



# ORIGINAL INSTRUCTION MANUAL

## RUNI SCREW COMPACTOR



Model SK200 - Serial no.: B178-2018

# 1. Table of contents

2.	EU - Conformity declaration .....	5
3.	Field of application .....	7
4.	Warranty and liability .....	7
5.	Safety around the machine .....	8
6.	Owner's responsibility .....	9
6.1	Disposal.....	11
7.	Technical specifications.....	11
8.	Control box - buttons.....	12
9.	Starting the compactor.....	12
10.	Operation using PLC – automatic operation .....	13
10.1	Machine halt when load outside the limit values.....	13
10.2	Reset* .....	13
10.3	Timers .....	13
11.	Operating the PLC and display.....	14
11.1	Levels of operation .....	14
11.2	Login .....	14
11.3	Display .....	14
11.4	Product 2 .....	17
12.	“QUICK MODIFY” .....	17
13.	Other parameters .....	18
13.1	Screw settings.....	18
13.2	Jaw settings.....	18
13.3	Other settings .....	19
14.	Factory settings.....	22
15.	Alarms / error messages.....	23
16.	EPS tips .....	24
17.	Electrical components settings.....	25
17.1	Photocells (optional extra) .....	26
17.2	Power converter to monitor the main motor/screw.....	26
18.	Configuring the hydraulic jaws .....	27
19.	The hydraulic system .....	28
20.	Starting the compactor for the first time .....	29
21.	Service and maintenance .....	29
21.1	Cleaning .....	30
21.2	Greasing.....	30
21.3	Re-tighten bolts .....	30
21.4	Gearbox .....	30
21.5	Main bearing.....	30

21.6	Hydraulic system .....	31
22.	Transportation instructions .....	31
23.	Installation .....	31
24.	Assembly and disassembly .....	32
25.	Glossary .....	33
26.	Contact .....	33
27.	Appendices .....	34
Appendix 1	Drawings and part lists	
Appendix 2	Assembly and disassembly instructions	
Appendix 3	Grease list / maintenance	
Appendix 4	Machine configuration	
Appendix 5	Qualification and training matrix	
Appendix 6	Gearbox	
Appendix 7	Hydraulic diagram and part list	
Appendix 8	Electrical documentation, PLC, power converter	
Appendix 9	Photocells	
Appendix 10	Speed control device	



## EU - Conformity declaration

# RUNI

### EU CONFORMITY DECLARATION

Manufacturer: **RUNI A/S**

**Industriparken 8  
DK-6880 Tarm  
Denmark**

**Tel.: +45 9737 1799**

Authorized to compile the technical file

**Søren Rossen Bech**  
Technical Director  
Industriparken 8  
DK-6880 Tarm

Hereby declares that:



Type:

**SK200**

Serial no.:

**B178**

Year:

**2018**

**Has been manufactured in conformity with:  
The requirements of the Council Directive 2006/42/EEC**

Relevant parts of the following standards are used:

<i>EN ISO 12100:2010</i>	<i>Safety of machinery - General principles for design - Risk assessment and risk reduction</i>
<i>EN 349 + A1:2010</i>	<i>Safety of machinery - Minimum gaps to avoid crushing of parts of the human body</i>
<i>EN ISO 13857:2008</i>	<i>Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs</i>
<i>ISO 13856-3:2013</i>	<i>Safety of machinery - Pressure-sensitive protective devices</i>
<i>EN 60204-1:2006</i>	<i>Safety of machinery - Electrical equipment of machines - Part 1: General requirements</i>
<i>ISO 13849-1:2015</i>	<i>Safety of machinery - Safety-related parts of control systems -- Part 1: General principles for design</i>
<i>ISO 13849-2:2012</i>	<i>Safety of machinery - Safety-related parts of control systems -- Part 2: Validation</i>

**Søren Rossen Bech**  
Technical Director

Date:

#### Aspects to assemblies of machinery

- When forming a section of an assembly of machinery §38 of the guideline to application of the machine directory shall apply.

#### Before being put into service according to Directive 2009/104

- Inspection by a competent person, shall be performed
- A work place assessment, shall be performed.

**Electrical power components in the machine complies with the requirements of the Council Directive 2014/35/EEC - Low Voltage Directive**

**Electronic components in the electrical equipment of the machine complies with the requirements of the Council Directive 2004/108/EEC - EMC Directive.**



### 3. Field of application

The screw compactor has been developed based on experience drawn from our briquetting machine. After trying out various counter pressure systems, we decided to use the principle of clamping jaws from our briquette presses. The clamping jaws – and the extrusion die – are the heart of the compactor. This system is protected by a utility model registration with the Danish Patent and Trademark Office.

**(Utility model registration no. DK 99500220 U3).**

The screw compactor is designed to process waste such as EPS (polystyrene foam)

To improve the processing of large EPS items, such as fish boxes, the screw is build with an integrated pre-crusher. The aim of the pre-crusher is to pulverise the material to the extent that the screw can pull it into the pressure chamber.

The compactor must not be used to compact hard, rigid components, as these can damage it. Dangerous materials, corrosive materials or explosive materials must not be compacted in the screw compactor - unless it has specifically been designed and built for this. Please note that some expanded polymer materials may contain excess flammable or explosive gasses for a longer time after production.

Only machines configured and approved specifically for gassy foamed plastics can be used for this purpose.

The manufacturer's warranty does not cover such misuse.

This machine is configured for compacting following material:

Degassed EPS (polystyrene foam)

### 4. Warranty and liability

**Warranty and liability in the event of human injury or machine damage are excluded if these are attributable to one or more of the following causes:**

- Use of the machine for purposes other than those it is designed for.
- Installation, commissioning, operation or maintenance of the machine by unqualified personnel.
- Use of the machine by unqualified or unauthorised personnel.
- Use of the machine with defective safety devices, incorrectly fitted or non-functional safety and protection systems.
- Failure to comply with directions in the instruction manual relating to transport, set up, commissioning, operation and maintenance of the machine.
- Structural modifications to the machine.
- Inadequate monitoring of machine components subject to wear.
- Repairs carried out by unqualified personnel.
- Failure to adequately remove compacted material.
- Repair or disassembly has been carried out during the warranty period by anyone other than the supplier's technicians, except where agreed otherwise.

- Interference from foreign bodies, disaster or Force Majeure.

### Interfaces:

- If the machine is integrated into an existing system, new hazard points may arise at the interfaces.
- RUNI A/S is not liable for any such new hazard points which arise due to integration of the machine into an existing system or production process!
- Our conformity declaration is nullified in such cases.

## 5. Safety around the machine



**No unauthorised access**

The machine must not be started if any **exposed persons\*\*** are within the **danger zone\***.

If an **exposed person** is within the **danger zone** (e.g. during inspection, service or maintenance), the following precautions must be observed:

- 1) Power must be disconnected from the machine.
- 2) A padlock must be attached to the repair isolation switch.
- 3) There must be clear indication that the machine is not to be started.

The operator must ensure that no **exposed persons** are within the **danger zone** while the machine is in use.

\* **Danger zone:** all areas in and around the machine which represent a threat to the health and safety of an exposed person while the machine is being operated. Please pay attention to the following areas: hopper, screw, pressure chamber and electrical components.

\*\* **Exposed person:** any person located partially or fully within the danger zone.



**Climbing into the hopper is expressly prohibited**  
**Climbing into the pressure chamber when it is empty is expressly prohibited.**  
**It is prohibited to climb on the machine.**  
**It is prohibited to operate the machine with damaged safety devices, not properly placed or not functioning safety and protective devices.**



Some polystyrene materials may contain flammable or explosive foaming gasses for a longer time after production.

Only machines configured and approved specifically for gassy polystyrene can be used for this purpose.



Please note that the machine starts up automatically when it has been configured to do so.



Read these safety instructions thoroughly before operating the machine. The safety instruction is placed on the control box.

Compacting of the waste materials may result in spores, germs, gasses and chemical substances and the like may be released and contaminate the working area. Staying near the machine you must always wear personal protective equipment that protects against the relevant substances.

Manual feeding of the screw compactor may cause physical disabilities. The user must make sure that the work is planned with sufficient variety to prevent disability damages.

The screw compactor is developed and produced for industrial use and use in warehouse areas in connection with shops or similar. The screw compactor must not be used for private purposes, in schools or in sheltered workshops.

The screw compactor must only be used by trained personnel.



**Safety instruction**

Only trained personnel should operate and adjust the machine. Always follow the safety instructions.

Before service/adjustment/repair you must read the manual. If there is no manual do not start adjustment, repair or separation of the machine.

**NEVER PUT YOUR HANDS INTO THE MACHINE WHEN RUNNING!**

Keep loose clothes, jewellery and long hair away from the rotating parts.

Use personal protective equipment to the extent that it is required for the job!

All safety devices of the compactor must be whole and functional. Defects must be reported immediately to the person responsible.

Any unauthorized separation should only happen with disconnected power plug or a locked main switch.

Must be earthed in accordance with high voltage notification EN 60204-1.



To avoid noise and stress, operators must always wear approved hearing protection due to the loud noises which arise when material is pre-crushed and compacted. The compactor itself has a sound level of approx. 55 dB. The noise which arises as material is processed can vary greatly depending on the material.

The noise level in the area in which the operator needs to work can reach 92-113 dB(A, C). Other personnel in the vicinity should also be offered hearing protection if the noise exceeds 80 dB (A). Hearing protection is recommended in all circumstances. It is important that the working area is clearly marked with the compulsory (blue) hearing protection symbol where the use of hearing protection is required.

Please note: the ability to orient oneself may be effected when wearing hearing protection. The user must make sure that the area is designed in a way that does not cause any danger for the operator and others.

## 6. Owner's responsibility

The owner is responsible for ensuring that the operator has the necessary skills (see appendix 5)

The operator must ensure that no **exposed persons** are within the **danger zone** while the machine is being operated.

As the use of the RUNI Compactor is outside our control, we can only guarantee the quality of the machine and cannot accept compensation claims of any kind in relation to its performance.

Any form of personal injury resulting from the presence of **exposed persons** within the **danger zone** is solely the responsibility of the owner.

It is the owner's responsibility to ensure that the machine is installed in accordance with local regulations. Please give special attention to ensuring that:

- the control box is protected by an external circuit breaker,
- the control box is correctly connected to earth,
- no ladders, platforms or other objects for stepping on to around the screw compactor have been mounted, so safety distance to dangerous areas is reduced or risk of falling onto or into the screw compactor is possible.
- the machine is not integrated with other machinery, without consideration being given to safety, and the entire system being CE-labelled.
- The screw compactor must not be operated with damaged safety devices, not properly placed or not functioning safety and protective devices.

It is the user's responsibility that the screw compactor is undamaged and correctly maintained. Please pay attention in particular to:

- All protective devices are undamaged and in accordance with the documentation
- Bearings are greased in accordance with the instruction and with the correct grease
- Cable, pressure hoses and safety circuit are checked and replaced in accordance with instruction.

It is the user's responsibility that only trained personnel can operate the screw compactor. In particular please pay attention to:

- Isolation switch is turned off and locked when trained personnel is not operating the machine.
- The instruction includes all safety devices in this instruction manual.
- Animals, children, mentally disabled people and private people do not have access to the danger zone, to operate the machine deliberately or unintended, neither to climb on or in the machine.
- Instruction includes correct protection and protective gear when standing close to the machine – this includes protection against noise and protection against relevant substances. Compacting of waste material may cause that spores, germs, gasses and chemical substances etc. are released and may contaminate the working area.
- The compactor must only be used for the approved purpose. Please note that some polystyrene materials may contain flammable or explosive foaming gasses for a longer time after production. Only machines configured and approved specifically for gassy polystyrene can be used for this purpose.



### **WARNING!**

**The operator must not wear long, loose clothing, such as a long scarf, that can be caught and drawn into the machine.**

All screws and bolts must be checked and tightened where necessary at regular intervals.

**Emergency stop** is used in dangerous situations and the machine must be brought to halt. **By ordinary operation the machine is stopped by pressing "STOP" on the touch display.**

## 6.1 Disposal



Packaging should be disposed of in accordance with local regulations covering disposal of the packaging materials used.

The machine has been manufactured using materials which cannot be disposed of together with household waste.

Empty the machine of oil and grease and close all connections. Uninstall and disassemble the machine for disposal in accordance with the applicable local regulations for disposal of the individual components.

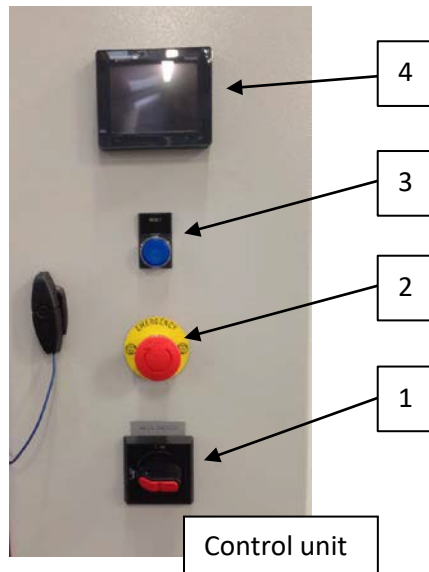
## 7. Technical specifications

Type	:	SK200
Serial number	:	B178
Year of manufacture	:	2018
Dimensional drawing no.	:	5000008441
Drawing no.	:	5000005680, 5000007255, 5000012196, 5000014048, 5000007932, 5000007942
Main dimensions (HxWxD in mm)	:	1466 x 3800 x 505
Weight	:	Approx. 0.5 tonnes
Main motor max. load	:	4 kW
Required power connection	:	3 x 480 V + earth, 60Hz
Fuse	:	Max. 16 A gL/gG
Electrical diagram no.	:	3-356-232-V01-01
Software version	:	17.05
Display	:	HMIS5T
Noise	:	Under no load: 55 dB Under load: 92-113 dB
Designed servicelife	:	10 years

## 8. Control box - buttons



Power unit



Control unit

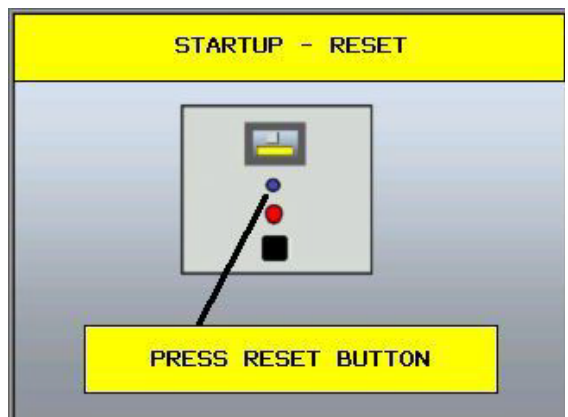
Item	Label	Name	Function and comments
1		Repair isolation switch - lockable	Disconnects all power to the compactor
2		Emergency stop	
3		Reset*, Fault – blue	Blue light
4		Display	Described in section 11.3

## 9. Starting the compactor

To start the machine/controller:

1. Turn the repair isolation switch (section 8, item 1) to the on position.  
Following approx. 15 seconds of initialisation, a start-up image is shown on the display.
2. Check that the emergency stop button (section 8, item 2) is pulled out (power enabled).
3. Check that any external emergency stop switches, panel switches and safety wire switches are enabled.  
Press “reset”\* (section 8, item 3) and the blue light should go out.

If the compactor has stopped and the blue light is lit, you must press “reset”\* before the machine can start again.



## 10. Operation using PLC – automatic operation

This section only applies to automatic operation of the machine.

During manual operation, the operator assumes full responsibility for the machine.

### Speed control

Under this method, the PLC continually measures the speed (“PROD. SPEED”) at which the compacted block is being ejected from the machine. The speed is measured using a speed control device positioned above the stabilising chamber. In addition to the desired production speed (“PROD. SPEED”), the “DB+” and “DB-” values are used to set how much this speed is permitted to vary before the controller should make a correction.

The lower the production speed defined, the higher the degree of compaction achieved.

Example: The machine is operating with a production speed of 80 (mm/min), “DB+” is set to 5 (mm/min) and “DB-” is set to 3 (mm/min). The PLC will clamp the jaws downwards when the production speed exceeds 85 mm/min. and open them when the speed falls below 77 mm/min.

### 10.1 Machine halt when load outside the limit values

If the PLC is unable to bring the production speed within the defined limit values by adjusting the jaws, the controller will stop the compactor after a predefined time limit. This helps prevent material meltdown from occurring in the machine.

If the compacting screw of the machine is blocked by a big hard foreign object in the waste material:

- dis-connect and lock the isolator switch
- the machine must be dismantled to remove the blockage.

### 10.2 Reset\*

If an error occurs the machine stops and the blue light is lit. The reason is shown on the display. In order to start the machine again, you must first press “reset” so the blue light goes out. Remember to address the problem first.

### 10.3 Timers

The PLC\* has several built-in timers. For example, there is a brief delay during start and stop to avoid the machine starting/stopping at the exact time a photocell, etc., detects material or an absence of material. This is to avoid the machine starting and stopping very frequently.

There is also a timer to stop the hydraulic pump when the jaws are pressed together to their limit. This timer has been incorporated to reduce:

1. Operating time for the hydraulic pump, hence increasing its lifetime.
2. Heat generation, and hence the oil temperature, to increase the lifetime of the pump.

There are also timers which count the machine’s operating hours. After 100 hours of operation, the machine’s primary bearings must be greased. A message is shown on the display to this effect. It is also possible to view the machine’s total operating hours.

## 11. Operating the PLC and display

### 11.1 Levels of operation

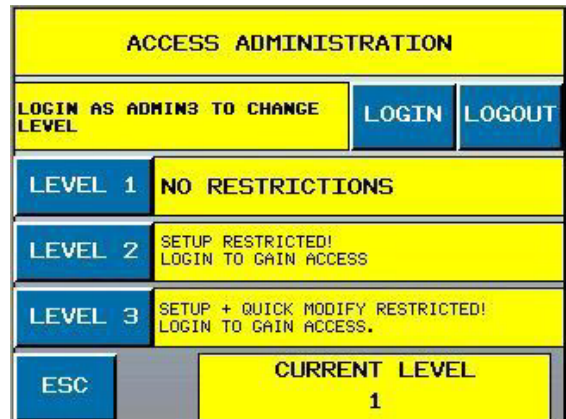
“LEVEL 1”: full access to change SETUP parameters

“LEVEL 2”: limited access. This level only permits access to changing QUICK MODIFY parameter without an access code

“LEVEL 3”: no permission to make any changes without an access code

If you wish to change the machine's access level you need to log in as user: ADMIN3 with a password.

Depending on your user status, you will have permission to change specific parameters.



### 11.2 Login

Name	Description
ADMIN1	User login
ADMIN2	Super user login
ADMIN3	Administrator login

Follow this procedure to log in:

Press the “LOGIN” button and this screen will be displayed.

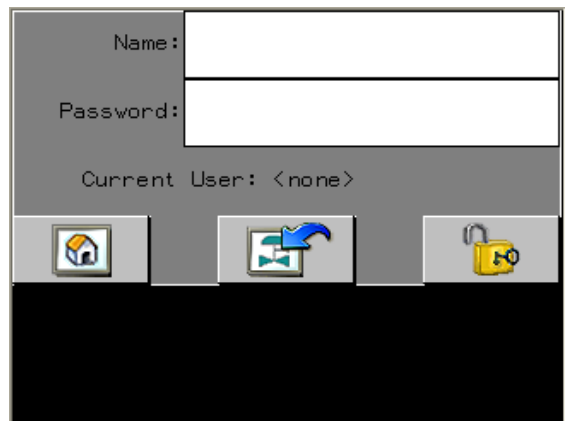
Press the field next to “Name:” and enter the username

Press the field next to “Password:” and enter the password (press the “123” button to bring up the numeric keypad)

Then press the padlock button – the PLC will be unlocked for a period of 5 minutes.

Return to the “ACCESS ADMINISTRATION” menu by pressing the

The new access level can now be set/selected.



button

### 11.3 Display

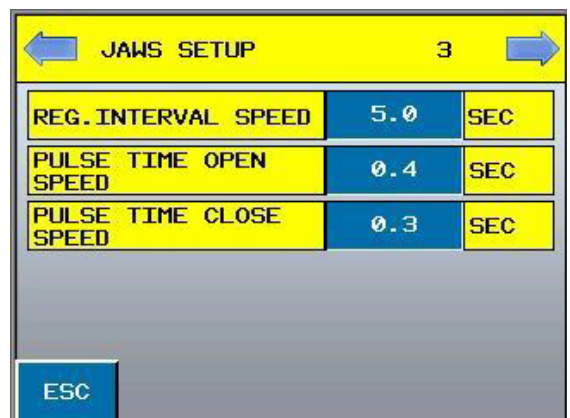
All settings/adjustments to the controller/PLC take place via the touchscreen.

**Yellow fields:** Display fields

**Blue fields:** Touch-sensitive fields

ESC: Touch to return to menu

**Blue arrows in the top corners:** Use these to page to the next/previous menu



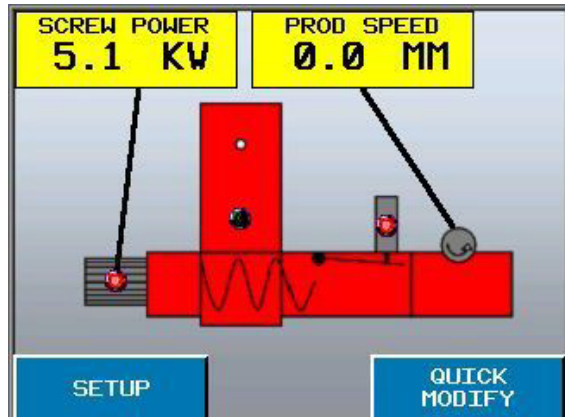
**Shaded blue fields:** You have no permission to make changes in the given menu (See levels of operation, section 11.1)



## START SCREEN

This screen is displayed whenever the machine is started or reset.

**The top yellow fields** displays the current power consumption for the main motor and the production speed. From this screen you can access "SETUP" or "QUICK MODIFY"



**The glowing points with the 2 motors** for respectively jaws and screw glow in the following colors.:

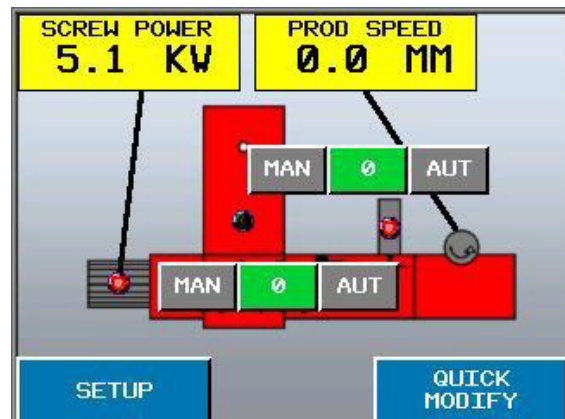
**Green:** at "AUTO" (automatic) operation

**Red:** at "0" (power is off)

**Yellow:** at "MAN" (manual) operation

On the hopper the point for the pre-crusher turns green when the sensor spots material.

To choose the operation mode of the jaws/screw press the motor on the display, following screen will appear:



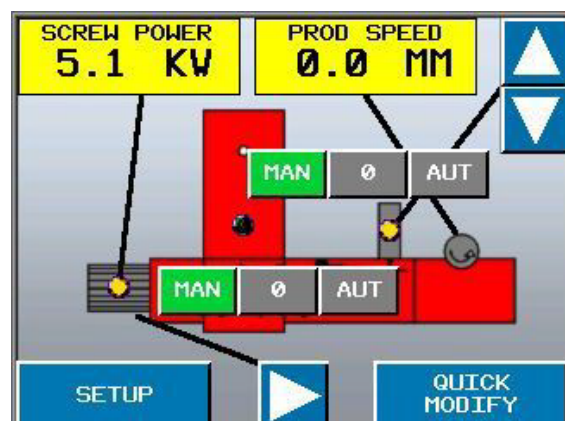
On the grey menu for each motor you choose between :  
MAN – 0 – AUT.

To get back to the start screen without the grey menu touch the point for the motor again.

The chosen menu area shows green (here 0), and therefore the point for the motor is red.

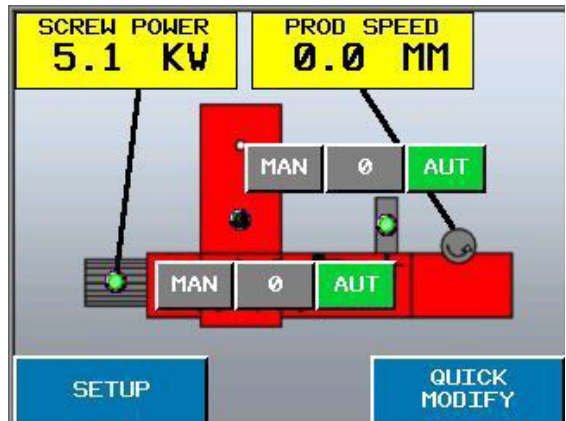
Here "MAN" is chosen and the point for the main motor glows yellow for manual operation. The arrow ref. to the main motor must be touched to run the screw.

To stop the motor again, when running in "MAN", touch the arrow again or the "0" in the grey menu.



There is also chosen MAN for the jaws. And you can adjust the jaw up and down by pressing the arrows. When you stop pressing the arrow the adjustment will stop.

Here AUTO is chosen and the points glow green. After about 10 sec. the next screen will appear. To go quicker to the next screen touch one of the yellow areas in the top.



### STATUS SCREEN

This is the **STATUS SCREEN** while operation in AUTO. You have to touch the START AUTO area to operate the compactor automatic ref. to the settings in the PLC.

When you have started the automatic operation the START AUTO area will light green (and the STOP area will be dark red). When the machine is stopped the STOP area will light red (and the START AUTO area will be dark green).

To stop the automatic operation touch STOP.

To return to the start screen press "ESC".



This is the status screen while operation in manual.

The measured production speed will be displayed, i.e. the speed at which the compacted material is being ejected from the machine per minute.



### CHANGING PLC SETTINGS/PARAMETERS

If you press on one of the blue fields containing a numeric value to change it, a screen will be displayed to allow you to enter the change (the value will be displayed in the top field).

Type the desired value and then press "ENTER" to return to the screen you have modified.



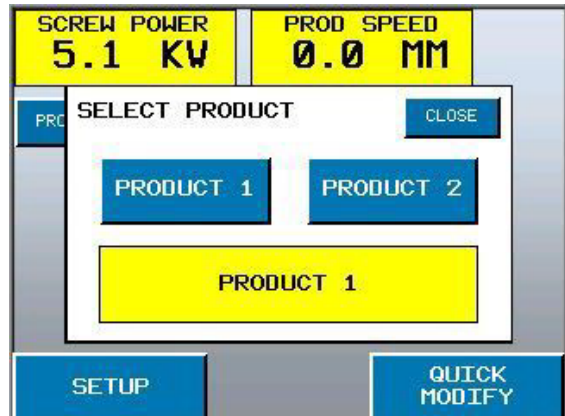


## 11.4 Product 2 (optional extra)

If handling of two material types has been selected in RUNI SETUP 1, the start screen will display a blue “PRODUCT” field. This field will only be shown if both motors is powered off – lights red.

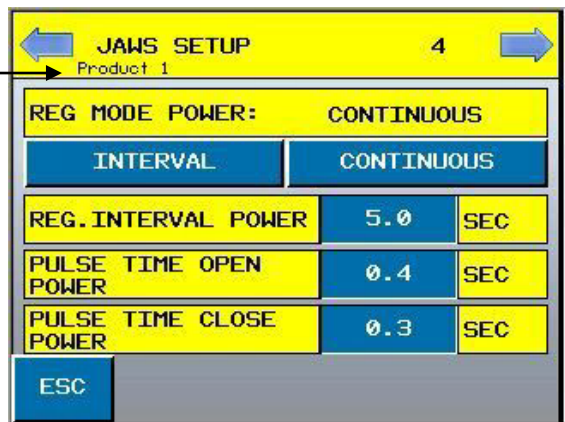
Press the PRODUCT field to display this screen, which allows you to choose the type of material being handled (determines which set of parameters is used to control operation).

Press “PRODUCT 1” or “PRODUCT 2” as appropriate.



The various screens will indicate which product has currently been chosen for operation. Only the parameters relevant to the selected product will be displayed on the screens.

Product 1 selected



### IMPORTANT:

When you want to change from one product to the other, the machine must be completely halted and all functions (screw and jaws) set to 0.

## 12. “QUICK MODIFY”

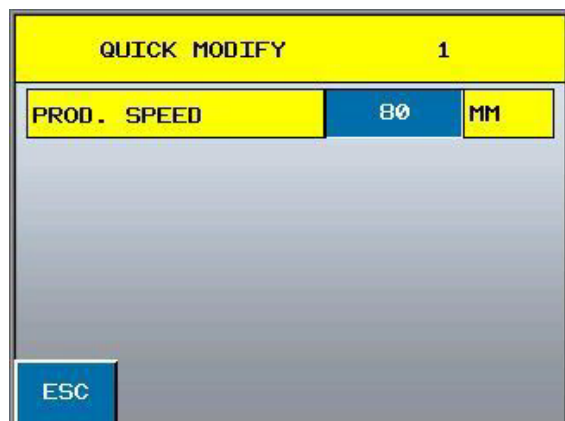
Press “QUICK MODIFY” on the start screen to display a menu where the parameter most commonly adjusted is easy to find.

When compacting material such as EPS it can be necessary to adjust the speed value in response to changes in the weather (and hence temperature and air humidity), in order to achieve a satisfactory result.

