oil separator. The quality of the Oil and the degree of contamination of the ambient air have a large impact on its service life. Only the oil for screw compressors that we recommend may be used as a oil.

The oil filtered by the oil separator is collected in the small, round cavity in the middle, and is conveyed back to the compressor stage through a oil return line.
- 4. Oil Temperature Regulator.** There is a thermoregulation valve in front of the oil cooler. The oil temperature is low shortly after starting up the system. The thermoregulation valve then automatically opens the return circuit, allowing oil to flow into the system without passing the oil cooler. If the oil temperature increases to more than 152 °F, this valve opens slowly until it is fully open at 162 °F. The entire oil then passes the oil cooler first before flowing into the system.



07. PROTECTIVE AND WARNING DEVICES

7.1 - MOTOR OVERLOAD PROTECTION

There are two electric motors in the screw compressor – a main drive motor and a motor for the cooling air fan. When the operating current exceeds the set upper limit for the protective device under normal operating conditions, the overload protection device automatically shuts down the power supply. After shutdown, the screw compressor starts up again automatically if it has not otherwise been reset by pressing the reset switch manually. The current protection device is set at the factory, and this is very important for protection when the compressor is operating normally. These settings must not be changed without authorization.

If a motor overload occurs during operation, please contact your service partner immediately. Otherwise there is a danger of further damage.

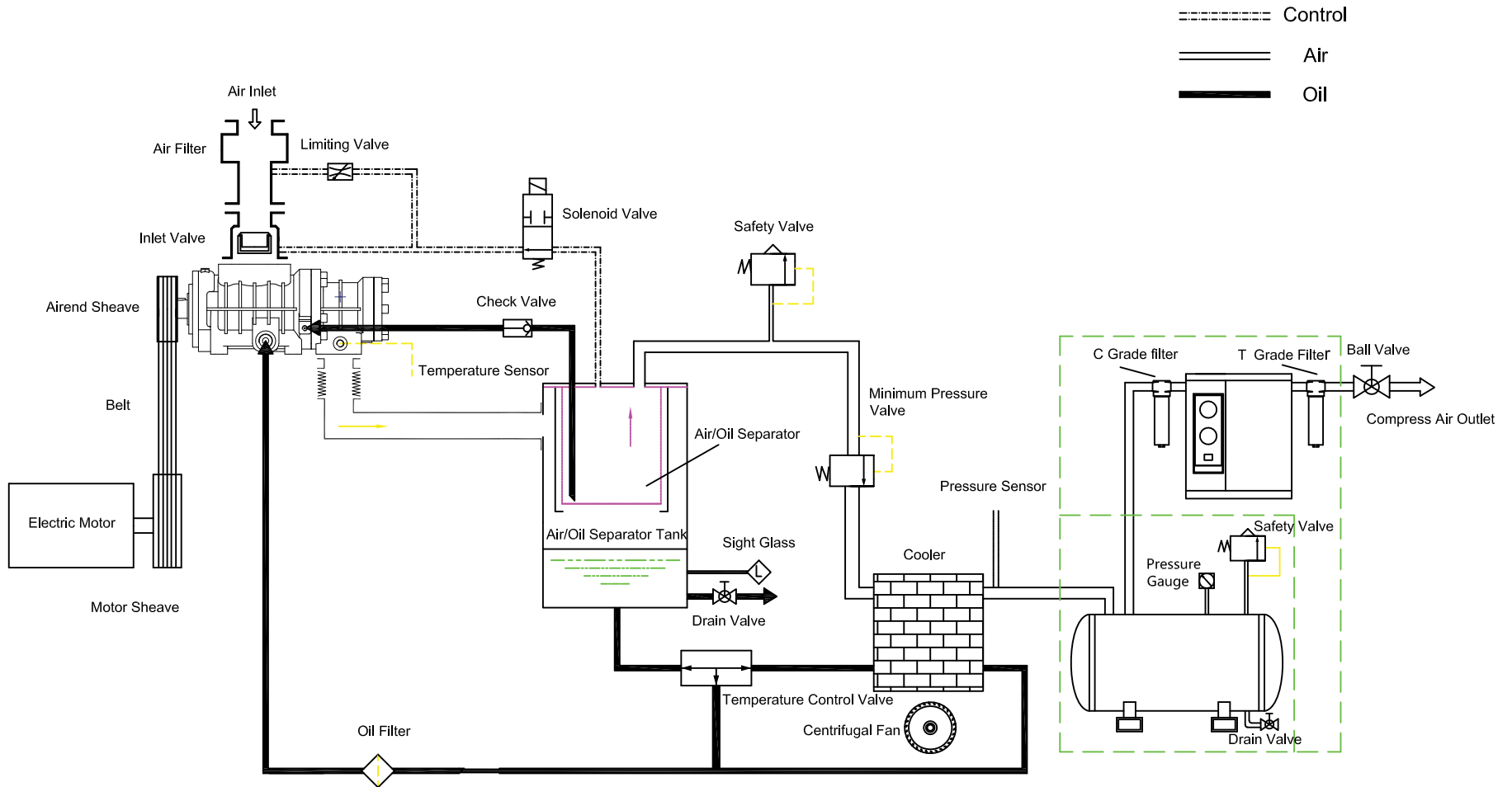
7.2 - COMPRESSED AIR FINAL TEMPERATURE – EXCESS TEMPERATURE PROTECTION

The maximum compressed air final temperature of the system totals 203 °F. At temperatures above this value, the display will flash and an alarm is triggered. If the temperature exceeds 212 °F, the system automatically shuts down the power supply. There are many possible reasons for an excessively high temperature at the compressed air outlet, with the most frequent being a high level of contaminants in the oil cooler. When the fins of the oil cooler are dusty, the cold air can no longer pass the cooler freely, and the temperature gradually increases and causes the system to shut down after reaching the corresponding value. This is why the fins need to be cleaned in short intervals.

The maximum ambient temperature of the screw compressor totals 113 °C. Consequently, an installation location with a low ambient temperature and good ventilation must be chosen whenever possible. If the excess temperature protection is tripped, the start circuit of the system is stopped; pressing the reset button allows the system to be restarted.

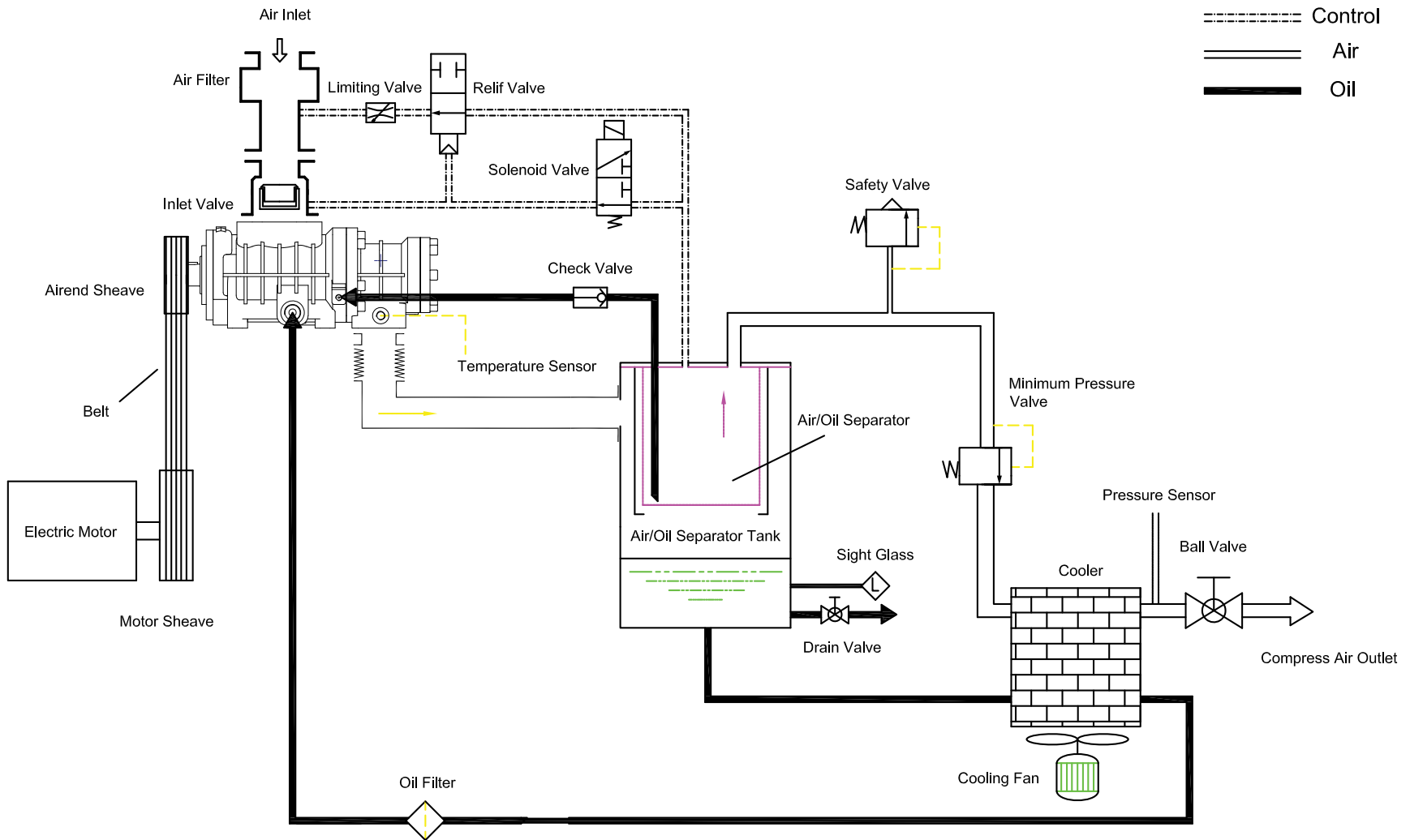
08. PIPING AND INSTRUMENT DIAGRAMS

8.1 - TT05 - TT20 - PIPING AND INSTRUMENT DIAGRAM





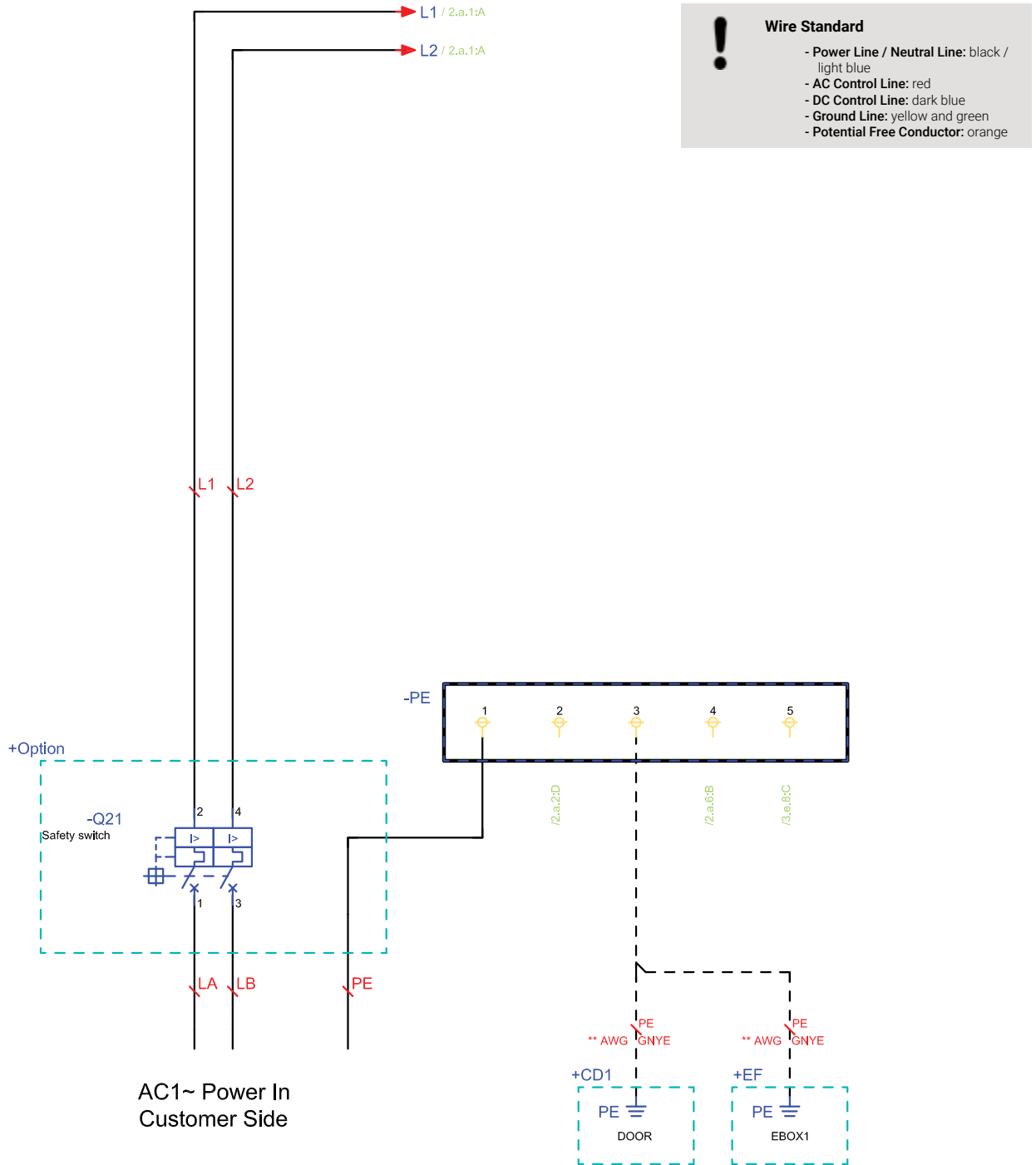
8.2 - TT25 - TT50 - PIPING AND INSTRUMENT DIAGRAM

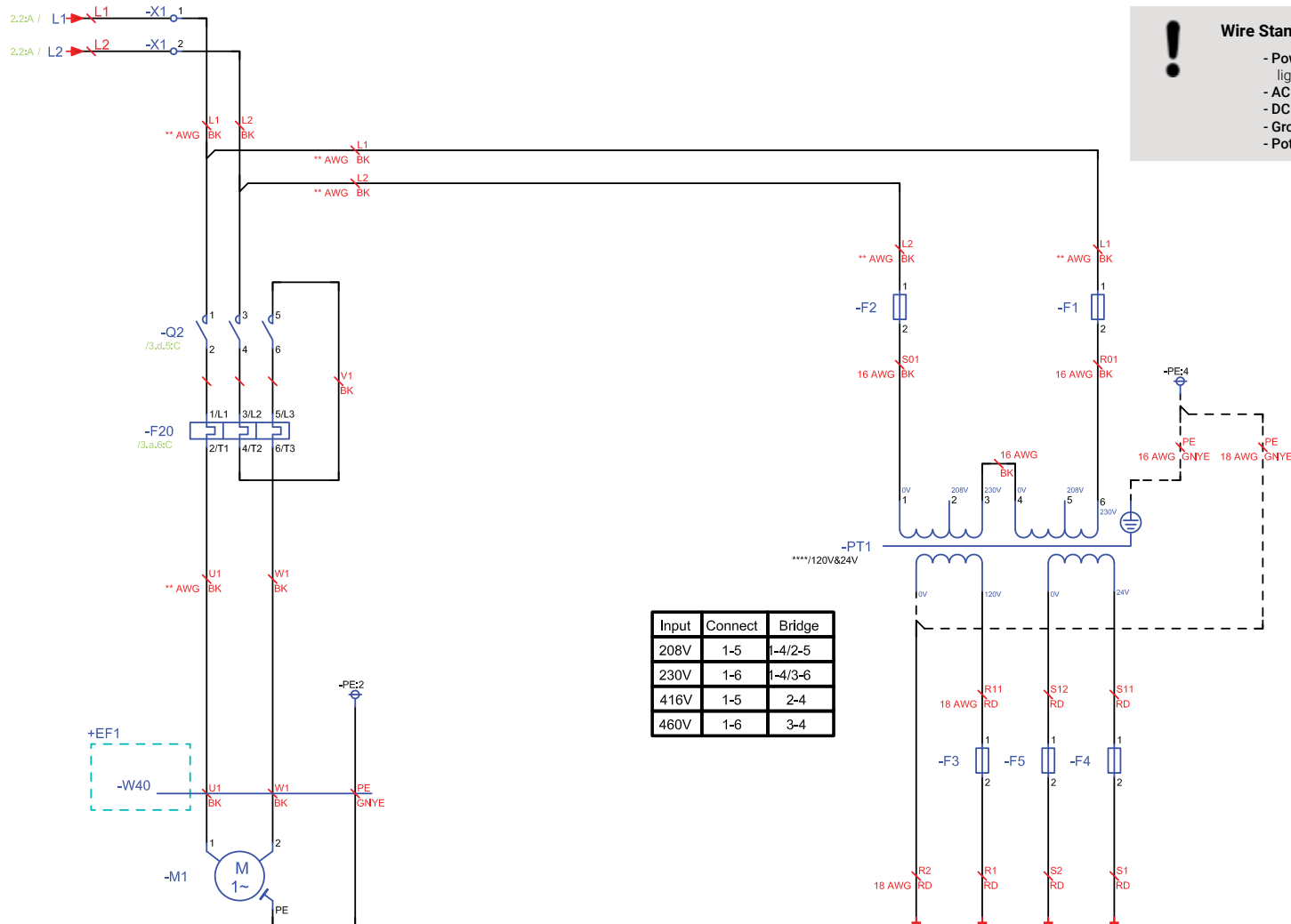




09. ELECTRICAL CIRCUIT DIAGRAM

9.1 - TT05 - TT07 - SINGLE PHASE





Wire Standard

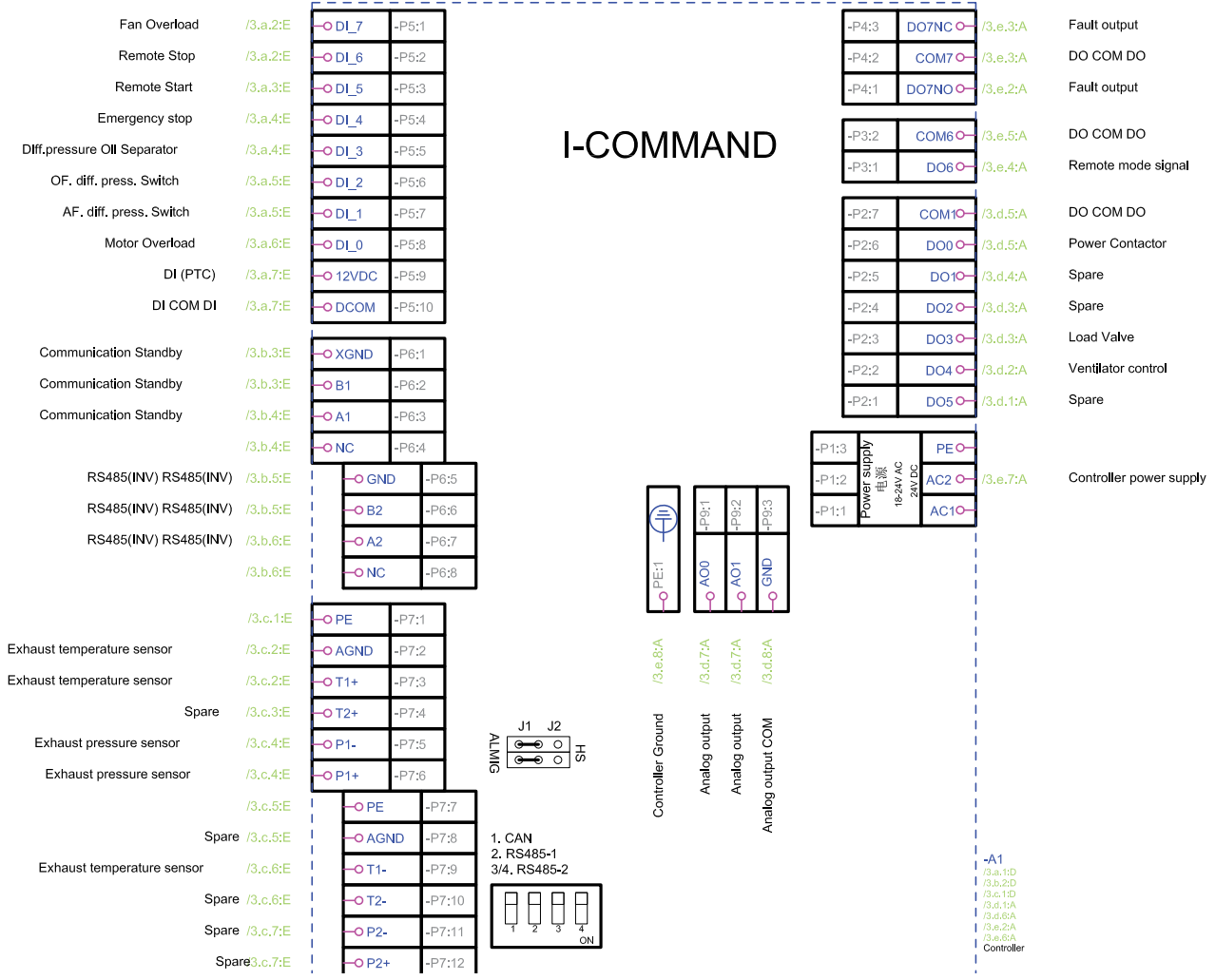
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

Input	Connect	Bridge
208V	1-5	1-4/2-5
230V	1-6	1-4/3-6
416V	1-5	2-4
460V	1-6	3-4



Wire Standard

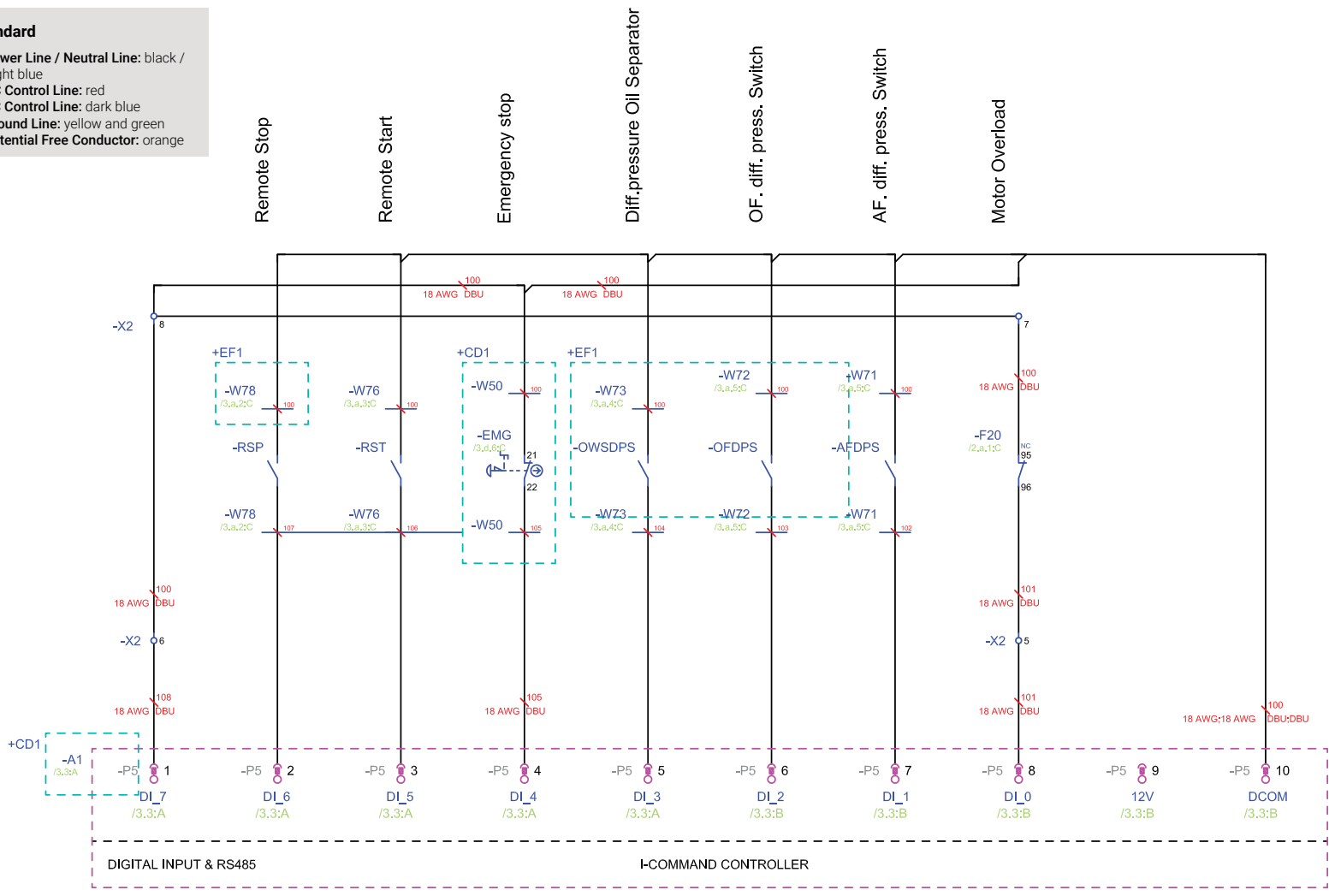
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange





! **Wire Standard**

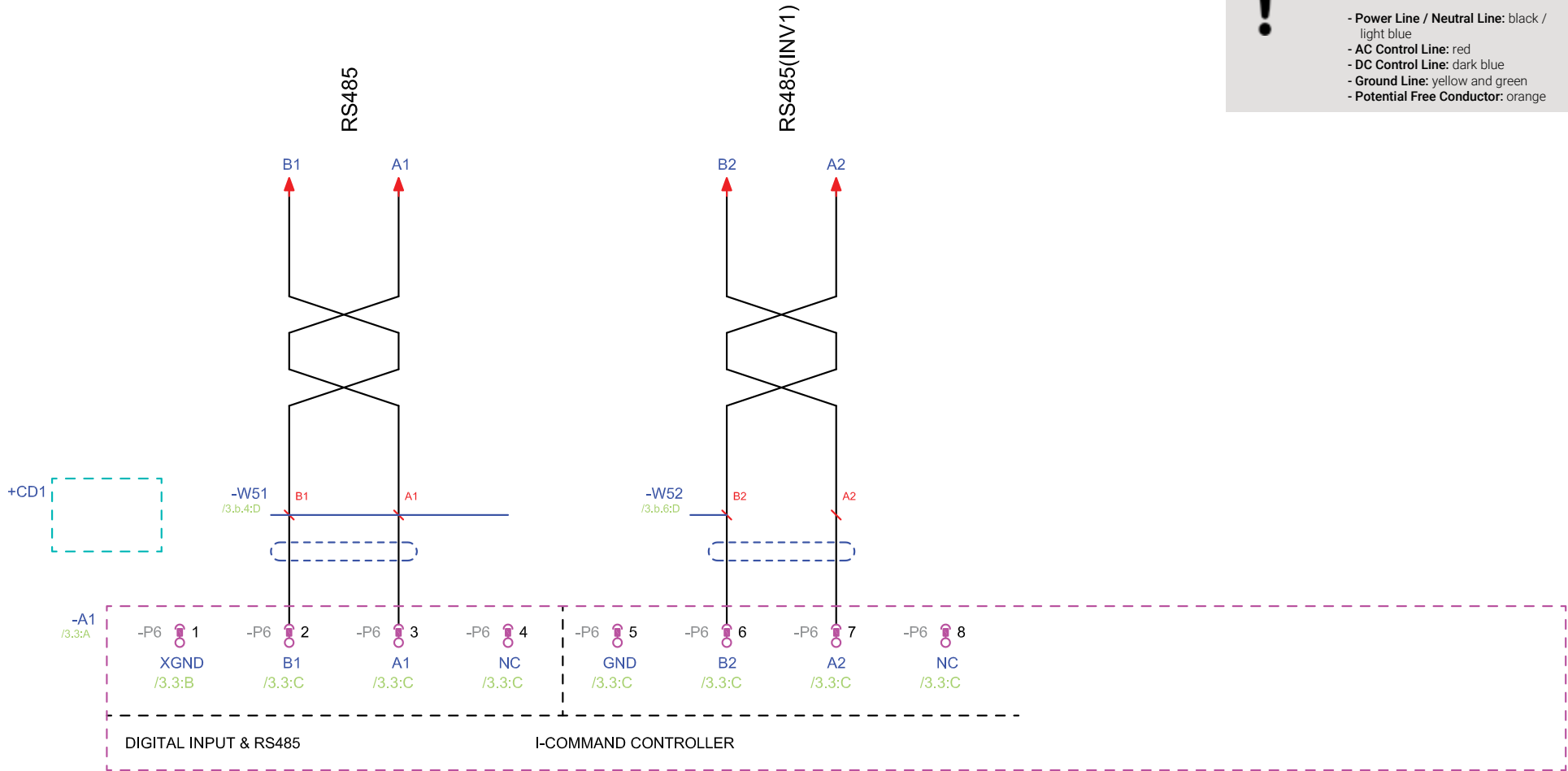
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

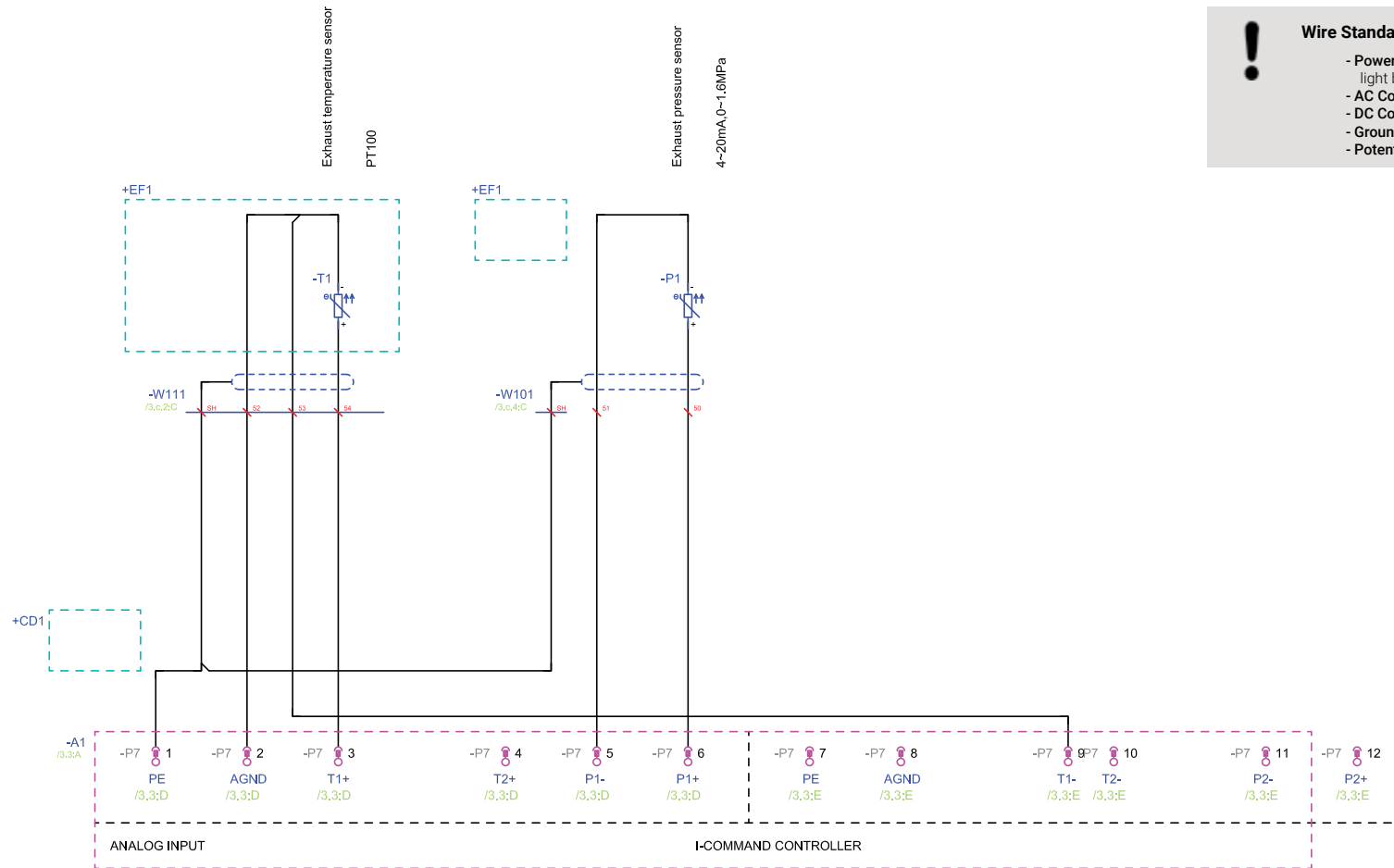




! **Wire Standard**

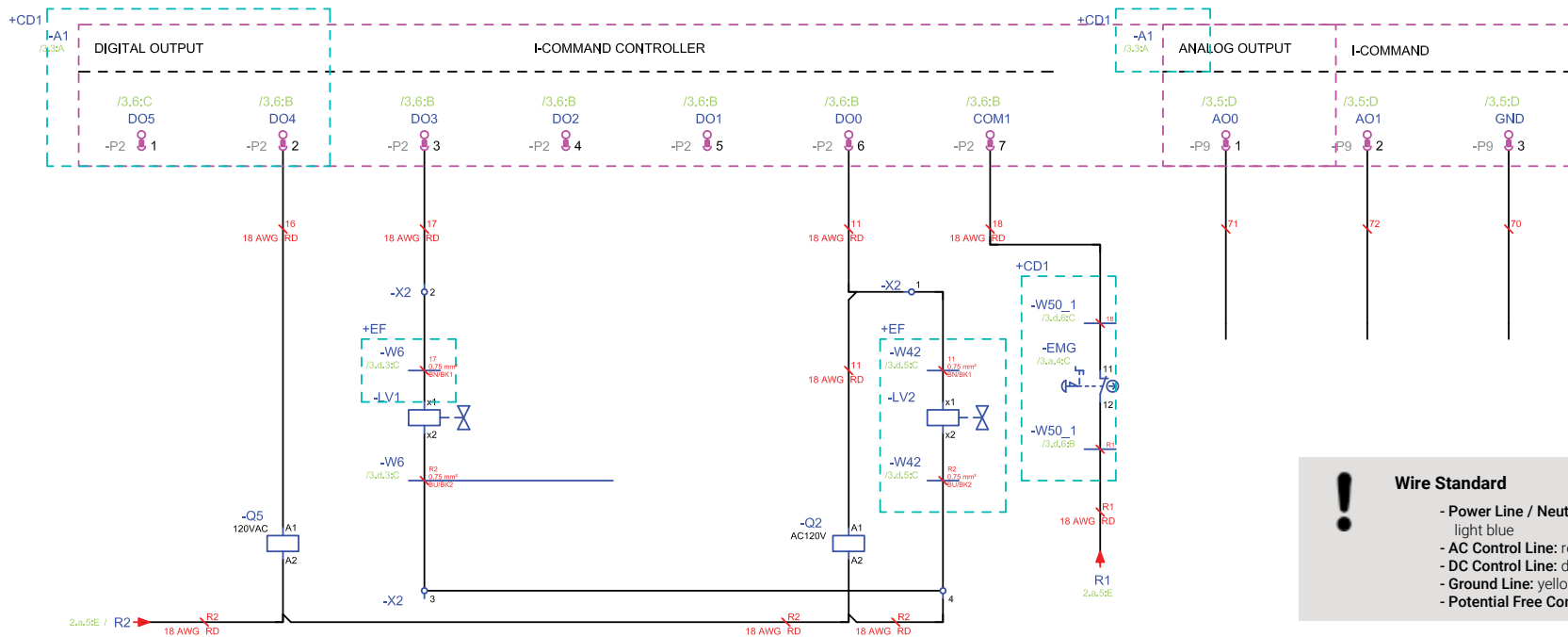
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange





! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



! Wire Standard

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

Ventilator

Load Valve

Power Contactor

Oil Return Valve

Emergency stop

Analog output

Ventilator converter command

Analog output

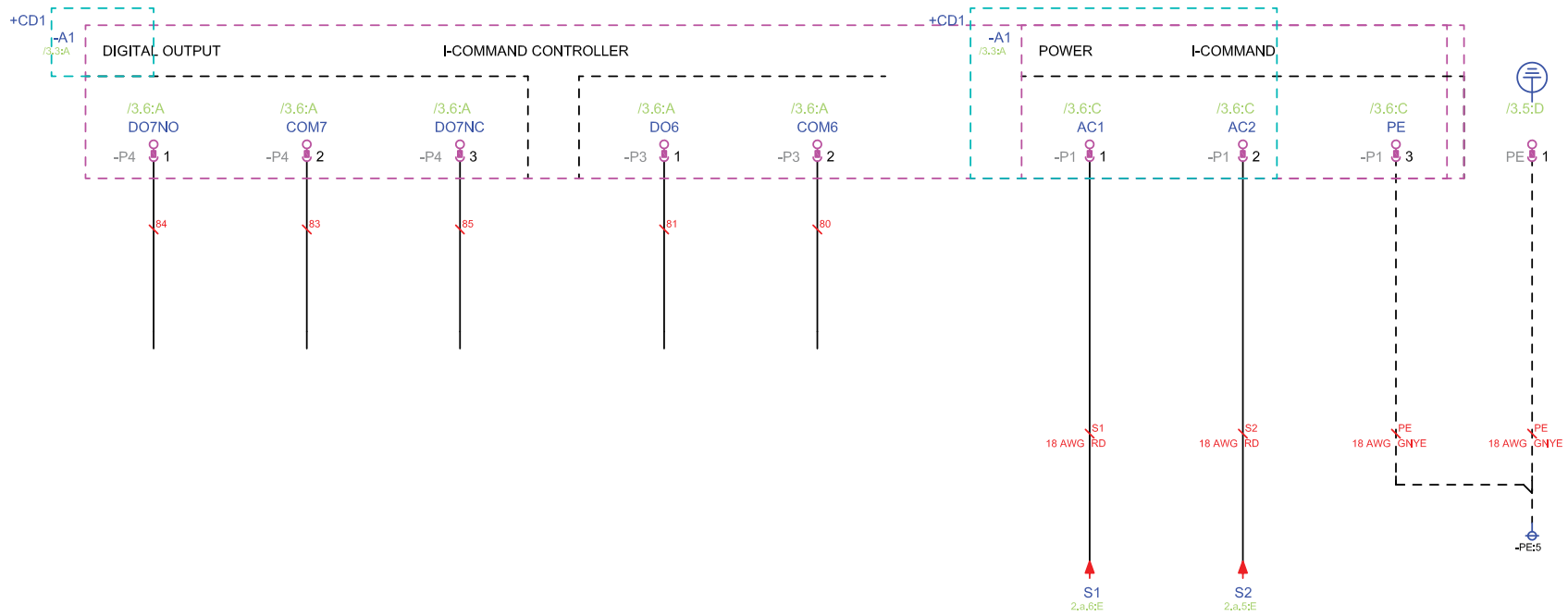
Main converter command





! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



Fault output

Remote mode signal

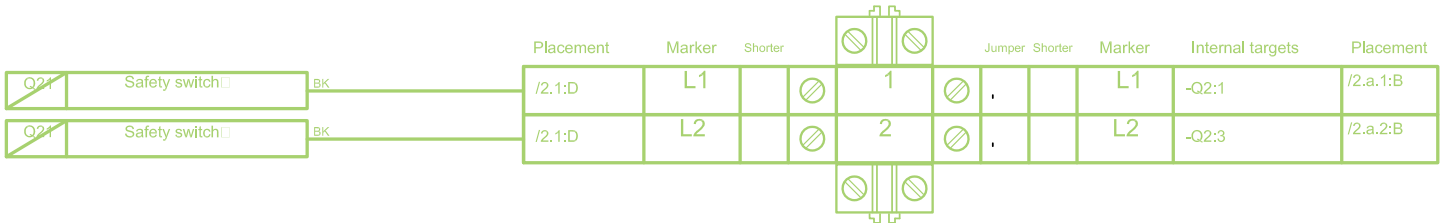
Controller power supply



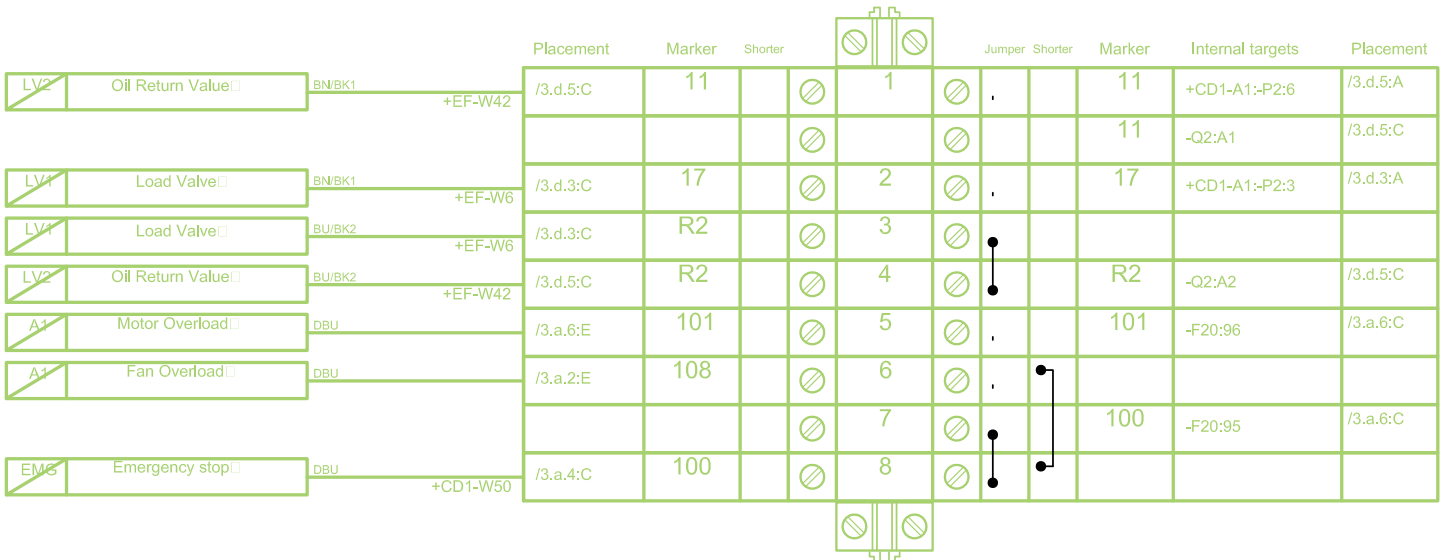
! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