(See section 16 for tips in relation to compacting EPS)

### “QUICK MODIFY”

“PROD. SPEED” (production speed) is the speed at which the compacted block is ejected from the machine.





The machine thereby monitors itself to ensure it is working as configured. This helps ensure that the material does not melt down.

If the machine stops because of one of these timers, this will be indicated on the display.

### “JAWS SETUP 2”

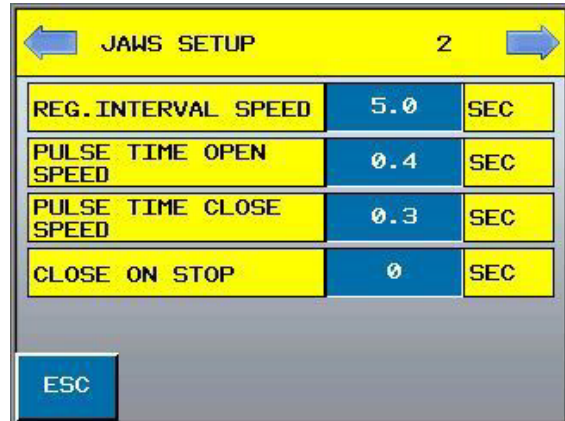
“REG. INTERVAL SPEED” defines that the jaws will be adjusted every X seconds. This time interval has been defined to give the speed controller time to perform a new measurement after making adjustment.

“PULSE TIME OPEN SPEED” and “PULSE TIME CLOSE SPEED” define how much time the machine has available to adjust the jaws.

#### “CLOSE ON STOP”

This allows the machine to close the jaws for a period of time when the machine stops. If the machine has to wait for material it may be necessary to close the jaws after a stop. This is because the speed controller is better at finding the right speed when the speed has to be increased rather than decreased. The machine should therefore start with a low speed every time it starts up.

*Recommended value: 0-3 sec.*

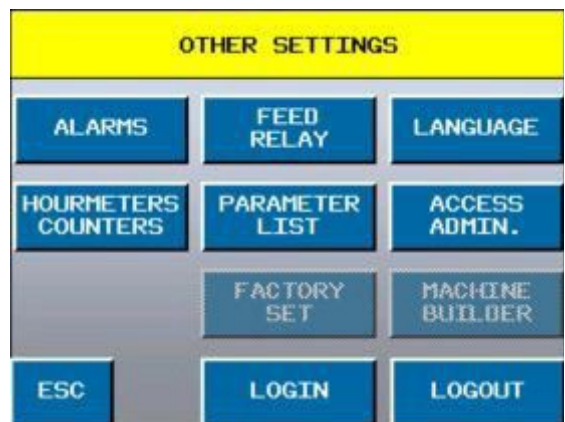


## 13.3 Other settings

Pressing the SETUP field on the STATUS SCREEN and you will also be able to touch the field “OTHER SETTINGS”.

Pressing this button brings up the following screen, from which a number of sub-menus can be selected.

Select the desired sub-menu.



### “ALARMS”

Select this screen to view alarms which have occurred since the machine was last started (on some machines history will be stored even following power disconnection).

If/when an alarm occurs, this screen will be displayed. The factor which gave rise to the alarm will be highlighted with a red background.

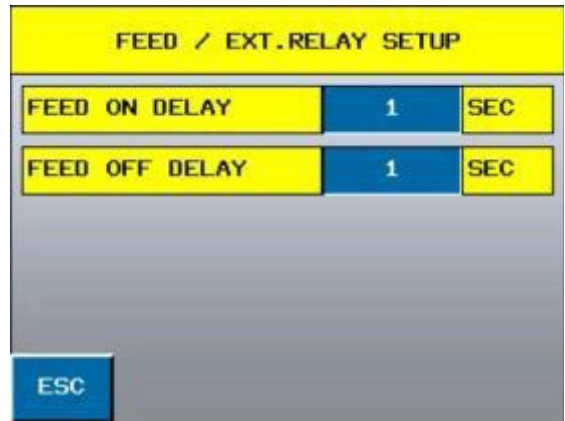
See section 15 for a description of the various alarms/error messages.



### “FEED / EXT. RELAY SETUP”

This is a relay function (NO/NC) used to let the compactor's sensor control external feeder equipment (feeder auger, feeder conveyor belt, etc.)

When this function is used to control a feeder, delays can be added for starting and stopping the feeder, via the “FEED ON DELAY” and “FEED OFF DELAY” parameters.



### “LANGUAGE”

Use this screen to select the language to be used on the display (not all languages are available).

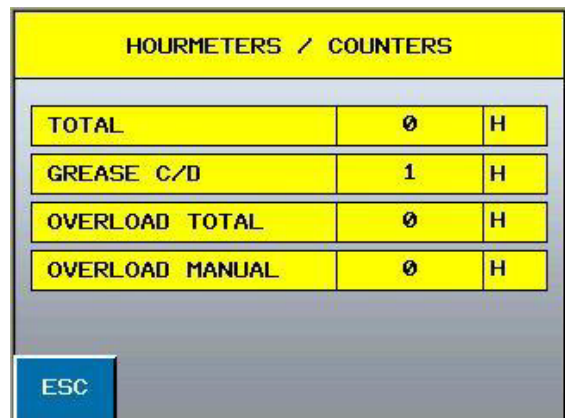


### “HOUR METERS/COUNTERS”

“TOTAL” shows the total hours of operation – this counter cannot be changed or reset.

“GREASE C/D” means “Grease Count Down”. This timer starts at 100 hours and counts down to 0. When it reaches 0, an alarm is displayed indicating that the main bearings need to be greased. The machine can continue to operate in this alarm state, but the reset lamp will flash until the hour counter has been reset.

**Resetting the hour counter:** After greasing the bearings, the counter can be reset by holding in the reset button continuously for 10 seconds. This counter can be reset at any time irrespective of its current value.



“OVERLOAD TOTAL” shows the total number of hours the machine has operated above the max. kW rating. “OVERLOAD MANUAL” shows how many hours the machine has operated above the max. kW rating during manual operation.

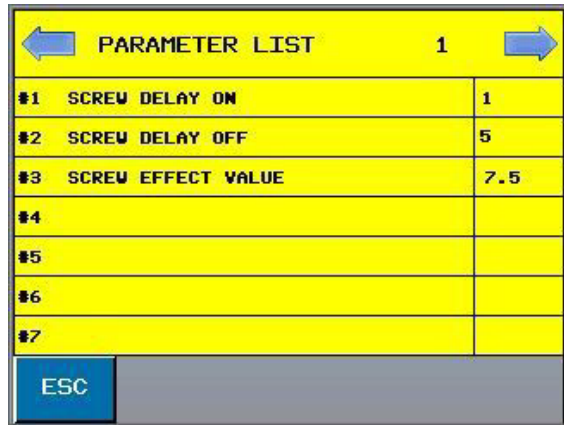
### “PARAMETER LIST”

This is a list displaying all parameters.

The list is several pages long – use the arrows in the top corners of the screen to page.

These fields are display only – the parameters cannot be changed via this menu.

The numbers in the list of factory settings (section 14) refer to the numbers in this parameter list.



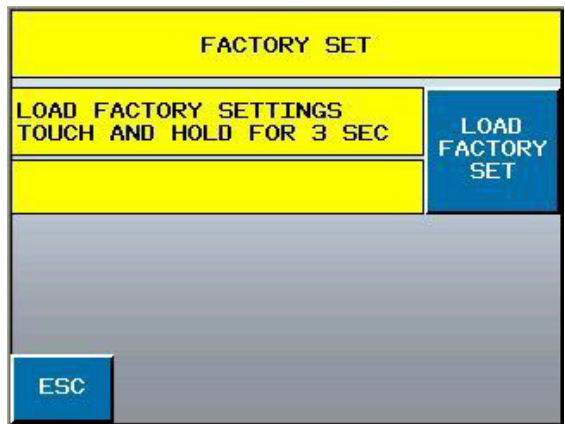
PARAMETER LIST		1
#1	SCREW DELAY ON	1
#2	SCREW DELAY OFF	5
#3	SCREW EFFECT VALUE	7.5
#4		
#5		
#6		
#7		

ESC

“ACCESS ADMINISTRATION” This has been explained in section 11.

### “FACTORY SET”

Press the “LOAD FACTORY SET” button continuously for 3 seconds to reset the PLC parameters to factory settings. (Requires login with the ADMIN 3 password).



### “MACHINE BUILDER”/“RUNI SETUP”

Parameters in the machine builder section can only be changed by RUNI or RUNI's certified dealers.

This section is described in appendix 4.

“RUNI SETUP 3” is active when operation is limited to a fixed period of time (e.g. one month at a time). In this case, see the instructions in the appendix for entering a new code.



## 14. Factory settings

The numbers in the first column refer to the parameter list which can be viewed under “OTHER SETTINGS”.

No.	Description	Unit	Factory setting	Setting after commissioning	Current setting
	<b>SCREW SETUP</b>				
1	SCREW DELAY ON	sec	1		
2	SCREW DELAY OFF	sec	5.0		
	<b>JAWS SETUP</b>				
8	PROD. SPEED	mm	80		
9	DB+	mm	3		
10	DB-	mm	3		
11	TIMEOUT SPEED ALARM DB+	sec	60		
12	TIMEOUT SPEED ALARM DB-	sec	60		
15	REG. INTERVAL SPEED	sec	5.0		
16	PULSE TIME OPEN SPEED	sec	0.4		
17	PULSE TIME CLOSE SPEED	sec	0.3		
18	JAWS CLOSE ON STOP	sec	0		
	<b>FEED / EXT. RELAY SETUP</b>				
22	EXT. RELAY FUNCTION		ALARM		
23	FEED ON DELAY	sec	0		
24	FEED OFF DELAY	sec	0		
	<b>OTHER SETTINGS/RUNI SETUP</b>				
25	ACCESS LEVEL		1		
29	OPER. CODE PERIOD		0		
30	CURRENT OPER. CODE		0		
31	PRODUCT NO. 2		OFF		
32	LANGUAGE		ENGLISH		
33	OPERATION CODE		DEACTIVATED		
34	SPEED CONTROL		MODEL 2		
	ROTATING SENSOR		OFF		

## 15. Alarms / error messages

When an alarm occurs, a screen is displayed on which the error is described. This screen also shows which alarms have occurred since the machine was last started (on some machines history will be stored even following power disconnection).

The following error messages can be displayed:

### “EMERGENCY STOP ACTIVATED”

This message is displayed if the machine has been shut down, if an emergency stop button has been pressed (on the control panel or an external emergency stop) or a door switch has been activated.

Possible fault and rectification:

1. Check whether the emergency stop button (section 8, item 2) is pulled out and thereby closed.
2. Check that any external emergency stop buttons and door switches are deactivated.

Press “reset”\* to resume operation.

### “THERMAL FAULT”

This message is displayed if the motor has been overloaded and the thermal relay has dropped out.

Possible fault and rectification:

1. A foreign body has entered the machine and blocked the pre-crusher or the screw. Inspect and remove if necessary.
2. The main motor is operating above its maximum rated power/amperage. Lower the limit values slightly if necessary.
3. The pre-crusher is exceeding its power rating and cannot handle the amount of EPS being added or the hardness of the EPS. Add smaller amounts of EPS. Open the control box and reactivate the protective motor switch\* which has dropped out.

Press “reset”\* to resume operation.

### “GREASE BEARINGS NOW”

If the “GREASE BEARINGS NOW” message is displayed it is time to grease the main bearings. After greasing the main bearings (see section 21.5 – Main bearings) reset the hour counter and hence the alarm.

To reset the counter, press and hold the reset button for 10 seconds.

### “TIMEOUT SPEED LIMIT LOW”

This message is displayed if the machine has operated at too low a production speed for longer than permitted (defined in “JAWS SETUP 1”).

Possible fault and rectification:

1. There is not enough material in the machine to reach the required speed. Investigate material feeding.

Date	Time	State
12/11/14	15:37:15	ACTIVE
CODE EXPIRED. PLEASE ENTER NEW		
12/11/14	15:45:19	ACTIVE
EMERGENCY STOP ACTIVATED		

ESC 15:45:24 14/11/2012

2. There may be an electrical or hydraulic problem with opening/closing the jaws. Change the jaws to manual operation and check whether they can open/close.  
Press “reset”\* to resume operation.

#### **“TIMEOUT JAWS OPEN SPEED LIMIT”**

This message is displayed if the machine has operated with lower than permitted production speed for longer than permitted in “JAWS SETUP 1 - TIMEOUT SPEED ALARM DB-”.

Possible fault and rectification:

1. The one-way restrictor valve\* may be set too tight, such that the jaws open too slowly. If so, it should be loosened.
2. There may be an electrical or hydraulic problem with opening/closing the jaws. Change the jaws to manual operation and check whether they can open/close.
3. There is not enough material in the machine to reach the required speed. Investigate material feeding.

Press “reset”\* to resume operation.

#### **“TIMEOUT JAWS CLOSE SPEED LIMIT”**

This message is displayed if the machine has operated with higher than permitted production speed for longer than permitted in “JAWS SETUP 1 – TIMEOUT SPEED ALARM DB+”.

Possible fault and rectification:

1. Increase the time allowed in “JAWS SETUP 1 – TIMEOUT SPEED ALARM DB+”.
2. There may be an electrical or hydraulic problem with opening/closing the jaws. Change the jaws to manual operation and check whether they can open/close.

Press “reset”\* to resume operation.

#### **“CODE EXPIRED. PLEASE ENTER NEW OPERATION CODE”**

The machine is operating for a limited period and needs a new code before the end of the third day of the month. (optional extra, see appendix 11)

#### **“CODE EXPIRED. OPERATION PROHIBITED. ENTER NEW CODE”**

The machine is locked and a code must be entered before it can be restarted. (optional extra, see appendix 11)

## **16. EPS tips**

1. Be careful to ensure that EPS\* does not melt inside the machine. If an EPS meltdown occurs, the machine will usually have to be disassembled. Disassembly can be very difficult following an EPS meltdown.
2. If the machine experiences a fault and the blue light is lit, do not simply press reset. Read the error message on the display first. If reset is pressed several times without addressing the problem, melt-

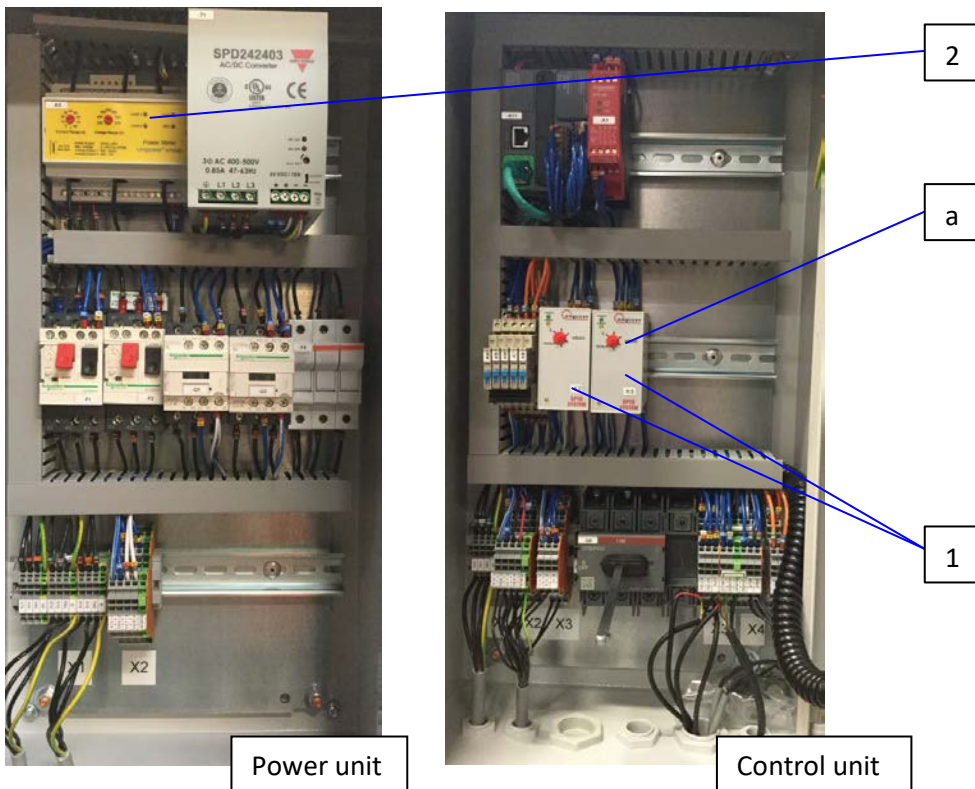


down usually occurs.

- 3 If the machine does not stop and the hopper is empty, it is usually due to dirt on the tips of the sensors. Clean the sensors.
- 4 The timer under “SCREW SETUP – DELAY OFF” must be so short that the screw does not run out of EPS. If the screw runs out of EPS before the machine stops, the load will drop, and it will take time before the desired load is regained. This causes the machine to work unevenly and significantly increases the risk of meltdown.
- 5 A 10 cm compacted EPS block should weigh 1 kg. 20 cm = approx. 2 kg. 40 cm = approx. 4kg. etc. It is important to always monitor the weight of the blocks. If they are generally too heavy, the speed value must be increased to protect against meltdown. If they are too light, the speed value must be reduced to ensure the blocks remain cohesive. It can be necessary to adjust the speed value, especially if the surrounding temperature changes, or if the moisture content in the EPS changes.
- 6 When EPS melts, it becomes like chewing gum/dough while it is hot. NB: When molten EPS cools down it becomes very hard, and in some cases the screw becomes stuck.
- 7 RUNI has many customers who have had many years of satisfaction with their compactors. Problem-free operation is only possible if the bearings are greased regularly. The machine must be greased at the correct intervals and with the correct amount of grease in order to continue to function properly.

## 17. Electrical components settings

### Control components



Item	Name	Comment
1	Amplifiers for photocell	
a	Red adjusting switch for photocell	
2	Power converter to monitor the main motor/screw	AMP 380

## 17.1 Photocells (optional extra)

The photocells detect when there is sufficient material in the machine to start.

The manufacturer's instructions must be carefully followed. See the photocell datasheet (appendix 9).

### Configuring sensitivity

Sensitivity is set at the factory.

Adjustment is best done by trial and error.

The sensors can sometimes be triggered by dust and steam. If so, it is necessary to adjust the sensitivity using the adjustment dial (a).

The amplifier relay has 3 LEDs:

Green LED:	Supply	Indicates the relay has power.
Yellow LED:	Adjust	Indicates that the photocells can see each other
Yellow LED:	Operation	Indicates that the photocells cannot see each other

## 17.2 Power converter to monitor the main motor/screw

The manufacturer's instructions must be carefully followed (See appendix 8).

## 18. Configuring the hydraulic jaws

### Hydraulically activated pressure plate

The pressure plate presses down and is raised automatically using a hydraulic system. This consists of a hydraulic cylinder and pump, and electronic controls.

The hydraulic cylinder is bidirectional and is attached to the top of the compression chamber. The piston rod is attached to the moveable pressure plate.

The components of the hydraulic pump are described in the next section and in appendix 7. The electronic controls are built into the control box.

### Setting and adjusting the oil pressure

**The pressure relief valve (section 19, item 6) should be set between 80-200 bar, depending on the material.**

***Recommended value: 150 bar***

Remove the cap from the pressure relief valve (item 6).

Loosen the nut on the pressure relief valve slightly, as it tightens against the adjustment screw.

Loosen or tighten the socket head screw until the desired pressure is achieved, then counter tighten the nut and replace the cap.

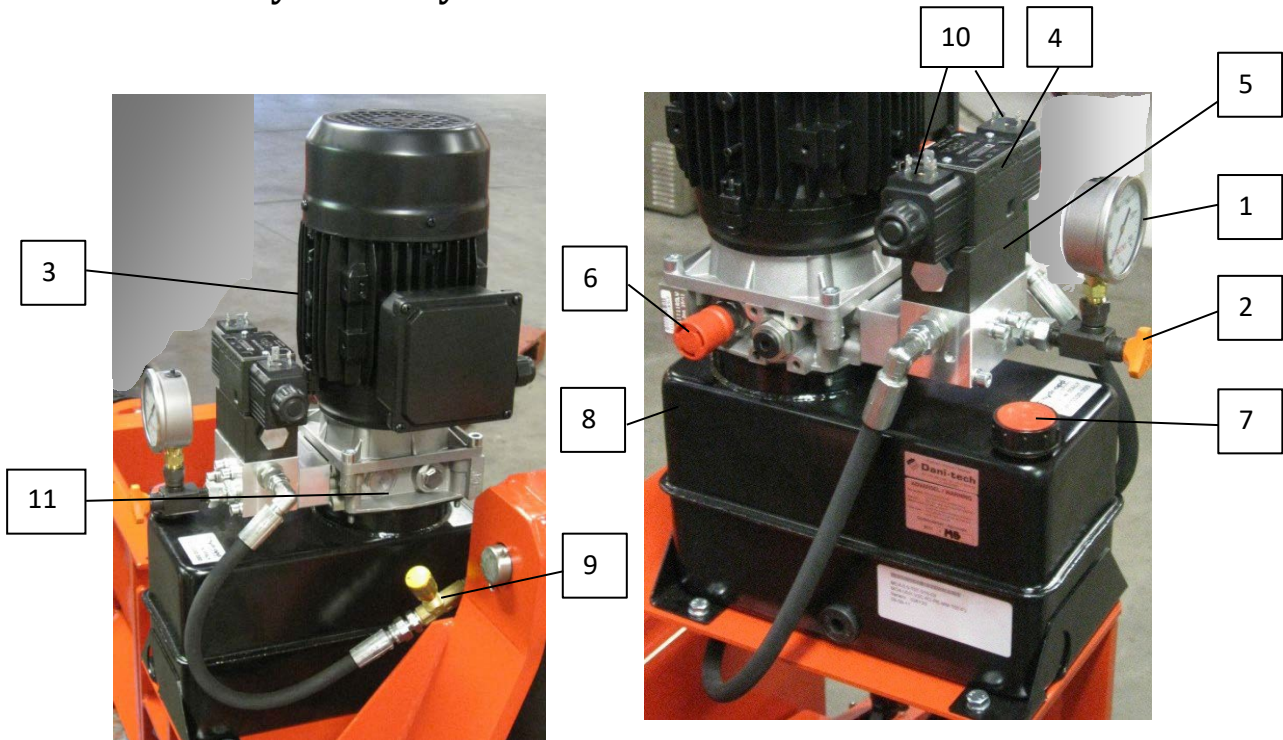
This is done while raising the jaws manually and keeping them continually activated such that the hydraulic cylinder is at the end of its travel and the maximum pressure is therefore built up and can be read.

**Set the one-way restrictor valve (section 19, item 9) to configure the right opening speed.**

It is very important that the one-way restrictor valve is set such that the opening speed of the hydraulic jaws is adequately low.

The speed is generally set to approx. 1 mm/second. The easiest way to do this is to manually close the jaw fully and then note its position. Open the jaw continuously for 10 seconds and then measure how many millimetres the jaw has opened – it should have opened approx. 10 mm.

## 19. The hydraulic system



Item	Name	Description
1	Manometer	0-250 bar 1/4 RG
2	Manometer tap	ES090
3	Electric motor	0.66 kW, 3×480V 60 Hz
4	Double solenoid valve NG06	24VDC
5	Pilot operated non-return valve NG06	
6	Pressure relief valve NG06	ADJUSTABLE
7	Filling cap	
8	Oil tank	7 L
9	One-way restrictor valve*	
10	Rectifier plug	24V DC
11	Flange for pump station	2000000659

## 20. Starting the compactor for the first time

### Starting up an empty compactor

When starting up an empty compactor, there is no compacted material in the pressure chamber and hence no initial counter pressure.

It is therefore necessary to generate counter pressure manually. This is done as follows:

1. Select “MAN” screw operation and “MAN” jaws operation (motor points on the display will light yellow, see section 11.3)
2. Check that the screw’s direction of rotation is correct (counter clockwise, viewed from the gearbox end).
3. Drive the movable jaw right up by pressing the up arrow on the touchscreen.

Stop the machine and lock the isolation switch. Feed new material “backwards” into the pressure chamber until it is completely full).

Unlock the isolation switch and continue “MAN” operation of screw and jaws. Drive the movable jaw right down by pressing the down arrow on the touchscreen.

4. Select “AUTOMATIC” screw operation but still “MAN” jaws operation. Start the machine and feed the raw material to be compacted into the hopper.
5. Monitor the machine to ensure that the kW consumption increases.

If the kW consumption does not increase and material is pushed out of the pressure chamber uncompacted, repeat step 3 using more solid material.

6. When the kW consumption reaches 2.5-3 kW select “AUTOMATIC” operation of the jaws. (All motor points on the display must now light green for automatic operation)

The machine will now automatically regulate the counter pressure in accordance with the JAWS SET-UP” settings.

7. If the start-up material need to be removed: stop the machine.

**There is now a “plug” in the chamber, and the machine can be started and stopped without adjusting the counter pressure. In other words, this procedure is only necessary when starting an empty machine for the first time.**

## 21. Service and maintenance

Repair work must only be done by skilled persons, see appendix 5. Please pay particular attention:

- Service and repair must be done without any danger to anybody.
- The isolator switch must be dis-connected and locked before any repair.
- Necessary devices, protective gear, lifting equipment, scaffold and fall protection gear must be used.
- Heavy or slanting lifts must be avoided by correct use of devices.

- Crushing between machine parts must be avoided by correct service
- Technical and safety instructions in this instruction manual must be followed.
- A separated machine must not be put into operation.

In this section it is described how the machine should be maintained correctly. In appendix 3 you will find the maintain schedule describing maintain intervals and a maintain protocol. This must be used for registration of monthly or yearly service and 2500 hours and 5000 hours service.

## 21.1 Cleaning

To keep the nice appearance of the machine it must be cleaned in a normal way and as needed.

- The isolator switch must be switched off and locked before any cleaning.
- The machine is cleaned with cloth and vacuum cleaner. If needed you can use clean water possibly with a cold water cleaner.
- The machine must not be cleaned with corrosive cleaning detergent.
- The control panel cannot endure heavy cleaning with water.

## 21.2 Greasing

Greasing of the machine is important for the lifetime and function of the machine. In particular, greasing of the bearings and control of oil in gearbox as well as hydraulic oil on the pump station. In appendix 3 you will find the greasing instruction.

## 21.3 Re-tighten bolts

Each time the pressure chamber has been removed e.g. in connection with service, the bolts must be re-tightened **after 30 hours of operation**. All bolts have been oiled at the factory.

## 21.4 Gearbox

The first oil change must be after 100 hours of operation. From then on, after every 2,500 hours of operation. The instructions in the manufacturer's "Operation and maintenance guide" must be followed (see appendix 6).

Oil type:	Statoil gearbox oil Loadway EP 220
Oil volume:	4.3 litres

**The temperature of the gearbox must not exceed 85° C.**

## 21.5 Main bearing

The bearing (see drawing 5000007255) must be greased via a grease nipple on the bearing housing. Remember that the screw must be turning during greasing.

Grease after every **100** hours of operation. **IMPORTANT !** (see appendix 3)

Grease type: STATOIL GREASEWAY CAH 92 / AGIP AUTOL TOP 2000 / Shell Gadus S3 A1300 C 2  
Grease quantity: approx. 10 cm<sup>3</sup> (10 ml)

**After 5,000 hours of operation** the bearing housing must be disassembled and both the bearing and bearing housing must be cleaned. The bearing must be filled up with new bearing grease before assembling.

See appendix 2 for instructions on disassembling and assembling the bearings.

## 21.6 Hydraulic system

The hydraulic system is described in section 18/19 and appendix 7.

Regularly check the oil level and fill when necessary. Regularly check that the hoses and connections are not leaking. Otherwise the normal rules for hydraulic systems apply.

The first oil change must be after 100 hours of operation. From then on, after every 2,500 hours of operation (see appendix 3).

Oil type: Hydraulic oil, viscosity ISO 46  
Oil volume: 5 litres

## 22. Transportation instructions

Ensure that the machine is stable on a solid base, and that the accompanying parts have been carefully secured or packaged separately.

The machine should be transported using a fork-lift or lifting truck.



## 23. Installation

The following conditions must be met for correct use and commissioning of the machine:

- A level and solid base
- Correct transport (see section 22).

- Installation must be carried out by authorised personnel

**If in doubt, please contact the importer or manufacturer.**

## **Setting up**

1. It is recommended that the machine be placed in a dry area (under cover) with plenty of space around it.
2. The compactor should be set up in such a way that there is easy access for maintaining and servicing all functions and primary components.
3. The compactor must be placed on a level floor. It is not normally necessary to bolt the machine to the floor. Do not install ladders, platforms or other objects, to step up on around the machine, as safety distances for hazardous area is reduced or the risk of falling into the machine becomes possible.
4. Manual feeding of the machine may cause physical disabilities. The user must ensure that the work is planned with sufficient variety to avoid disability damages.
5. If the machine is for manual feeding the user must secure a good working environment when it comes to light, temperature, ventilation, anti-slippery and necessary devices for e.g. heavy lifting.
6. Light must be placed without the reach of the operator from the machine. If the light is placed above the machine it must be minimum 2.7 meters above the walking foundation of the operator.

## **Power connection**

All internal wiring is complete and ready when the machine leaves the factory.

**The machine must be connected to power by an authorised electrician. In particular please pay attention to:**

- Connection must be in accordance with el-documentation - appendix 8
- Residual Current Circuit Breaker must be installed before our control panel.
- Correct earth connection to our control panel must be installed.