Terminal strip
=AB+CD-X1

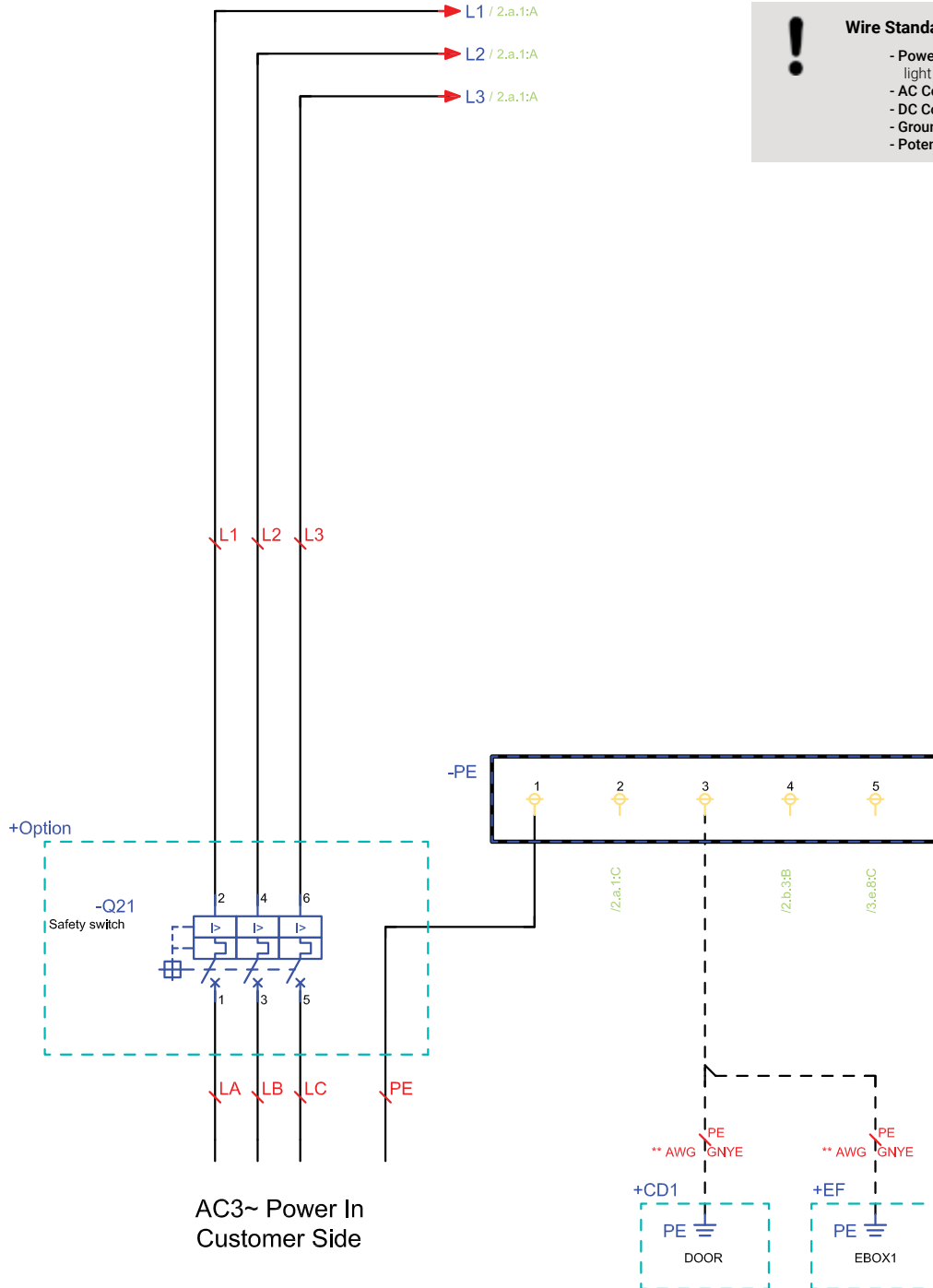


Terminal strip
=AB+CD-X2



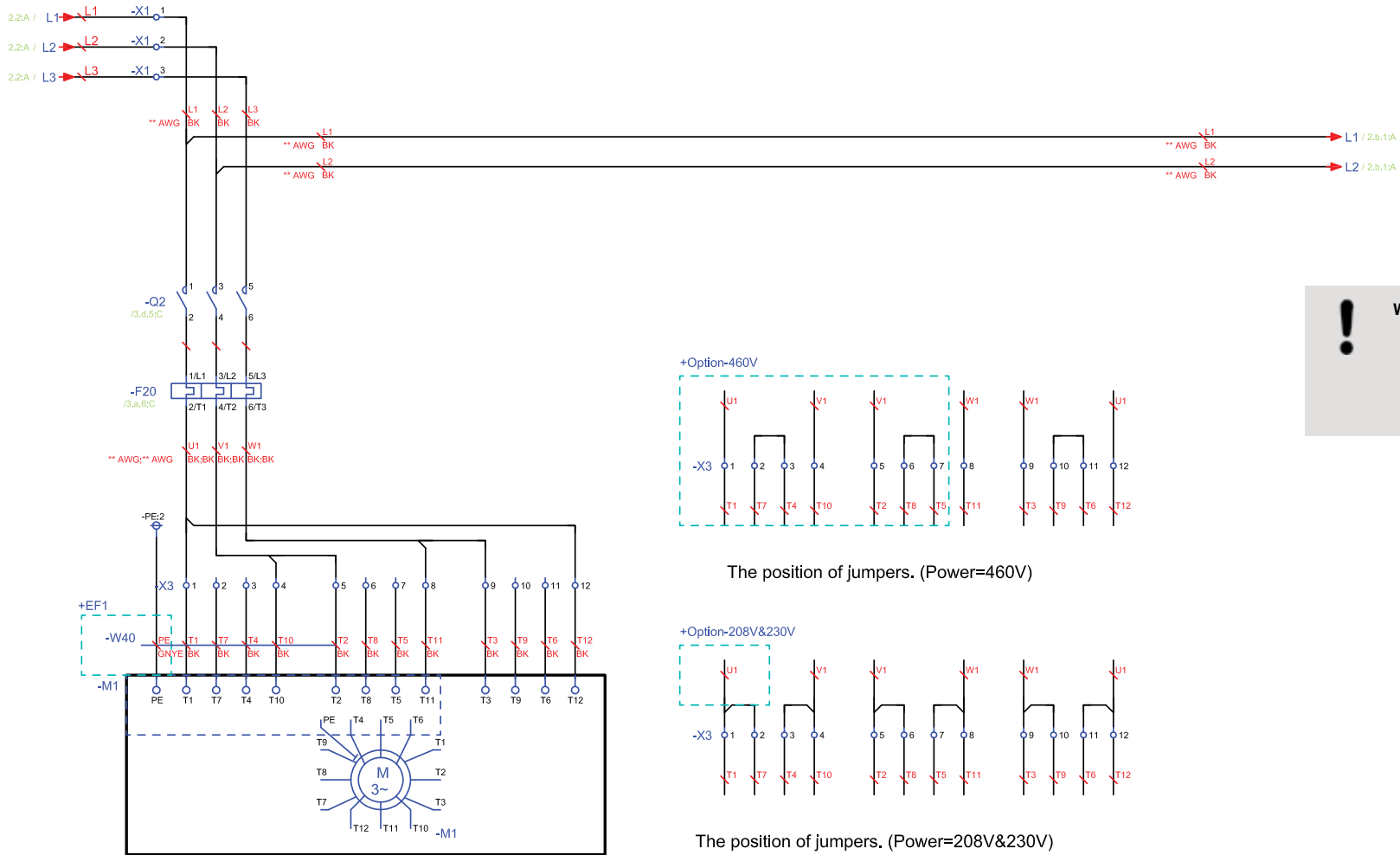


9.2 - TT05 - TT07 - 3 PHASE (DOL)



! Wire Standard

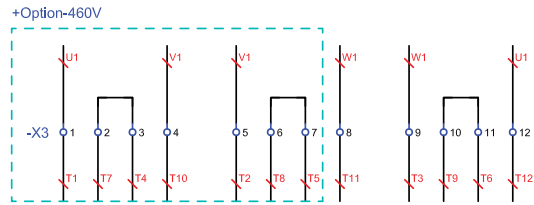
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



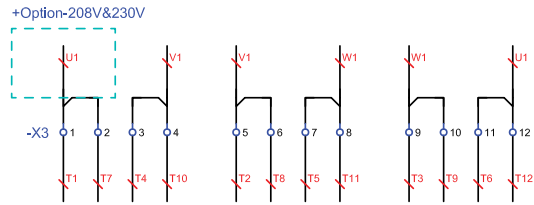
Main Motor

! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



The position of jumpers. (Power=460V)



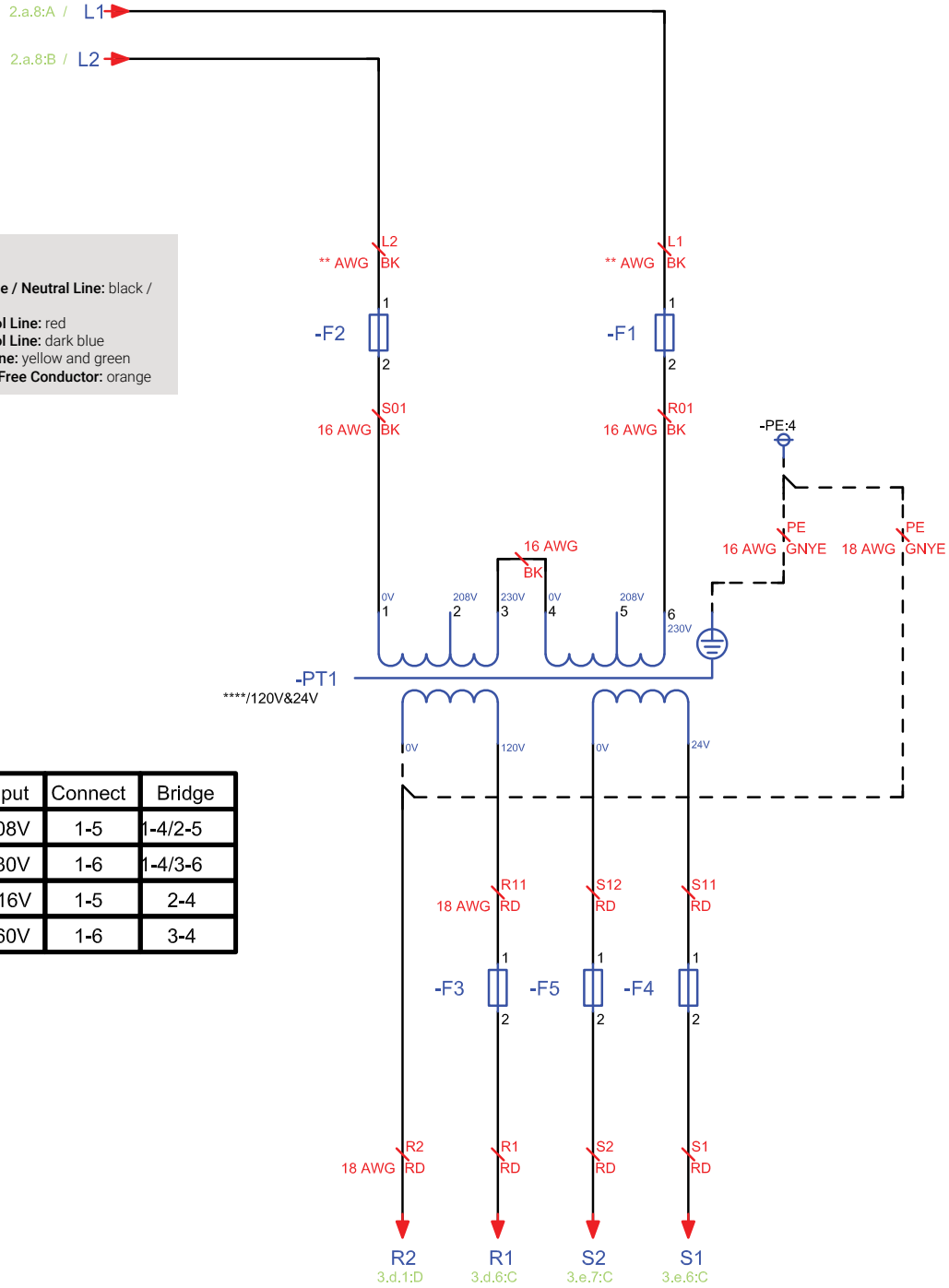
The position of jumpers. (Power=208V&230V)



! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

Input	Connect	Bridge
208V	1-5	1-4/2-5
230V	1-6	1-4/3-6
416V	1-5	2-4
460V	1-6	3-4

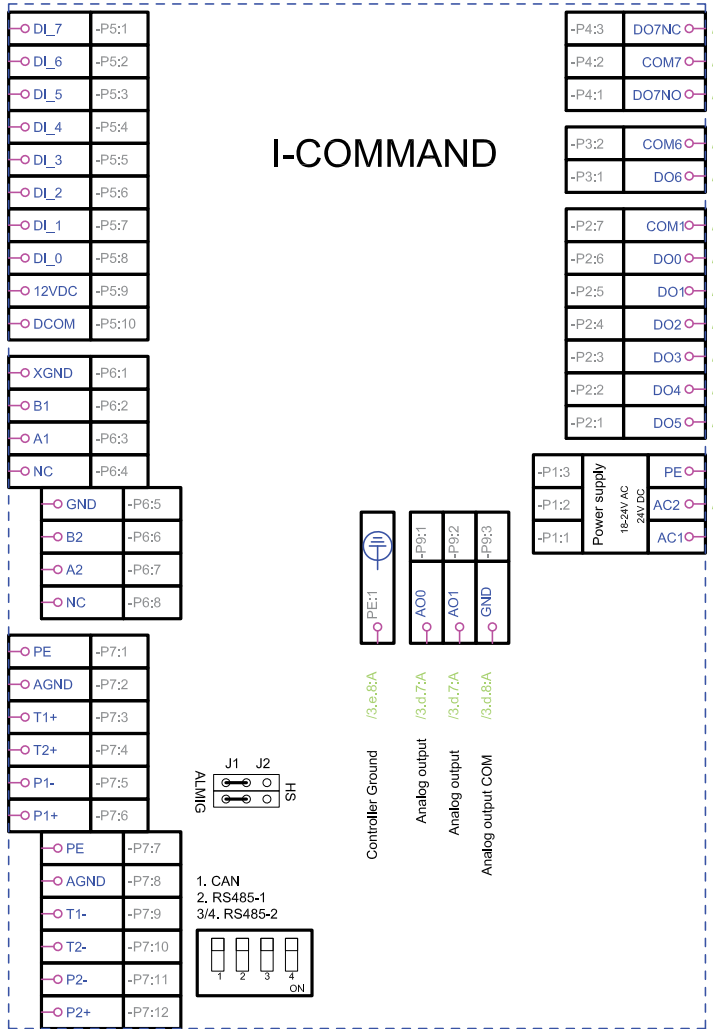


Transformer



+CD1

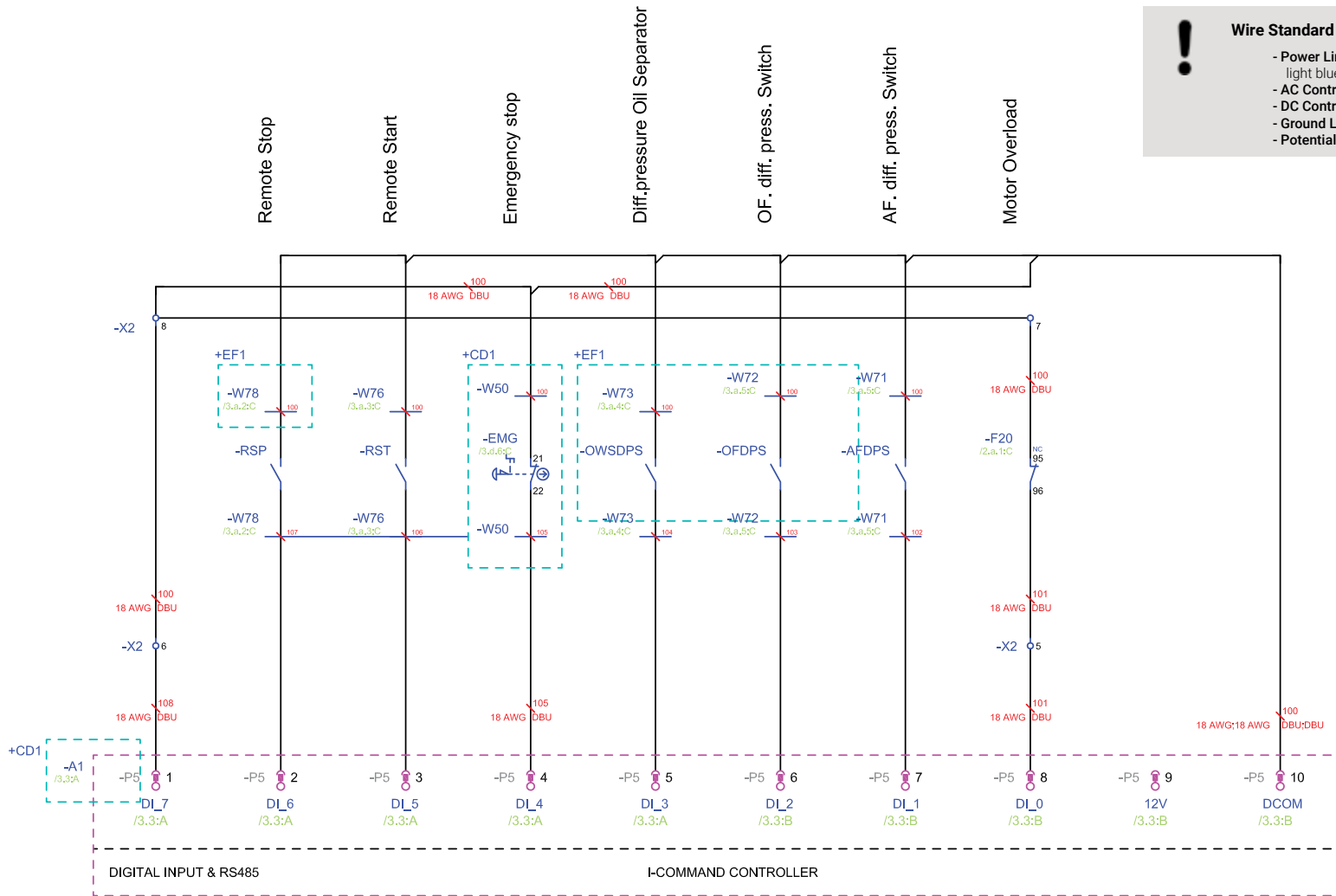
- Fan Overload /3.a.2:E
- Remote Stop /3.a.2:E
- Remote Start /3.a.3:E
- Emergency stop /3.a.4:E
- Diff.pressure Oil Separator /3.a.4:E
- OF, diff. press. Switch /3.a.5:E
- AF, diff. press. Switch /3.a.5:E
- Motor Overload /3.a.6:E
- DI(PTC) /3.a.7:E
- DI COM DI /3.a.7:E
- Communication Standby /3.b.3:E
- Communication Standby /3.b.3:E
- Communication Standby /3.b.4:E
- Communication Standby /3.b.4:E
- RS485(INV) RS485(INV) /3.b.5:E
- RS485(INV) RS485(INV) /3.b.5:E
- RS485(INV) RS485(INV) /3.b.6:E
- RS485(INV) RS485(INV) /3.b.6:E
- Exhaust temperature sensor /3.c.1:E
- Exhaust temperature sensor /3.c.2:E
- Exhaust temperature sensor /3.c.2:E
- Spare /3.c.3:E
- Exhaust pressure sensor /3.c.4:E
- Exhaust pressure sensor /3.c.4:E
- Spare /3.c.5:E
- Spare /3.c.5:E
- Exhaust temperature sensor /3.c.6:E
- Spare /3.c.6:E
- Spare /3.c.7:E
- Spare /3.c.7:E



- Fault output
- DO COM DO
- Fault output
- DO COM DO
- Remote mode signal
- DO COM DO
- Power Contactor
- Spare
- Spare
- Load Valve
- Ventilator control
- Spare
- Controller power supply

Wire Standard

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



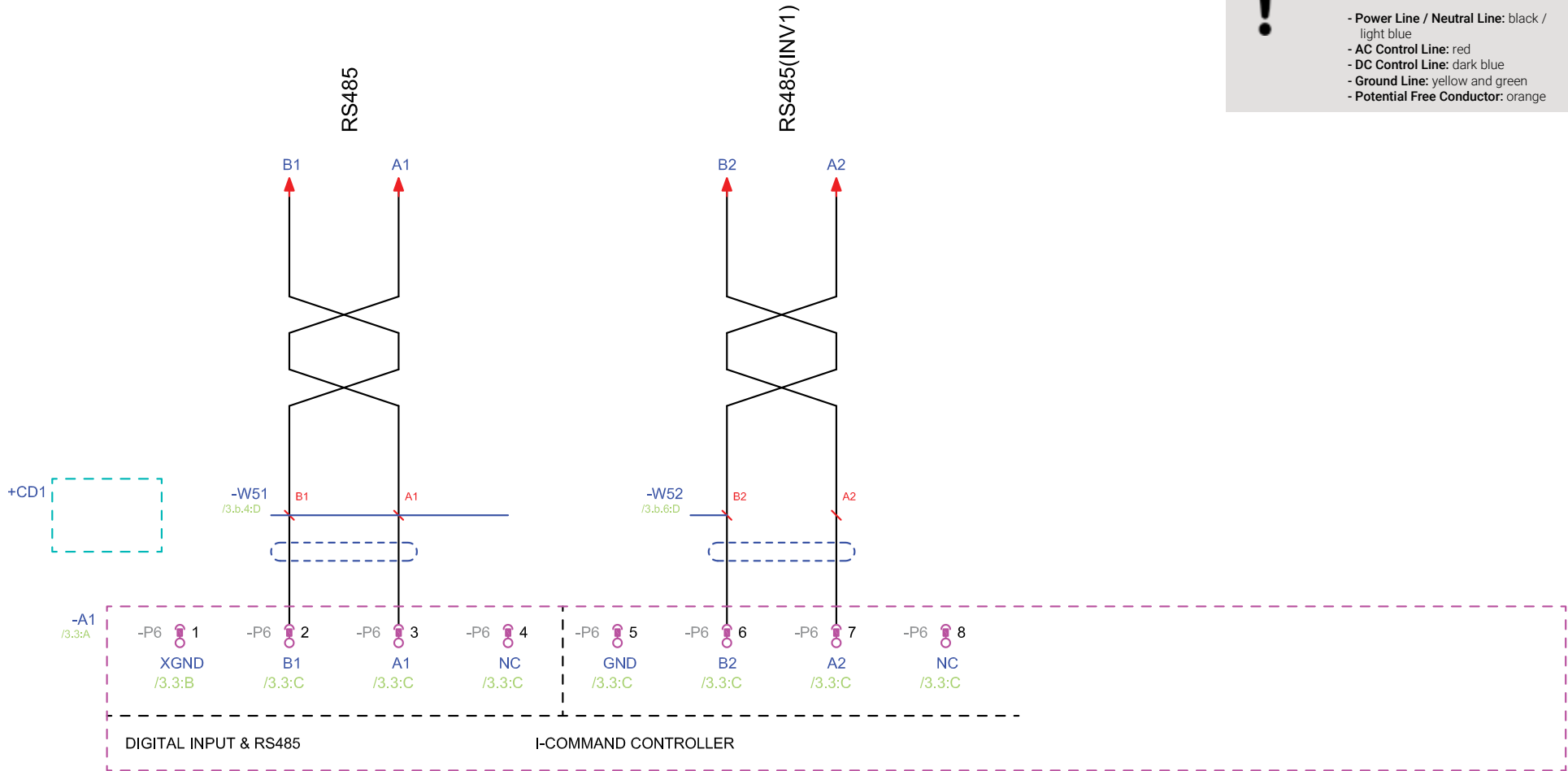
Wire Standard

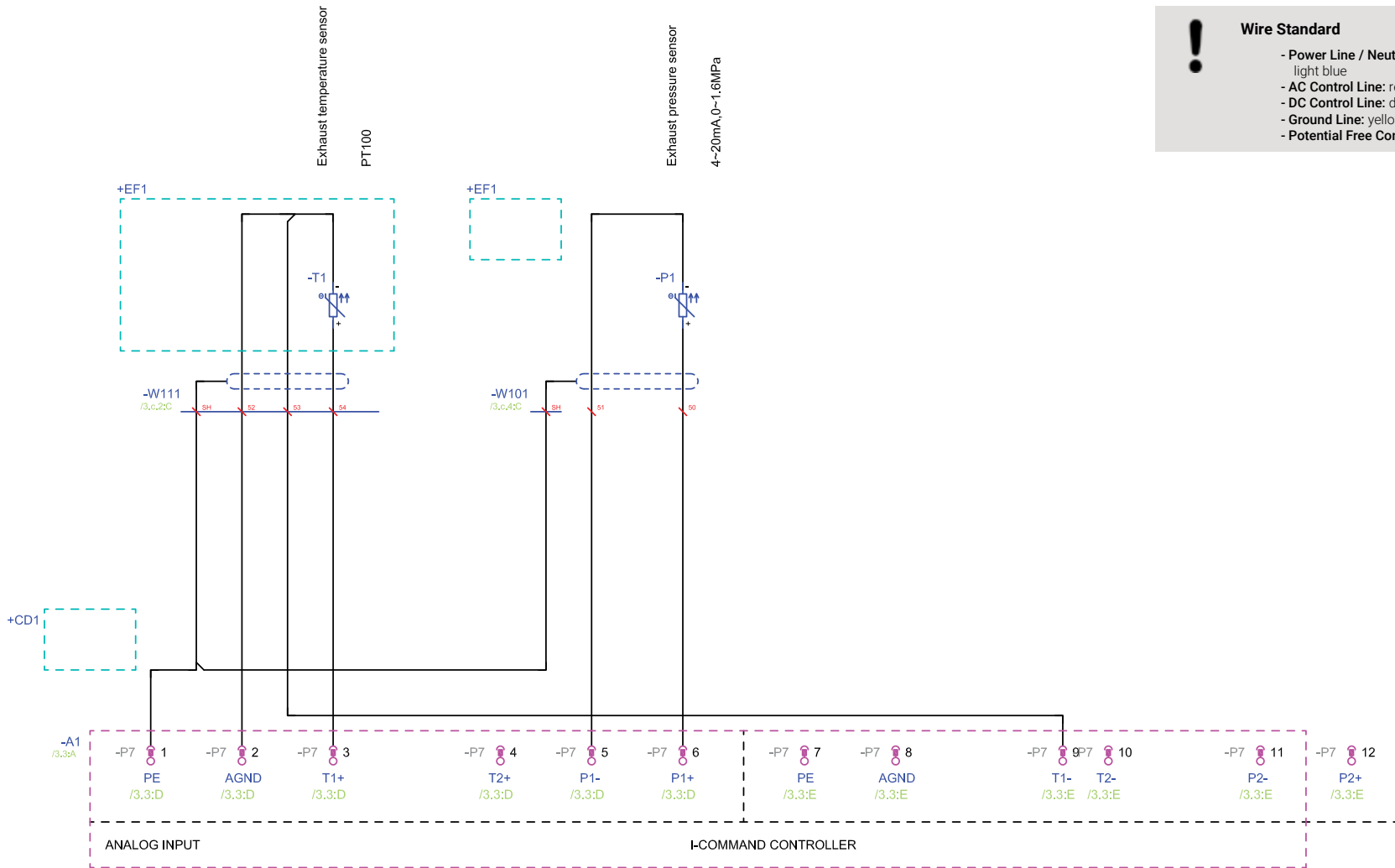
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