## **24. Assembly and disassembly**

See instructions in appendix 2



## 25. Glossary

Words marked with an asterisk (\*) in the manual are explained below. Please note that screenshots are not labelled with asterisks.

EPS	Expanded polystyrene, also called Styropor or Styrofoam. Populærnavn: 'Flamingo' (forvanskning af varemærket 'Flaminco')
One-way restrictor valve	A hydraulic component designed to provide resistance in one direction and free flow in the other direction.
PLC	Programmable Logic Controller. A small computer used for automatic control of simple processes, e.g. controlling motors in a plant, etc. A PLC control system replaces numerous relays and timers compared to a traditional control system.
Protective motor switch	An electrical component that protects an electric motor, for example, from running overloaded for a prolonged period. If this happens, the motor's power drops out and the PLC detects this. The machine can only be restarted once the protective motor switch, i.e. the red button, is returned to its starting position.
Reset	Return something to its original state, often so work can carry on from a known state.

## 26. Contact

Please locate this instruction manual before initiating contact for spare parts or service, as it contains the model and serial numbers on the front page.

When ordering spare parts, please specify:

1. The model and serial number
2. The part numbers and names (can be found on the drawings in appendix 1)
3. The number of parts being ordered

If the machine has been purchased through a dealer, please contact the dealer.

Otherwise contact:

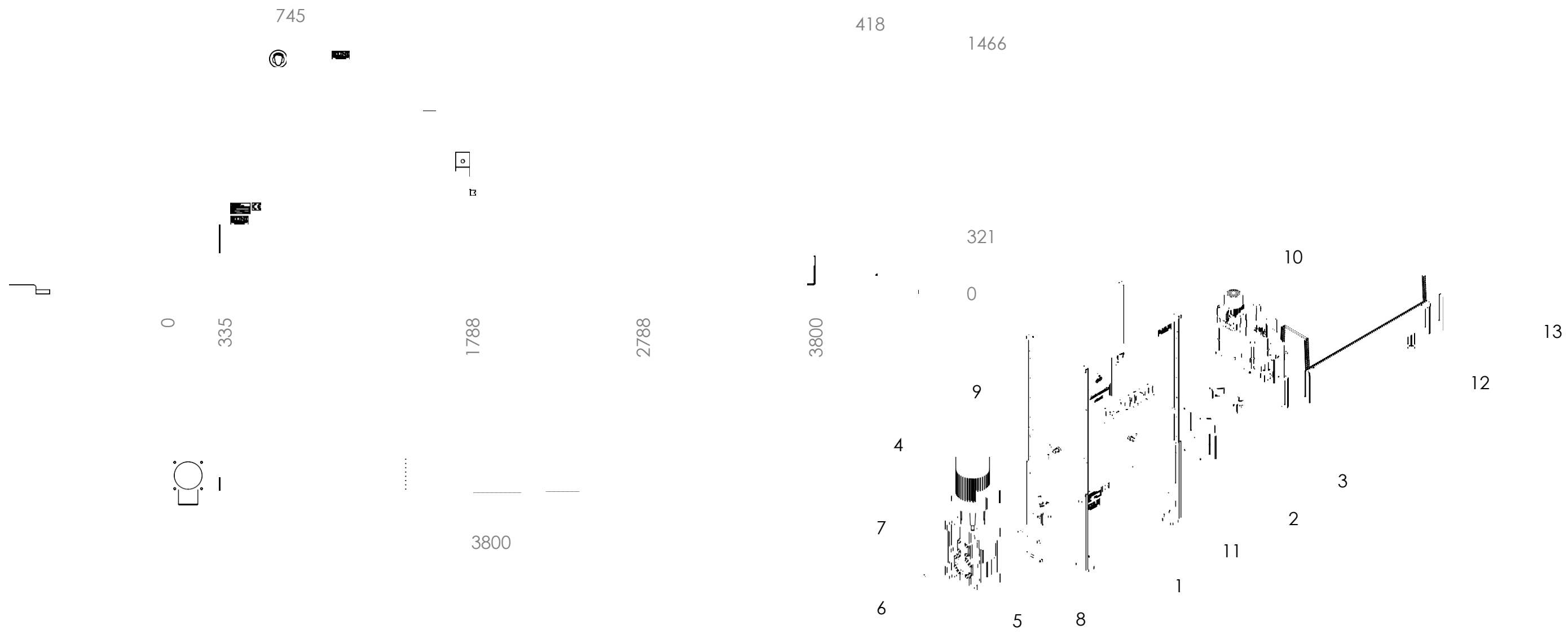
RUNI A/S  
Industriparken 8  
DK-6880 Tarm  
Denmark  
Tel.: +45 9737 1799  
Fax.: +45 9737 3800  
Email: [runi@runi.dk](mailto:runi@runi.dk)

## **27. Appendices**

<b>Appendix 1</b>	<b>Drawings and part lists</b>
<b>Appendix 2</b>	<b>Assembly and disassembly instructions</b>
<b>Appendix 3</b>	<b>Grease list / maintenance</b>
<b>Appendix 4</b>	<b>Machine configuration</b>
<b>Appendix 5</b>	<b>Qualification and training matrix</b>
<b>Appendix 6</b>	<b>Gearbox</b>
<b>Appendix 7</b>	<b>Hydraulic diagram and part list</b>
<b>Appendix 8</b>	<b>Electrical documentation</b>
<b>Appendix 9</b>	<b>Photocells</b>
<b>Appendix 10</b>	<b>Speed control device</b>

# Appendix 1

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ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	QTY.
1	5000005680	SK200 Basic	SK200 Basis	B.	1
2	5000012196	SK200 Jaw complete ul/csa	SK200 Kæbe komplet ul/csa	A.	1
3	5000007479	SK200 Stabilisazion channel mounted	SK200 Stabiliseringskammer monteret	A.	1
4	2000000151	Elastomer spring Ø40/13,5x32mm	Steinel vulkolanfjeder Ø40/13,5x32mm		2
5	3098050851	Washer M12 6.8 FZB DIN 125	Skive M12 6.8 FZB DIN 125	A.	4
6	3098050852	Washer FZB M12 Ø13 x 32 x 2.5	Skærmskive FZB M12 Ø13 x 32 x 2.5		4
7	3097060810	Locknut DIN 933 M12 FZB	Låsømøtrik M12 FZB	C.	2
8	3002060981	Bolt M12x85 FZB	Bolt M12x85 FZB	A.	2
9	5000007932	Motor: 4kW Gearbox: TF140BO 60Hz UL/CSA	Motor: 4kW Gear: TF140BO 60Hz UL/CSA	A.	1
10	5000014048	Speed control - Stainless	Speed control - Rustfri	A.	1
11	5000015312	Drip tray	Spildebakke under trug	A.	1
12	5000015107	Support table	Støttebord	A.	1
13	2000001128		Stilleben M8x70	B.	1

Revisioner: No, Note, Init, Dato

**RUNI**

General Tolerances (-DS/ISO 2768-1 m)

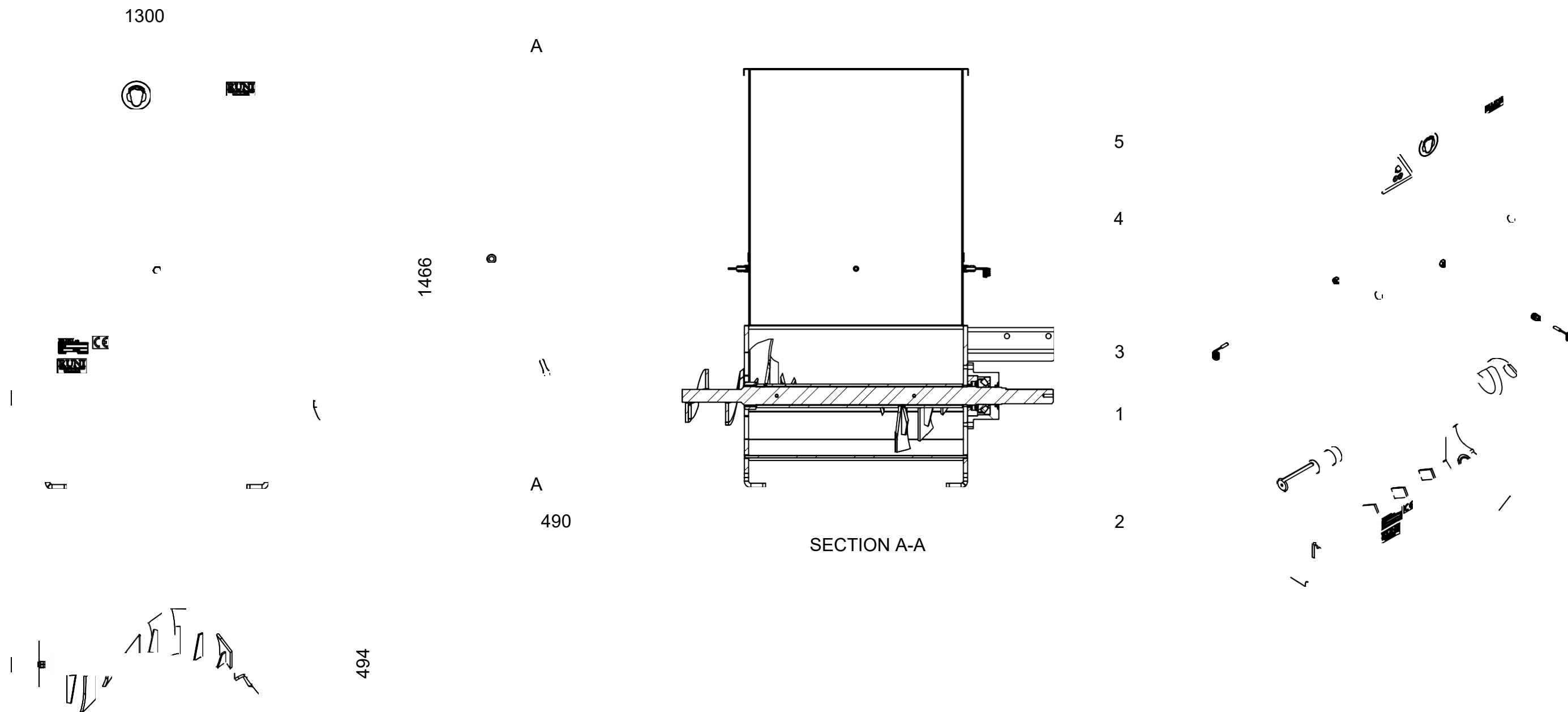
Nominal value	Tolerance	Color:	Surface:
Above	Max.	Linear	Angle
0,5	3	±0,1	±1° 0'
3	6	±0,1	±1° 0'

Replaces: Projection: Format: A3

Description: SK200 for EPS 60Hz UL/CSA  
 Beskrivelse: SK200 for EPS 60Hz UL/CSA

Date: 23-05-2014  
 Creator: CM





ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	QTY.
1	5000007956	SK200 Screw trough with bushing	SK200 Snegletrug med bøsning	A.	1
2	5000007255	SK200 Bearing house mounted	SK200 Lejehus monteret	A.	1
3	5000005679	SK200 Screw	SK200 Snegl	D.	1
4	5000005084	SK200 Pre-crusher	SK200 Opriver	A.	1
5	5000007942	SK200 Hopper complete	SK200 Tragt komplet	A.	1

No Revisioner  
Note Note Init Dato

**RUNI**

General Tolerances  
(-DS/ISO 2768-1 m)

Replaces:  
Projection:

RUNI A/S

Nominal value Tolerance Color: Surface:  
Above Max. Linear Angle Description: SK200 Basic

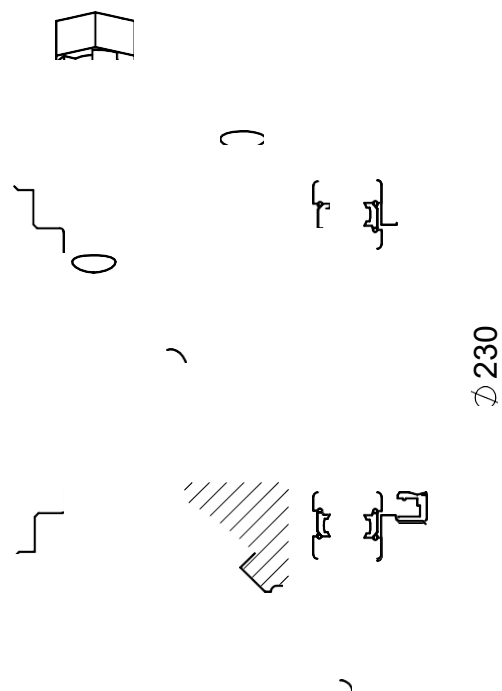
Format: A3  
Date: 31-10-2012



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SECTION A-A

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ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	1/QTY.
1	5000007256	SK200 Bearing house	SK200 Lejehus	C.	1
2	2000001108	FAG_29412-E1	FAG_29412-E1		1
3	5000007257	SK200 Ring for bearing	SK200 Ring til leje		1
4	2000001121	Bearing 6013-2RSR 100x65x18	Leje 6013-2RSR 100x65x18		1
5	5000007258	SK200 Press ring for screw	SK200 Trykskive til snegl	A.	1
6	2000000167	Lubrication nipple 1/4"	Smørenippel lige 1/4"	F.	1
7	2000000164	Sea w. inox springl f. SK240 bearing house 65c80x8	Pakdåse m.rustfri fjeder f. SK240 lejehus/snegl 65x80x8		1
8	2000001123	Seal ring CC60 x 75 x 8mm	Pakdåse CC60 x 75 x 8mm		1
9	2000001122	Circlip inner 100x3,0mm DIN 472	Låsering indv. 100x3,0mm DIN 472		1
10	2000000250	Safety valvet 1/4" - 0,5 bar w. viton seal	Sikkerhedsventil 1/4" - 0,5 bar m. viton pakning	D.	1

No

Revisioner  
Note

Init Dato

**RUNI**

General Tolerances  
(-DS/ISO 2768-1 m)

Replaces:  
Projection:

Nominal value

Tolerance

Color:

Surface:

Format:

A3





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ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	QTY.
1	2000005090	Bevel Helical gearbox TF140BO B5 1:50	Gear TF140BO B5 1:50 (29 RPM) Ø55		1

2	2000006076	Fabrika Motor UL 112M4 B5 IE2 UL/CSA 4.0kW/1460/230/400V-50Hz/460V-60Hz	Fabrika Motor UL 112M4 B5 IE2 UL/CSA 4.0kW/1460/230/400V-50Hz/460V-60Hz		1
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No Revisioner  
Note Init Dato

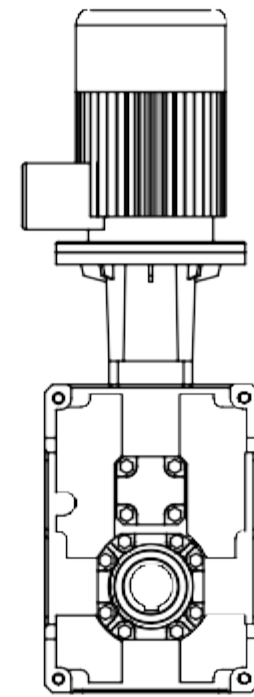
General Tolerances  
(-DS/ISO 2768-1 m) Replaces:  
Projection:

Nominal value Tolerance Color: Surface: Format: A3

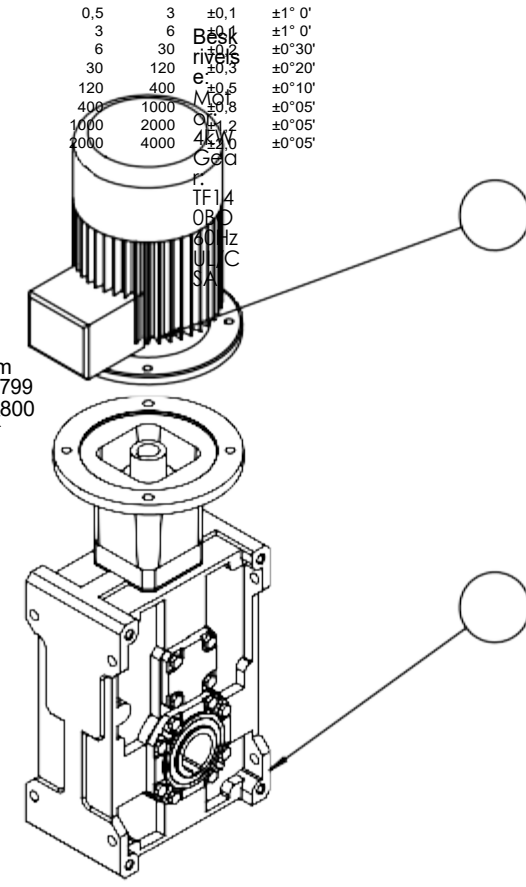
Max.

Linear	Angle	Description	Deviation
		Motor	±1° 0'
		4kW	±1° 0'
		Gearbox	±0° 30'
		TF14	±0° 20'
		OBO	±0° 10'
		60Hz	±0° 05'
		UL/C	±0° 05'
		SA	±0° 05'

21-08-2014  
CM



DK-6880 Tarm  
 TLF. +45 97371799  
 FAX. +45 97373800  
 www.runi.dk



Scale:	Weight:	Projekt ID:	P040
1:10	211.9 kg	Drawing no.:	5000007932

C:\RUNI\Maskiner\P040\_SK200\Konstruktion\Drev pakke


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1

ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	QTY.
1	5000006441	SK200 Press chamber fixed part welded	SK200 Pressekammer fast del svejst	B.	1
2	5000006445	SK200 Press plate welded	SK200 Presseplade svejst	A.	1
3	5000006512	SK200 Axle for press plate	SK200 Aksel til presseplade	A.	1
4	5000006514	SK200 Lower pin for cylinder	SK200 Nederste nagle til cylinder	A.	1
5	5000006515	SK200 Upper pin for cylinder	SK200 Øverste nagle til cylinder	A.	1
6	2000001056	Cylinder H2C-S-40/20x100-L20	Cylinder H2C-S-40/20x100-L20		1
7	2000009109	Hydraulic station MC4 with UL-CSA motor	Hydraulikstation MC4 med UL-CSA motor	A.	1
8	5000007244	SK200 Plate for hydraulic	SK200 Plade til hydraulik	A.	1
9	5000012194	Bushing for SK200 cylinder	Bøsning til SK200 cylinder		2

No Revisioner  
 Note Init Dato

General Tolerances  
 (-DS/ISO 2768-1 m)

Replaces:  
 Projection:

Nominal value Tolerance

Color: Surface:

Format: A3

RUNI A/S  
 Industriparken 8

Above	Max.	Linear	Angle
0,5	3	±0,1	±1° 0'
3	6	±0,1	±1° 0'
6	30	±0,2	±0°30'
30	120	±0,3	±0°20'

Description: SK200 Jaw complete ul/csa  
 Beskrivelse: SK200 Kæbe komplet ul/csa

Date: 04-09-2013  
 Creator: CM



11 1 2 4 8 10 9 5 6 3 7

ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	1/QTY
1	5000014051	Arm for speed control AISI 304	Arm til speed control AISI 304	A.	1
2	2000000524	Encoder Kübler 3600 PPR	Enkoder Kübler 3600 PPR		1
3	5000002400	Wheel for Speed-control	Hjul for speedkontrol Ø110	A.	1
4	2000000293	Bearing housing (speed control)	Lejehus (Speed control)		1
5	2000000291	Bearing 6304-2RS	Leje 6304-2RS	A.	1
6	2000000292	Circlip A20x1,2 DIN 471	Låsering A20x1,2 DIN 471		1
7	5000002465	Drive shaft Ø12 (pur)	Drivaksel Ø12 (pur)	A.	1
8	3098060550	Washer DIN 125 M6 FZB	Skive DIN 125 M6 FZB	J.	6
9	3008050509	Unbraco M6x16 DIN 912 FZB	Unbraco M6x16 DIN 912 FZB	A.	3
10	3097050502	Nut M6 FZB	Møtrik M6 FZB	C.	3
11	3020060105	Machine screw M3x8 CH DIN84 FZB	Maskinskruer M3x8 CH DIN84 FZB	A.	3

No Revisioner  
 Note Init Dato

General Tolerances  
 (-DS/ISO 2768-1 m)

Replaces:  
 Projection:

Nominal value Tolerance Color:

Surface:

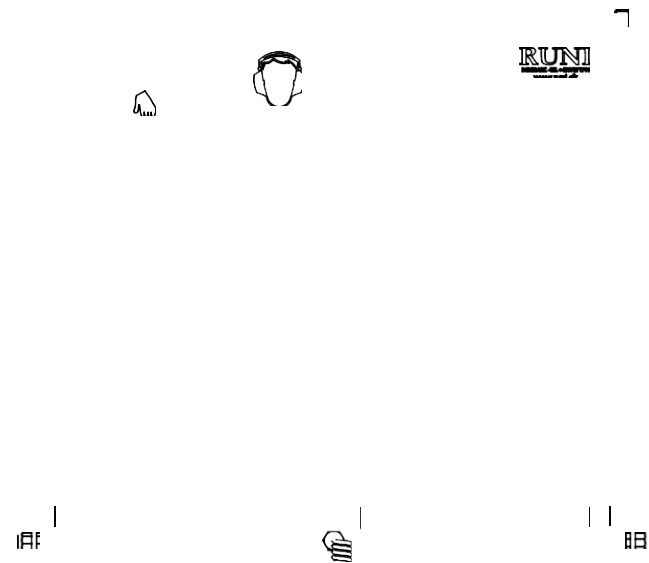
Format: A3



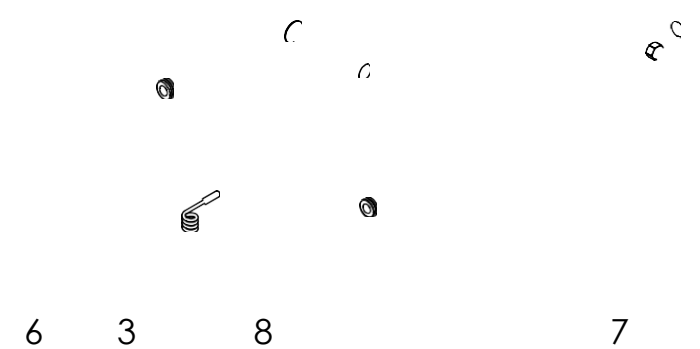
2 1

785

494



4 5



418  
745

ITEM	PART NO.	DESCRIPTION	DescriptionDK	Rev.	QTY.
1	5000007567	SK200 Side for hopper welded	SK200 Gavl til tragt svejst	C.	1
2	5000007570	SK200 Back for hopper welded	SK200 Bagplade til tragt svejst	C.	1
3	2000000266	Conquest fotocelle - transmitter - CT10	Conquest fotocelle - sender - CT10	W.	2
4	2000000371	Cable glands M16 x 1,5 Ø5-10 mm	Kabelforskrining M 16 x 1.5 Ø5-10 mm	R.	4
5	2000000267	Conquest fotocelle - receiver - CR10	Conquest fotocelle - modtager - CR10	W.	2
6	2000001119	Cable bush Ø16/24 2 mm plate	Kabeltylle Ø16/24 2 mm plade		4
7	5000010400	SK200 Front for hopper welded	SK200 Forplade til tragt svejst	A.	1
8	5000010399	SK200 Side for hopper (motor end) welded	SK200 Gavl til tragt (motor ende) svejst	A.	1

Replaces:

Projection:

Format: A3

Date: 26-08-20104

Creator: AL

**RUNI**

General Tolerances

(-DS/ISO 2768-1 m)

Nominal value Tolerance

Color:

Surface:

Description: SK200 Hopper complete

Beskrivelse: SK200 Tragt komplet

Above	Max.	Linear	Angle
0,5	3	±0,1	±1° 0'
3	6	±0,1	±1° 0'
6	30	±0,2	±0°30'
30	120	±0,3	±0°20'
120	400	±0,5	±0°10'
400	1000	±0,8	±0°05'
1000	2000	±1,2	±0°05'

Revisioner

No	Note	Init	Dato
B.	Flyttet hul til ledning	CM	16-06-2016





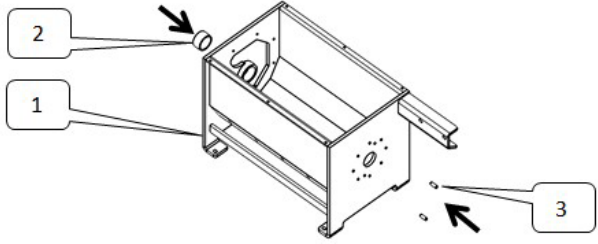
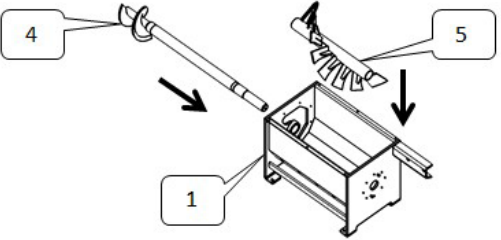
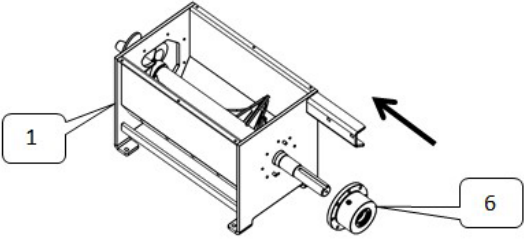
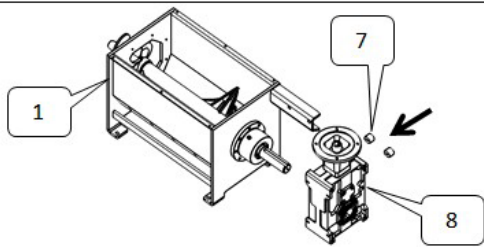
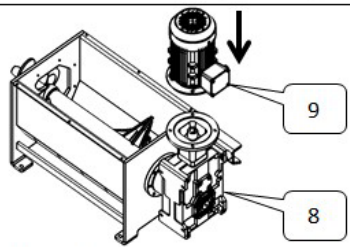
## Appendix 2

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## ASSEMBLY OF BEARING HOUSING SK200

1		<p>Mount bearing (2) in to housing (1) Drawing 500007255</p>	5		<p>Mount lock for sheet (7) in the bearing ring (6). Drawing 500007255</p>
2		<p>Mount press ring for screw (3) in to housing (1) Drawing 500007255</p>	6		<p>Mount sealing ring (8) in to bearing ring (6) Drawing 500007255</p>
3		<p>Mount sealing ring (4) in to housing (1) Drawing 500007255</p>	7		<p>Mount assembled bearing ring(6) in to bearing housing (1) Drawing 500007255</p>
4		<p>Mount bearing (5) in to bearing ring (6) Drawing 500007255</p>	8		<p>Mount lubrication nipple (9) in to housing (1) Drawing 500007255</p>
<p>Disassembling of bearing housing is in opposite order</p>					

## ASSEMBLING OF BEARING HOUSING AND SCREW SK200

1	 <p>Diagram 1 shows a perspective view of a screw trough (1). A bronze bearing (2) is being inserted into the trough. Two pins (3) are also being inserted into the trough. Arrows indicate the direction of assembly.</p>	<p>Mount the bronze bearing (2) and two pins (3) on to screw trough (1). Drawing 5000005680.</p>
2	 <p>Diagram 2 shows the screw trough (1) with a screw (4) and a pre-crusher (5) being inserted into it. Arrows indicate the direction of assembly.</p>	<p>Mount the screw (4) and pre-crusher (5), in to screw trough (1). Drawing 5000005680.</p>
3	 <p>Diagram 3 shows the screw trough (1) with a bearing housing (6) being mounted onto it. An arrow indicates the direction of assembly.</p>	<p>Mount the bearing housing (6) on to screw trough (1). Drawing 5000005680.</p>
4	 <p>Diagram 4 shows the screw trough (1) with a gear box (8) and a vulkolan bushing (7) being mounted onto it. Arrows indicate the direction of assembly.</p>	<p>Mount the gear box (8) and vulkolan bushing (7) on to screw trough (1). Drawing 5000005680.</p>
5	 <p>Diagram 5 shows the gear box (8) with an electric motor (9) being mounted onto it. An arrow indicates the direction of assembly.</p>	<p>Mount the el motor (9) on to gear box (8). Drawing 5000005680.</p>

Disassembling is in opposite order.