! **Wire Standard**

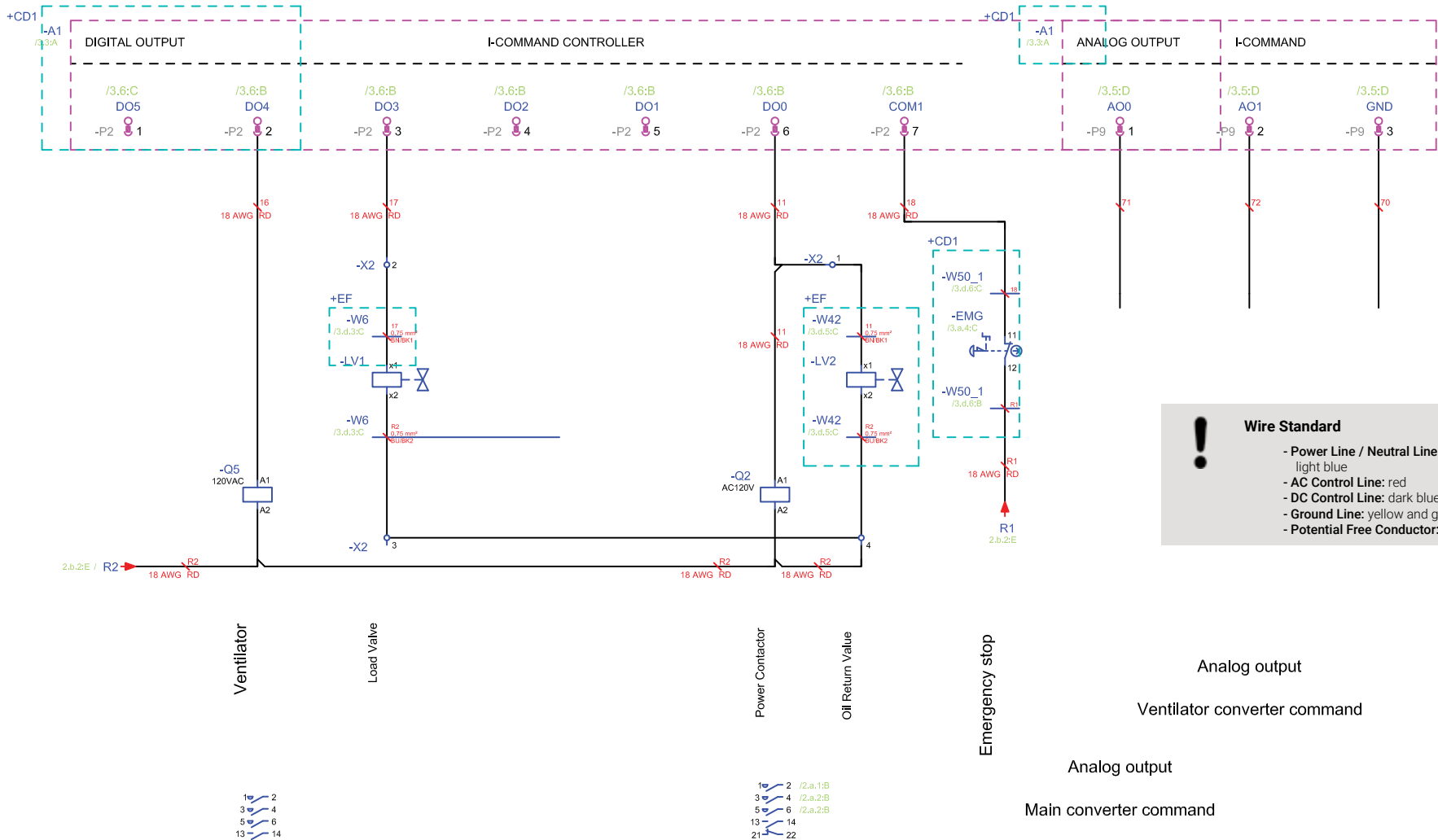
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

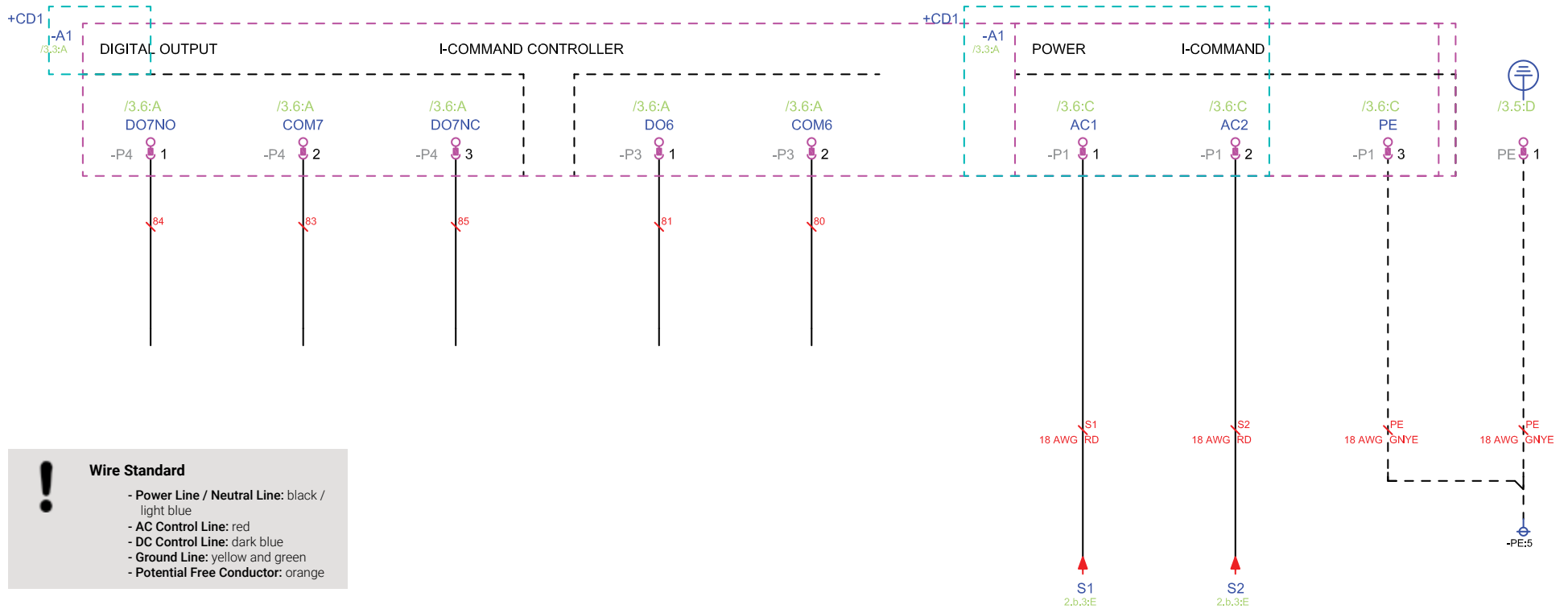




! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange





Fault output

Remote mode signal

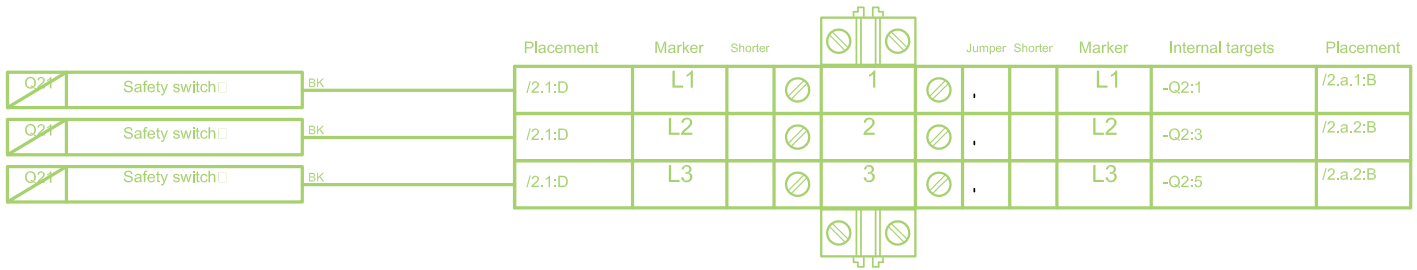
Controller power supply

! **Wire Standard**

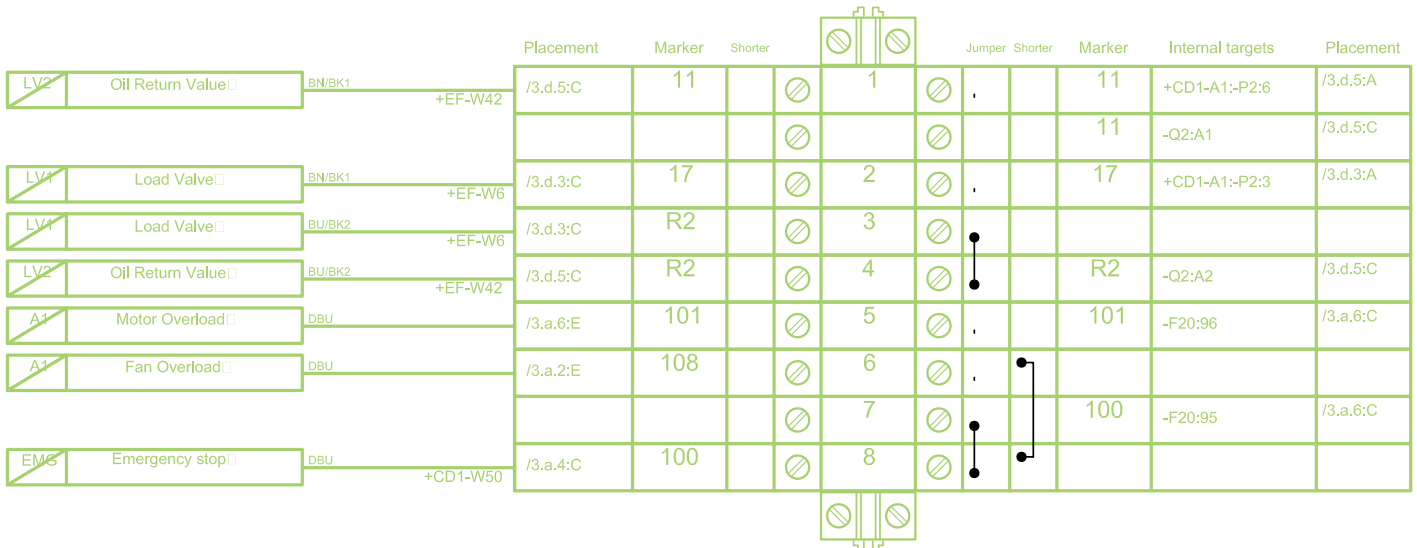
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



Terminal strip
=AB+CD-X1



Terminal strip
=AB+CD-X2





! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

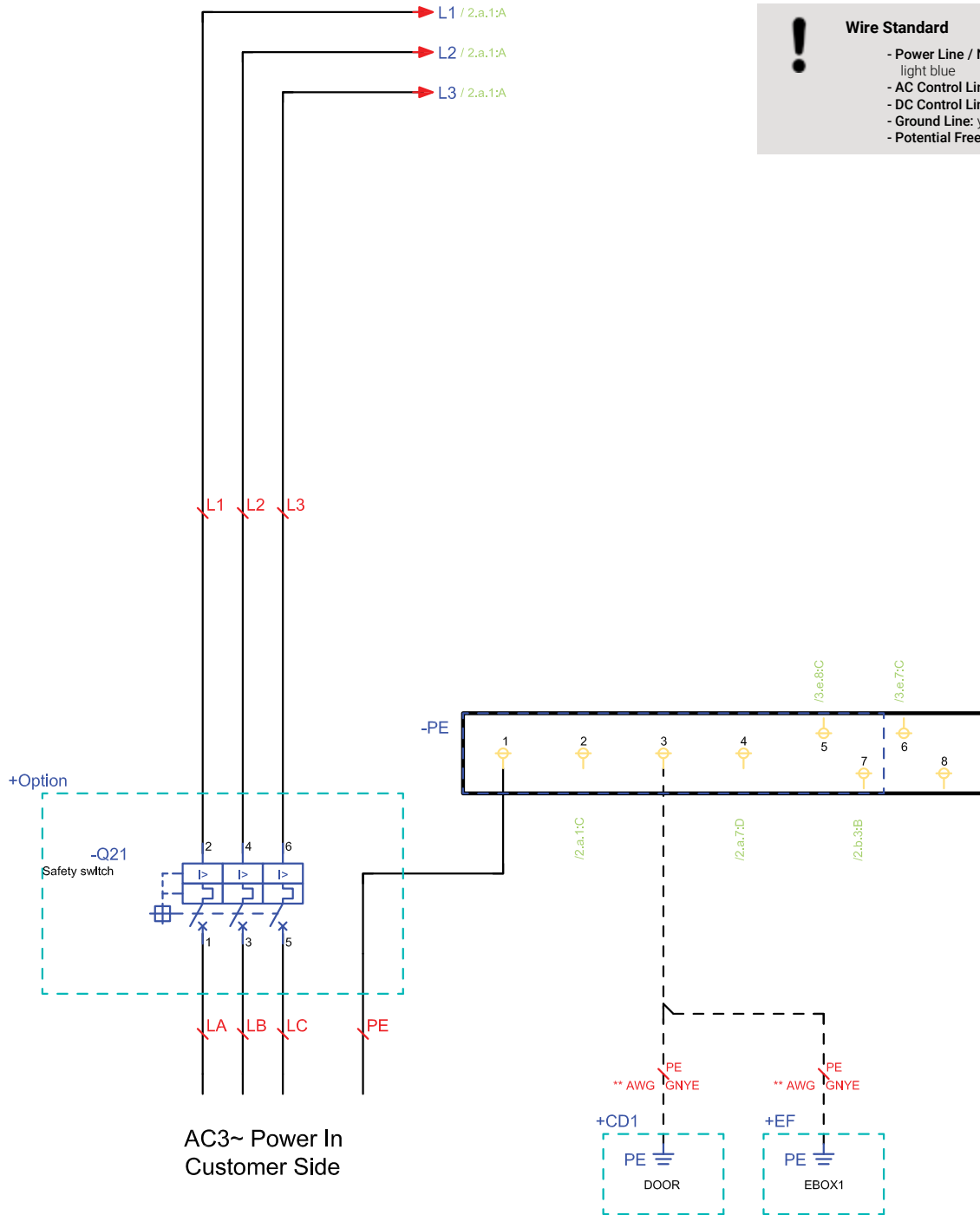


Terminal strip
=AB+CD-X3

		Placement	Marker	Shorter		Jumper	Shorter	Marker	Internal targets	Placement
M1	BK	+EF1-W40	/2.a.1:D	T1	1			U1	-F20:2/T1	/2.a.1:C
M1	BK	+EF1-W40	/2.a.2:D	T7	2					
M1	BK	+EF1-W40	/2.a.2:D	T4	3					
M1	BK	+EF1-W40	/2.a.2:D	T10	4			V1	-F20:4/T2	/2.a.1:C
M1	BK	+EF1-W40	/2.a.2:D	T2	5			V1	-F20:4/T2	/2.a.1:C
M1	BK	+EF1-W40	/2.a.2:D	T8	6					
M1	BK	+EF1-W40	/2.a.3:D	T5	7					
M1	BK	+EF1-W40	/2.a.3:D	T11	8			W1	-F20:6/T3	/2.a.1:C
M1	BK	+EF1-W40	/2.a.3:D	T3	9			W1	-F20:6/T3	/2.a.1:C
M1	BK	+EF1-W40	/2.a.3:D	T9	10					
M1	BK	+EF1-W40	/2.a.3:D	T6	11					
M1	BK	+EF1-W40	/2.a.3:D	T12	12			U1	-F20:2/T1	/2.a.1:C

Terminal-connection diagram

9.3 - TT10 - TT50 - 3 PHASE (Y-D)

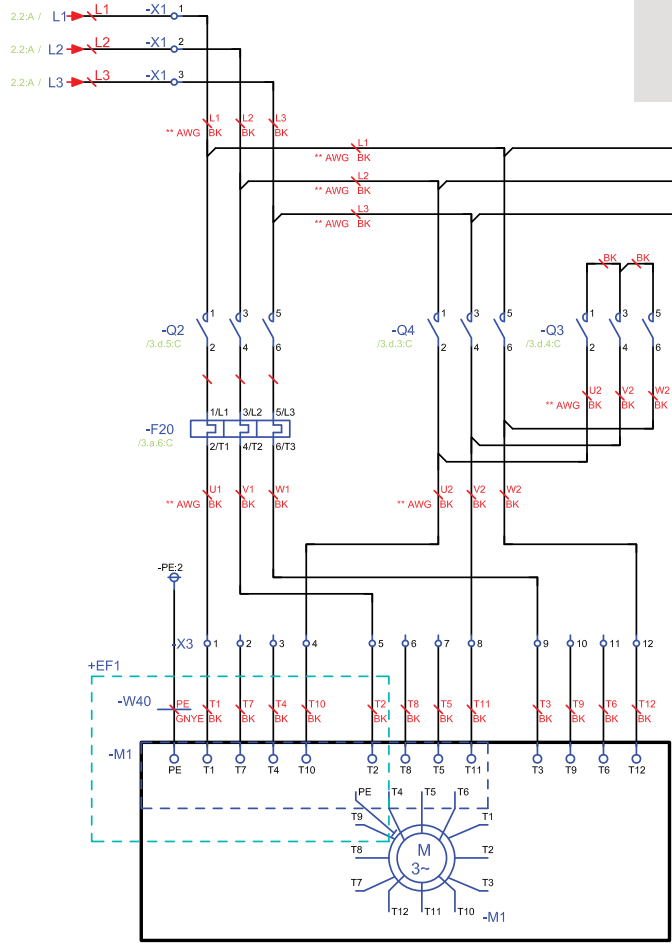


! Wire Standard

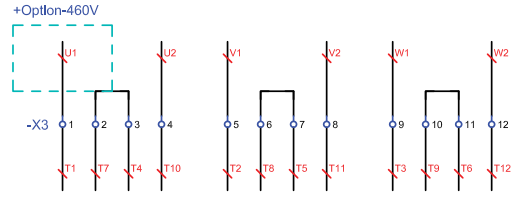
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

! Wire Standard

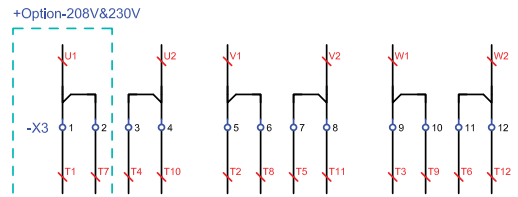
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



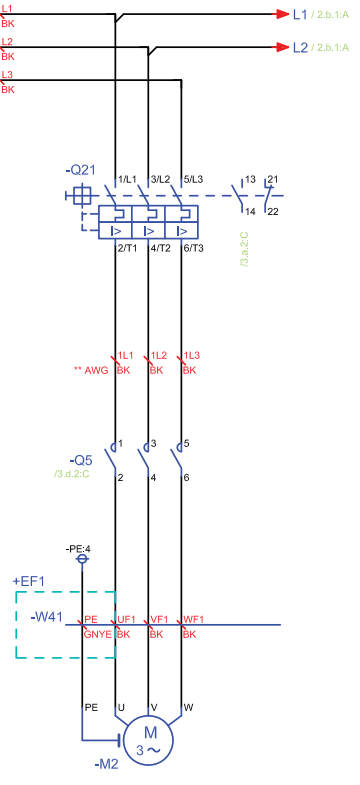
Main Motor



The position of jumpers. (Power=460V)