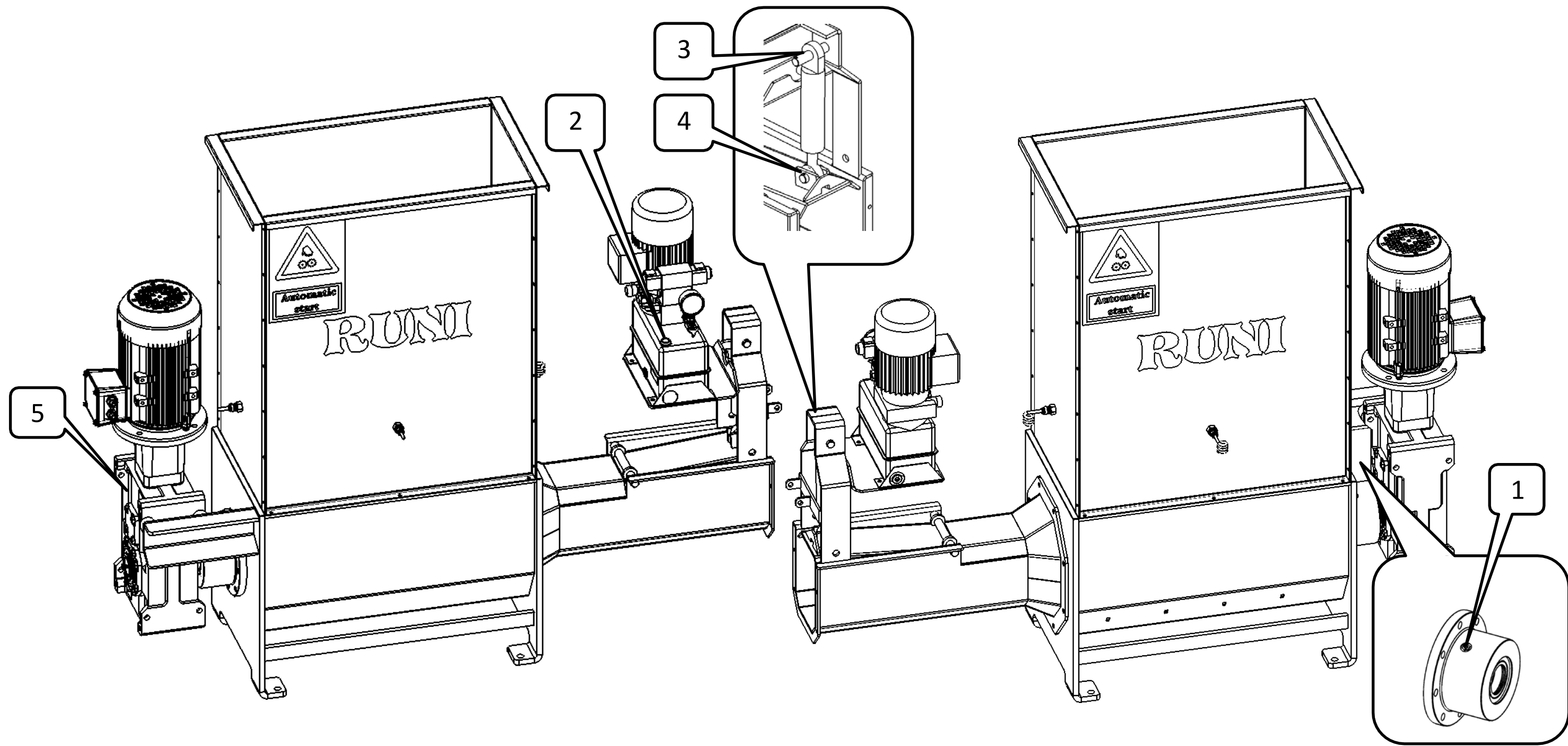
## ASSEMBLING OF PRESS CHAMBER SK200

1	<p>A technical drawing showing a large, rectangular metal frame (1) with a moveable jaw (2) being attached to its right side. A pin (3) is shown being inserted into a hole in the frame to secure the jaw.</p>	<p>Mount moveable jaw (2) on to press chamber (1) with pin (3). Drawing 5000005680</p>
2	<p>A technical drawing showing the hydraulic cylinder (4) being mounted to the side of the press chamber (1). Two pins, (5) and (6), are shown being inserted into the cylinder to secure it to the frame.</p>	<p>Mount hydraulic cylinder (4) in to press chamber (1) with pin (5) and (6). Drawing 5000005680</p>
3	<p>A technical drawing showing a hydraulic station (7) being mounted on top of the press chamber (1). The station consists of a pump and a valve assembly.</p>	<p>Mount hydraulic station (7) on to press chamber (1). Drawing 5000005680</p>
4	<p>A technical drawing showing the connection of a hydraulic hose (8) between the pump's A-port and the bottom end of the cylinder. An inset diagram shows the pump with 'PORT B' and 'PORT A' labeled, and the cylinder with a hose connected to its bottom end.</p>	<p>Mount the hydraulic hose (8) on the pump's (7) A-port (with one way restrictor valve) and the cylinder's (4) "bottom end" (top).</p>
	<p>A technical drawing showing the connection of a second hydraulic hose (9) between the pump's B-port and the top end of the cylinder. An inset diagram shows the pump with 'PORT B' and 'PORT A' labeled, and the cylinder with a hose connected to its top end.</p>	<p>Mount the hydraulic hose (9) on the pump's (7) B-port and the cylinder's (4) "top end" (bottom).</p>

Disassembling is in opposite order.

# Appendix 3

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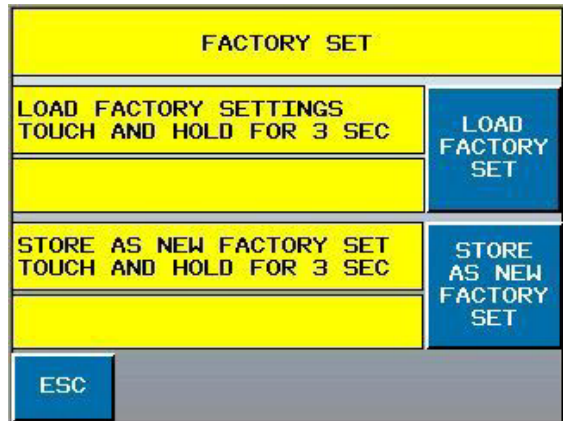


Position	Description	Greasing type / Lubricator	Quantity	Service interval, operating hours
1	Nipple to lubricate the screw bearing	GREASEWAY CAH 92 / AGIP AUTOL TOP 2000 / Shell Gadus S3 A1300 C 2	approx. 10 ml	100
2	Hydraulic pump	Hydraulic oil, viscosity ISO 46	5,0 l.	100 / 2500
3	Hydraulic cylinder	GREASEWAY CAH 92 / AGIP AUTOL TOP 2000 / Shell Gadus S3 A1300 C 2	2 x pr. month (1push)	or every 100
4	Hydraulic cylinder	GREASEWAY CAH 92 / AGIP AUTOL TOP 2000 / Shell Gadus S3 A1300 C 2	2 x pr. month (1push)	or every 100
5	Gearbox	STATOIL Loadway EP 150	4,3 l.	100 / 2500

# Appendix 4

The settings in this section can only be viewed and adjusted following log-in as a RUNI technician or distributor.

It is possible to save new factory settings.



## “RUNI SETUP 1”

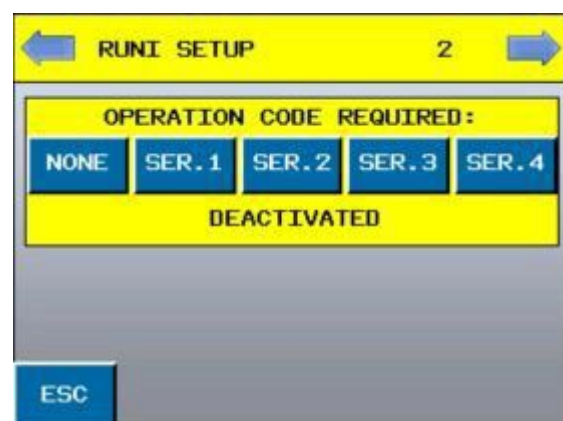
This menu allows you to configure the composition of the machine – which components are present, etc.

The first screen is used to define whether there is a rotating sensor in the hopper, whether the machine menu should handle one or two types of material, whether there is speed control and whether there is healthy signal.



## “RUNI SETUP 2”

Can only be accessed by the RUNI machine builder





# Appendix 5

## Qualification and Training Chart SK120/200/240/370



	Transporting and moving around	Installing and Dismantling	Operating	Adjusting	Cleaning and Maintenance	Repairing, Disassembling and Assembling	Scrapping
<b>Qualifications and Preconditions<sup>1</sup></b>							
Mentally stable and fully conscious	X	X	X	X	X	X	X
Physically capable to perform normal factory work	X	X	X	X	X	X	X
Normal eyesight	X	X	X	X	X	X	X
Skilled Electrician		X <sup>2</sup>				X <sup>2</sup>	X <sup>2</sup>
Skilled Fitter		X				X	X
<b>Training Required<sup>1</sup></b>							
Trained in fastening of goods under transport	X						X
Trained in use of lifting equipment and devices	X	X				X	X
Trained in safe working behavior	X	X	X	X	X	X	X
Trained in relevant environmental legislations	X	X	X	X	X	X	X
Trained in basics of Machine Safety		X	X	X	X	X	
Trained in general machine operation		X	X	X	X	X	
Trained in general machine care and cleaning		X	X	X	X	X	
Trained in use of relevant personal protection gear	X	X	X	X	X	X	X
Trained in Operating and Cleaning of a RUNI Machine			X	X	X	X	
Trained in Inspection, Adjustment and Maintenance of a RUNI Machine		X	X	X	X	X	

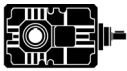
<sup>1</sup> This is machine manufacturers requirements - if national legislations or company specific guidelines requires higher level it is mandatory to comply with those.

<sup>2</sup> For electrical labeling work a skilled electrician is required.

# Appendix 6

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<b>2.0</b>	<b>RIDUTTORE AD ASSI ORTOGONALI</b>	<b>BEVEL HELICAL GEARBOX</b>	<b>KEGELSTIRNRADGETRIEBE</b>	
2.1	Caratteristiche	<i>Characteristics</i>	Merkmale	8
2.2	Designazione	<i>Designation</i>	Bezeichnung	8
2.3	Dati tecnici	<i>Technical data</i>	Technische Daten	9
2.4	Dimensioni	<i>Dimensions</i>	Abmessungen	10
2.5	Accessori	<i>Accessories</i>	Zubehör	12
2.6	Sensi di rotazione alberi	<i>Direction of shaft rotation</i>	Drehrichtungen der Wellen	13
2.7	Lubrificazione	<i>Lubrication</i>	Schmierung	14
2.8	Carichi radiali e assiali	<i>Radial and axial loads</i>	Radial und axial Belastungen	14
2.9	Lista parti di ricambio	<i>Spare parts list</i>	Ersatzteilliste	15



## 2.1 Caratteristiche

- Costruiti in 6 grandezze a due riduzioni e in 5 grandezze a tre riduzioni.
- Sono previsti tre tipi di entrata: con albero entrata sporgente, con predisposizione attacco motore (campana e giunto) e predisposizione attacco motore COMPATTA. I tre tipi di entrata possono essere montati indifferentemente nelle esecuzioni verticale e/o orizzontale.
- Il corpo riduttore in ghisa meccanica (71-180) o in ghisa sferoidale (200-225), abbondantemente nervato all'interno e all'esterno per garantire la rigidità, è lavorato su tutti i piani per consentire un facile posizionamento; inoltre un'unica camera di lubrificazione garantisce una maggiore dissipazione termica e una migliore lubrificazione di tutti gli organi interni.
- Gli ingranaggi sono costruiti in acciaio legato da cementazione e sottoposti a trattamento di cementazione a tempra. In particolare, la prima riduzione è costituita da due ingranaggi conici a dentatura spirooidale GLEASON con profilo accuratamente rodato, in acciaio 16CrNi4 o 18NiCrMo5 UNI7846 cementati e temprati.
- L'utilizzo dei cuscinetti a rulli conici di qualità su tutti gli assi (ad eccezione del manico in entrata nella predisposizione attacco motore compatta, il quale è sostenuto da cuscinetti obliqui a sfere) consente al riduttore di ottenere delle durate molto elevate e di sopportare dei carichi radiali e assiali esterni molto elevati.
- L'albero lento cavo di serie in acciaio (disponibile a richiesta con calettatore), la possibilità di montare una flangia uscita su uno o entrambi i fianchi laterali e la predisposizione per il montaggio del dispositivo antiritorno esaltano la versatilità di questi riduttori facilitandone l'installazione.

## 2.2 Designazione

## 2.1 Characteristics

- Built in 6 sizes with 2 reducers and in 5 sizes with 3 reducer gearing.
- Three input types are available : with projecting input shaft, with pre-engineered motor coupling (bell and joint) and pre-engineered COMPACT motor coupling. The three input types can be mounted either vertically or horizontally.
- Gear unit body in engineering cast iron, (71-180) or spheroidal graphite cast iron(200-225) is ribbed internally and externally to guarantee rigidity and machined on all surfaces for easy positioning. The single lubrication chamber guarantees improved heat dissipation and better lubrication of all the internal components.
- Gears are built in casehardening compound steel which has undergone case-hardening and quench-hardening treatments. In particular, the first reducer consists of two GLEASON helical gear-tooth bevel gears with precision ground profile, in 16CrNi4 or 18NiCrMo5 UNI7846 case-hardened and quench-hardened steel.
- The use of high-quality taper bearings on all shafts (except for the input sleeve on the pre-engineered compact motor coupling, which is supported by angular ball bearings) ensures extremely long gear unit life, even under very high radial and axial loads.
- The standard hollow steel output shaft (locking assembly available on request), as well as the option of mounting an output flange on one or both sides and the pre-engineered backstop coupling make these gear units extremely versatile while facilitating installation.

## 2.2 Designation

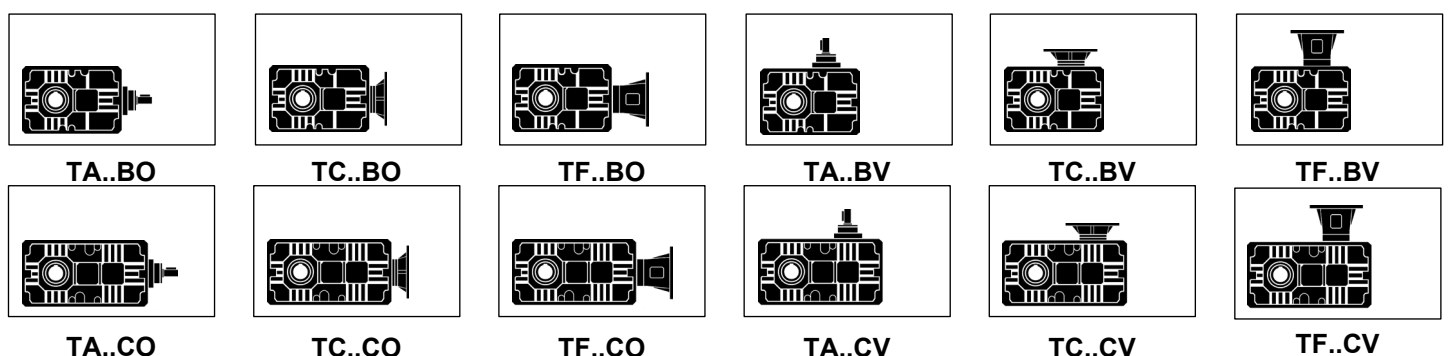
## 2.1 Merkmale

- Erhältlich in 6 Größen zu je zwei Unterstufungsstufen und in 5 Größen zu je 3 Unterstufungsstufen.
- Vorgesehen sind drei Antriebsarten: mit vortretender Antriebswelle, mit Auslegung für Motoranschluß (Anbauflansch und Kuppelung), mit Kompaktauslegung für Motoranschluß. Die drei Antriebstypen können alle sowohl bei der vertikalen als auch der horizontalen Ausführung verwendet werden.
- Das Getriebegehäuse aus Maschinenguß ist (71-180) oder aus Späroguß mit Rippen versehen, die die Starrheit gewährleisten; die Bearbeitung aller Flächen ermöglicht eine leichte Positionierung; eine einzige Schmierkammer gewährleistet eine höhere Wärmedissipation und eine bessere Schmierung aller inneren Elemente.
- Die Zahnräder bestehen aus legiertem Einsatzstahl, sie wurden einsatz- und abschreckgehärtet. Insbesondere die erste Unterstufungsstufe besteht aus zwei spiralverzahnten GLEASON-Kegelrädern mit sorgfältig eingefahretem Profil aus einsatz- und abschreckgehärtetem 16CrNi4- oder 18NiCrMo5-Stahl UNI7846.
- An allen Achsen wurden Qualitäts-Kegelrollenlager verwendet (Ausnahme: Muffe am Antrieb bei Kompaktauslegung, diese wird von Schrägkugellagern gehalten); diese gewährleisten eine hohe Lebensdauer und das Aushalten sehr hoher äußerer Quer- und Längsbelastungen.
- Die serienmäßige Abtriebs-Hohlwelle aus Stahl (auf Wunsch mit Schrumpfscheibe erhältlich), die Möglichkeit der Montage eines Abtriebsflansches an einer oder an beiden Seiten und die Auslegung für die Montage der Rücklaufsperr erhöhen die Flexibilität dieser Unterstufungsgetriebe und erleichtern ihren Einbau.

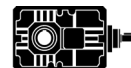
## 2.2 Bezeichnung

Macchina	Tipo	Grandezza	Rotismo	Rapporto rid.	Predisposiz.	Esecuzione	Posizione di	Flangia uscita	Antiritorno	Calettatore
Machine Maschine	entrata Input type Antriebsart	Size Größe	Gearing Getriebe	Ratio Untersetzung	Motor mounting facility Motoranbau	Execution Ausführung	montaggio Mounting position Anbauposition	Output flange Abtriebsflansch	Back-stop device Rücklaufsperr	Shrink disk Schrumpfscheibe

T	A	112	B	10/1	P.A.M.	O	B3	FLS	CW	C.S.
Riduttore ad assi ortogonali		71 90 112	B 2 rid. 2 red. 2 Stufen	in = .../1 8 630	63 ÷ 225	O Albero entrata orizzontale Horizontal input shaft Antriebswelle horizontal	B3 B6 VA VB	 FLD	CW Rotazione oraria Clockwise rotation Im-Uhrzeigersinn	C.S. Calettatore sinistro Shrink disc left Verkellung Links
Bevel helical gearbox		140 180 225				V Albero entrata verticale Vertical input shaft Antriebswelle senkrecht			AW Rotazione antioraria Anti-clockwise rotation Gegen den Uhrzeigersinn	C.D. Calettatore destro Shrink disc right Verkellung rechts
Kegelstirnrad-getriebe		80 100 125 160 200	C 3 rid. 3 red. 3 Stufen							







2.3 Dati tecnici

2.3 Technical data

2.3 Technische Daten

T	n <sub>1</sub> = 1400			TC - TF				TA	
	in	ir	n <sub>2</sub> rpm	T <sub>2</sub> Nm	P <sub>1</sub> kW	FS'	IEC	T <sub>2M</sub> Nm	P kW
71B	10	10.25	137	120	1.8	1.9	TC-TF 63 71 80 90	230	3.5
	12.5	13.05	107	152	1.8	1.6		240	2.8
	16	15.63	90	182	1.8	1.4		250	2.5
	20	19.64	71	229	1.8	1.1		260	2.0
	25	24.99	56	243	1.5	1.0		250	1.5
	31.5	29.95	47	213	1.1	1.1		240	1.2
	40	38.73	36	188	0.75	1.3		240	1.0
	50	50.18	28	244	0.75	1.0		240	0.7
	63	60.13	23	214	0.55	1.2		250	0.6
80	77.76	18	186	0.37	1.3	250	0.5		
90B	10	10.25	137	266	4	1.7	TC-TF 71 80 90 100 112	460	6.9
	12.5	13.05	107	338	4	1.4		480	5.7
	16	15.63	90	405	4	1.2		500	4.9
	20	19.64	71	509	4	1.0		520	4.1
	25	24.99	56	486	3	1.0		500	3.1
	31.5	29.95	47	427	2.2	1.1		480	2.5
	40	38.73	36	452	1.8	1.1		480	1.9
	50	50.18	28	488	1.5	1.0		480	1.5
	63	60.13	23	429	1.1	1.2		500	1.3
80	77.76	18	378	0.75	1.3	500	1.0		
80C	50	52.18	27	596	1.8	1.0	TC-TF 63 71 80 90	580	1.8
	63	62.53	22	595	1.5	1.0		600	1.5
	80	79.58	18	555	1.1	1.1		620	1.2
	100	99.97	14	476	0.75	1.3		640	1.0
	125	119.78	12	570	0.75	1.2		660	0.9
	160	152.45	9	532	0.55	1.3		680	0.7
	200	182.67	8	637	0.55	1.1		700	0.6
	250	240.51	6	565	0.37	1.3		720	0.5
	315	306.11	5	719	0.37	1.0		740	0.4
400	366.78	4	582	0.25	1.2	700	0.3		
500	474.35	3	542	0.18	1.2	660	0.2		
630	613.46	2	525	0.13	1.2	620	0.2		
112B	10	10.25	137	598	9	1.5	TC-TF 80 90 100 112 132	920	13.9
	12.5	13.05	107	761	9	1.3		960	11.4
	16	15.63	90	912	9	1.1		1000	9.9
	20	19.64	71	954	7.5	1.1		1030	8.1
	25	24.99	56	891	5.5	1.1		1000	6.2
	31.5	29.95	47	776	4	1.2		960	4.9
	40	38.73	36	753	3	1.3		960	3.8
	50	50.18	28	976	3	1.0		960	3.0
	63	60.13	23	857	2.2	1.2		1000	2.6
80	77.76	18	907	1.8	1.1	1000	2.0		
100C	50	52.18	27	993	3	1.2	TC-TF 71 80 90 100 112	1160	3.5
	63	62.53	22	1190	3	1.0		1200	3.0
	80	79.58	18	1111	2.2	1.1		1240	2.5
	100	99.97	14	1142	1.8	1.1		1280	2.0
	125	119.78	12	1140	1.5	1.2		1320	1.7
	160	152.45	9	1064	1.1	1.3		1360	1.4
	200	182.67	8	1275	1.1	1.1		1400	1.2
	250	240.51	6	1144	0.75	1.3		1440	0.9
	315	306.11	5	1456	0.75	1.0		1480	0.8
400	366.78	4	1280	0.55	1.1	1400	0.6		
500	474.35	3	1113	0.37	1.2	1320	0.4		
630	613.46	2	973	0.25	1.2	1240	0.3		

T	n <sub>1</sub> = 1400			TC - TF				TA	
	in	ir	n <sub>2</sub> rpm	T <sub>2</sub> Nm	P <sub>1</sub> kW	FS'	IEC	T <sub>2M</sub> Nm	P kW
140B	10	10.25	137	1461	22	1.3	TC-TF 80 90 100 112 132 160 180	1840	27.7
	12.5	13.05	107	1860	22	1.0		1920	22.7
	16	15.63	90	1874	18.5	1.1		2000	19.7
	20	19.64	71	1909	15	1.1		2080	16.3
	25	24.99	56	1782	11	1.1		2000	12.3
	31.5	29.95	47	1747	9	1.1		1920	9.9
	40	38.73	36	1882	7.5	1.0		1920	7.7
	50	50.18	28	1789	5.5	1.1		1920	5.9
	63	60.13	23	1559	4	1.3		2000	5.1
80	77.76	18	2016	4	1.0	2000	4.0		
125C	50	52.18	27	1821	5.5	1.3	TC-TF 80 90 100 112 132	2320	7.0
	63	62.53	22	2182	5.5	1.1		2400	6.1
	80	79.58	18	2019	4	1.2		2480	4.9
	100	99.97	14	2537	4	1.0		2560	4.0
	125	119.78	12	2280	3	1.2		2640	3.5
	160	152.45	9	2128	2.2	1.3		2720	2.8
	200	182.67	8	2549	2.2	1.1		2800	2.4
	250	240.51	6	2746	1.8	1.0		2880	1.9
	315	306.11	5	2913	1.5	1.0		2960	1.5
400	366.78	4	2560	1.1	1.1	2800	1.2		
500	474.35	3	2257	0.75	1.2	2640	0.9		
630	613.46	2	2140	0.55	1.2	2480	0.6		
180B	10	10.25	137	1993	30	1.8	TC-TF 132 160 180 200	3680	55.4
	12.5	13.05	107	2536	30	1.5		3840	45.4
	16	15.63	90	3039	30	1.3		4000	39.5
	20	19.64	71	3818	30	1.1		4160	32.7
	25	24.99	56	3563	22	1.1		4000	24.7
	31.5	29.95	47	3590	18.5	1.1		3840	19.8
	40	38.73	36	3764	15	1.0		3840	15.3
	50	50.18	28	3577	11	1.1		3840	11.8
	63	60.13	23	3507	9	1.1		4000	10.3
80	77.76	18	3779	7.5	1.1	4000	7.9		
160C	50	52.18	27	3641	11	1.3	TC-TF 80 90 100 112 132 160 180	4640	14.0
	63	62.53	22	4363	11	1.1		4800	12.1
	80	79.58	18	4543	9	1.1		4960	9.8
	100	99.97	14	4756	7.5	1.1		5120	8.1
	125	119.78	12	4179	5.5	1.3		5280	6.9
	160	152.45	9	5319	5.5	1.0		5440	5.6
	200	182.67	8	4635	4	1.2		5600	4.8
	250	240.51	6	4577	3	1.3		5760	3.8
	315	306.11	5	5826	3	1.0		5920	3.0
400	366.78	4	5119	2.2	1.1	5600	2.4		
500	474.35	3	4514	1.5	1.2	5280	1.8		
630	613.46	2	4281	1.1	1.2	4960	1.3		
225B	8	8.44	166	2461	45	2.9	TC-TF 160 180 200 225	7050	128.9
	10	10.13	138	2955	45	2.5		7330	111.6
	12.5	12.45	112	3630	45	2.1		7700	95.5
	16	15.93	88	4644	45	1.7		7950	77.0
	20	19.13	73	5577	45	1.4		8350	67.4
	25	23.49	60	6850	45	1.1		7980	52.4
	31.5	30.29	46	7262	37	1.1		7950	40.5
	40	37.09	38	7210	30	1.0		7700	32.0
	200C	40	42.62	33	8110	30		1.1	TC-TF 132 160 180 200
50		51.18	27	7143	22	1.3	9280	28.6	
63		62.86	22	8772	22	1.1	9600	24.1	
80		81.64	17	9581	18.5	1.0	9920	19.2	
100		98.04	14	9330	15	1.1	10240	16.5	
125		120.41	12	8403	11	1.3	10560	13.8	
160		147.45	9	10290	11	1.1	10880	11.6	
200		196.87	7	11240	9	1.0	11200	9.0	
250		241.79	6	11504	7.5	1.0	11520	7.5	
315	296.07	5	10330	5.5	1.1	11840	6.3		



2.4 Dimensioni

2.4 Dimensions

2.4 Abmessungen

	TA... - TC... - TF...												
	71B	90B	112B	140B	180B	225B							
A	142	180	224	280	360	450							
a	102	134	166	209	272.5	344							
a1	—	—	—	—	—	—							
B	112	127	150	175	215	290							
b	90	104	125	145	180	240							
C2	115	130	155	180	220	300							
D1	14	19	24	28	38	48							
D2	24	28	32	30	35	42	40	45	55	50	70	60	100
E	206	262	326	407	522.5	654							
e	38	52	64	82	110	140							
F	9	11	13	15	17	21							
f	M8	M10	M12	M14	M16	M18							
G	122	155	194	244	320	400							
g	61	77.5	97	122	160	200							
H	71	90	112	140	180	225							
h	174	212	262	317	400	500							
I	110	130	160	190	237.5	296							
i	125	159.5	199	249	322.5	404							
L1	30	40	50	60	80	110							
M1	16	21.5	27	31	41	51.5							
M2	27.3	31.3	35.3	33.3	38.3	45.3	43.3	48.8	59.3	53.8	74.9	64.4	106.4
N1	5	6	8	8	10	14							
N2	8	8	10	8	10	12	12	14	16	14	20	18	28
O	64	82	102	127	162.5	204							
T	275	342	424	517	660	835							
t	211	260	322	390	497.5	631							
Z	9	11	13	15	17	25							

	TA... - TC... - TF...									
	80C	100C	125C	160C	200C					
160	200	250	320	400						
82	102	127	162.5	204						
106	134	169	217	277.5						
125	150	175	215	290						
104	125	145	180	240						
130	155	180	220	300						
14	19	24	28	38						
32	30	35	42	40	45	55	50	70	60	100
306	384	479	609.5	766.5						
42	52	67	90	115						
11	13	15	17	21						
M10	M12	M14	M16	M18						
135	170	214	280	350						
67.5	85	107	140	175						
80	100	125	160	200						
256	314	389	479.5	604						
110	130	160	190	237.5						
213.5	269	336	429.5	541.5						
30	40	50	60	80						
16	21.5	27	31	41						
35.3	33.3	38.3	45.3	43.3	48.8	59.3	53.8	74.9	64.4	106.4
5	6	8	8	10						
10	8	10	12	12	14	16	14	20	18	28
146	184	229	289.5	366.5						
366	454	564	699.5	884						
220	270	335	410	517.5						
11	13	15	17	25						

Kg	TA..					
	12.5	20	34	58	116	232
Kg	TC... - TF...					
	15.5	25	44	75	136	270

	TA..				
	19	36	66	120	260
	TC... - TF...				
	22	41	76	137	295

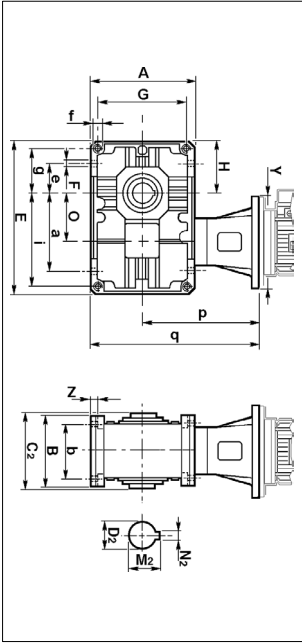
	TC...															
	71B			90B			112B			140B			180B			
IEC	63	71	80/90	71	80/90	100/112	80/90	100/112	132	80/90	100/112	132	160/180	132	160/180	200
Y	140	160	200	160	200	250	200	250	300	200	250	300	350	300	350	400
P	177	184	204	220	240	250	286	296	318	331	341	363	393	463 (i=10-40) / 473 (i=50-80)		
p	113	120	140	138	158	168	184	194	216	204	214	236	266	300 (i=10-40) / 310 (i=50-80)		
Q	248	255	275	310	330	340	398	408	430	471	481	503	533	643 (i=10-40) / 653 (i=50-80)		
q	184	191	211	228	248	258	296	306	328	344	354	376	406	480 (i=10-40) / 490 (i=50-80)		