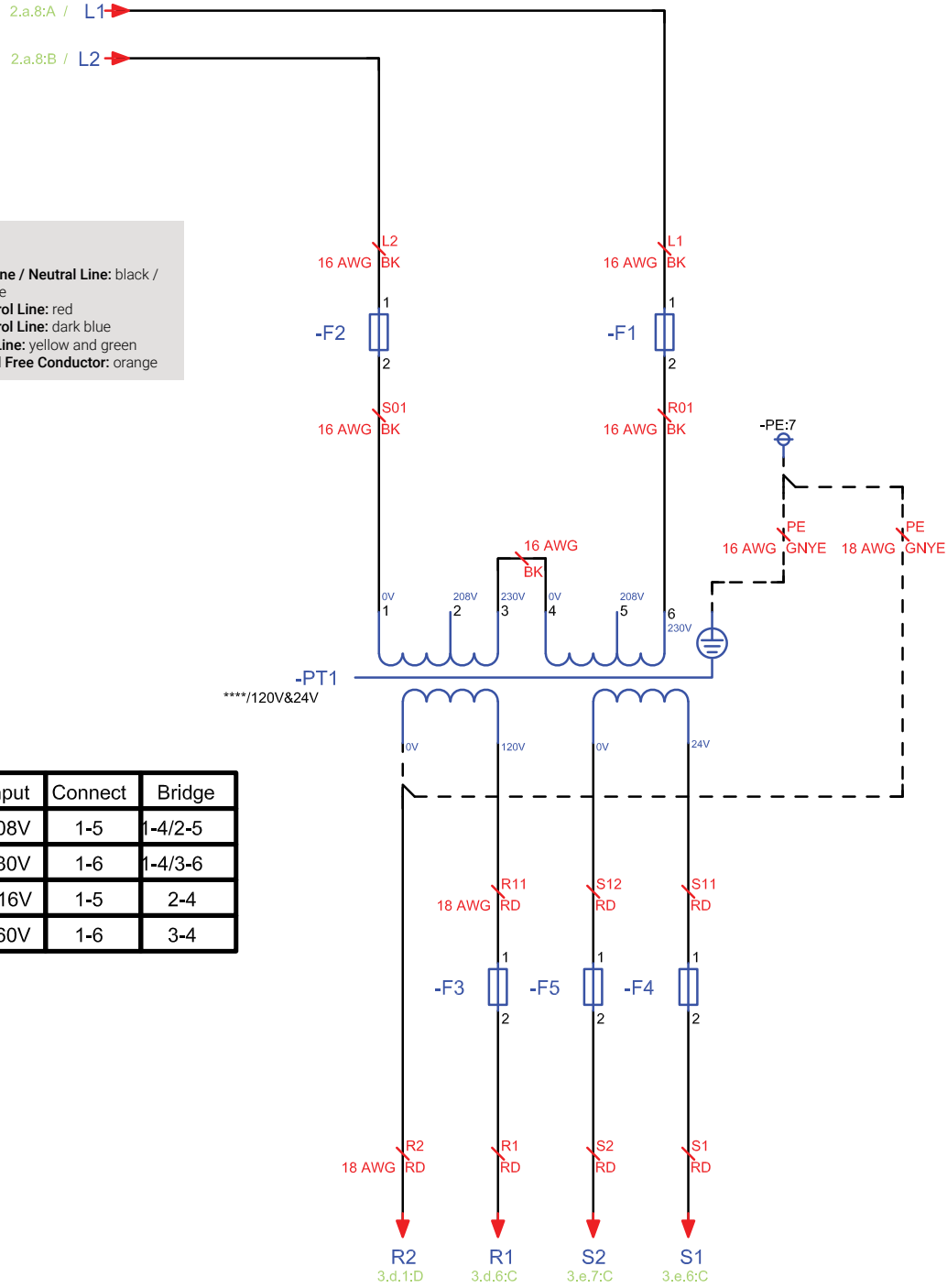


The position of jumpers. (Power=208V&230V)



Ventilator

Option



Wire Standard

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

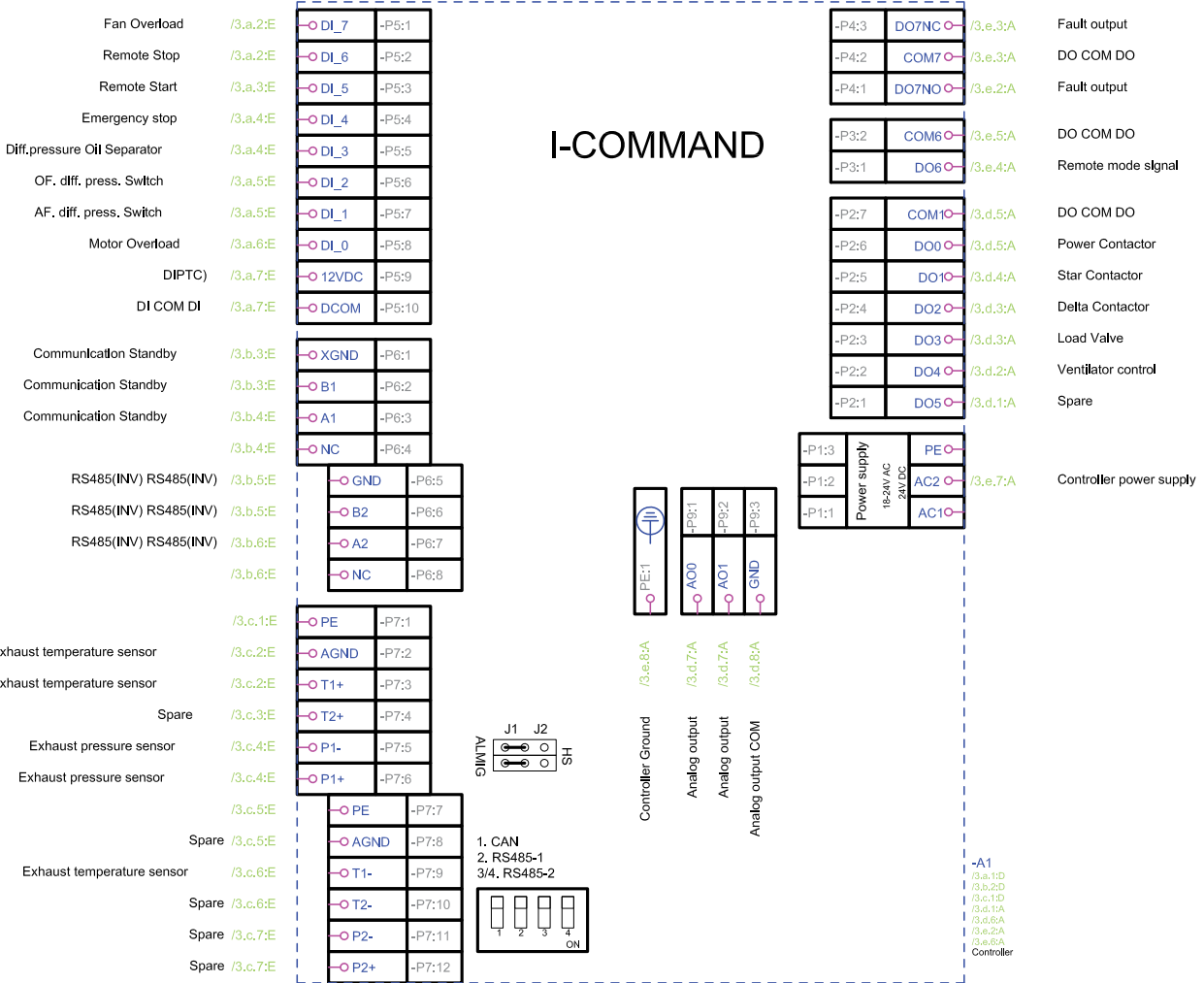
Input	Connect	Bridge
208V	1-5	1-4/2-5
230V	1-6	1-4/3-6
416V	1-5	2-4
460V	1-6	3-4

Transformer



Wire Standard

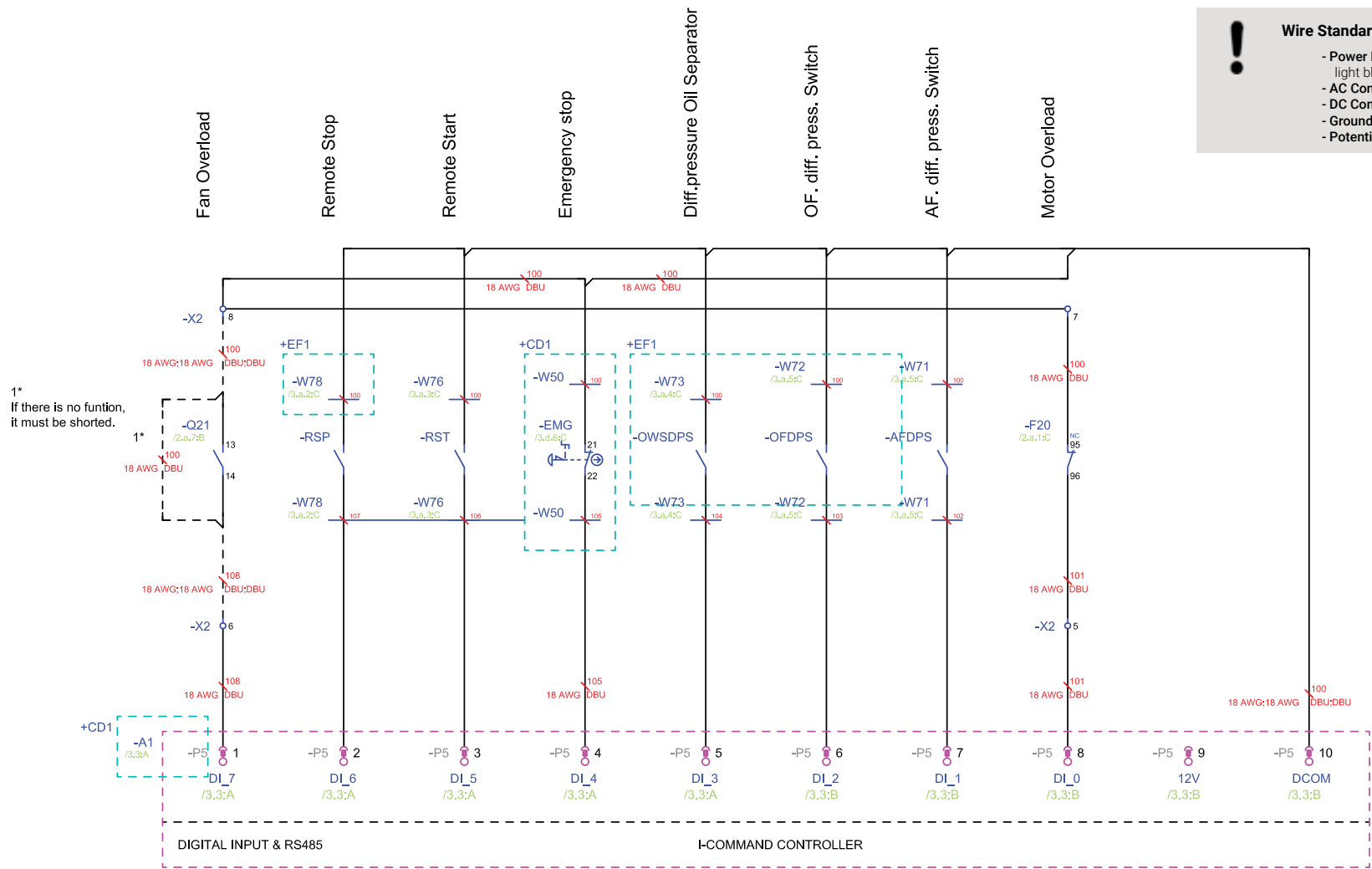
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange





Wire Standard

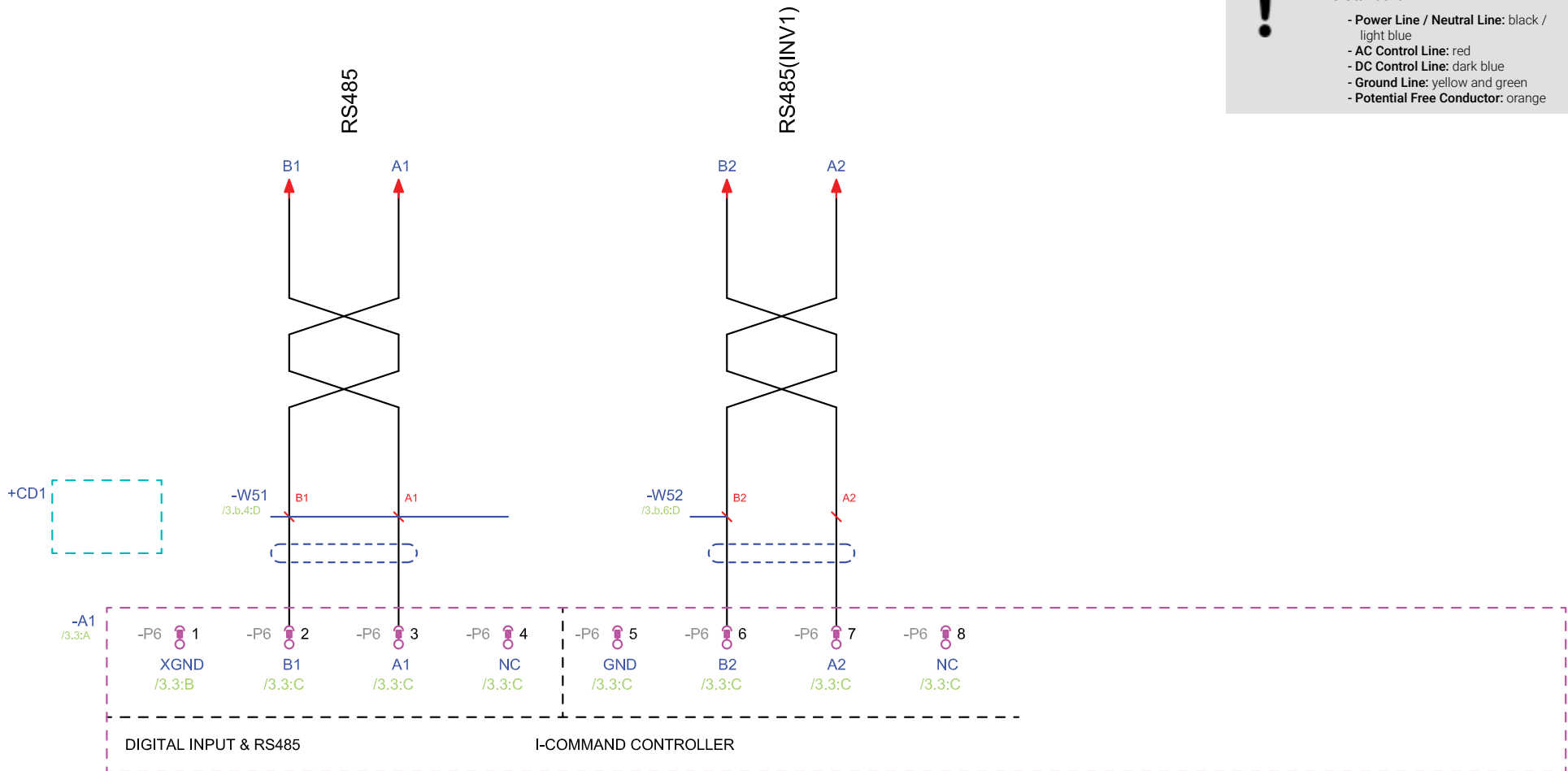
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

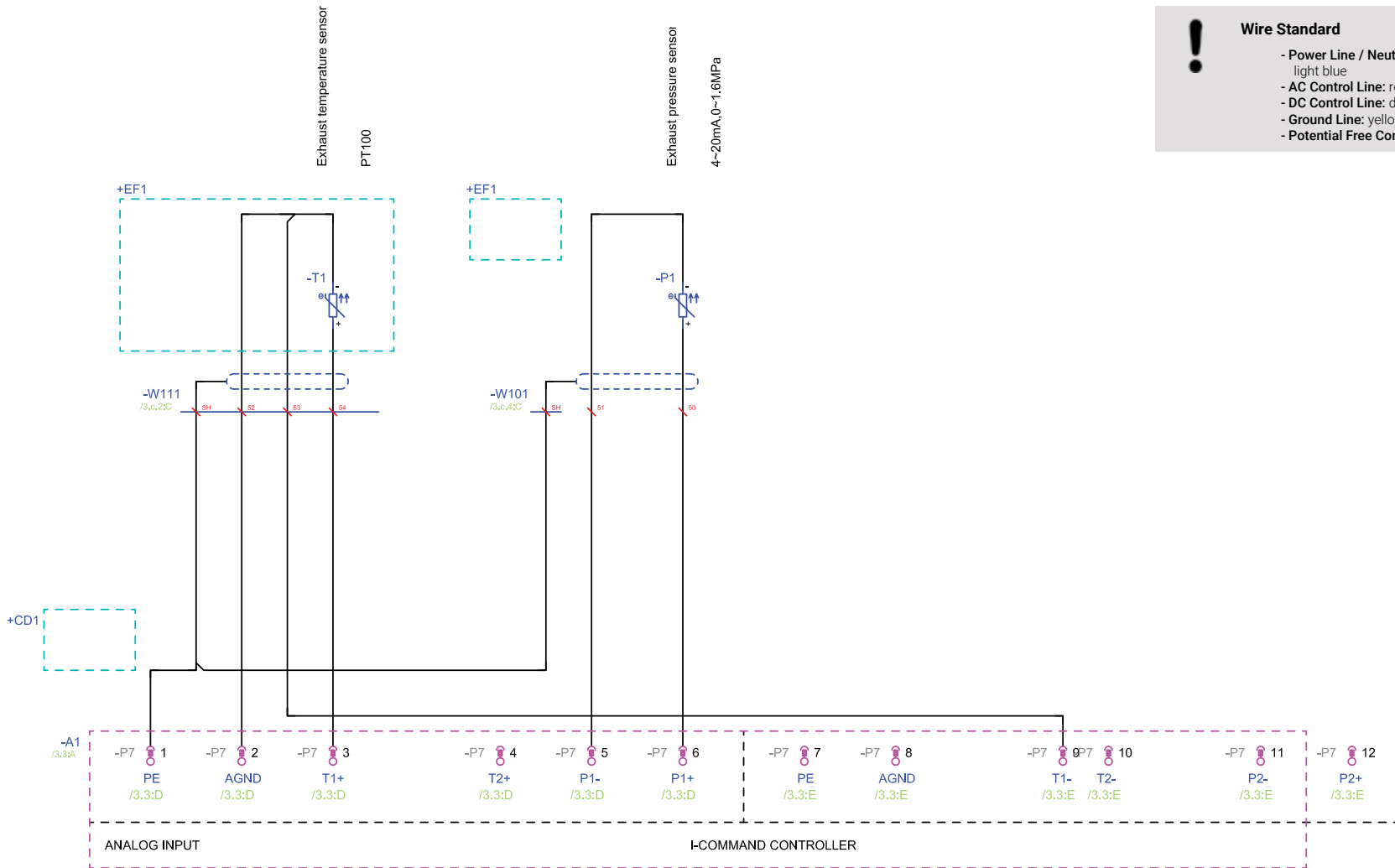




! **Wire Standard**

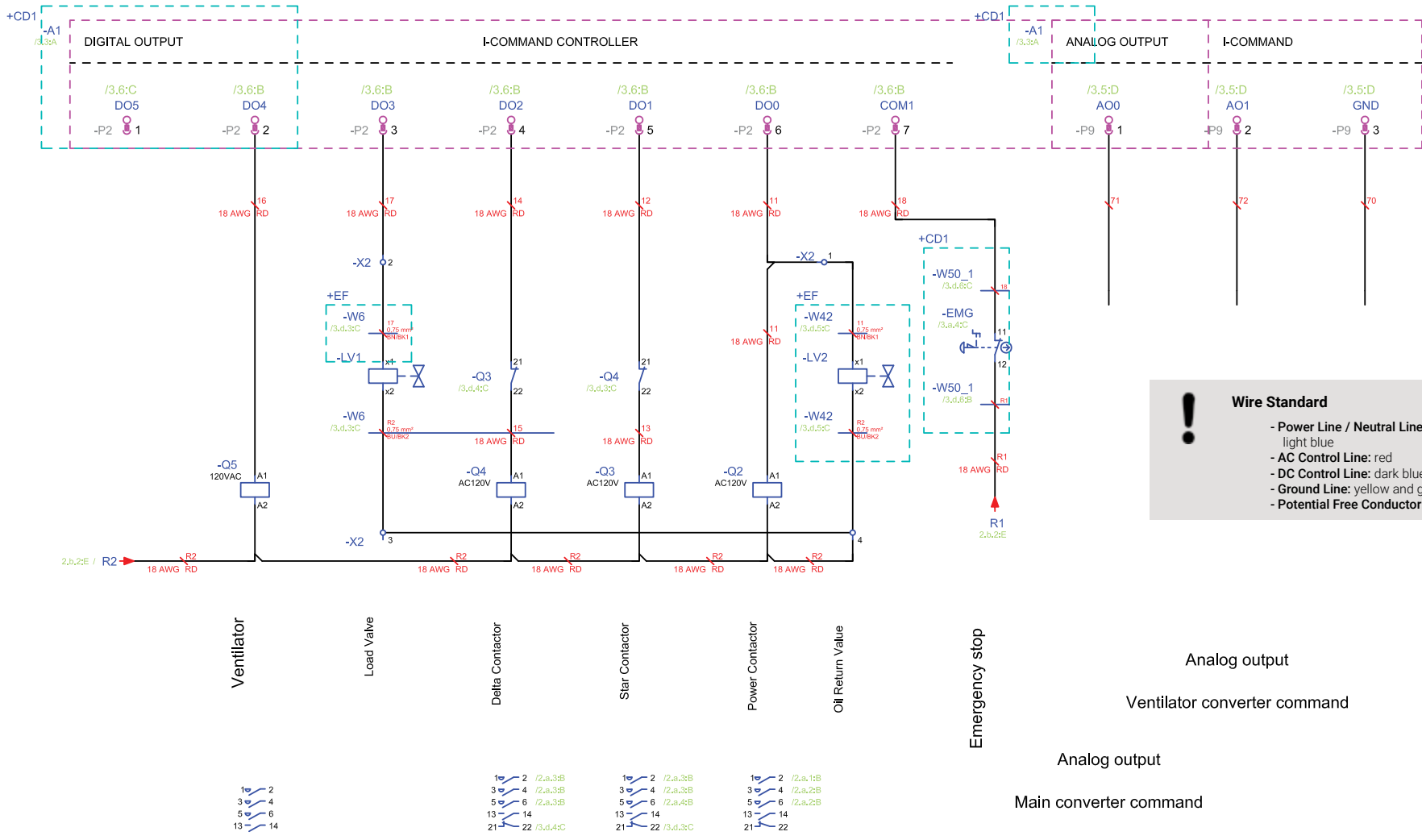
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange





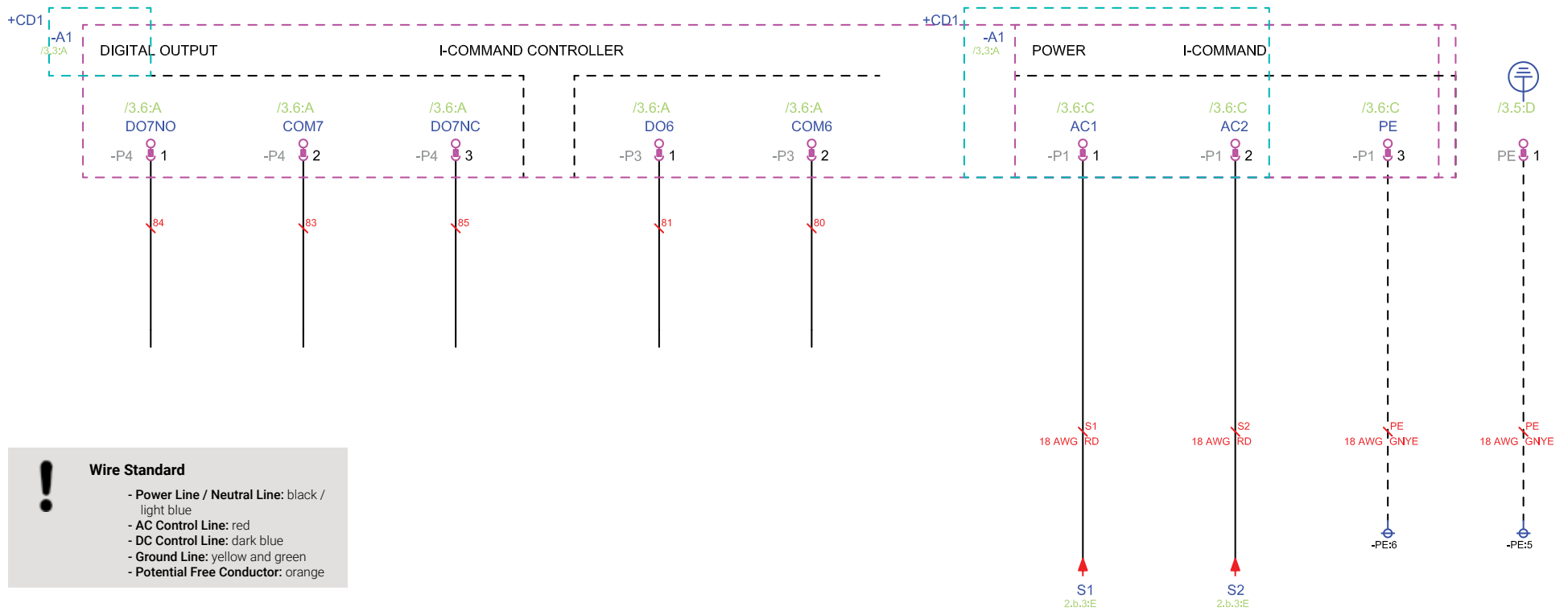
! Wire Standard

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



Wire Standard

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange

Fault output

Remote mode signal

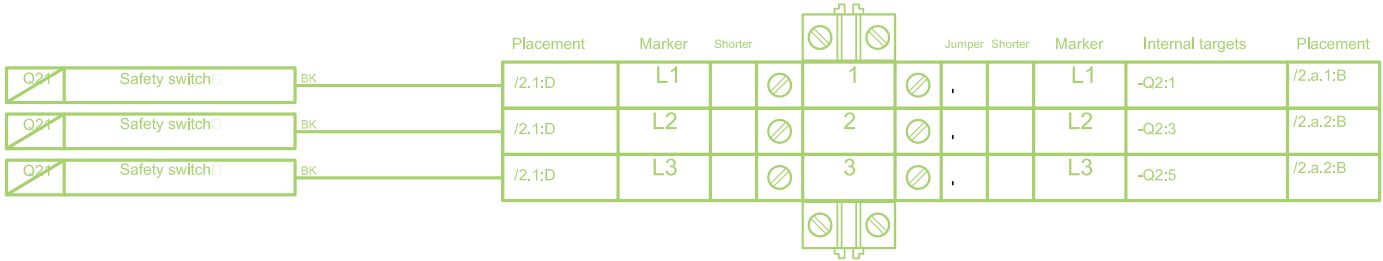
Controller power supply

! Wire Standard

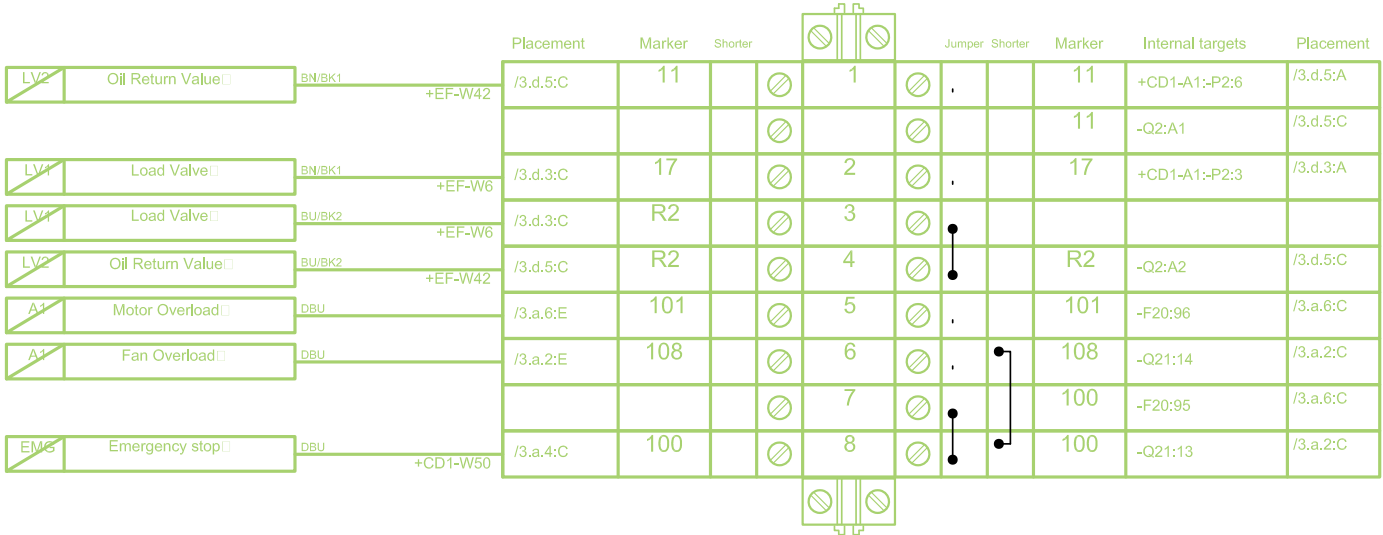
- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



Terminal strip
=AB+CD-X1



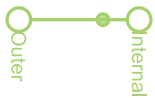
Terminal strip
=AB+CD-X2





! **Wire Standard**

- Power Line / Neutral Line: black / light blue
- AC Control Line: red
- DC Control Line: dark blue
- Ground Line: yellow and green
- Potential Free Conductor: orange



Terminal strip
=AB+CD-X3

		Placement	Marker	Shorter		Jumper	Shorter	Marker	Internal targets	Placement
M1	BK	+EF1-W40	/2.a.1:D	T1	1			U1	-F20:2/T1	/2.a.1:C
M1	BK	+EF1-W40	/2.a.2:D	T7	2					
M1	BK	+EF1-W40	/2.a.2:D	T4	3					
M1	BK	+EF1-W40	/2.a.2:D	T10	4			U2	-Q4:2	/2.a.3:B
M1	BK	+EF1-W40	/2.a.2:D	T2	5			V1	-F20:4/T2	/2.a.1:C
M1	BK	+EF1-W40	/2.a.2:D	T8	6					
M1	BK	+EF1-W40	/2.a.3:D	T5	7					
M1	BK	+EF1-W40	/2.a.3:D	T11	8			V2	-Q4:4	/2.a.3:B
M1	BK	+EF1-W40	/2.a.3:D	T3	9			W1	-F20:6/T3	/2.a.1:C
M1	BK	+EF1-W40	/2.a.3:D	T9	10					
M1	BK	+EF1-W40	/2.a.3:D	T6	11					
M1	BK	+EF1-W40	/2.a.3:D	T12	12			W2	-Q4:6	/2.a.3:B



10. TRANSPORTATION, PACKAGING AND STORAGE

10.1 - SAFETY INSTRUCTIONS FOR TRANSPORTATION

- Improper Transportation

**NOTE!*****Property damage due to improper transportation!***

Improper transportation can cause packages to fall or topple over. This can cause considerable property damage.

- Proceed with caution when unloading packages upon delivery and when transporting them on the premises, and observe the symbols and instructions on the packaging.
- Only use the fastening points provided.
- Do not remove packaging until shortly before installation.

10.2 - TRANSPORTATION INSPECTION

Upon receipt of the delivery, check for completeness and transportation damage immediately.

In the event of visible transportation damage on the outside, proceed as follows:

- Do not accept the delivery, or only conditionally.
- Make a note of the extent of the damage on the transportation documents or the delivery note issued by the transportation company.
- File a complaint.



File a complaint about each defect as soon as it has been identified. Claims for damages can only be lodged within the applicable claim periods.

10.3 - PACKAGING

- **About the Packaging.** The individual screw compressors are packaged in cartons or, at times, on wooden frames and in accordance with the expected transport conditions. Only environmentally-friendly materials are used for the packaging.

The packaging is designed to protect the individual components from transport damage, corrosion and other damage until they are installed. You must therefore not destroy the packaging and not remove it until shortly before installation.



- **Handling Packaging Materials.** Packaging material must be disposed of in accordance with the legal provisions and local regulations applicable respectively.



NOTE!

Danger for the environment due to incorrect disposal!

Packaging material is a valuable resource and can, in many cases, be re-used or be reconditioned and recycled. Incorrect disposal of packaging materials can cause environmental hazards.

- Dispose of the lubricant in an environmentally friendly manner.
- Observe the disposal regulations applicable locally. Commission a specialist company with disposal, if necessary.

Symbols on the Packaging

The following symbols are affixed to the packaging. Always observe these symbols during transportation.

- **Top**



The tips of the arrows point to the top of the package. They must always point upwards, as otherwise the content may be damaged.

- **Fragile**



Identified packages with fragile or sensitive content. Handle the package with care, do not drop it and do not subject it to impacts.

- **Protect from Moisture**



Protect the package from moisture and keep it dry.



10.4 - TRANSPORTATION

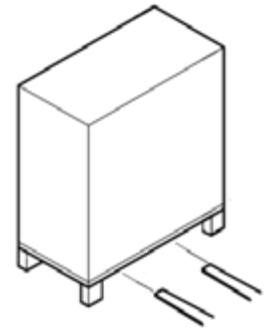
Transportation with a Fork Lift

Packages can be transported with a fork lift under the following conditions:

- The fork lift must be engineered for the weight of the packages.
- Existing guide rails on the frame must be used.
- The length of the forks must be at least 1400 mm.

Transportation

1. Use the fork lift with the forks inserted as shown at right.
2. Insert the forks so that they protrude on the other side.
3. Ensure that the package cannot tip if the center of gravity is off-center.
4. Lift the package and begin transportation.



10.5 - STORAGE

- **Storage of the Package.** Store the packages under the following conditions:
 - Do not store outdoors.
 - Store in a dry and dust-free environment.
 - Do not expose to any aggressive media.
 - Protect from exposure to sunlight.
 - Avoid mechanical jolts.
 - Storage temperature: 60° - 95° F (15° - 35° C).
 - Relative humidity: max. 60%.
 - In the event of storage for more than 3 months, check the general condition of all parts and the packaging regularly. If necessary, refresh or replace the rust-proofing.



Under some circumstances, there may be notes about storage on the packages which extend beyond the requirements specified here. Adhere to these accordingly.



11. OPERATION

11.1 - OPERATING

Safety Instructions for Operation

- **Improper Operation**



WARNING!

Danger of injury due to improper operation!

Improper operation may result in serious injuries and considerable property damage.

- Carry out all operating steps in accordance with the specifications and information in these instructions.
- Before starting work, observe the following:
 - Ensure that all covers and safety equipment are installed and function properly.
 - Ensure that there are no persons in the danger area.
- Never disable or bypass safety equipment during operation.

Shutting Down in an Emergency

In dangerous situations, components movements must be stopped and the power supply has to be shut off as quickly as possible.

- **Shutting Down in an Emergency.** In an emergency, proceed as follows:
 1. Immediately trigger the emergency stop by means of the emergency stop device.
 2. If there is no danger to your own health, remove personnel from the danger zone.
 3. Administer first aid measures as necessary.
 4. Alert the fire services and/or rescue services.
 5. Inform the responsible parties at the location.
 6. Switch the machine off and secure to prevent a restart.
 7. Clear access routes for emergency vehicles.
 8. Brief rescue vehicles.
 9. Inform the responsible authorities if the severity of the emergency requires this.
 10. Assign specialist personnel to rectify the fault.
 11. Before restarting the machine, ensure that all safety equipment is installed and functional.



WARNING!

Risk of fatal injury if the machine is restarted without authorization or in an uncontrolled manner!

An uncontrolled or unauthorized restart of the power supply can result in severe or fatal injuries.

- Before restarting, ensure that all safety devices have been fitted and are fully functional, and that there are no hazards for personnel.

11.2 - COMMISSIONING, STARTING AND SHUTTING DOWN



NOTE!

Damage to the compressor stage due to insufficient lubrication!

If the unit is started up after a long transport route, 0.5 l of oil must be filled in the compressor stage straight away, and the screw compressor must be rotated several times by hand to ensure it does not start up without lubrication.

Connecting to the Power Supply

Requirements	
Personnel	Qualified Electrician
Protective Equipment	Protective Work Clothing
	Safety Shoes



Prerequisites for correct installation are correctly dimensioned fuses in the mains supply (person-system protection) and a suitable main switch (for switching the supply on and off).



NOTE!

Danger of material damage to the compressor stage as a result of incorrect connection of the power supply!

In the event of incorrect connection of the power supply, the compressor stage may be destroyed due to an incorrectly rotating drive.


- Connect the power in accordance with the circuit diagram and check the rotating field before starting the screw compressor.



1. Using the data in the circuit diagram (in the switch cabinet), check whether the existing mains supply is suitable. Voltage deviations of more than 10% are not permitted.
2. Connect the power in accordance with the circuit diagram included in the delivery and in accordance with the technical data.
3. Check that the direction of rotation is to the right by using a rotating field measurement device.
4. Ensure that the power cable does not present a stumbling hazard.

Connecting to the Compressed Air Network

Requirements	
Personnel	Qualified Electrician
Protective Equipment	Protective Work Clothing
	Safety Shoes
Materials	Flexible Compressed Air Hose, Max. 1.5 m

 *A properly planned, installed and serviced compressed air network and an additional stop valve installed at the input to the compressed air network are prerequisites for correct installation.*



WARNING!

Danger of injury due to unpredictable movement of the compressed air hose!

Load switches in the compressed air network cause the compressed air hose to move suddenly, and with high force.

- Anchor and fasten the compressed air hose sufficiently.

1. Connect the compressed air in accordance with the technical data.
2. Ensure that the compressed air hose does not present a stumbling hazard.
3. Anchor and fasten the flexible compressed air hose sufficiently.



Switching On / Switching Off

- **Check:**

1. Whether all screw connections are tight.
2. That the oil level in the oil pressure tank is between the highest level (H) and the lowest level (L).

Press **"ON"**. The compressor starts operation. The current compressor data appear on the controller display.

Pressing the **"OFF"** switch makes the controller switch off the motor once the run-on time has elapsed. (The switch-off delay prevents the compressor from stopping immediately under heavy loads and oil from escaping from the intake side.

This does not apply for **"EMERGENCY STOP"**; in this case, the compressor shuts down immediately.)

Precautionary Measures During Operation

1. In the event of strong vibrations or unusual noises, the compressor must be shut down immediately using the **"Emergency Stop"** button.
2. Lines, tanks and valves are pressurized during operation. Removal of panels or opening screws and nuts during operation is prohibited.
3. If the oil level falls below the minimum level and the temperature gradually increases during extended periods of operation, stop the system immediately. Check the liquid level after 10 minutes of downtime. If it is still insufficient, wait until the system is no longer pressurized, then refill oil.



A sufficiently high compression temperature ensures that the moisture in the intake air does not form condensate. Switching the screw compressor on and off frequently may result in the compressor not reaching the required operating temperature.



NOTE!

Danger of material damage due to condensate in the oil circuit!

Condensate in the oil circuit can result in the destruction of the compressor stage.

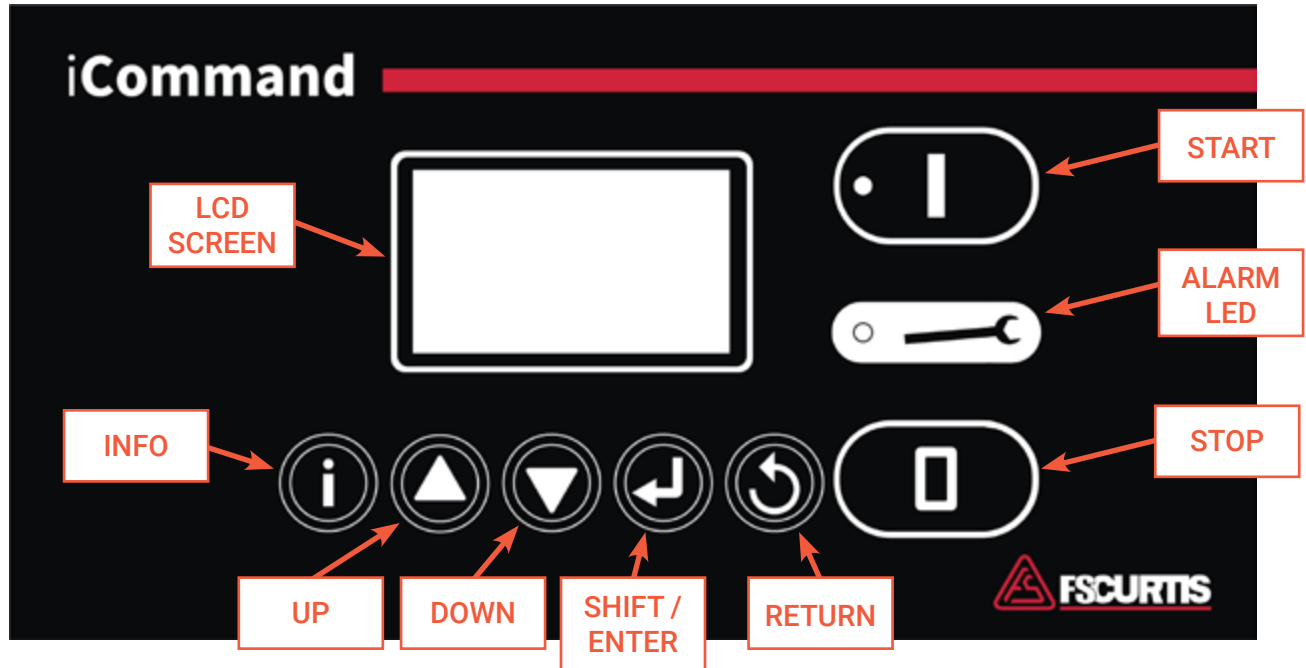
- In the event of condensate in the Oil pressure tank, contact our service immediately; see page 2 for the contact data.



Because the condensate is heavier than the oil, it collects on the bottom of the oil pressure tank after extended downtime.

12. INSTRUCTIONS FOR OPERATION








12.1 - CONTROLLER



12.2 - DESCRIPTION OF THE INDIVIDUAL BUTTONS

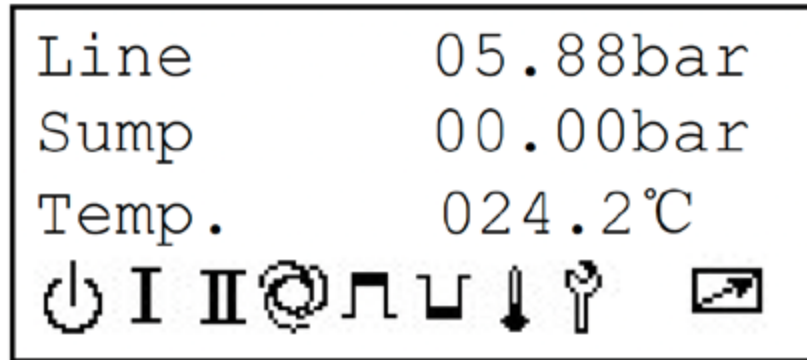
Button	Function	Description
Start Button 	Turn the compressor on	<p>The function depends on the operating mode, sump and line pressure. (Note: The compressor can not be started when the sump pressure is higher than the setting value of parameter "Sump press cut-in") There are two operating modes to be selected.</p> <p>Automatic-operation: Once the cut-out pressure is reached, the system goes into idling mode for the duration of the "Idle time". The compressor shuts down after the "Idle time". As soon as the line pressure again falls below the cut-in pressure, the system restarts.</p> <p>Continuous-operation: The compressor switches between "Loaded" and "Idling" mode, i.e. it runs all the time. If the line pressure is lower than the cut-in pressure, the compressor switches to "Loaded" mode.</p>
Stop Button 	Turn the compressor off	The compressor switches to idling mode from loaded mode and stop.



<p>Return Button</p> 	<p>Return</p>	<p>Return to previous menu or cancel modification. Press Return key for at least 2 seconds to switch between "Loaded" and "Idling" mode forcedly.</p>
<p>Shift/Enter Button</p> 	<p>Enter into parameter selection</p>	<p>Shift cursor or enter into parameter selection. In the main screen, press and hold this key for 3 seconds to turn on / off the remote control mode.</p>
<p>Info Button</p> 	<p>Confirm parameter settings</p>	<p>By pressing the info key and the up key together, the parameter menu will be invoked. By pressing the info key and the down key together, the code menu can be invoked. After confirming parameter setting, press info key to save the setting.</p>
<p>Up Button</p> 	<p>Parameter and information selection</p>	<p>The up-key scrolls to the next information display, switches to the next menu or increases a parameter value.</p>
<p>Down Button</p> 	<p>Parameter and information selection</p>	<p>The down-key scrolls to the previous information display, switches to the previous menu or decreases a parameter value.</p>
<p>Running LED</p> 	<p>Operating status</p>	<p>The running LED signalizes that the compressor is operating or in stand-by mode.</p>
<p>Alarm LED</p> 	<p>Fault or warning information</p>	<p>A blinking red LED indicates a warning signal. A continuously lit red LED indicates a fault signal and the compressor has/will shut down.</p>





12.3 - DISPLAY



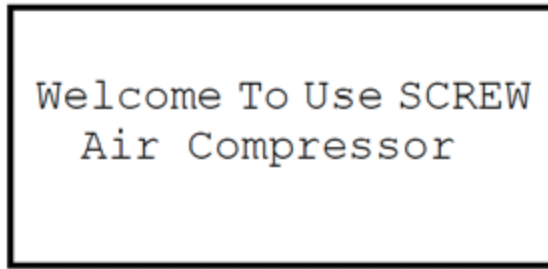
Display Symbol	Signification	Function
	Stand-By	Compressor is in stand-by mode.
	1st Band Pressure	This symbol appears when the 1st Band is active.
	2nd Band Pressure	This symbol appears when the 2nd Band is active.
	External Unload Or Load Switch	This symbol appears when the External Switch is active.
	Load Operation	Compressor is in loaded mode.
	Idle Operation	Compressor is in idling mode.
(5)	Count Down	The number between brackets shows a countdown timer. (E.g. the driver time between star and delta mode.)
	Air End	A lighting symbol signalized Continuous mode. A blinking symbol signalized Automatic mode.
	Service	This symbol appears when the service time arrives.