	TC...															
	80C			100C			125C			160C			200C			
IEC	63	71	80/90	71	80/90	100/112	80/90	100/112	132	80/90	100/112	132	160	132	160/180	200
Y	140	160	200	160	200	250	200	250	300	200	250	300	350	300	350	400
P	259	266	286	322	342	352	413	423	445	493	503	525	555	667(i=40-160) / 677(i=200-315)		
p	113	120	140	138	158	168	184	194	216	204	214	236	266	300(i=40-160) / 310 (i=200-315)		
Q	339	346	366	422	442	452	538	548	570	653	663	686	715	867(i=40-160) / 877(i=200-315)		
q	193	200	220	238	258	268	309	319	341	364	374	396	426	500(i=40-160) / 510(i=200-315)		

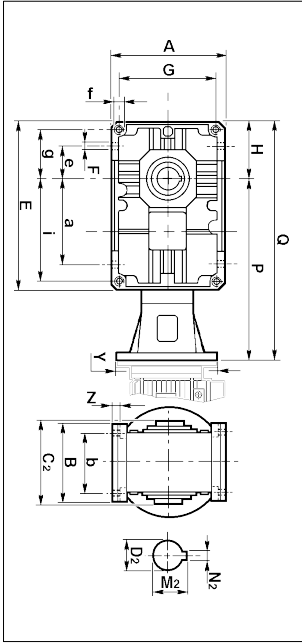
	TF...																	
	71B			90B			112B			140B			180B			225B		
IEC	63	71	80/90	71	80/90	100/112	80/90	100/112	132	100/112	132	160/180	132	160/180	200	160/180	200	225
Y	140	160	200	160	200	250	200	250	300	250	300	350	300	350	400	350	400	450
P	231	238	259	286	307	317	367	377	398	442	463	493	566	596	596	728	728	760
p	167	174	195	204	225	235	265	275	296	315	336	366	403	433	433	524	524	556
Q	302	309	330	376	397	407	479	489	510	582	603	633	746	776	776	953	953	985
q	238	245	266	294	315	325	377	387	408	455	476	506	583	613	613	749	749	781

	TF...														
	80C			100C			125C			160C			200C		
IEC	63	71	80/90	71	80/90	100/112	80/90	100/112	132	100/112	132	160	132	160/180	200
Y	140	160	200	160	200	250	200	250	300	250	300	350	300	350	400
P	313	320	341	388	409	419	494	504	525	604	625	655	770	800	802
p	167	174	195	204	225	235	265	275	296	315	336	366	404	434	436
Q	393	400	421	488	509	519	619	629	650	764	785	815	970	1000	1002
q	247	254	275	304	325	335	390	400	421	475	496	526	604	634	636

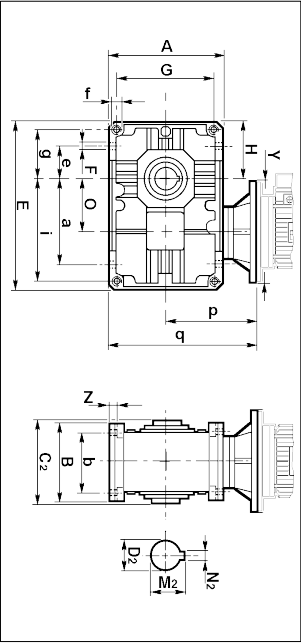
TF..BV



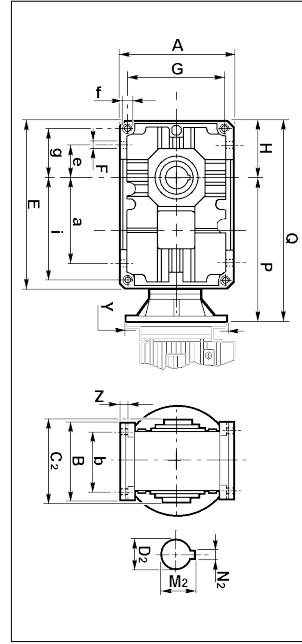
TF..BO



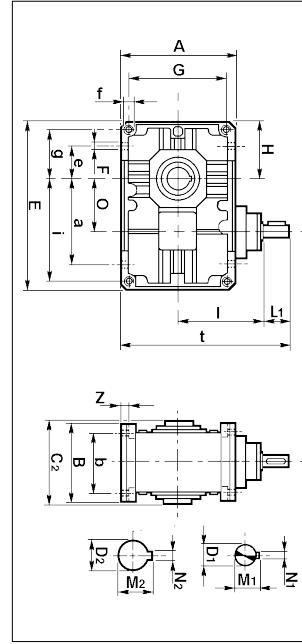
TC..BV



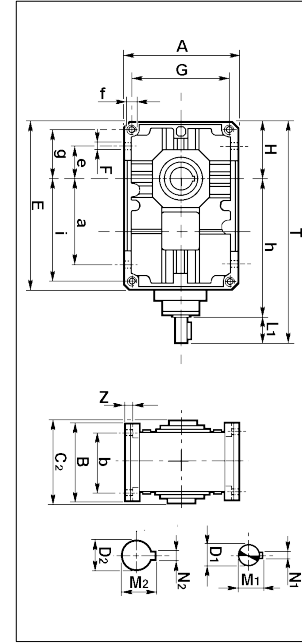
TC..BO



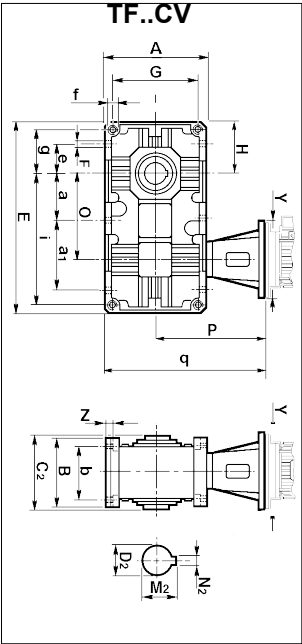
TA..BV



TA..BO



TF..CV



TF..CO

TC..CV

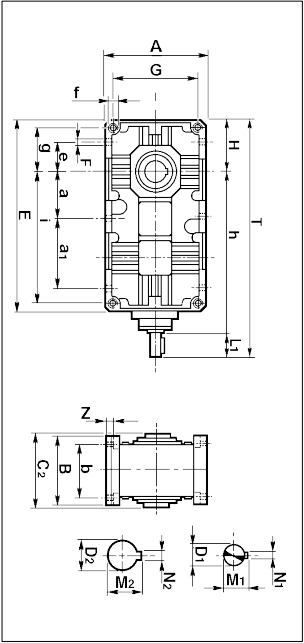
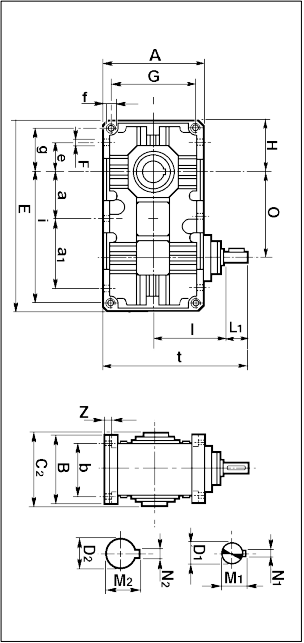
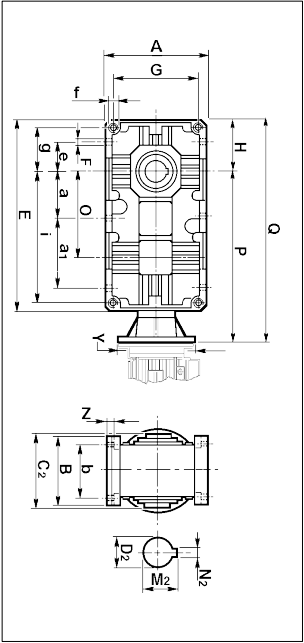
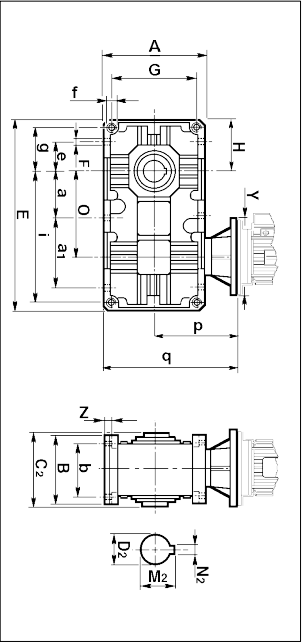
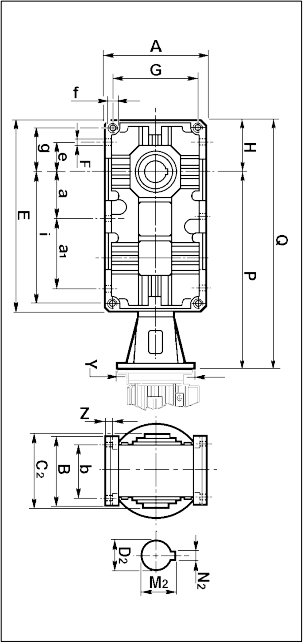
TC..CO

TA..CV

TA..CO









2.5 Accessori

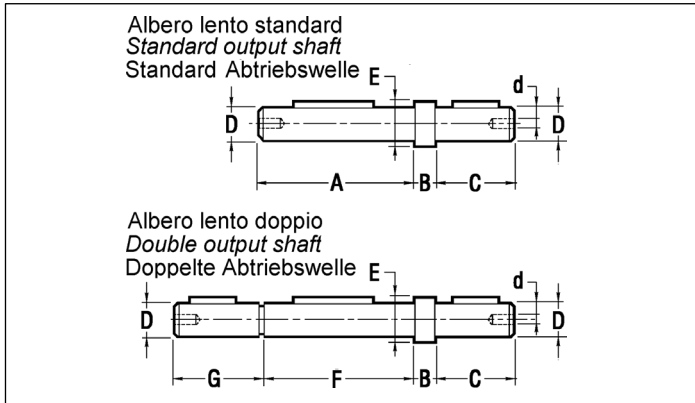
2.5 Accessories

2.5 Zubehör

Albero lento

Output shaft

Abtriebswelle

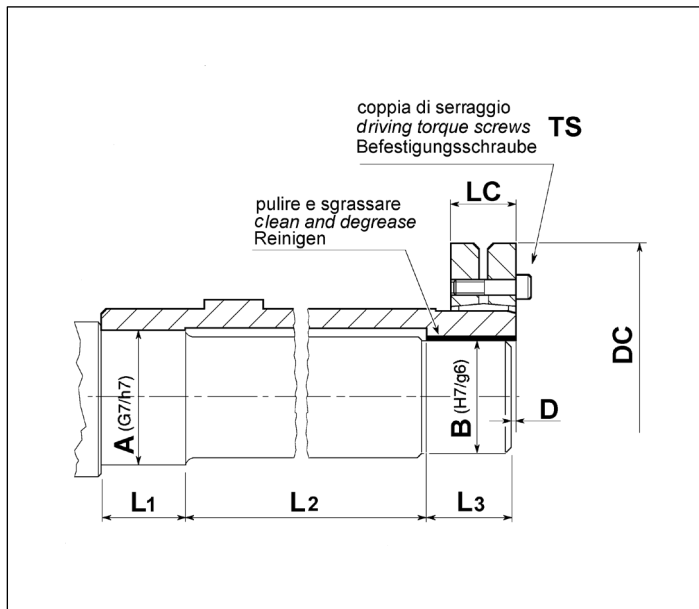


	T					
	71B	90B 80C	112B 100C	140B 125C	180B 160C	225B 200C
A	114	129	154	179	219	298
B	5	6	8	10	12	15
C	50	60	80	100	125	180
D <sub>g6</sub>	24	32	42	55	70	100
d	M8	M8	M10	M10	M12	M18
E	30	40	50	65	80	118
F	115	130	155	180	220	300
G	49	59	79	99	124	178

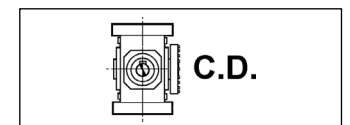
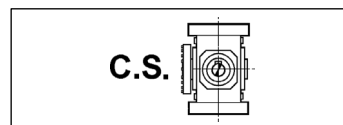
Albero lento cavo con calettatore

Hollow output shaft with shrink disc

Abtriebs-Hohlwelle mit Schrupfscheibe



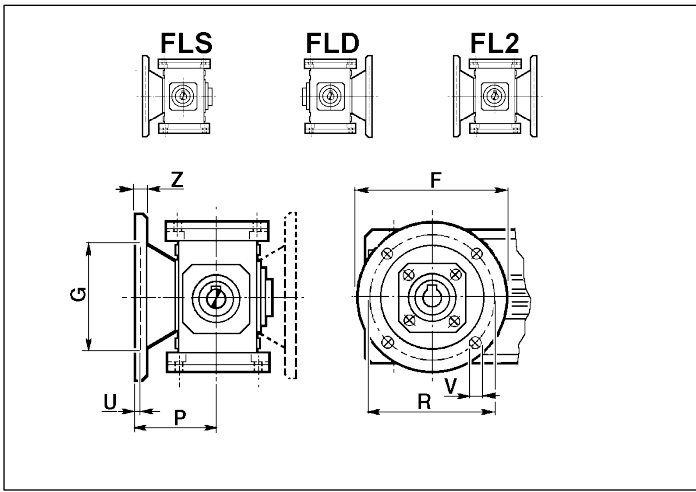
	T					
	71B	90B 80C	112B 100C	140B 125C	180B 160C	225B 200C
A	27	37	47	57	72	102
B	25	35	45	55	70	100
D	2	2	2	2	2	3
DC	60	80	100	115	145	215
LC	22	26	31	31	33	54
L <sub>1</sub>	36	39	45	50	60	80
L <sub>2</sub>	68	82	100	115	135	200
L <sub>3</sub>	36	39	45	50	60	80
TS (Nm)	8	12	12	12	36	72



Flangia uscita

Output flange

Abtriebsflansch

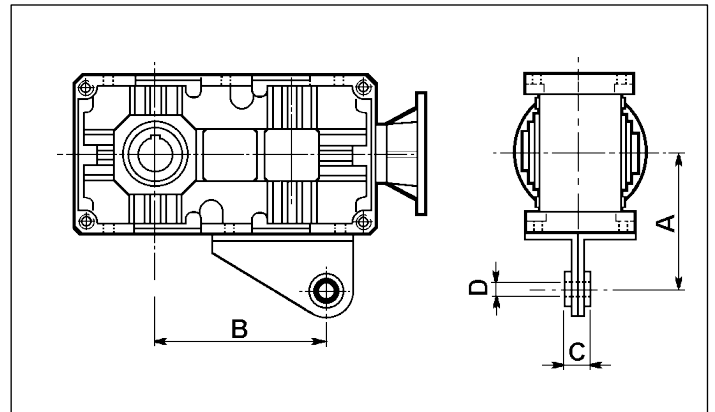
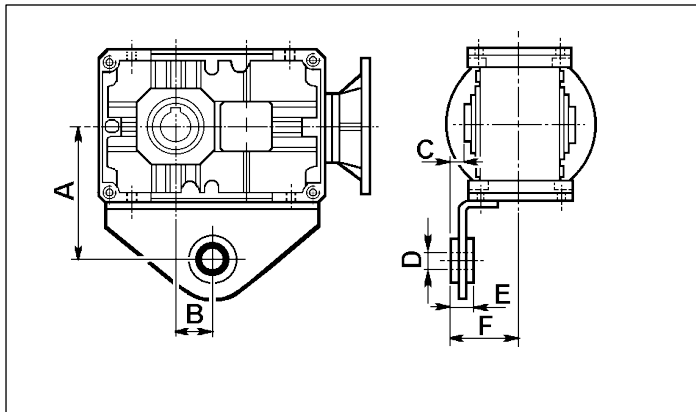


	T				
	71B	90B 80C	112B 100C	140B 125C	180B 160C
<b>F</b>	160	200	250	300	350
<b>G</b>	110	130	180	230	250
<b>R</b>	130	165	215	265	300
<b>P</b>	87	100	125	150	180
<b>U</b>	4	4.5	5	5	6
<b>V</b>	9	11	13	15	17
<b>Z</b>	10	12	16	20	25
<b>Kg</b>	2	3.2	5	8	12.5

### Braccio di rezione

### Torque arm

### Drehmomentstütze



	T					
	71B	90B	112B	140B	180B	225B
A	123	145	180	214	270	340
B	32	41	51	63.5	81.25	102
C	12.5	11	15	15.5	20	30
D	20	20	25	25	35	40
E	25	25	30	30	35	45
F	70	77	92.5	105.5	130	180

	T				
	80C	100C	125C	160C	200C
A	130	160	190	240	300
B	170	214	276	354.5	456.5
C	25	30	30	35	45
D	20	25	25	35	40

### Dispositivo antiritorno

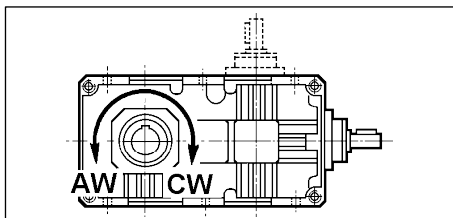
### Backstop device

### Rücklaufsperre

A richiesta è possibile fornire il riduttore con dispositivo antiritorno; questo permette la rotazione dell'albero lento solo nel senso desiderato.

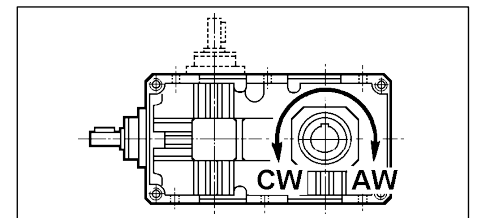
The gear unit can be supplied with optional backstop device; this ensures that the output shaft only turns in the permitted direction. Specify the direction of rotation required (clockwise or anti-clockwise) when ordering.

Auf Wunsch ist das Untersetzungsgetriebe mit Rücklaufsperre lieferbar; diese Vorrichtung sorgt dafür, daß die Abtriebswelle nur in die gewünschte Richtung läuft. Bei der Bestellung muß die gewünschte Drehrichtung angegeben werden (im oder gegen den Uhrzeigersinn).



**CW** Rotazione oraria  
Clockwise rotation  
Im Uhrzeigersinn

**AW** Rotazione antioraria  
Anti-clockwise rotation  
Gegen den Uhrzeigersinn



### 2.6 Sensi di rotazione alberi

### 2.6 Direction of shaft rotation

### 2.6 Drehrichtungen der Wellen

Nei riduttori esecuzione orizzontale, per ottenere il senso di rotazione contrario al catalogo dell'albero lento mantenendo invariato il senso di rotazione dell'albero veloce, è sufficiente ruotare il riduttore di 180° attorno all'asse dell'albero veloce, utilizzando in pratica il piano di fissaggio opposto.

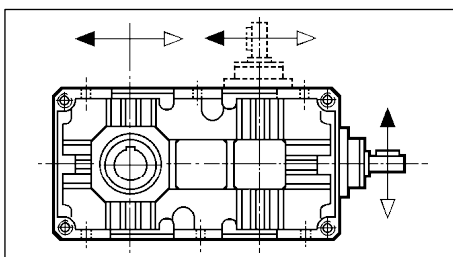
In gear units in horizontal execution, to obtain output shaft rotation direction opposite to that given in the catalogue while retaining the input shaft direction unchanged, simply turn the gear unit through 180° around the input shaft; in practice, mount the other way up.

Wenn bei Untersetzungsgetrieben in waagerechter Ausführung für die Abtriebswelle eine andere als die im Katalog angegebene Drehrichtung gewünscht wird und die Antriebswelle ihre Drehrichtung beibehalten soll, so genügt es, das Getriebe um 180° um die Achse der Antriebswelle zu drehen, d.h. die gegenüberliegende Anschlußfläche zu verwenden.

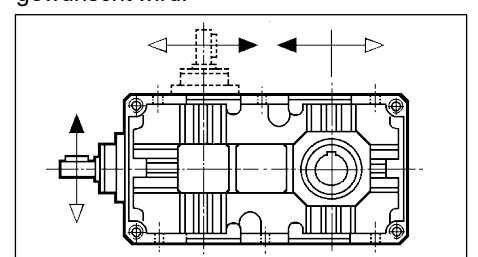
Nei riduttori esecuzione verticale è possibile fornire il senso di rotazione contrario al catalogo specificando al momento dell'ordine.

Vertical units can be supplied with rotation direction opposite to that in the catalogue; specify when ordering.

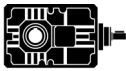
Bei Untersetzungsgetrieben in vertikaler Ausführung ist es bei der Bestellung anzugeben, falls die umgekehrte Drehrichtung gewünscht wird.



**Sensi di rotazione standard**  
Standard direction of rotation  
Standarddrehrichtungen.







## 2.7 Lubrificazione

I riduttori ad assi ortogonali sono forniti predisposti per lubrificazione a olio e muniti dei tappi di carico, livello e scarico olio.

Si raccomanda di precisare sempre la posizione di montaggio desiderata in fase di ordine.

POMPA DI LUBRIFICAZIONE.

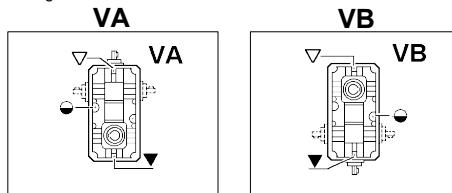
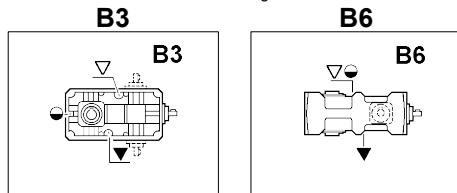
Una pompa per lubrificazione forzata dei cuscinetti superiori è fornita a richiesta sulle grandezze 125, 140, 160, 180, 200 e 225 nella posizione di montaggio VA.

### Posizione di montaggio e quantità di lubrificante

### Mounting positions and lubricant quantity (litres)

### Montageposition und Ölmenge (liter)

Nella posizione di montaggio B6 è previsto un tappo di sfiato con asta di livello. In mounting position B6 the vent / filler plug is fitted with dipstick. Für die B6 version ist eine Entlüftungsschraube mit Ölstandanziger vorausgesehen.



## 2.8 Carichi radiali e assiali (N)

Le trasmissioni effettuate tramite pignoni per catena, ruote dentate o pulegge generano delle forze radiali ( $F_R$ ) sugli alberi dei riduttori. L'entità di tali forze può essere calcolata con la formula:

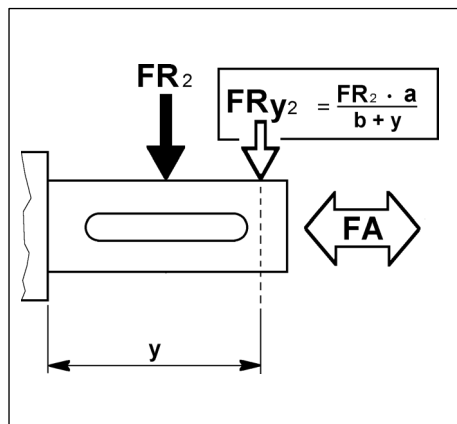
$$K_R \cdot T$$

$$F_R = \frac{K_R \cdot T}{d} \quad (N)$$

dove:

- T = Momento torcente (Nm)
- d = Diametro pignone o puleggia (mm)
- $K_R$  = 2000 per pignone per catena
- = 2500 per ruote dentate
- = 3000 per puleggia con cinghie a V

I valori dei carichi radiali e assiali generati dall'applicazione debbono essere sempre minori o uguali a quelli ammissibili indicati nelle tabelle.



I carichi radiali indicati nelle tabelle si intendono applicati a metà della sporgenza dell'albero e sono riferiti ai riduttori operanti con fattore di servizio 1.

The radial loads indicated in the chart are considered to be applied to the half-way point of the projection (a) of the shaft, and refer to gear units operating with service factor 1.

Die Querbelastungen, die in den Tabellen angegeben werden gelten für Ansatzpunkte in der Mitte des herausragenden Wellenteils (a)

## 2.7 Lubrication

The bevel helical gearboxes are supplied with standard oil lubrication, and come equipped with filling plugs, level indicators and oil discharge. It is extremely important that desired mounting position be specified in your order.

OIL PUMP.

A pump for forced lubrication of the upper bearings is supplied on request for sizes 125, 140, 160, 180, 200 and 225 in the VA mounting position.

### Mounting positions and lubricant quantity (litres)

## 2.7 Schmierung

Die Kegelstirradgetriebe sind für die Ölschmierung mit Einfüll-, Ölstand- und Ablaufstopfen ausgerüstet. Bei der Bestellung ist immer die gewünschte Montageposition anzugeben.

ÖLPUMPE.

Eine Pumpe für die Zwangsschmierung der oberen Lager kann auf Wunsch beiden Größen 125, 140, 160, 180, 200 und 225 in der Montageposition VA geliefert werden.

T	B3	B6	VA	VB
71B	0.6	0.75	0.6	0.7
80C	1.2	1.5	1.2	1.3
90B	1.2	1.5	1.2	1.3
100C	2	2.6	2	2.2
112B	2	2.6	2	2.2
125C	3.7	4.8	3.7	4
140B	3.7	4.8	3.7	4
160C	7.1	9.2	7.1	7.8
180B	7.1	9.2	7.1	7.8
200C	13.5	17.5	13.5	14.8
225B	13.5	17.5	13.5	14.8

## 2.8 Radial and axial loads (N)

Transmissions implemented by means of chain pinions, gears or pulleys generate radial forces ( $F_R$ ) on the gear unit shafts. The entity of these forces may be calculated using this formula:

$$K_R \cdot T$$

$$F_R = \frac{K_R \cdot T}{d} \quad (N)$$

where:

- T = torque (Nm)
- d = pinion or pulley diameter (mm)
- $K_R$  = 2000 for chain pinion
- = 2500 for gears
- = 3000 for V-belt pulleys

The value of the radial and axial loads generated by the application must always be less than or equal to admissible values as indicated in the chart.

## 2.8 Radial and axial Belastungen (N)

Antriebe mit Kettenrädern, Zahnrädern oder Riemenscheiben erzeugen radiale Kräfte ( $F_R$ ) an den Wellen der Unteretzungsgetriebe. Das Ausmaß dieser Kräfte kann nach folgender Formel berechnet werden:

$$K_R \cdot T$$

$$F_R = \frac{K_R \cdot T}{d} \quad (N)$$

dabei ist:

- T = Drehmoment (Nm)
- d = Kettenrad-bzw. Riemscheibendurchmesser (mm)
- $K_R$  = 2000 bei Kettenrad
- = 2500 bei Zahnrad
- = 3000 bei Riemscheibe mit Keilriemen

Die Werte der Quer- und Längsbelastungen, die durch die Anwendungen hervorgerufen werden, dürfen nicht über den in den Tabellen angegebenen zulässigen Werten liegen.