	Temperature	This symbol appears when temperature reaches upper/lower limit.
	Remote Start	Compressor start via digital input.


12.4 - OPERATING THE SCREW COMPRESSOR

After the power is on, the welcome screen is shown.

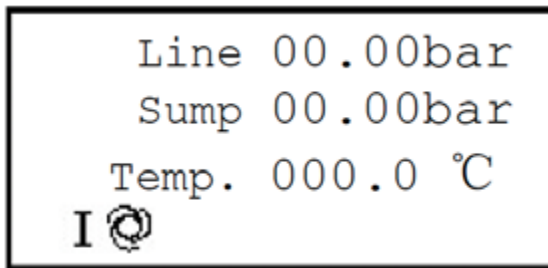




A short time after power-on, the main screen is displayed. The line pressure (behind pressure maintaining valve), the sump pressure and the air-end temperature will be displayed.

If the compressor is in automatic operation mode, the  symbol will flash.


In continuous operation mode the symbol  is on permanently.

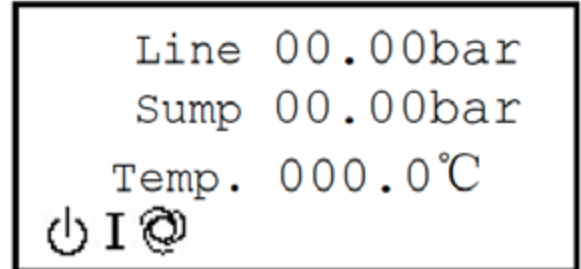
The **I** and **II** symbol indicate the actual pressure band.




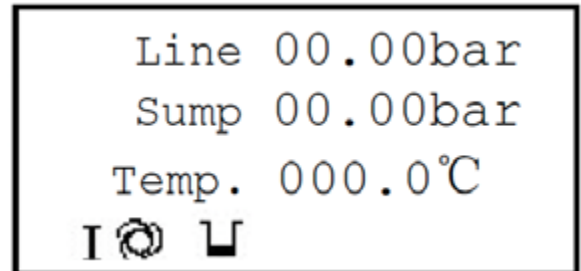
If the line pressure is higher than cut-out pressure, the compressor will stay in stand-by-mode when the start key  is pressed. Stand-by-mode is indicated by the symbol .




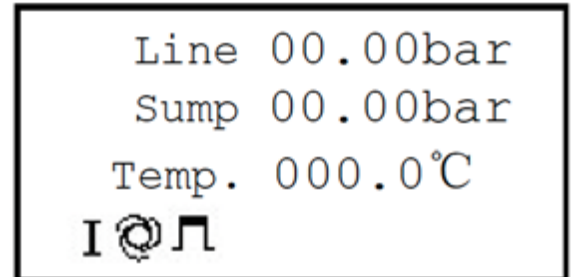
If "Sump pres Sensor" is activated and the symbol  flashes, which means the sump pressure is still too high, the compressor can't start at once until the pressure is lower than the setting value of the parameter "Sump press cut-in".



If the compressor is in idle-mode (the pressure is higher than the cut-out pressure or forced into idle operation after start-up) the symbol  is displayed.




If the line pressure is lower than the cut-in pressure the compressor switches to loaded mode, indicated by the symbol .

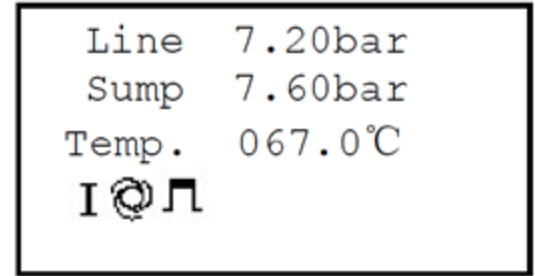






12.5 - DATA OVERVIEW


In the main screen display, pressing the down button  the parameter display (Data overview) will show up. Following parameters are shown here:

- Sequence time
- Counter
- Time and date
- Fault and service
- History log
- Service interval remaining time.



Main Screen

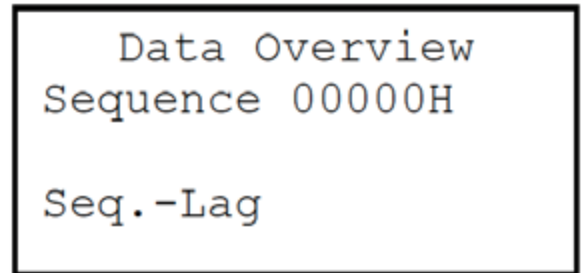
Pressing the up button  or down button  to switch the previous or next parameter screen.

In the main screen, after pressing the down button  for the first time, the first parameter screen is displayed where the interlock control is shown.

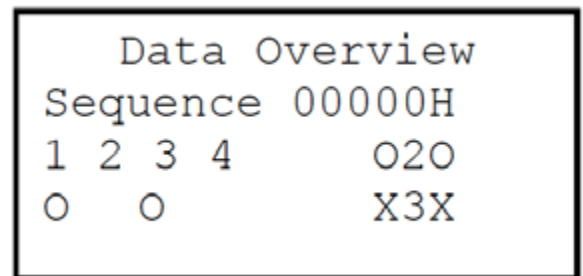
When the parameter “Remote Mode” is set “Lag”, the first state page will be displayed.

When the parameter “Remote Mode” is set “Lead” and this mode starts to work, the second type of state page will be displayed.

The number in the 3rd row is the interlock control machine number connected with this controller, the following O2O indicates the next to start is #2 machine. The 4th row " 0 " indicates the status of the machine above, " 0 " indicates the machine is in operation, no display indicates stopping, and the following X3X indicates the next to stop is the #3 machine.



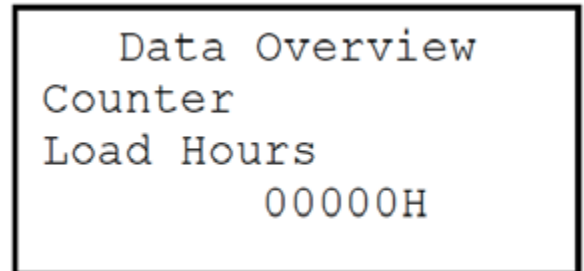
Communication Status Page




Sequence Signal Status

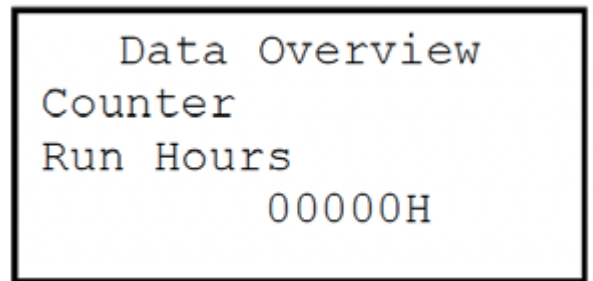


Pressing the down button  again, will display the load hours.




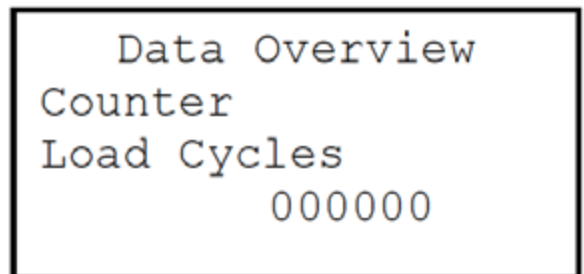
Load Operating Times

Pressing the down button  again will display the total running hours (including the load and idle hours), stand-by times are not included.



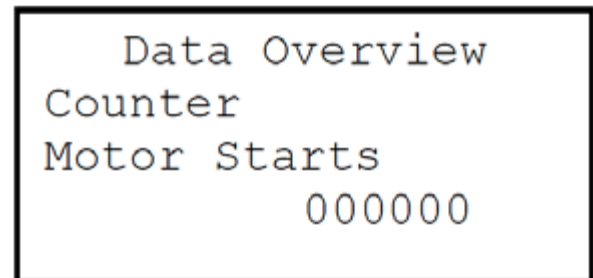
Total Operating Times

Pressing the down button  again will display the number off-load cycles. The counter indicates how many times the compressor has changed between load and idle operation.



Number Off-Load Change Counter

Pressing the down button  again will display the number of motor starts.



Number of Motor Starts





Pressing the down button  again will display the actual time and date.

```
Data Overview
Internal Clock
Data      Time
18.03.2020 09.59.26
```

Date / Time

Pressing the down button  again will display the Error History log.

Press the shift button  to view the "most recent" fault. "00" is always the "most recent" log. The arrow keys can be used to scroll through the 30 items of the fault history.

Press the shift button  to view the related parameter status upon occurrence of the fault.


If no faults are logged, the display is ignored.

```
Data Overview
Fault History
```

Error Record Main Page

Pressing the shift button  will show the page shown below.


- The 1st line display fault history number.
- The 2nd line display fault content.
- The 3rd line display time and date.
- The 4th line display line pressure and Temperature.

Press the shift button  may see more state of compressor upon occurrence of the fault.

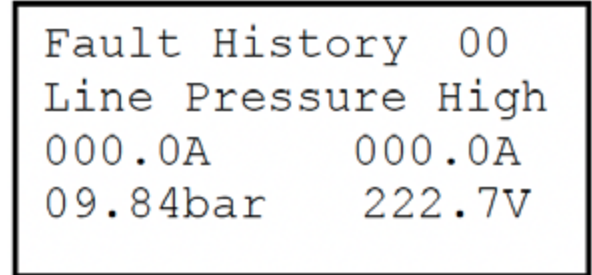
```
Fault History 00
Line Pressure High
2.09.2020 17.59.52
09.84bar    075.6°C
```

Error Record Subpage




Pressing the shift button  again on the previous page, shows the page below.

- The 1st line display fault history number.
- The 2nd line display fault content.
- The 3rd line display motor current.
- The 4th line display sump pressure and Bus Voltage.

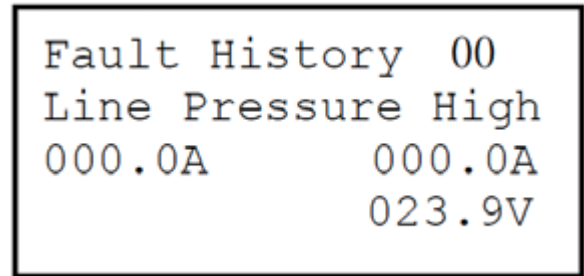


Subpage Appendix 1 Page


Pressing the shift button  may see more state of compressor upon occurrence of the fault.

Pressing the shift button  again on the previous page, the below page shows.

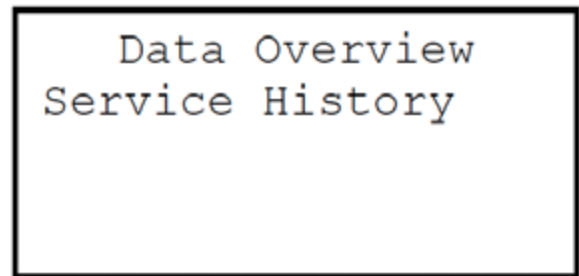
- The 1st line display fault history number.
- The 2nd line display fault content.
- The 3rd line display the fan current.
- The 4th line display the controller voltage.




Subpage Appendix 2 Page

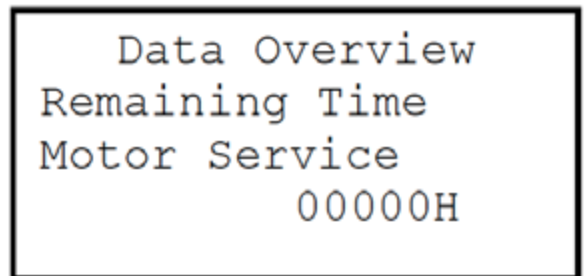
In the Error record main page, pressing the down button  again will display the service history log. The last 30 service history times are displayed.

If no messages are logged, the display is ignored. "29" indicating the first log, "28" second log..."00" is always the "most recent" log.



Pressing the down button  again will display the remaining time until the next service. Firstly the remaining time of the next motor service is displayed. (unit: hour)

Note: If the parameter "Motor service" is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.

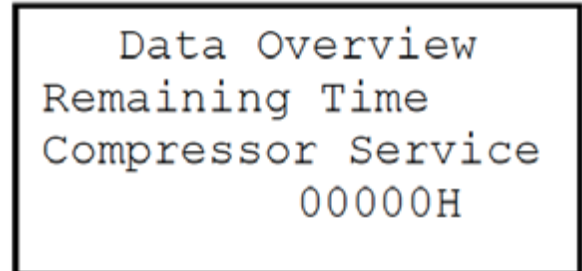


Remaining Time of Motor Service




Pressing the down button  again will display the remaining time of the next compressor service. (unit: hour)

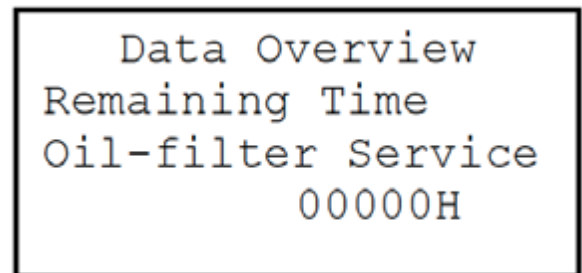
Note: If the parameter “Compressor service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.



Remaining Time of Compressor Service

Pressing the down button  again will display the remaining time of the next oil-filter service. (unit: hour)

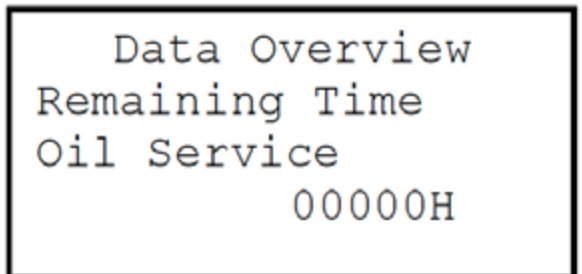
Note: If the parameter “Oil-filter service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.




Remaining Time of Oil-filter Service

Pressing the down button  again will display the remaining time of the next oil service. (unit: hour)

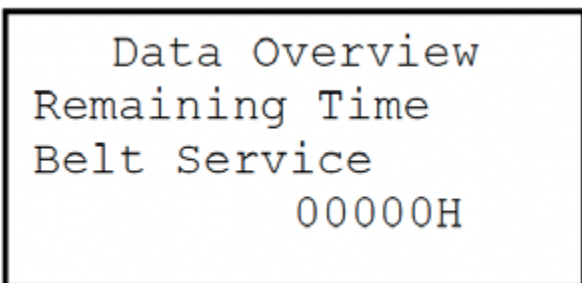
Note: If the parameter “Oil service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.



Remaining Time of Oil Service

Pressing the down button  again will display the remaining time of the next belt service. (unit: hour)

Note: If the parameter “Belt service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.

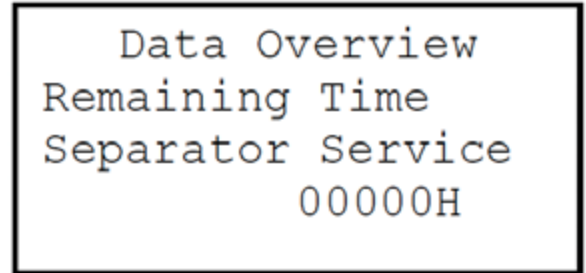


Remaining Time of Belt Service




Pressing the down button  again will display the remaining time of the next separator service. (unit: hour)

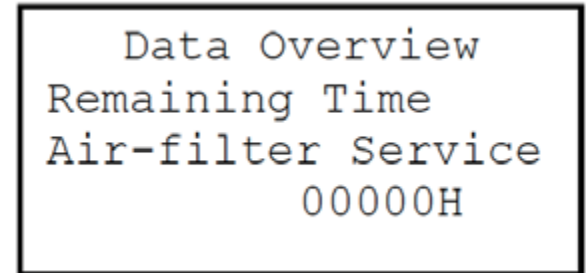
Note: If the parameter “Separator service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.



Remaining Time of Separator Service

Pressing the down button  again will display the remaining time of the next air-filter service. (unit: hour)

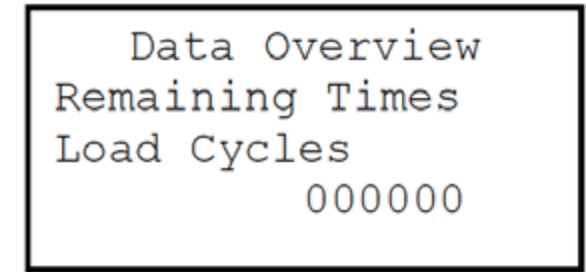
Note: If the parameter “Air-filter service” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden



Remaining Time of Air Filter Service

Pressing the down button  again will display the remaining times of load-idle switch.

Note: If the parameter “Cycle counter” is set **OFF** in the Service Menu (user password permission cannot access this parameter), this display is hidden.



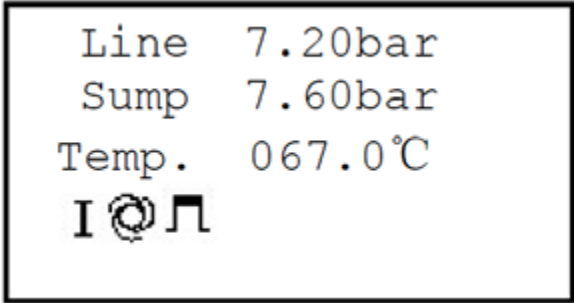
Remaining Times of Load-Idle Switch




12.6 - QUERY INTERFACE

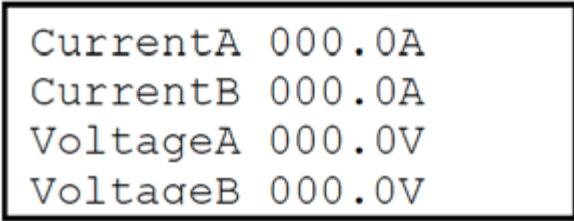
Pressing the up button , display as follows:

1. Voltage and current of motor.
2. Hardware and Firmware Version.
3. Real-time record of warning,error and maintenance.
4. Relevant status of the motor and fan. (Some parameters can be viewed after turning on the frequency function of the motor and fan. See the related parameter configuration in the Inverter Menu. User password permission cannot access this parameter menu.)



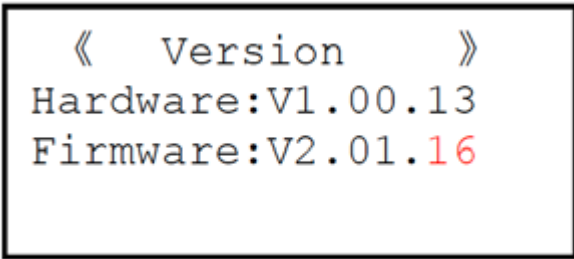
Main Screen

Pressing the up button  for the first time will display the Current A, Current B, Phase A, and Phase B voltage.




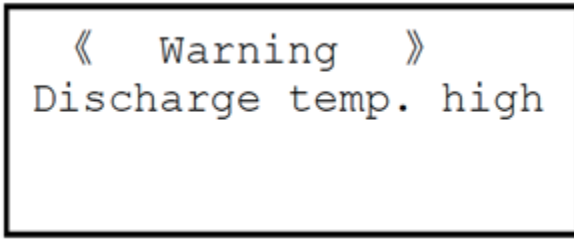
Motor Status

Pressing the up button  again will display the version number of Controller hardware and firmware.



Hardware and Firmware Version

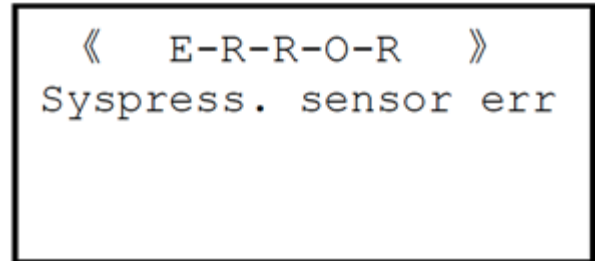
Pressing the up button  again will display warning real-time record page. Skip this screen when there is no warning.



Warning Real-Time Record Page



Pressing the up button  again will display fault real-time record page. Skip this screen when there is no fault.



Fault Real-Time Record Page

Pressing the up button  again will display wireless communication information 1.

- IMEI: international mobile device identification code, commonly known as "mobile phone serial number".
- ICCD: integrated circuit card identification code, i.e. SIM card number.
- IP: IP address.



Communication Info 1


Pressing the up button  again will display wireless communication information 2.

- STAG: Indicates the signal strength. [1-5 gradually stronger]
- STAT: The state starts from 1, then 2, 3, 4, 5, and finally cycle between 4-5.
 1. Wireless communication is normal.
 2. The SIM card is connected to the wireless base station normally.
 3. Enter the wireless data communication status, obtain the dynamic IP address.
 4. A connection has been established with the server and no data has been sent.
 5. Sending data.
- LONG: Longitude
- LATI: Latitude



Communication Info 2




Pressing the up button  again will display the vibration value of the X / Y / Z direction of the **Opt.**.

Note: If the parameter “Opt.vibration meter” is set **OFF**, the values and units will not be displayed.

```
Opt.X vibra000.0mm/s
Opt.Y vibra000.0mm/s
Opt.Z vibra000.0mm/s
```


Fan Vibration Status

Pressing the up button  again will display the vibration value of the X / Y / Z direction of the Motor.

Note: If the parameter “Motor vibration meter” is set **OFF**, the values and units will not be displayed.

```
Motor Xvibra000.0mm/s
Motor Yvibra000.0mm/s
Motor Zvibra000.0mm/s
```


Motor Vibration Status

Pressing the up button  again will display the vibration value of the X / Y / Z direction of the Body.

Note: If the parameter “Body vibration meter” is set **OFF**, the values and units will not be displayed.

```
Body X vibra000.0mm/s
Body Y vibra000.0mm/s
Body Z vibra000.0mm/s
```

Body Vibration Status

Pressing the up button  again will display Fan speed and Fan Error. (Fan means the fan motor.)

Note:

1. If the parameter “Fan Inverter Control” is set **OFF** in the Inverter Menu, the number and the unit can't be shown here.
2. Relevant settings can be set in the Inverter Menu. User password permission cannot access this parameter menu.

```
Fan Speed 00000
Fan Error 00000
```

Fan Inverter Status 2




Pressing the up button  again will display Fan Frequency, Fan Current, Fan Voltage, and Fan Power.