	T 71B	T 90B	T 112B	T 140B	T 180B	T 225B
	a=114.5 b=84.5	a=127.5 b=95.5	a=161.5 b=113.5	a=192 b=132	a=237 b=162	a=326 b=221
<b>ALBERO ENTRATA / INPUT SHAFT / ANTRIEBSWELLE (n1 = 1400 rpm)</b>						
in	$F_{r1}$	$F_{a1}$	$F_{r1}$	$F_{a1}$	$F_{r1}$	$F_{a1}$
8 ÷ 20	630	126	1000	200	1600	320
25 ÷ 40	500	100	800	160	1250	250
50 ÷ 80	400	80	630	130	1000	200
	$F_{r1}$	$F_{a1}$	$F_{r1}$	$F_{a1}$	$F_{r1}$	$F_{a1}$
8 ÷ 20	630	126	1000	200	1600	320
25 ÷ 40	500	100	800	160	1250	250
50 ÷ 80	400	80	630	130	1000	200
<b>ALBERO USCITA / OUTPUT SHAFT / ABTRIEBSWELLE</b>						
n2 (rpm)	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150	630	5000	1000	8000	1600
140	3350	670	5300	1060	8500	1700
150	3550	710	5600	1120	9000	1800
120	3750	750	6000	1200	9500	1900
95	4000	800	6300	1260	10000	2000
75	4250	850	6700	1340	10600	2120
60	4500	900	7100	1420	11200	2240
50	4750	950	7500	1500	11800	2360
≤ 40	5000	1000	8000	1600	12500	2500
	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$	$F_{r2}$	$F_{a2}$
300	3000	600	4750	950	7500	1500
240	3150					

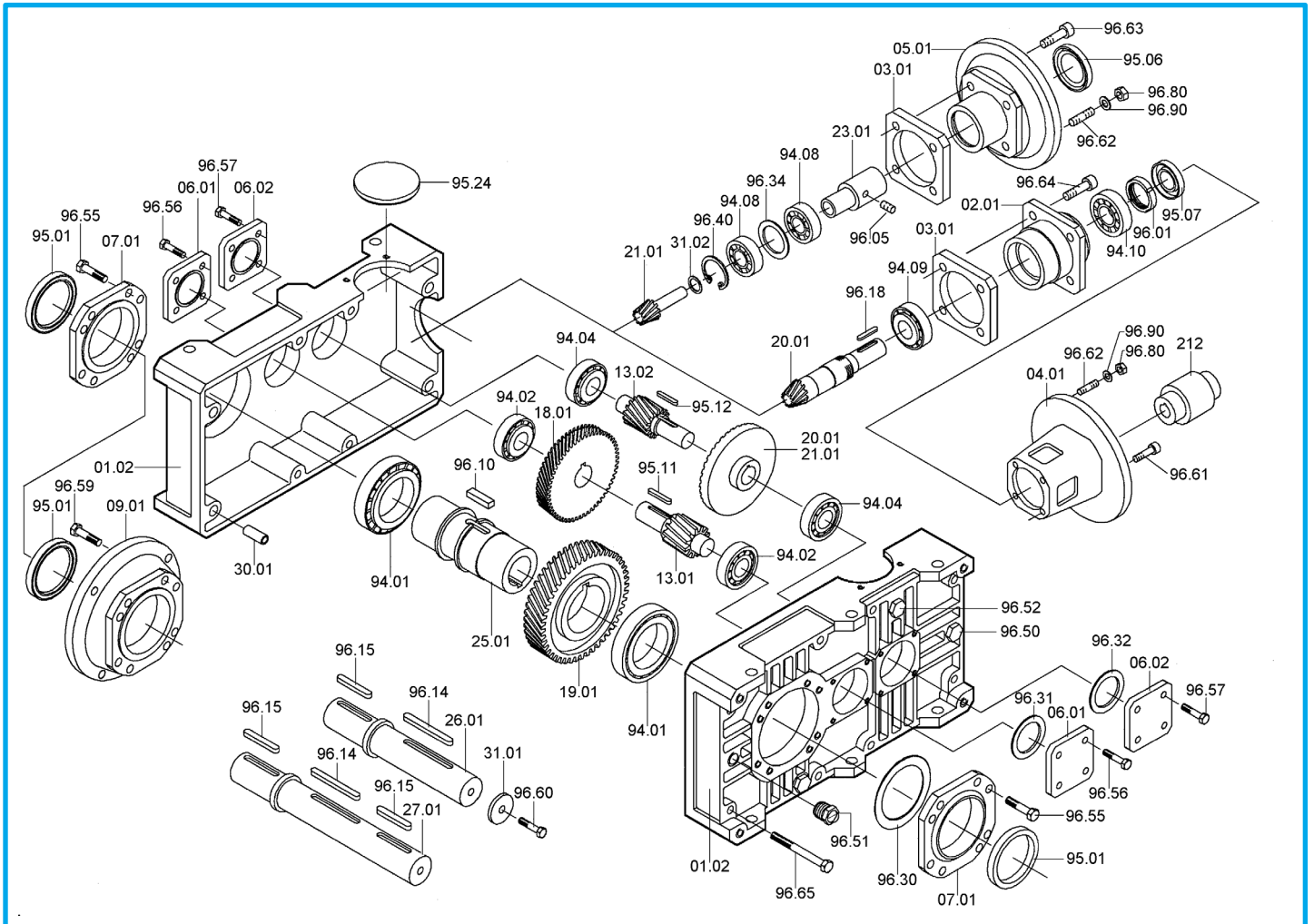
und für Getriebe mit Betriebsfaktor 1.







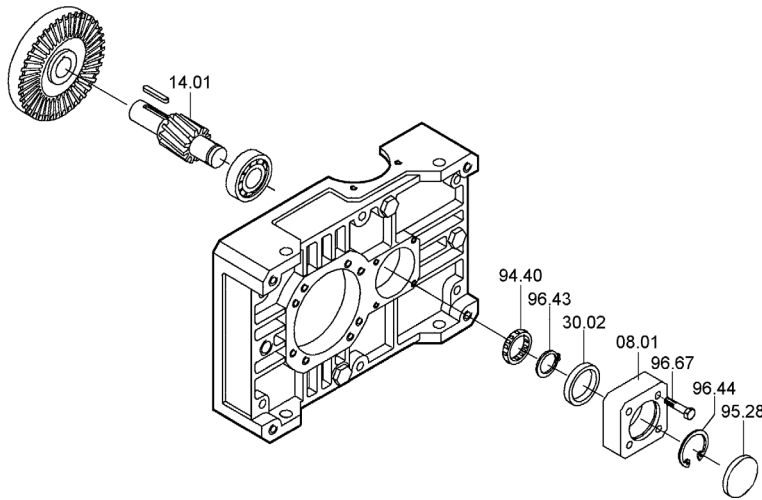
**TA..C - TC..C - TF..C**



T	Cuscinetti / Bearings / Lager						Anelli di tenuta / Oilseals / Öldichtungen				
	TA - TC - TF			TC	TA - TF		TA - TC - TF	TC		TA - TF	
	94.01	94.02	94.04	94.08	94.09	94.10	95.01	IEC	95.06	95.07	
<b>80C</b>	<b>32010</b> 50/80/20	<b>30204</b> 20/47/15.25	<b>30302</b> 15/42/14.25	<b>7203</b> 17/40/12	<b>30203</b> 17/40/13.25		50/65/8	63	25/52/7	15/40/10	
								71	30/52/7		
								80	35/52/7		
								90	37/52/7		
<b>100C</b>	<b>32012</b> 60/95/23	<b>30305</b> 25/62/18.25	<b>30204</b> 20/47/15.25	<b>7205</b> 25/52/15	<b>32005</b> 25/47/15		60/80/10	71	35/62/7	20/47/7	
								80	35/62/7		
								90	40/62/8		
								100	45/62/8		
<b>125C</b>	<b>32015</b> 75/115/25	<b>32206</b> 30/62/21.25	<b>30305</b> 25/62/18.25	<b>7206</b> 30/62/16	<b>32006</b> 30/55/17		75/95/10	112	45/62/8	25/58/10	
								80	40/72/10		
								90	40/72/10		
								132	55/72/10		
<b>160C</b>	<b>32019</b> 95/145/32	<b>32207</b> 35/72/24.25	<b>32206</b> 30/62/21.25	<b>7207</b> 35/72/17	<b>32007</b> 35/62/18		95/125/12	80	45/80/10	30/62/10	
								90	45/80/10		
								100	45/80/10		
								112	45/80/10		
								132	55/80/10		
<b>200C</b>	<b>32026</b> 130/200/45	<b>31310</b> 50/110/29.25	<b>30307</b> 35/80/22.75				130/160/14	160	60/80/10	40/80/10	
								180	65/80/10		

## TA..B - TC..B - TF..B - TA..C - TC..C - TF..C

### Dispositivo antiritorno - Backstop device - Rücklaufsperr



In fase di ordine delle parti di ricambio, specificare sempre n° particolare (vedi disegno esploso), data (1), n° codice (2) e n° variante (3).  
(Vedi targhetta).

*When you need to order a spare part, you must always specify the detail number (look at technical drawing), manufacture date (1), code number (2) and variable (3) (look at data plate).*

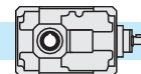
Bei Ersatzteilbestellung bitte Ersatzteil-Nr., Kode nr.(2), Herstellungsdatum (1) und Bauform (3) angeben.  
Bitte mit der Explodierten Zeichnung und evt. Typenschild abstimmen.

TIPO	TYPE	RAP.	RATIO
		DATA <b>1</b>	DATE
CODICE N° <b>2</b>	CODE N°	<b>3</b>	
<b>TRAMEC</b> BOLOGNA ITALY			

TIPO	TYPE	RAP.	RATIO
		DATA <b>1</b>	DATE
CODICE N° <b>2</b>	CODE N°	<b>3</b>	
<b>TRAMEC</b> BOLOGNA ITALY			

TIPO	TYPE	RAP.	RATIO
		DATA <b>1</b>	DATE
CODICE N° <b>2</b>	CODE N°	<b>3</b>	
<b>TRAMEC</b> BOLOGNA ITALY			





## 2.12 Giochi angolari

Bloccando l'albero di entrata, il gioco viene misurato sull'albero uscita ruotandolo nelle due direzioni ad applicando la coppia strettamente necessaria a creare il contatto tra i denti degli ingranaggi, al massimo pari al 2% della coppia massima garantita dal riduttore ( $T_{2M}$ ).

Nella tabella seguente sono riportati i valori indicativi del gioco angolare (in minuti di angolo) per quanto riguarda il montaggio normale ed i valori ottenibili con una regolazione più precisa. Quest'ultima esecuzione è da utilizzare solo in caso di reale necessità in quanto potrebbe comportare un leggero aumento della rumorosità e rendere meno efficace l'azione dell'olio lubrificante.

## 2.12 Angular backlash

*After having blocked the input shaft, the angular backlash can be measured on the output shaft by rotating it in both directions and applying the torque which is strictly necessary to create a contact between the teeth of the gears. The applied torque should be at most 2% of the max. torque guaranteed by the gearbox. ( $T_{2M}$ ).*

*The following table reports the approximate values of the angular backlash (in minutes of arc) referred to standard mounting and mounting with a more precise adjustment. The latter solution should be adopted only in case of necessity because it may raise the noise level and lessen the action of the lubricant.*

## 2.12 Winkelspiel

Nachdem die Antriebswelle blockiert worden ist, darf das Winkelspiel auf die Abtriebswelle bemessen werden. Dabei soll die Abtriebswelle in beiden Richtungen gedreht werden und ein Drehmoment ausgeübt werden, das zur Entstehung eines Kontaktes zwischen den Zähnen genügt. Das ausgeübte Drehmoment soll höchstens 2% des max. von Getrieben garantierten Drehmoment ( $T_{2M}$ ) sein.

Die folgende Tabelle weist die Näherungswerte des Winkelspiels (in Bogenminuten) für Standardmontage und Montage mit präziser Regulierung. Die präzisere Lösung darf nur im Notfall angewendet werden, weil infolgedessen das Geräuschpegel zunimmt und die Wirkung des Schmiermittels abnimmt.

Gioco angolare / Backlash / Winkelspiel (1')		
	Montaggio normale Standard mounting Standardmontage	Montaggio con gioco ridotto Mounting with reduced backlash Montage mit reduziertem Winkelspiel
2 stadi/stages/stufig	16/20	12/15
3 stadi/stages/stufig	20/25	15/17

## 2.13 Lubrificazione

I riduttori ad assi ortogonali (ad esclusione dei tipi TF56 e TF63, con lubrificazione a vita) sono forniti predisposti per lubrificazione a olio e muniti dei tappi di carico, livello e scarico olio.

Si raccomanda di precisare sempre la posizione di montaggio desiderata in fase di ordine.

### POMPA DI LUBRIFICAZIONE.

Una pompa per lubrificazione forzata dei cuscinetti superiori è fornita a richiesta sulle grandezze 112, 125, 140, 160, 180, 200 e 225 nella posizione di montaggio VA.

Nelle posizioni di montaggio in cui sono presenti cuscinetti posti al di sopra del livello dell'olio lubrificante è prevista l'applicazione di grasso speciale su talicuscini per migliorarne la lubrificazione. E' possibile dotare gli stessi cuscinetti di un anello metallico (nylos) con la funzione di contenimento del grasso e, di conseguenza, di prolungare l'effetto nel tempo. Questa soluzione viene fornita su specifica richiesta.

## 2.13 Lubrication

*Bevel helical gearboxes (except for TF56 and TF63 which are lubricated for life) require oil lubrication and are equipped with filler, level and drain plugs.*

*The mounting position should always be specified when ordering the gearbox.*

### OIL PUMP.

*A pump for forced lubrication of the upper bearings is supplied on request for sizes 112, 125, 140, 160, 180, 200 and 225 in the VA mounting position.*

*Depending on the mounting position, the bearings may be lodged above the lubricant level. In this case it is necessary to apply special grease on the bearings in order to improve their lubrication. A metallic ring (nylos) can be fitted on the bearings it keeps the grease in place thus prolonging the action. It is supplied on specific request.*

## 2.13 Schmierung

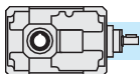
Die Kegelstirnradgetriebe sind für die Ölschmierung mit Einfüll-, Ölstand- und Ablassstopfen versehen.

Bei der Bestellung ist immer die gewünschte Montageposition anzugeben.

### ÖLPUMPE.

Eine Pumpe für die Zwangsschmierung der oberen Lager kann auf Wunsch bei den Größen 112, 125, 140, 160, 180, 200 und 225 in der Montageposition VA geliefert werden.

Abhängig von der Einbaulage kann es sein, dass die Lager über den Ölstand liegen. In dem Fall wird Sonderfett auf die Lager geschmiert, um deren Schmierung zu verbessern. Ein metallischer Ring (nylos) für die Lager darf auf Wunsch geliefert werden: er hält das Fett fest und verlängert die Wirkung.



### Posizione di montaggio e quantità di lubrificante (litri)

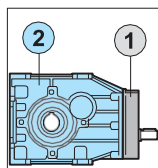
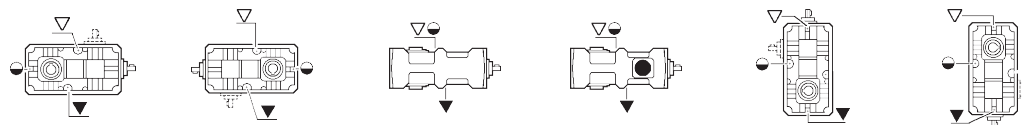
I quantitativi di olio riportati nelle varie tabelle sono indicativi e riferiti alle posizioni di lavoro indicate e considerando le condizioni di funzionamento a temperatura ambiente e velocità in ingresso di 1400 min<sup>-1</sup>. Per condizioni di lavoro diverse da quelle sopra riportate contattare il servizio tecnico.

### Mounting positions and lubricant quantity (liters)

The oil quantities stated in the tables are approximate values and refer to the indicated working positions, considering operating conditions at ambient temperature and an input speed of 1400 min<sup>-1</sup>. Should the operating conditions be different, please contact the technical service.

### Montageposition und Ölmenge (liter)

Die in der Tabellen angegebenen Daten sind Richtwerte. Die Ölmenge beziehen sich auf die angegebenen Betriebsposition. Dabei werden Betrieb bei Umgebungstemperatur und Antriebsdrehzahl von 1400 min<sup>-1</sup> berücksichtigt. Falls die Betriebsbedingungen anders sind, dann ist das technische Büro zu befragen.



	T	B3	B8	B6	B7	VA	VB
②	56B			0.30		0.40	0.30
①	56C				0.05		
②	56C			0.30		0.40	0.30
②	63B			0.35		0.45	0.35
①	63C				0.05		
2	63C			0.35		0.45	0.35
	71B	0.6		0.7	0.5		0.8
	80C	1.1		1.5	1.3		1.5
	90B	1.0		1.4	1.2		1.3
	100C	2.0		2.6	2.3		2.8
	112B	1.8		2.6	2.3		2.4
	125C	3.8		4.8	4.5		5.0
	140B	3.6		4.6	4.3		4.3
	160C	7.0		9.2	8.7		10.0
	180B	7.5		9.7	9.2		8.0
	180C	9.5		14.0	13.0		15.5
	200B	12.5		15.0	14.0		17.5
	200C	13.5		19.0	18.0		19.5
	225B	14.5		19.0	18.0		18.7

\* Nella posizione di montaggio B6 è previsto un tappo di sfiato con asta di livello.

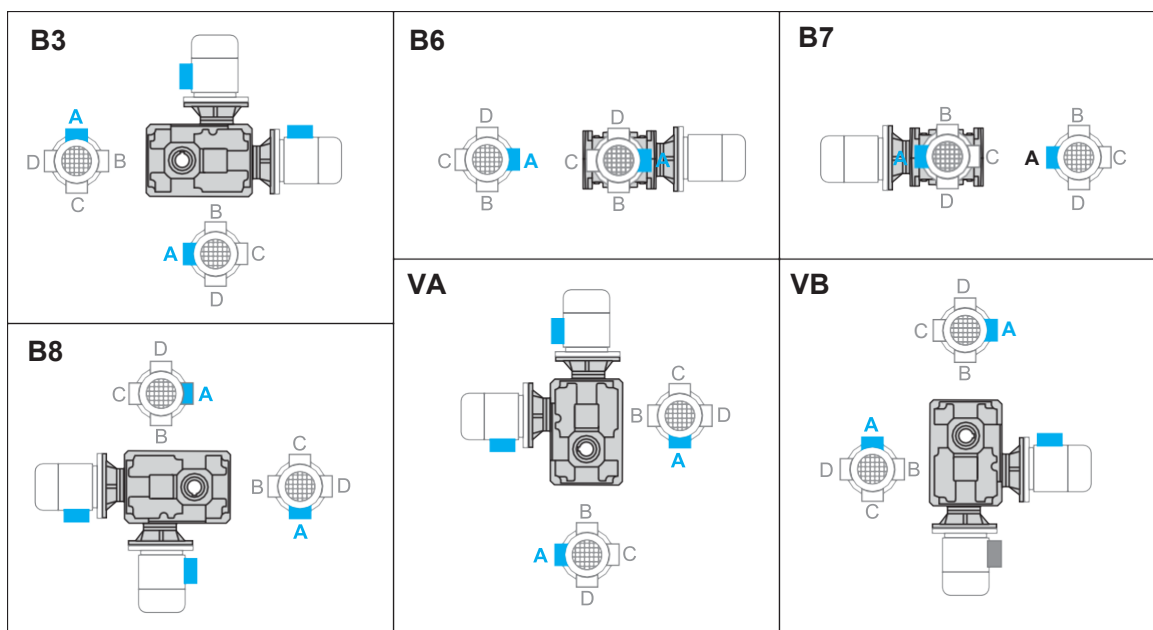
\* In mounting position B6 the breather plug is fitted with dipstick.

\* Für die B6 Version ist eine Entlüftungsschraube mit Ölstandsanzeiger vorausgesehen.

### Posizione morsetti

### Terminal board position

### Lage der Klemmenkaste



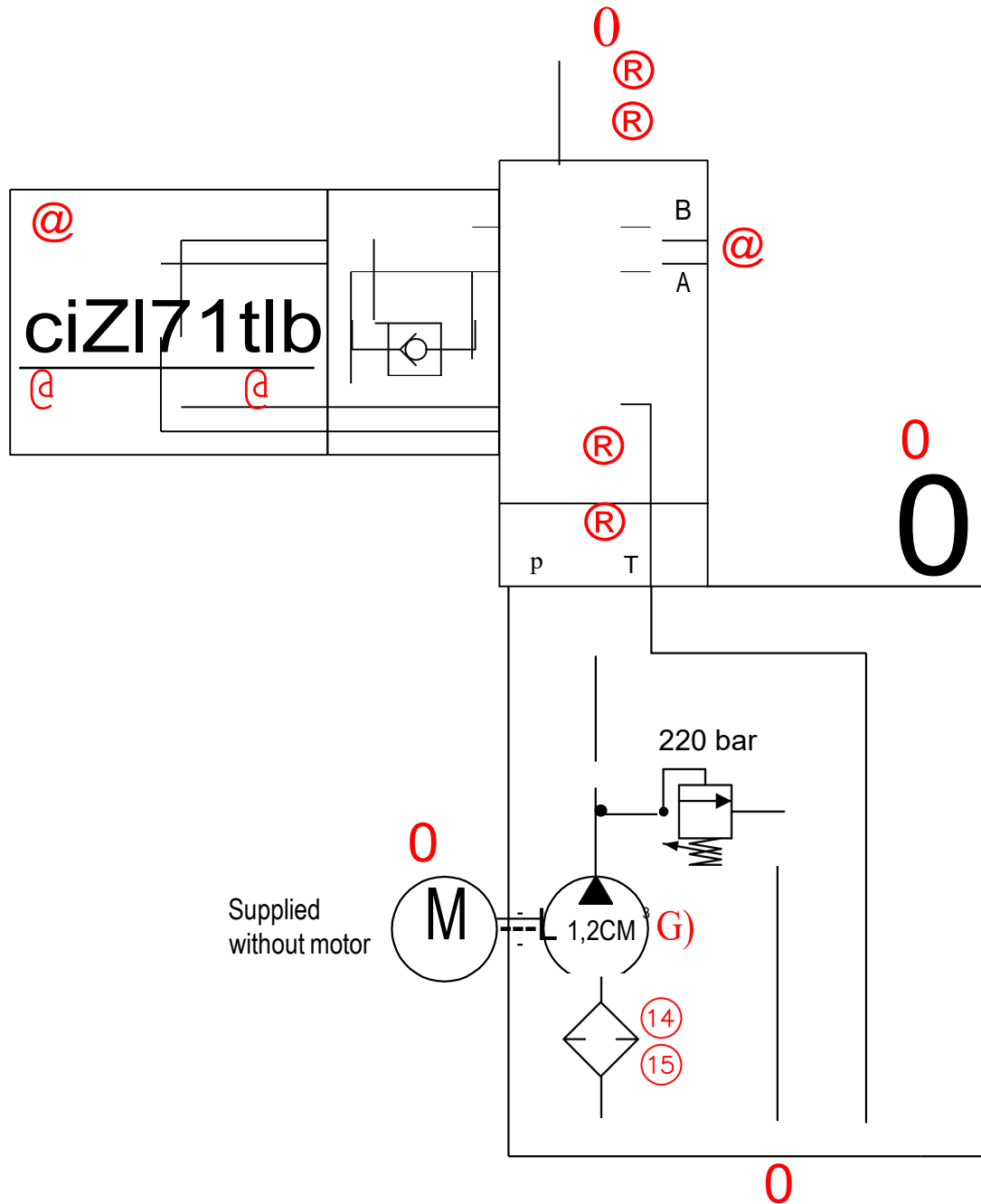
N.B.  
Se non diversamente specificato, il motore verrà fornito con la morsetti in posizione A.

N.B.  
Unless otherwise agreed, the motor will be supplied with the terminal board in position A.

ANMERKUNG:  
Ausser wenn anders angegeben, wird der Motor mit Klemmenkaste in der A Position geliefert.

# Appendix 7

---



Application	Drawing JSA	Approved	Drawing no. 8220	Date 04-11-2011	Scale
<h2 style="margin: 0;">Dani-tech</h2> <p style="margin: 0;"> <b>Denmark.</b> ☎+45-76342300 ☎+45-76342301  <b>Sweden.</b> ☎+46-46233060 ☎+46-46233069  <b>Nederland.</b> ☎+31-715417704 ☎+31-715419106         </p>			<b>Description</b> MC4-UD-V2C-PE-MM-T07-F2		
			<b>Item no.</b> MC4-0,00-T07-009-02	<b>Sheet</b> 1/1	

# MC4-0.0-T07-009-02 MC4-UD-V2C-PE-MM-T07-F2 - Part list

## Unit with out cooler

Part number	Description	Amount	Unit	Position
C4000002.000	MC4-V2C-PE-TY07-F1 1,2ccm	1	Pcs.	1
90310014	Tank T07 rectangular with mounting food	1	Pcs.	2
TMDFA/12	Filler/breather with dipstick	1	Pcs.	3
KIT01008.002	Motor-mounting kit "M" 80	1	Pcs.	4
AMFDG0404	adapter 1/4"male-1/4"fem.	1	Pcs.	5
ES090	Manometer valve 90° R1/4"	1	Pcs.	6
BS-04	Bonded seals 1/4"	1	Pcs.	
2263R250-RUNI	Manometer Ø63 0-250 bar stand.	1	Pcs.	7
61112000	Manifold with manometer connection 1/4" "D"	1	Pcs.	8
61100500	Manifold parallel	1	Pcs.	9
RM10588	Plastic cap serie SR1002 1/4"BSP	2	Pcs.	10
0084-6X90	Bolt 8.8 forz. inside hexagon	4	Pcs.	
0441-6	Spring washer FZB M6	4	Pcs.	
Q25831022	O-ring for manifold block	4	Pcs.	
0084-5X70	Bolt 8.8 forz. Indside hexagon	4	Pcs.	
DL3-S2/10N-D24K1	NG06 solenoid valve 24vdc	1	Pcs.	11
MVPPD/50	NG06 double piloted check valve	1	Pcs.	12
088010060	Valve connector with full bridge rectifier	2	Pcs.	13
P171866	FIOA35/3 Suction strainer 1/2"	1	Pcs.	14
ARGG0806	Adapter 3/8"-1/2"	1	Pcs.	15





# Appendix 8

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**UNI-EL A/S**

Dybdalvej 4, Rimmerhus

6920 Videbæk, Denmark

Tel: +45 9716 6311 Fax: +45 9716 6366

Web: [www.uni-el.dk](http://www.uni-el.dk) Mail : [uni-el@uni-el.dk](mailto:uni-el@uni-el.dk)

**Runi A/S**

# **SK200 Screw Compactor / Skrue Komprimator**

## **UL/CSA Model**



Customer : Runi A/S - Industriparken 8 - 6880 Tarm - Denmark - Tel: +45 9737 1799 - Fax: +45 9737 3800 - Web: [www.runi.dk](http://www.runi.dk) - Mail: [runi@runi.dk](mailto:runi@runi.dk)

End Customer :

Runi A/S - Industriparken 8 - 6880 Tarm - Denmark - Tel: +45 9737 1799 - Fax: +45 9737 3800 - Web:

[www.runi.dk](http://www.runi.dk) - Mail: [runi@runi.dk](mailto:runi@runi.dk)

Created : 01-02-2017 Article No : 200000609-RUNI

Modified : 10-02-2017 Archive No : 3-356-232

Next : T.O.C



# Table Of Contents

Page Number	Page Title
1	Lay Out - Outside / Udvendig
2	Lay Out - Internal / Intern
3	Main Circuit / Hovedstrøm
4	Control Circuit - Emergency Stop Circuit / Styrestrøm - Nødstop kreds
5	Control Circuit - Photocell Amplifier Relays / Styrestrøm - Fotocelle Forstærkerrelæer
6	Control Circuit - PLC & Panel / Styrestrøm - PLC Reference
7	Control Circuit - PLC & Panel / Styrestrøm - HMI Touchscreen
8	Control Circuit - PLC Inputs / Styrestrøm - PLC Indgange
9	Control Circuit - PLC Inputs / Styrestrøm - PLC Indgange
10	Control Circuit - PLC Outputs / Styrestrøm - PLC Udgange
11	Control Circuit - Contactors Screw & Valves / Styrestrøm - Kontaktorer Snegl & Magnetventiler
12	+A1/-X1
13	+A1/-X2
14	+A2/-X3
15	+A2/-X3
16	+A2/-X3
17	+A2/-X4
18	Switchboard Data / Tavledata
19	EU Incorporation Declaration / Indkorporerings Erklæring
20	Lay Out - Ethernet
21	Terminals, Operator Interface and Aspects / Klemmerækker, Betjeningsorganer og Aspekter
22	Wires - Marking, Colour & Signalsymbols / Ledninger - Opmærkning, Farver og Signalsymboler
23	Component List
25	PLC I/O List



A

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C

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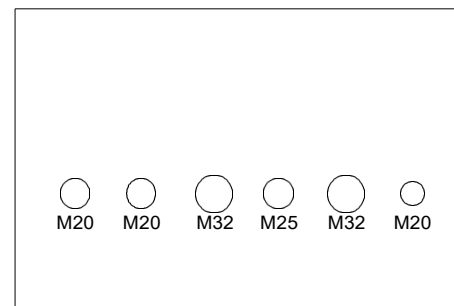
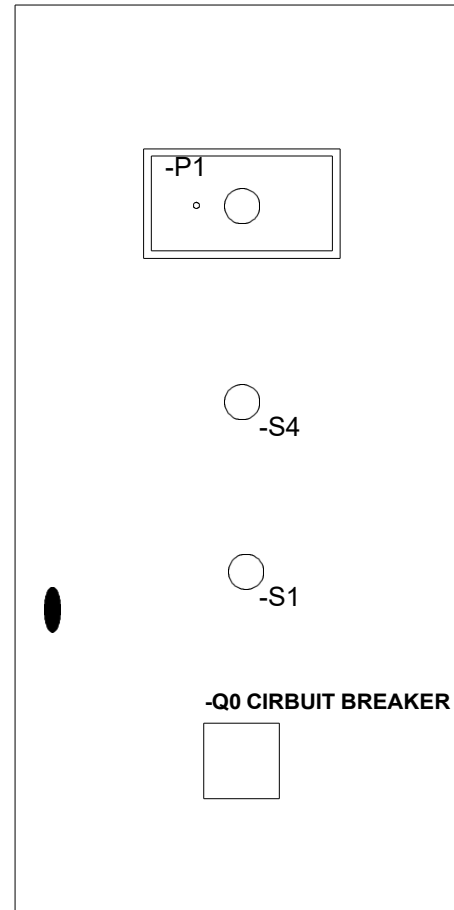
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FRONT:  
FRONT:



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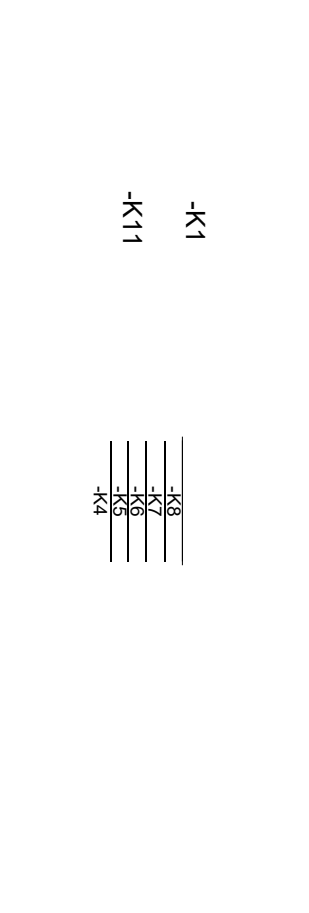
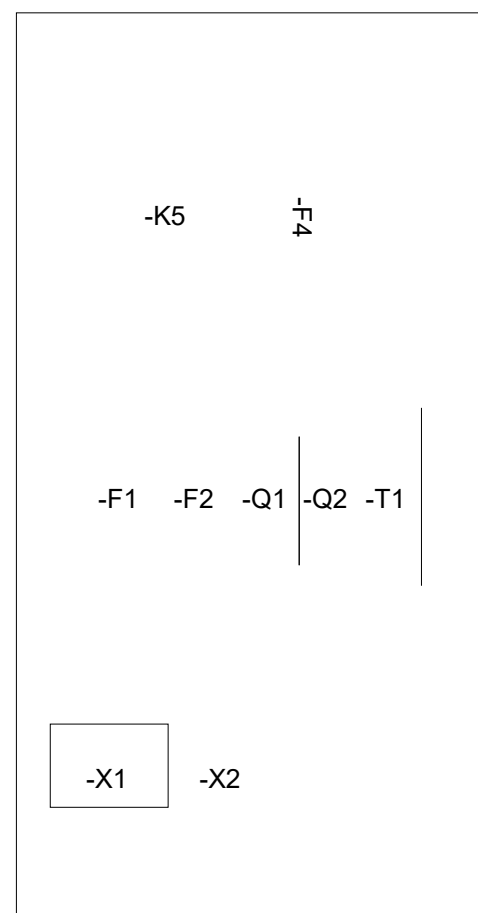
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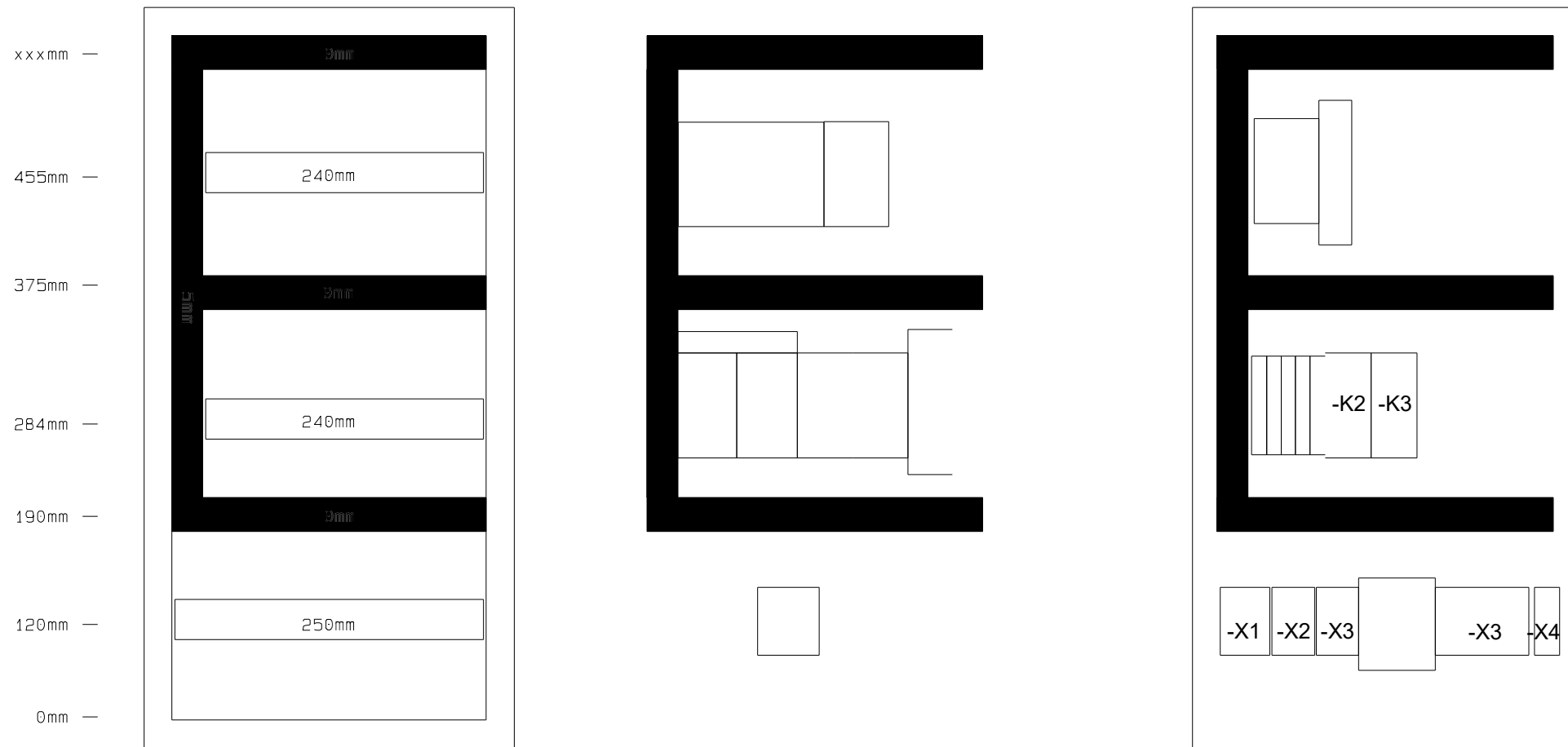
POWER UNIT - 232.RUNI

CONTROL UNIT - 233.RUNI



Aspect :



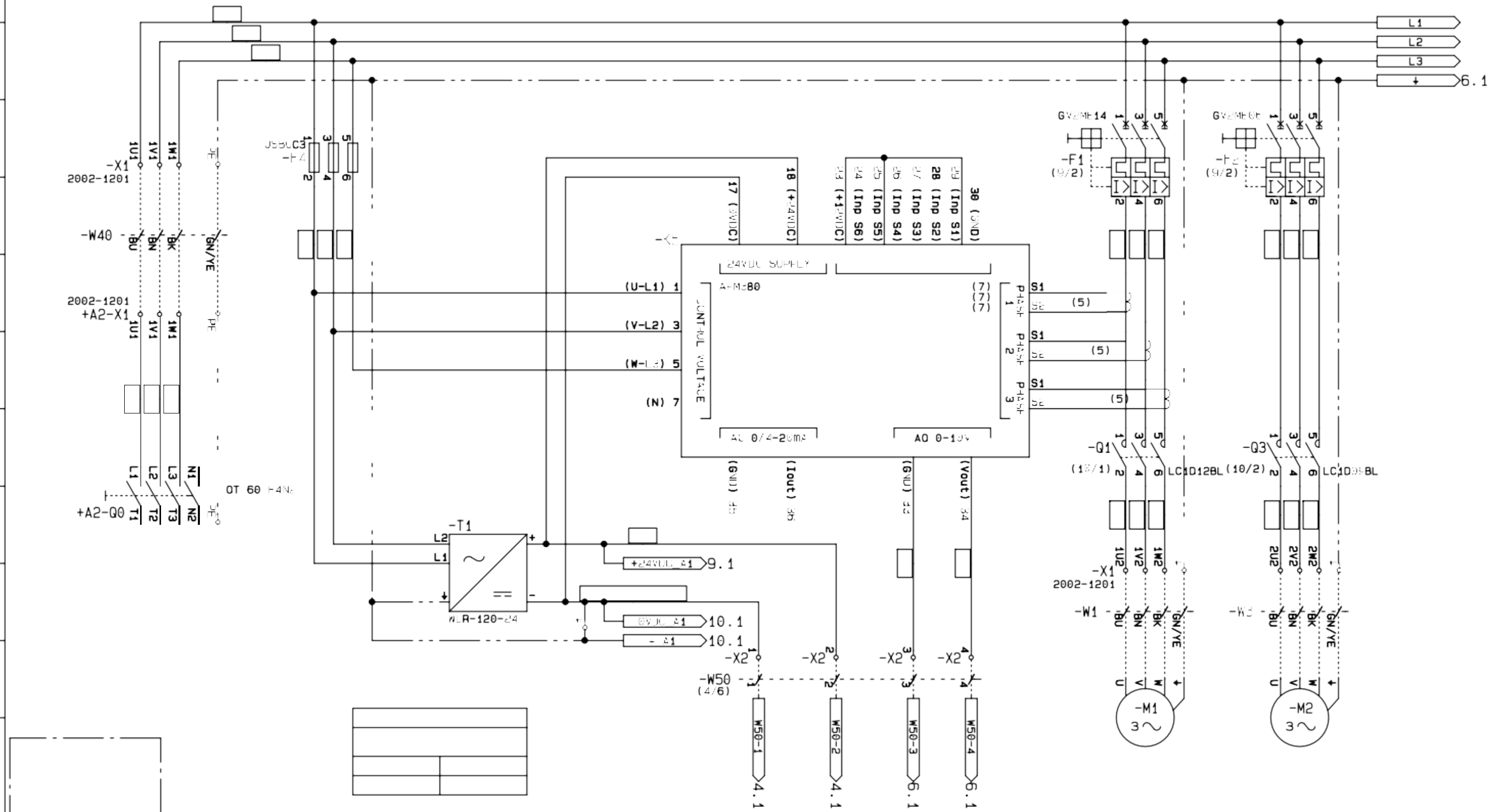


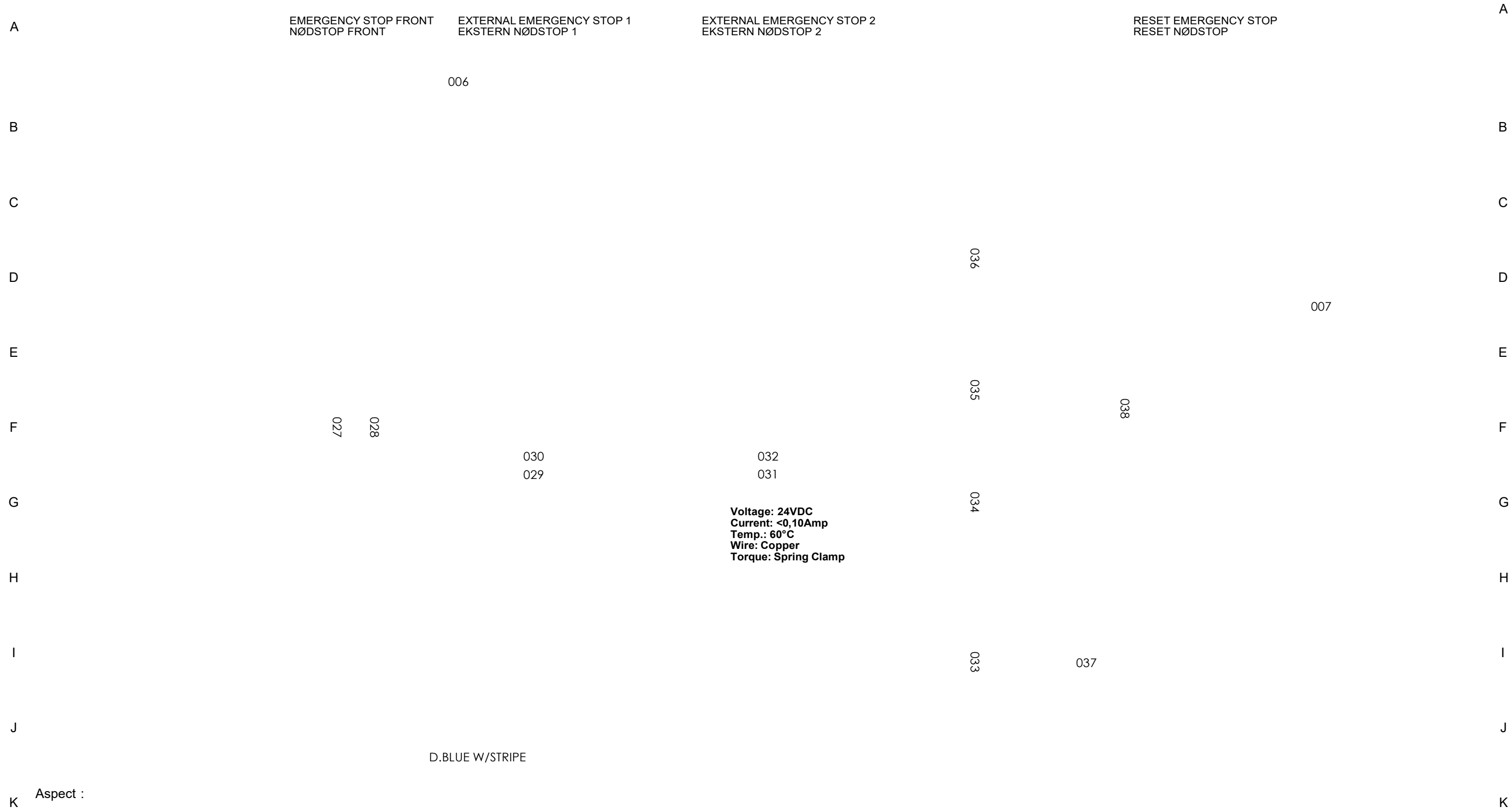


Aspect :

+A1  
Screw Compactor Power Panel

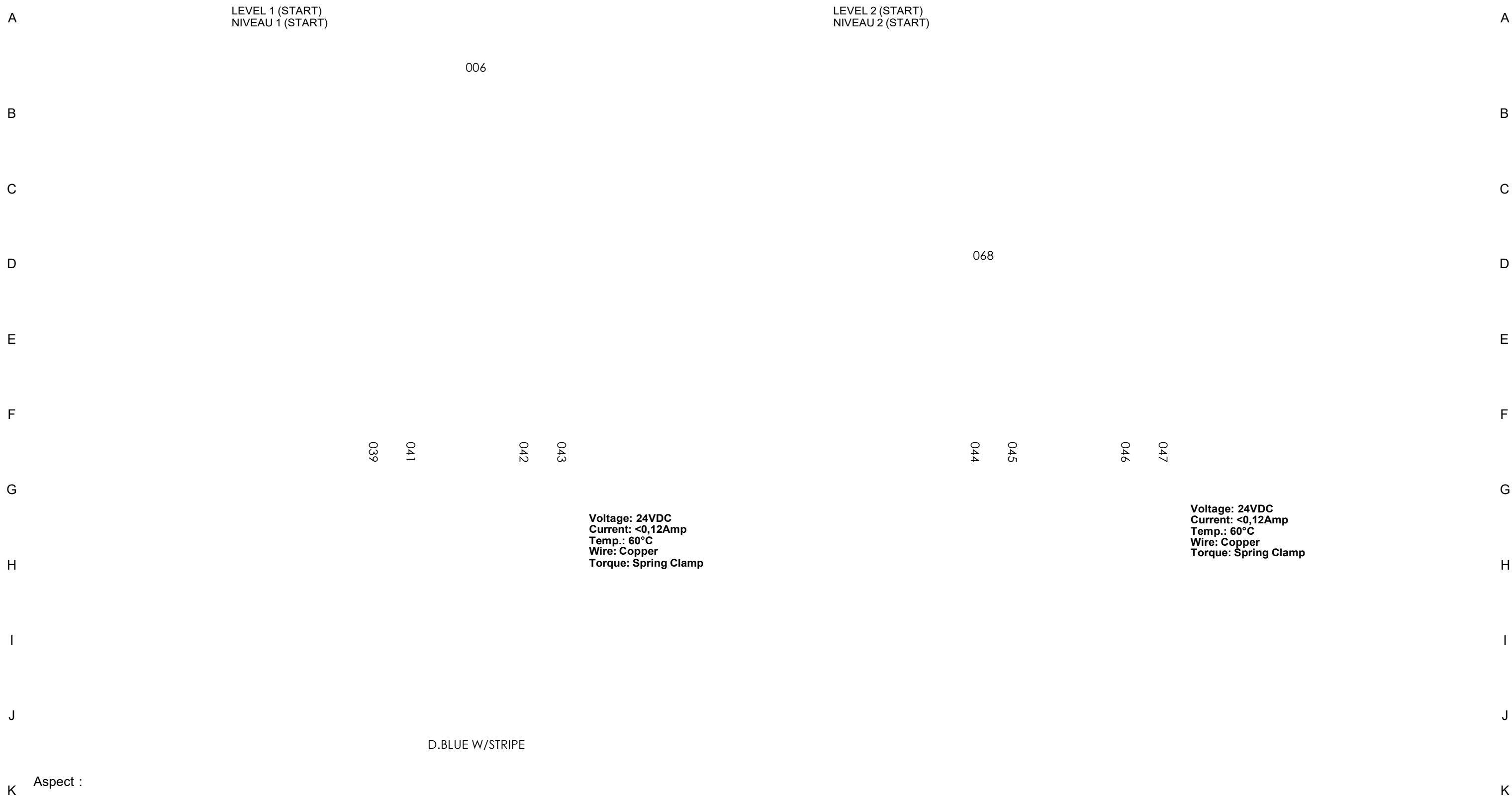
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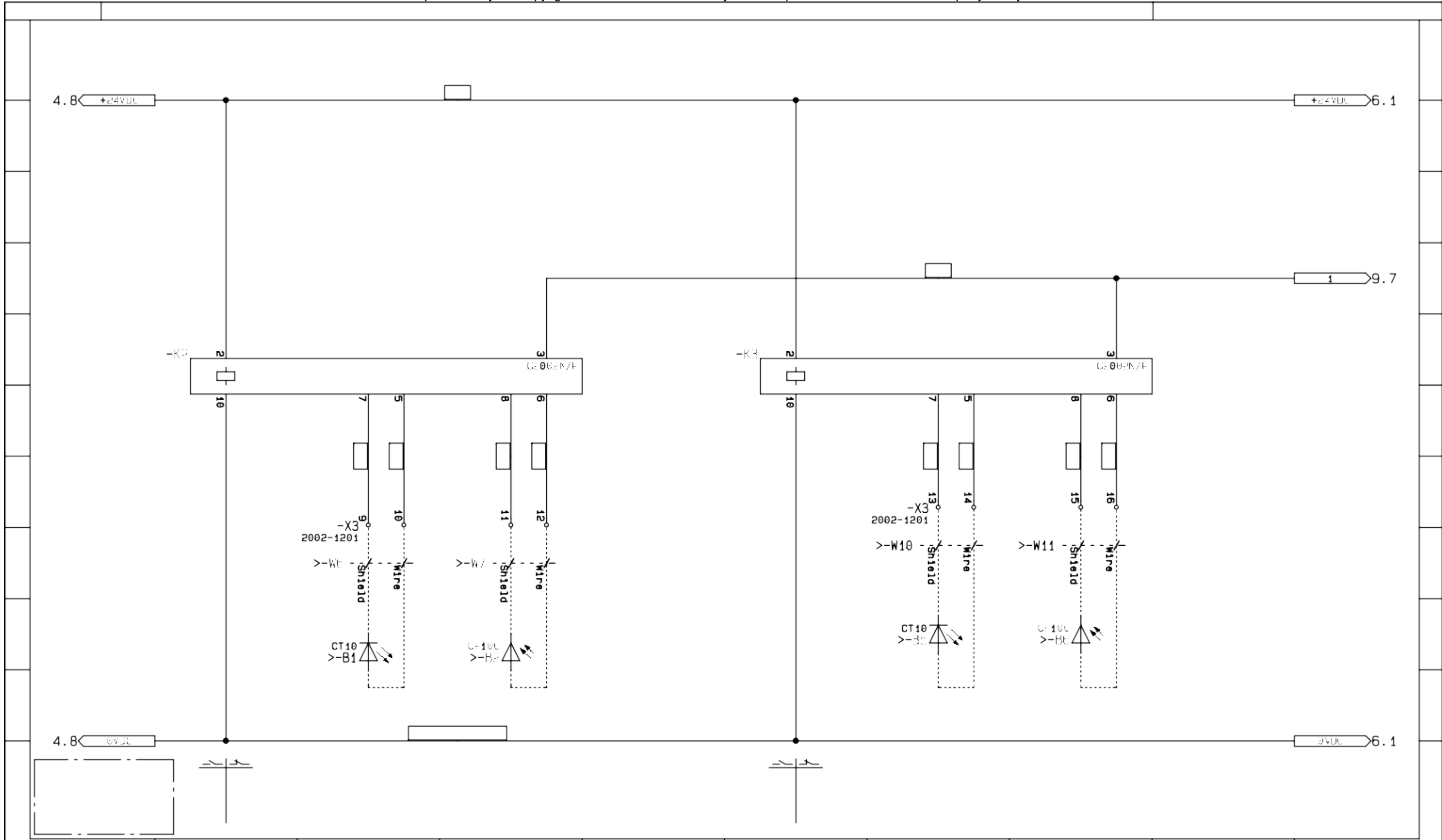