Note:

1. If the parameter “Fan Inverter Control” is set **OFF** in the Inverter Menu, the number and the unit can't be shown here.
2. Relevant settings can be set in the Inverter Menu. User password permission cannot access this parameter menu.

```
Fan Fre. 0000.0Hz
Fan Current 000.0A
Fan Voltage 0000V
Fan Power 0000.0KW
```

Fan Inverter Status 1


Pressing the up button  again will display Motor speed and Motor Error. (Moto means the main motor.)

Note:

1. If the parameter “Motor Inverter Control” is set **OFF** in the Inverter Menu, the number and the unit can't be shown here.
2. Relevant settings can be set in the Inverter Menu. User password permission cannot access this parameter menu.

```
Moto Speed 00000
Moto Error 00000
```

Motor Inverter Status 2

Pressing the up button  again will display Motor Frequency, Motor Current, Motor Voltage and Motor Power. (Moto means the main motor.)

Note:

1. If the parameter “Motor Inverter Control” is set **OFF** in the Inverter Menu, the number and the unit can't be shown here.
2. Relevant settings can be set in the Inverter Menu. User password permission cannot access this parameter menu.

```
Moto Fre. 0000.0Hz
Moto Current 0000A
Moto Voltage 0000V
Moto Power 0000.0KW
```

Motor Inverter Status 1




Pressing the up button  again will display the EXT-P3, EXT-P4, EXT-P5 values.

Note: Display this screen only when the parameter “EXT MODULE TYPE3” is set **ON**. User password permission cannot access this parameter.

```
EXT-P3 : 00.00bar
EXT-P4 : 00.00bar
EXT-P5 : 00.00bar
```

Ext. Module Pressure Temperature 3

Pressing the up button  again will display the 1st temperature, bearing temperature, winding temperature, and 1st pressure value.

Note: Display this screen only when the parameter “EXT MODULE TYPE3” is set **ON**. User password permission cannot access this parameter.

```
1st Temp: 000.0°C
BearTemp: 000.0°C
WindTemp: 000.0°C
1st Temp: 00.00bar
```


Ext. Module Pressure Temperature 2

Pressing the up button  again will display the values of intake pressure, motor temperature, etc.

Note: Display this screen only when the parameter “EXT MODULE TYPE3” is set **ON**. User password permission cannot access this parameter.

```
Input P :00.00bar
MotorTmp:000.0°C
```

Ext. Module Pressure Temperature 1


Pressing the up button  again to view fan current phase A, fan current phase B.


```
Fan CurrentA 000.0A
Fan CurrentB 000.0A
```

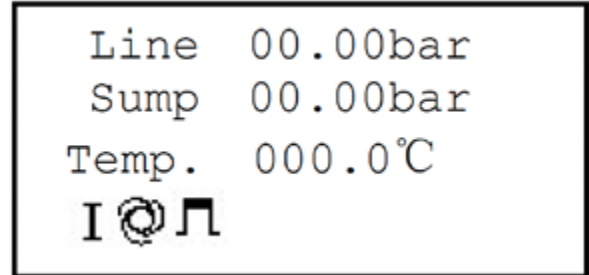


12.7 - WARNING AND FAULT MESSAGES

The flashing red LED indicates a warning signal.

The main screen  is still displayed and the compressor is still in operation.


To see the warning message, press the up button  and scroll to the warning history.

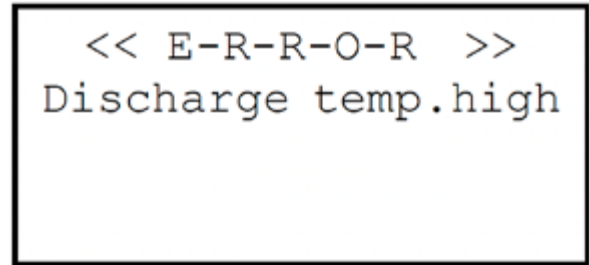


 Red Message LED

Permanent red LED indicates a system fault and fault message is displayed on the screen. The compressor shuts down immediately.


If more than one error occurred simultaneously, it is possible to switch between the messages with the arrow keys.

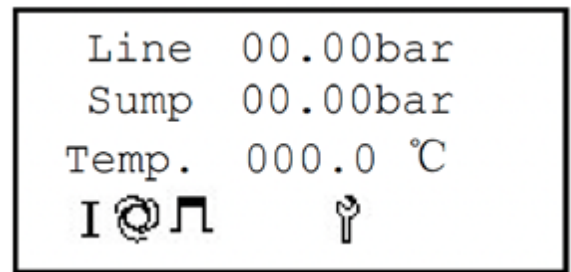
After acknowledging the fault message and pressing the return button , the message disappears, but still can be shown in the info display by pressing the up key and scrolling to the fault history.



 Red Message LED

If a warning and fault occurs at the same time, the fault message is displayed.

The symbol  in the main screen indicates a service message. The type of service message is shown in the information display and the compressor is still in operation.





12.8 - MESSAGES ABOUT OPERATING, ALARM AND FAULT STATUSES

Operating Status

No.	Status Displayed	Description of the Status
1	Compressor Stopped	Normal stop, compressor can be started
2	Emergency Stop of the Compressor	The emergency stop button was pressed
3	Compressor Running	The compressor is running
4	Compressor Pressurized	The compressor is pressurized normally
5	Compressor Not Pressurized	The compressor is not pressurized
6	Compressor – Idle Stop	Idling period elapsed, compressor was stopped (normal stop)
7	Compressor Stop Delay	Compressor must depressurize before it can be started
8	Delay – Main Motor Overload	The main motor is overloaded, the compressor can only be started after a given delay
9	Contact Manufacturer	Servicing or maintenance is required on the compressor

Alarm Due to Minor Faults

A minor fault is signaled in the status bar of the control panel. **The compressor does not stop**; you will, however, be informed that a minor intervention is required.

No.	Status Displayed	Description of the Status
1	Replace Air Filter	The air filter service life has expired – replace air filter, reset compressor
2	Air Filter Blocked	Air filter blocked or defective – needs replacement
3	Replace Oil Filter	The oil filter service life has expired – replace oil filter, reset compressor
4	Oil Filter Blocked	Oil filter blocked or defective – needs replacement
5	Replace Oil Precipitator	The oil precipitator service life has expired – replace oil precipitator, reset compressor
6	Oil Precipitator Blocked	Oil precipitator blocked or defective; needs replacement
7	Replace Lubricant	The lubricant service life has expired – replace lubricant, reset compressor
8	Alarm – High Compressed Air Final Temperature	The compressed air final temperature is too high, check the cooling system
9	Alarm – Ambient Temperature Too Low	The ambient temperature is too low – increase the ambient temperature
10	Alarm – Ambient Temperature Too High	The ambient temperature is too high – decrease the ambient temperature



11	Motor Bearing Temperature Too High	The temperature of the bearings in the main motor is too high – check motor bearing
12	Main Motor – Current Too High	The current at the main motor is too high – check the lubrication system
13	Temperature Precipitator Tank Too High	The temperature in the precipitator tank is too high – check the cooling and lubrication system

Alarm Due to Major Faults

If a major fault occurs and the system cannot be restarted, **the compressor stops**. Rectify the problem and restart the compressor. A major fault is displayed in the status line of the controller.

No.	Status Displayed	Description of the Status
1	Alarm – High Compressed Air Final Temperature	The compressed air final temperature is too high – check the lubrication system
2	Alarm – High Final Pressure	The final pressure is too high – check the safety valve
3	Temperature Sensor – No Signal	No temperature sensor signal – check sensor and cable
4	Pressure Transducer – No Signal	No pressure transducer signal, check sensor and cable
5	Stop – Main Motor Overload	The main motor is overloaded, check the lubrication system for the drive
6	Stop – Cooling Air Fan Motor Overload	The motor for the cooling air fan is overloaded – check the cooling air fan; if a thermal overload relay is installed, reset the relay
7	Stop – Water Loss (for Water-Cooled Systems)	Cooling water could not be refilled – check the cooling water system
8	Phase Sequence Fault	Direction of drive rotation incorrect – change phase sequence of input current
9	Temperature Too Low	The lubricant temperature is too low – heat up the lubricant
10	Voltage Too High	The supply voltage is too high – check the voltage supply
11	Voltage Too Low	The supply voltage is too low – check the voltage supply
12	Precipitator Tank Temperature Too High	The temperature in the precipitator tank is too high – check the cooling system
13	Precipitator Tank Pressure Too High	The pressure in the precipitator tank is too high – check the relief valve
14	Current Incorrect	The power supply fluctuates, pressure relief current too high – check the power supply and relief valve
15	Inverter Fault	An inverter feedback fault has occurred



13. MAINTENANCE

13.1 - SAFETY INSTRUCTIONS FOR MAINTENANCE

- Electrical System



DANGER!

Danger to life due to electric current!

Danger to life in the event of contact with live components. Active electrical components may make uncontrolled movements and result in severe injuries.

- Switch off the electric power and secure it against a restart before starting work.

- Moving Parts



WARNING!

Danger of injury due to moving components!

Rotating parts or parts making linear motions can cause serious injuries.

- Before carrying out any maintenance work on moving components, switch off the machine and secure it against restart. Wait until all components have come to a complete standstill.
- Wear close-fitting work clothing with low resistance to tearing in the danger area.

- Securing Against a Restart



WARNING!

Danger of fatal injury due to unauthorized restart!

Restarting the power supply without authorization during maintenance puts any personnel in the danger zone at risk from severe injuries, or even death.

- Switch off all power supplies and secure them against a restart before starting work.



- Hot Surfaces

**WARNING!*****Danger of injury due to hot surfaces!***

The surfaces of components, and operating materials (e.g. Oil or cooling water) may heat up considerably during operation. Contact between the skin and hot surfaces and liquids cause serious burns to the skin.

- When performing any work near hot surfaces, heat-resistant occupational safety clothing and protective gloves must be worn.
- When performing any work with operating materials, heat-resistant occupational safety clothing and protective gloves must be worn.
- Before any work, make sure that all surfaces have cooled to ambient temperature; wait at least 30 minutes.

- Improperly Performed Maintenance Work

**WARNING!*****Danger of injury due to improperly performed maintenance work!***

Improper maintenance can cause serious injuries and considerable property damage.

- Before starting work, ensure sufficient installation space.
- Make sure that installation area is organized and clean! Loosely stacked components, or components and tools left lying around, are a source of accidents.
- If components were removed, ensure correct installation, reinstall all fastening elements and observe screw torques.
- Prior to re-commissioning, observe the following:
 - Ensure that all maintenance work has been performed and completed according to the information and instructions included in these instructions.
 - Ensure that there is nobody in the danger area.
 - Ensure that all covers and safety equipment are installed and function properly.



- **Improperly Performed Maintenance Work**

**WARNING!*****Danger of injury due to compressed air!***

Compressed air can escape from compressed air hoses or components under pressure in the event of improper handling or in the event of a fault. This can result in eye injuries, dust being raised, or hoses making uncontrolled movements. Pressurized components can move in uncontrolled manner and can cause injuries if handled incorrectly.

- Before removing pressurized hoses or components, depressurize them.
- Have any faulty pressurized components replaced immediately by specialist personnel.
- Before all work, ensure that the compressor is depressurized; wait at least 5 minutes.

- **Oil Mist**

**CAUTION!*****Danger of injury due to oil mist!***

In the event of high temperatures or mechanical spray dispersion, oil mist can form. oil mist can irritate eyes and the respiratory system.

- When working on the oil system and a oil mist forms, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

- **Accumulation of Fluids**

**CAUTION!*****Danger of injury due to slipping in accumulated fluids!***

Slipping in fluids that have accumulated on the floor may result in a fall. A fall may result in injuries.

- Absorb any accumulations of fluids using suitable means.
- Wear non-slip safety shoes.
- Affix warnings and mandatory signs on or near any area in which fluids can accumulate on the floor.



- **Environmental Protection.** Adhere to the following instructions on environmental protection when performing maintenance work:
 - Remove any escaped, used or excess grease from all lubrication points which are supplied with lubricant by hand and dispose of it in accordance with the applicable local regulations.
 - Collect replaced oils in suitable containers and dispose of them in accordance with the applicable local regulations. Do not expose to any aggressive media.

The following sections describe maintenance work that is required for optimal and fault-free operation of the machine.

If increased wear is identified during regular checks, the required maintenance intervals must be shortened to correspond to the actual signs of wear. For questions about maintenance work or intervals, contact the manufacturer; see the contact data on page 2.

13.2 - OIL FILTER MAINTENANCE

No.	Designation	Maintenance Cycle
1	Air Filter	Every 2,000 hr
2	Oil Filter	Every 2,000 hr
3	Oil Separator	Every 4,000 hr (TT05-07: every 2,000 hr)
4	Oil	Every 4,000 hr

Oil Change Intervals at Elevated Temperatures		
Discharge Temperature	FSC-8000 Change Interval	FSC-4000 Change Interval
Up to 180° F	8000 hours	4000 hours
180° - 190° F	6000 hours	3000 hours
190° - 200° F	4000 hours	2000 hours
200° - 210° F	2000 hours	1000 hours



13.3 - MAINTENANCE SCHEDULE

Description	Daily	Weekly	Yearly	2000 hr.	4000 hr.	6000 hr.	8000 hr.	10000 hr.	12000 hr.	14000 hr.	16000 hr.	18000 hr.	20000 hr.	22000 hr.	24000 hr.
Check Sump Oil Level (Fill If Necessary)	✓														
Check Pressure Operating Point and Controls	✓														
Check Oil Scavenger Line for Oil Flow	✓														
Drain Condensate from Air Receiver	✓														
Check Pressure Relief Valve for Operation (4)		✓													
Drain Condensate from Sump		✓													
Inspect/Clean Air Suction Filter Element		✓													
Inspect/Clean Finned Surface of Cooler (S)		✓													
Inspect Hoses for Signs of Wear		✓													
Check for Loose Fittings and Fasteners			✓												
Grease Motor				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check or Calibrate Pressure Sensor and Temperature Sensor					✓		✓		✓		✓		✓		✓
Check All Valves					✓		✓		✓		✓		✓		✓
Change Oil					✓		✓		✓		✓		✓		✓
Oil Sample				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Inspect Anti-Vibration Pads					✓		✓		✓		✓		✓		✓
Belt Tension/Replacement				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quarterly Maintenance Kit				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Half Year Maintenance Kit					✓		✓		✓		✓		✓		✓
Tune Up Kit															

Notes:

1. Change oil yearly if operating under 8000 hr. Lubricant may require more frequent changes depending on operating environment and running conditions. For oil life versus operating temperature, see chart on page 91.

2. Spin on separator will need to be replaced every 4000 hr or once a year.

* The maintenance intervals described herein are for normal operating conditions in clean and well ventilated environments. Frequency of intervals will increase for non-standard environments.

Service Kit Components:

Quarterly Maintenance Kit: (TT5-7) air filter element, oil filter, separator element; (TT10-50) air filter element, oil filter

Half year Maintenance Kit: (TT10-50) air filter element, oil filter, separator element

Tune Up Kit: (TT5-7) inlet valve, combination valve; (TT10-50) inlet valve, thermos valve, mini-pressure valve

Please refer to the Parts List for a more detailed description.



13.4 - MEASURES ON COMPLETION OF MAINTENANCE

After completion of the maintenance work and before switching the machine on, carry out the following steps:

1. Check all screw connections which were unfastened beforehand to make sure they are tightened.
2. Check whether all protective devices and covers removed beforehand have been reinstalled properly.
3. Ensure that all tools, materials and other items of equipment that were used have been removed from the work area.
4. Carefully open the compressed air network-side shut-off valve.
5. Clean the work area and remove any substances such as fluids, processing material or similar that may have escaped.
6. Ensure that all safety equipment on the machine functions perfectly.



14. TROUBLESHOOTING THE SCREW COMPRESSOR

Fault Description	Cause	Remedy	Personnel
Compression Temperature Too High	Intake or ambient temperature too high	Ventilate compressor room	Trained person
	Cooling air intake or outlet blocked	Unblock cooling air intake or outlet sufficiently	Trained person
	Oil contains contaminants	Replace the oil	Qualified personnel
	Oil low	Refill Oil	Qualified personnel
	Oil cooler contains contaminants	Clean the oil cooler	Qualified personnel
Network Pressure Drops	Compressed air consumption higher than delivery quantity of the screw compressor	Screw compressor with higher delivery quantity necessary	Manufacturer
	Intake filter clogged	Replace intake filter	Qualified personnel
	Relief valve discharges during compression	Check relief valve and replace gaskets if necessary	Manufacturer
	Intake regulator does not open	Check solenoid valve and plunger and replace if necessary	Manufacturer
	Leaks in the compressed air network	Seal the compressed air network	Qualified personnel
Screw Compressor Discharges Via Safety Valve	Minimum pressure valve blocked	Clean or replace minimum pressure valve	Manufacturer
	Safety valve faulty	Check safety valve and replace if necessary	Manufacturer
	Oil separator clogged	Replace the oil separator	Qualified personnel
"High Pressure" in Display	Oil separator clogged	Replace the oil separator	Qualified personnel
	Higher outside pressure present in compressed air network	Equalize outside pressure or disconnect from the network	Qualified personnel
Screw Compressor Does Not Start Automatically or Does Not Convey After Being Switched Off Beforehand by Reaching the Final Pressure or From Idle	Network pressure set too high	Reset network pressure	Trained person
	Interruption in the power circuit	Check power circuit for interruption	Qualified electrician
	Ambient temperature below +1 °C, message	Install auxiliary heating or regulate temperature of compressor room, and also contact the manufacturer	Qualified personnel
	Switching times are activated in the circuit	Check switching and pressure times in the circuit	Trained person



System Does Not Start Up When the Start Switch is Pressed	Network pressure higher than switch-on pressure	Observe network pressure and change settings	Trained person
	“Lokl” or “Remo” symbol flashes	Remote control activated	Trained person
	No voltage at the screw compressor	Check whether there is voltage	Qualified electrician
	Electrical fault in the controller	Check controller	Qualified electrician
Compressed Air Contains a Lot of Oil (oil Consumption Too High)	Return line for the oil is blocked	Clean or replace return line for the oil	Qualified personnel
	Faulty oil separator	Replace oil separator	Qualified personnel
System Stops Before Reaching The Final Pressure	Excess temperature or overpressure	Rectify fault	Qualified personnel
	Interruption in the control power circuit	Check power circuit	Qualified electrician
Pressure Drop	Pressure difference of the filters too high	Replace filter	Qualified personnel

14.1 - COMMISSIONING AFTER RECTIFYING A FAULT

After rectifying the fault, carry out the following steps for recommissioning:

1. Check all screw connections which were unfastened before-hand to make sure they are tightened.
2. Ensure that all tools, materials and other items of equipment that were used have been removed from the work area.
3. Check whether all protective devices and covers removed beforehand have been reinstalled properly.
4. Reset emergency stop equipment.
5. Acknowledge fault
6. Carefully open the compressed air network-side shut-off valve.
7. Make sure that there is nobody in the danger area.
8. Start the screw compressor



15. DISMANTLING AND DISPOSAL

Once the service life has ended, the machine must be dismantled and disposed of in an environmentally responsible manner.

15.1 - SAFETY INSTRUCTIONS FOR DISMANTLING AND DISPOSAL

- **Electrical System**



DANGER!

Danger to life due to electric current!

Danger to life in the event of contact with live components. Active electrical components may make uncontrolled movements and result in severe injuries.

- Switch off the electric power supply and secure it against a restart before starting to dismantle the machine.

- **Improper Dismantling**



WARNING!

Danger of injury due to improper dismantling!

Any residual energy stored, sharp-edged components, points and corners on or in the machine or the tools required can result in injuries.

- Before starting work, ensure there is sufficient space.
- Use caution when handling exposed sharp-edged components.
- Ensure the workplace is organized and clean! Loosely stacked components, or components and tools left lying around, are a source of accidents.
- Dismantle components properly. Observe what can be high inherent component weights. If necessary, using lifting equipment.
- Ensure components cannot be dropped or cannot fall over.
- Consult the manufacturer in the event of uncertainty.



15.2 - DISMANTLING

Before starting dismantling:

- Switch the machine off and secure to prevent a restart.
- Physically disconnect the entire power supply from the machine, allow stored residual energy to discharge.
- Remove operating materials and auxiliary materials, as well as residual processing materials and dispose of them in an environmentally responsible manner.

Then clean modules and components properly and disassemble them in compliance with the occupational safety and environmental regulations applicable locally.

15.3 - DISPOSAL

If no agreement has been made for return or disposal, recycle the dis-assembled components:

- Scrap metals.
- Recycle plastic elements.
- Sort other components by material properties and dispose of them separately.



NOTE!

Danger for the environment due to incorrect disposal!

Incorrect disposal can cause environmental hazards.

- Have electrical scrap, electronic components, lubricants and other consumables disposed of by certified specialist companies.
- If there are any doubts about environmentally responsible disposal, contact the local community authorities or specialist disposal company for information.

CONTINUED COMMITMENT

A company history that dates 170 years is a company history that, to us, is just the beginning. FS-Curtis is committed to offering a world-class portfolio of products. Through the dependability of our people and our quality-focused manufacturing, FS-Curtis will continue to be the most trusted and dependable name in compressed air serving even more markets through our ever-growing global presence.

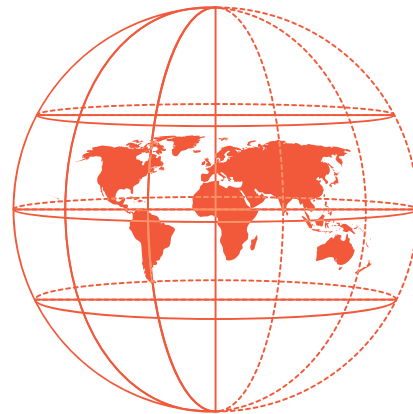


You can count on **FS-Curtis** to approach the next 170 years by staying true to the values and strengths that are appreciated by our customers today.

A WORLD OF DIFFERENCE

The FS-Curtis headquarters in St. Louis, Missouri, U.S.A. is the anchor of a larger global network. FS-Curtis builds quality products – and a quality reputation – at locations around the world.

In addition to our manufacturing and packaging locations, a large global network of sales agents and distributors ensures that sales and service support is available around the world, day in and day out.



ST. LOUIS, MO USA (HEADQUARTERS)

TAIPEI, TAIWAN (FUSHENG HQ) | SHANGHAI, CHINA (FUSHENG)
PITTSBURGH, PA USA (FS-ELLIOTT) | KONGEN, GERMANY (ALMIG)
PUNE, INDIA (FS-CURTIS) | HO CHI MINH CITY, VIETNAM (FUSHENG)

Distributed By:



CURTIS-TOLEDO, INC.

1905 KIENLEN AVENUE | ST. LOUIS, MO 63133

+1 314-383-1300 | WWW.FSCURTIS.COM | INFO@FSCURTIS.COM



CORPLITERATURE: FSC-TTREV1
Improvements and research are continuous at FS-Curtis. Specifications may change without notice.

© 2024 CURTIS-TOLEDO, INC.