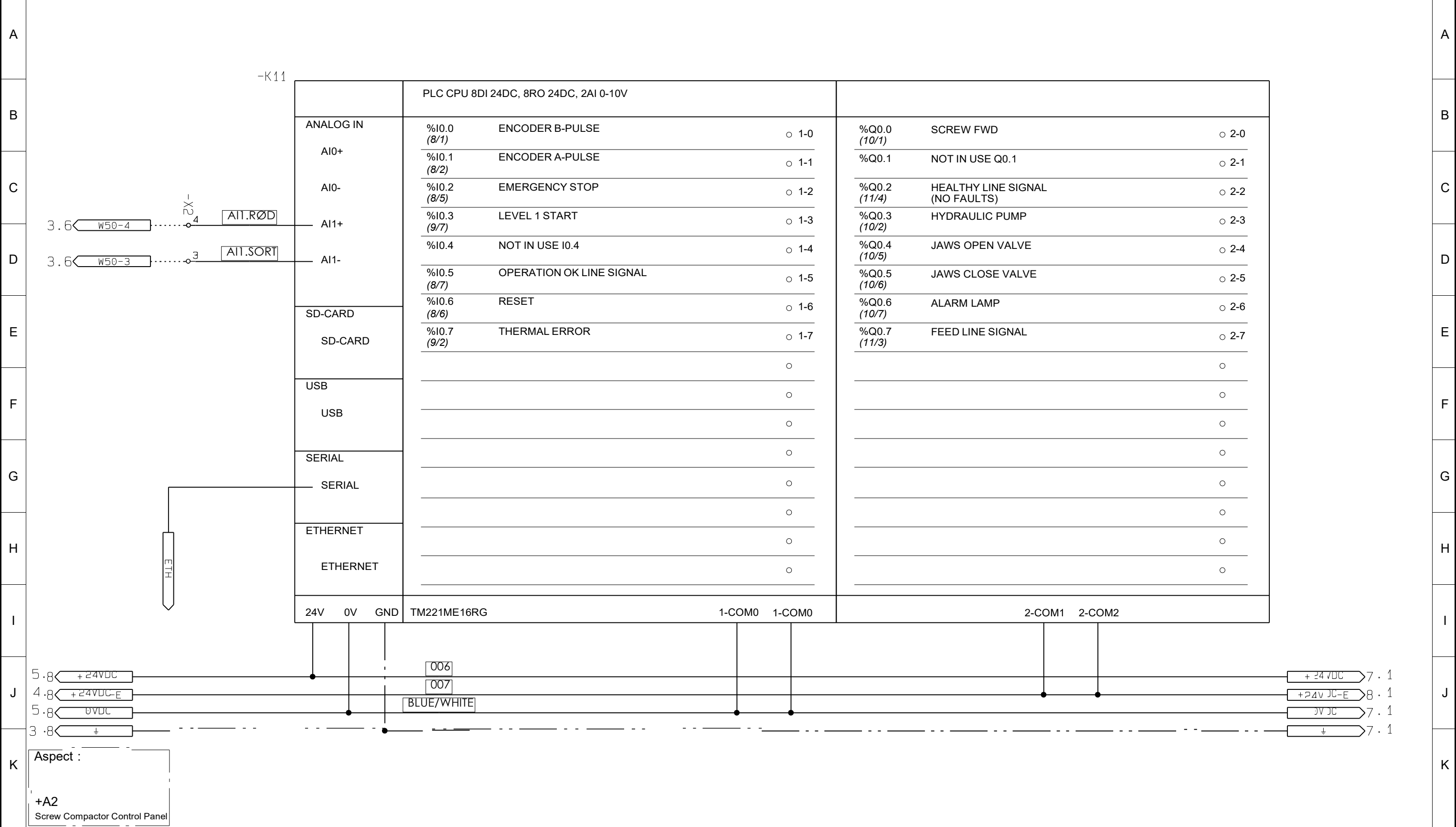
+A2  
Screw Compactor Control Panel



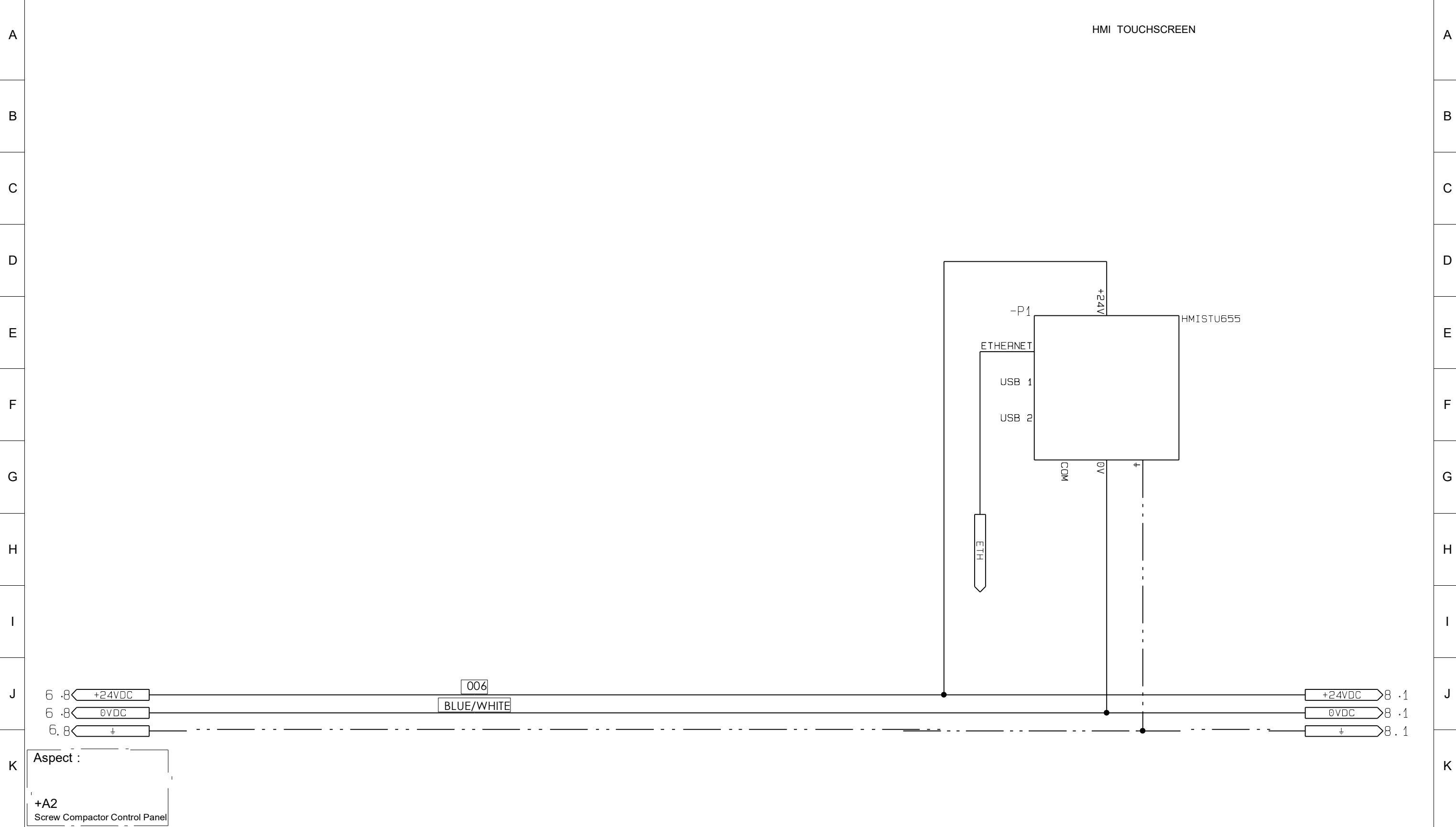


+A2  
Screw Compactor Control Panel



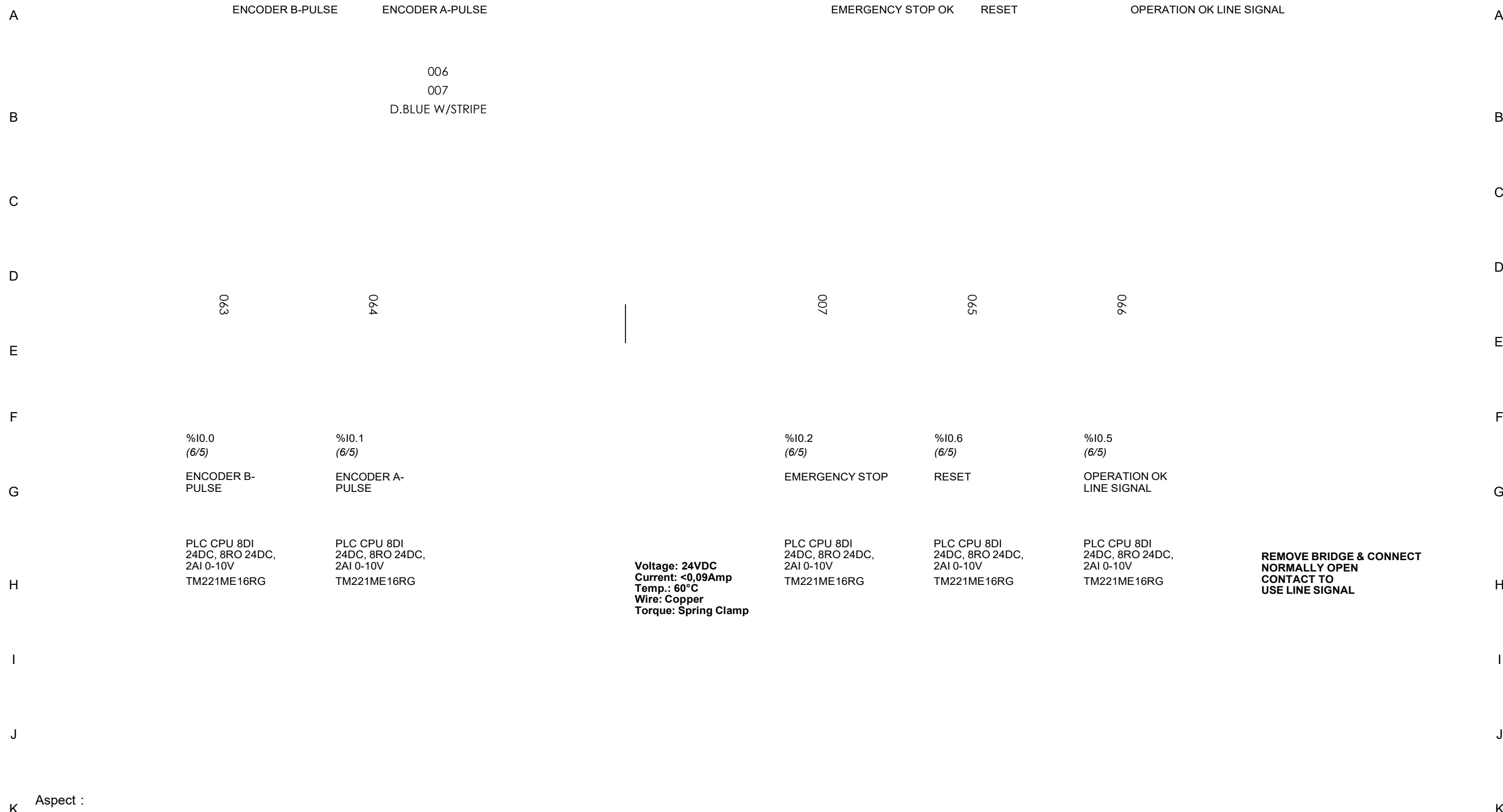






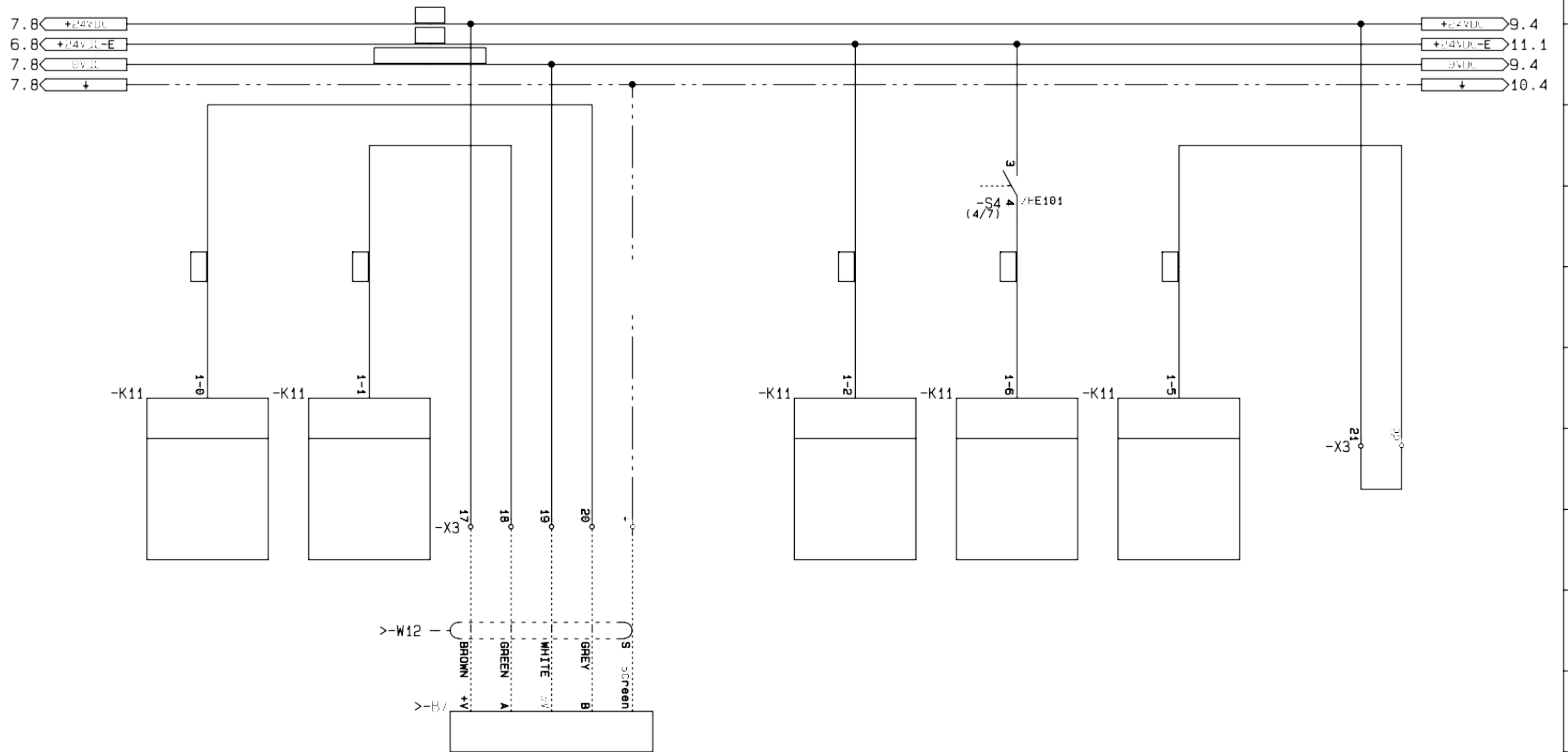
Aspect :  
+A2  
Screw Compactor Control Panel

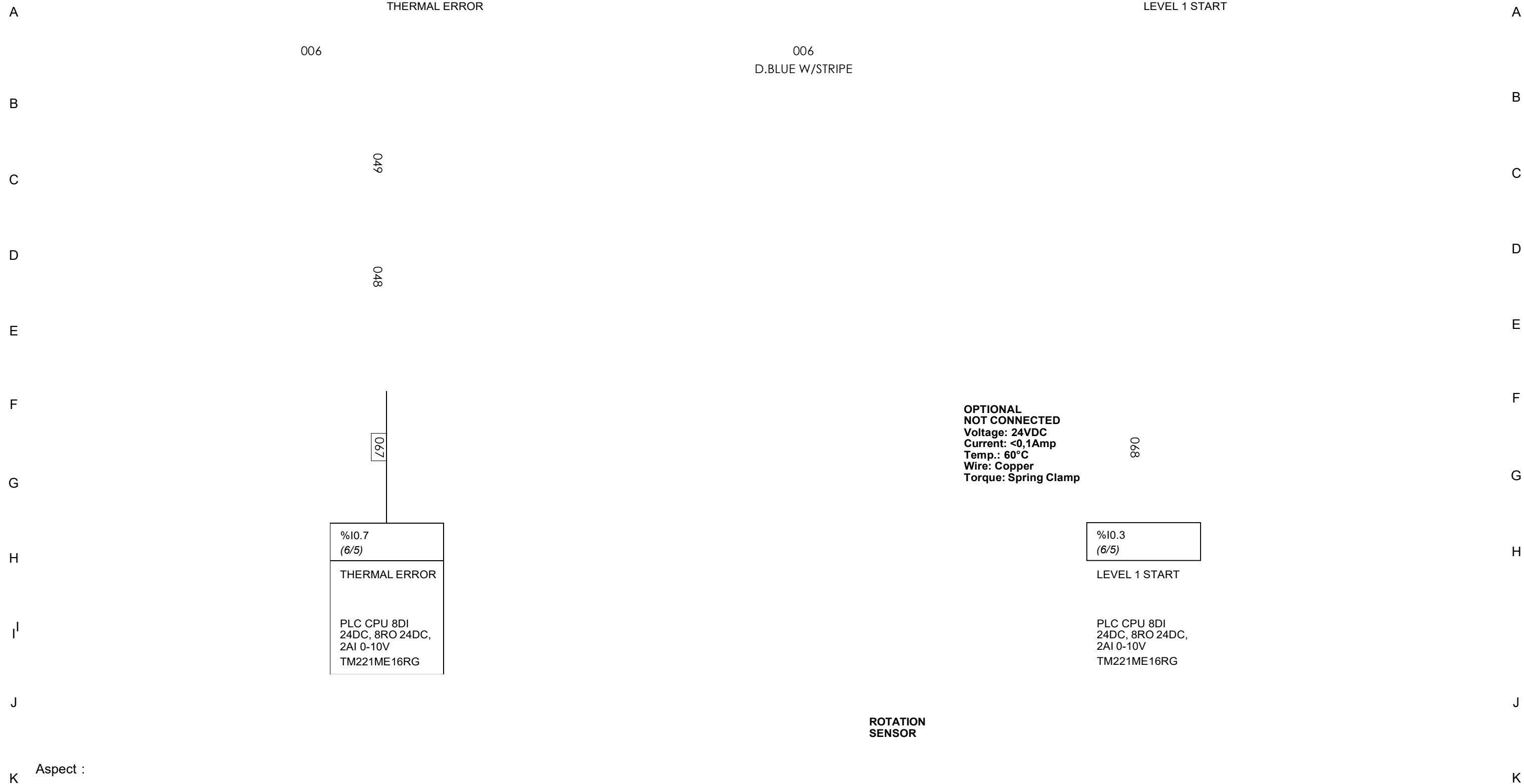




+A2  
Screw Compactor Control Panel

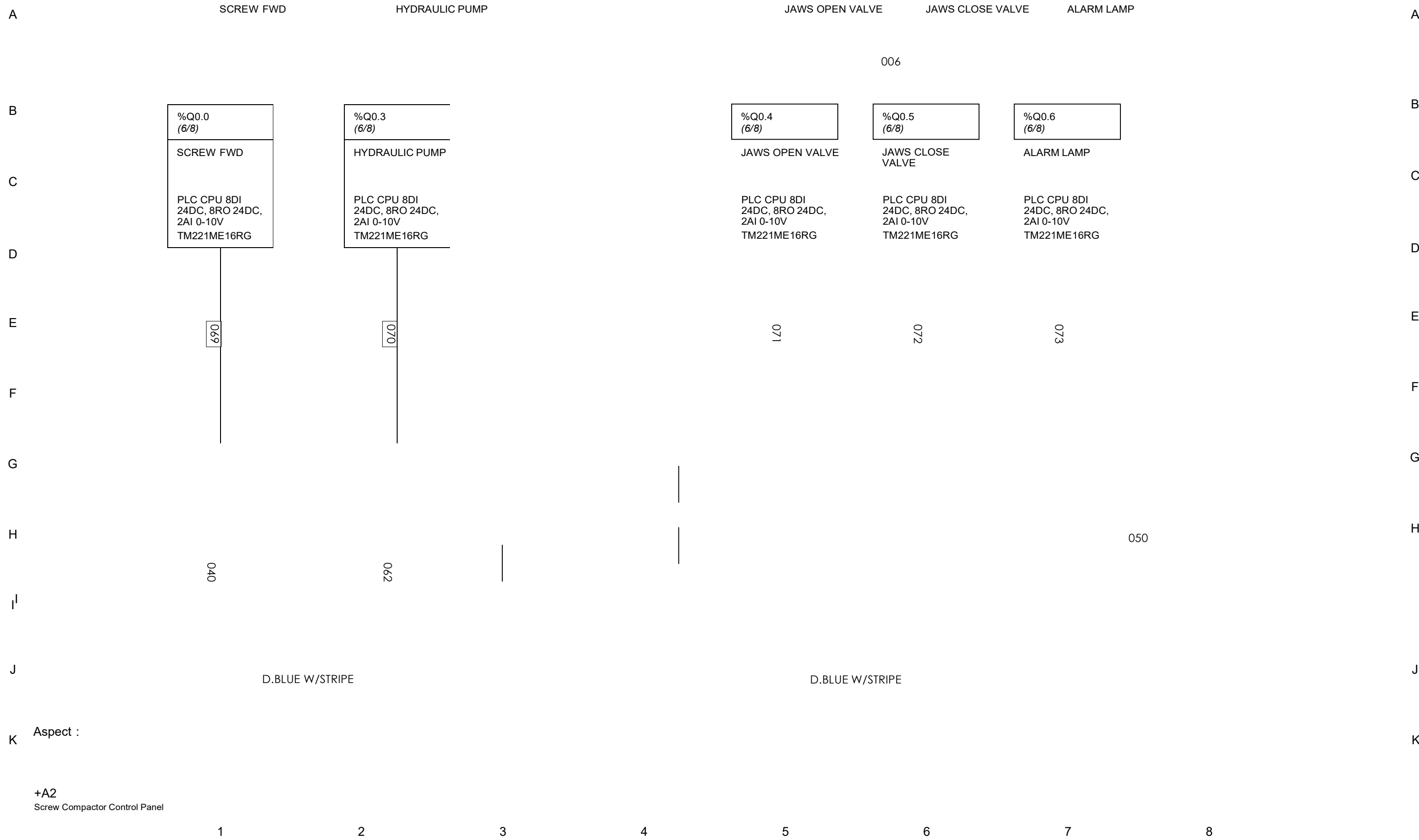
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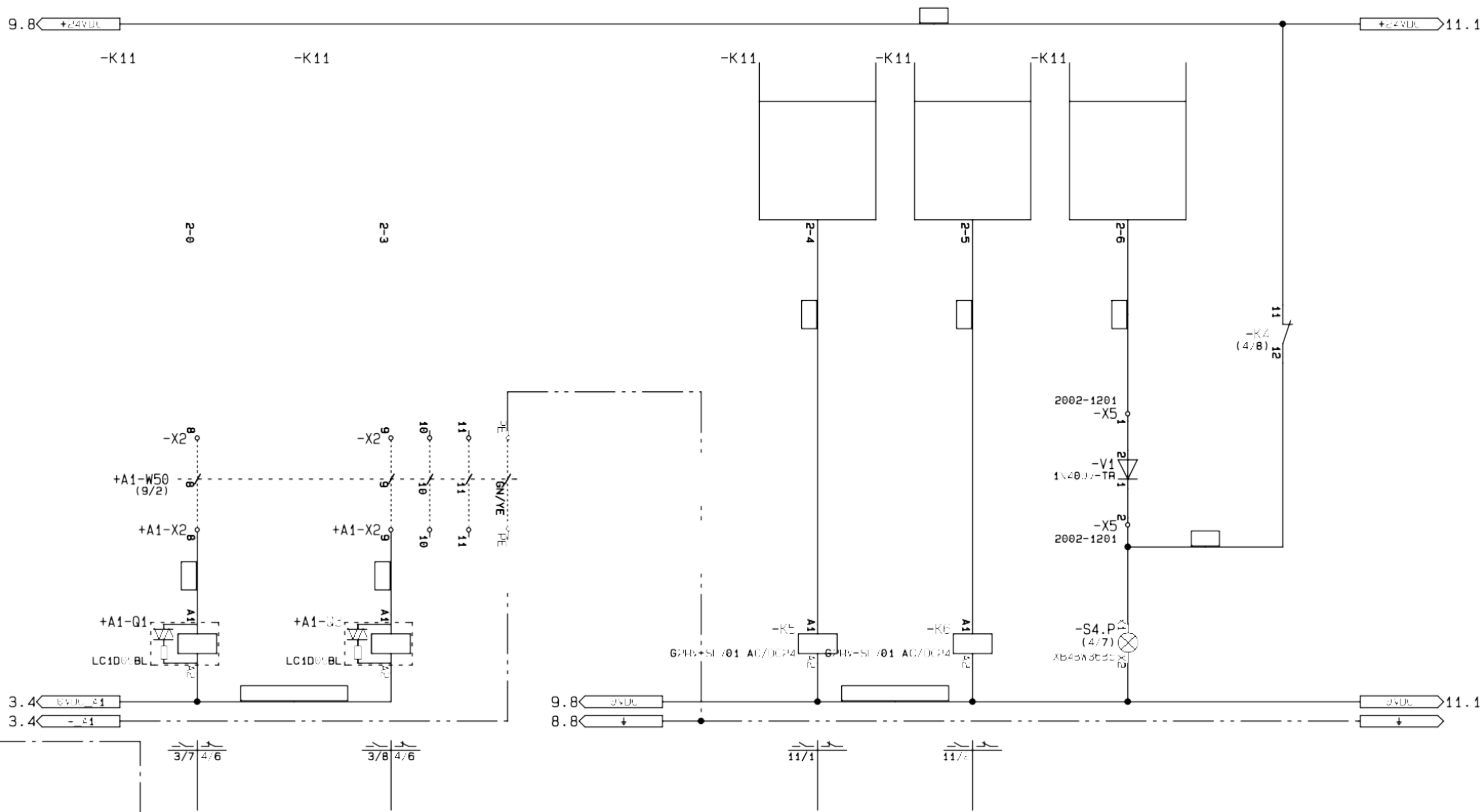
+A2  
Screw Compactor Control Panel

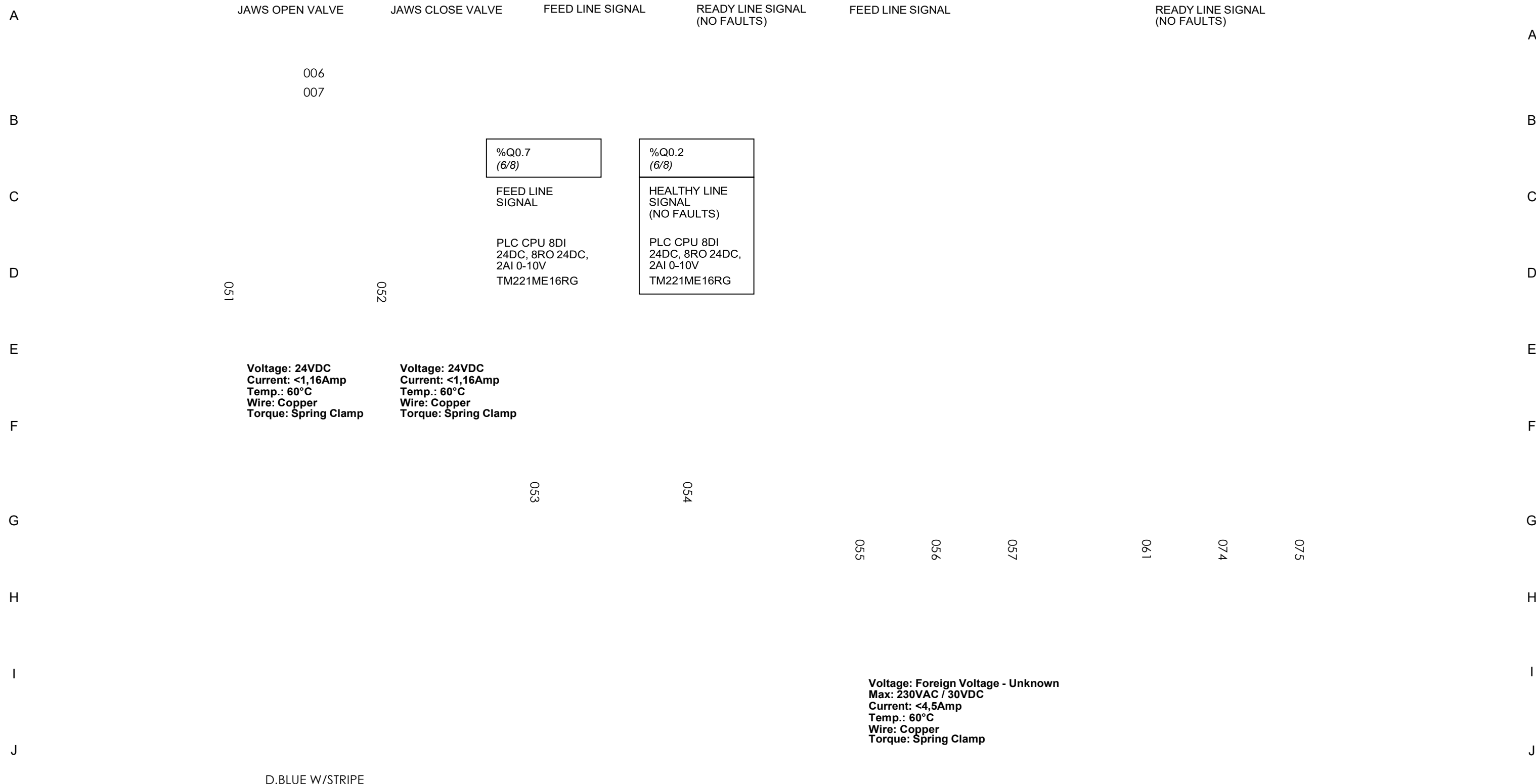




+A2  
Screw Compactor Control Panel

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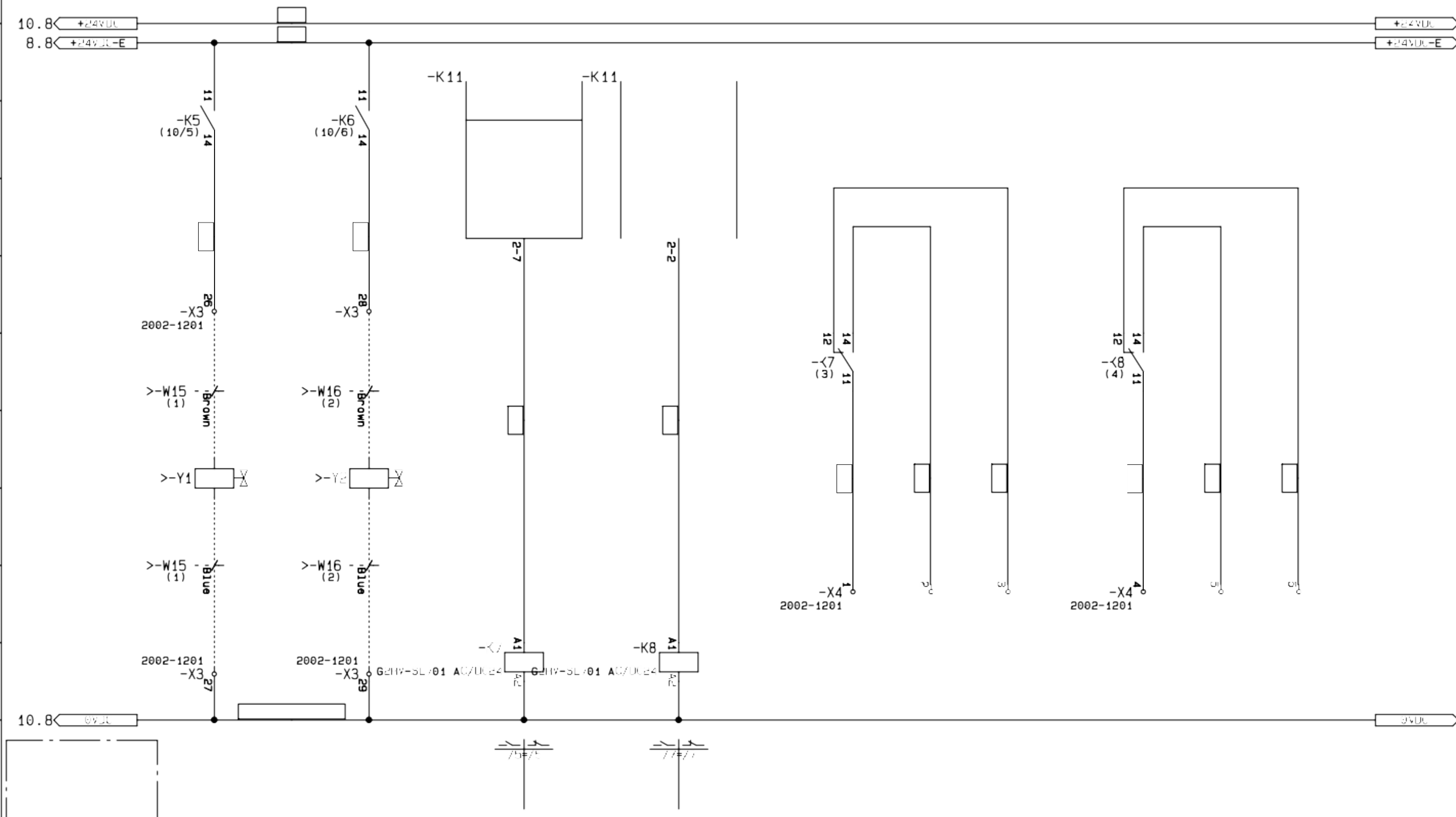


K Aspect :

+A2  
Screw Compactor Control Panel



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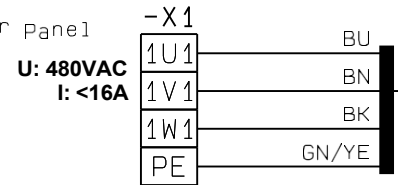
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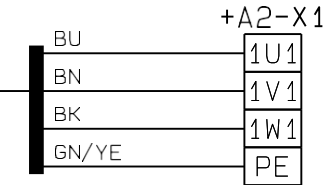
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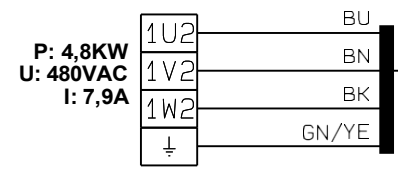
Screw Compactor Power Panel



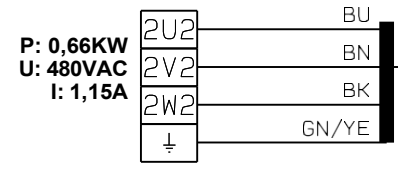
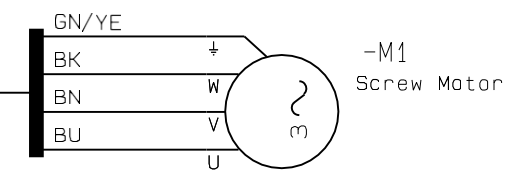
(3/1) -W40



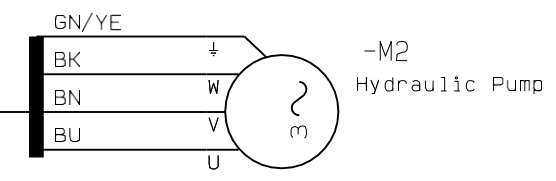
Screw Compactor Control Panel



(3/7) -W1



(3/8) -W3



Aspect :  
  
+A1  
Screw Compactor Power Panel

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Screw Compactor Power Panel

**Voltage: 24VDC**  
**Current: <1,16Amp**  
**Temp.: 60°C**  
**Wire: Copper**  
**Torque: Spring Clamp**

-X2	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
PE	GN/YE

(3/4) -W50

+A2-X2

Screw Compactor Control Panel

1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
GN/YE	PE

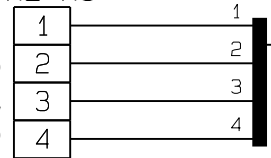
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+A1  
Screw Compactor Power Panel

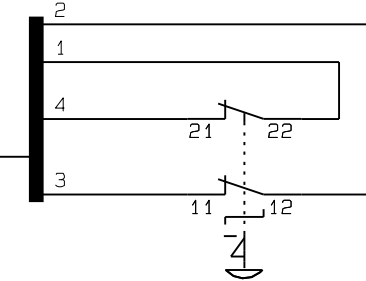
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Switchboard Screw Compactor +A2-X3  
 Voltage: 24VDC  
 Current: <0,10Amp  
 Temp.: 60°C  
 Wire: Copper  
 Torque: Spring Clamp

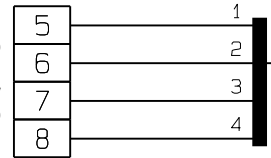


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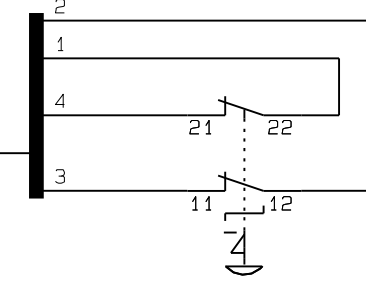


>-S2  
External Emergency Stop 1

Voltage: 24VDC  
 Current: <0,10Amp  
 Temp.: 60°C  
 Wire: Copper  
 Torque: Spring Clamp

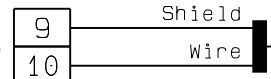


(4/3) >-W5

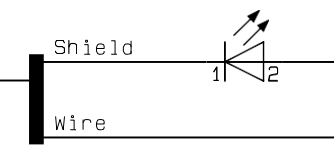


>-S3  
External Emergency Stop 2

Voltage: 24VDC  
 Current: <0,12Amp  
 Temp.: 60°C  
 Wire: Copper  
 Torque: Spring Clamp

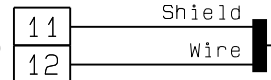


(5/2) >-W6

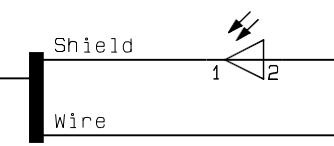


>-B1  
Photo Level 1 Transmitter

Voltage: 24VDC  
 Current: <0,12Amp  
 Temp.: 60°C  
 Wire: Copper  
 Torque: Spring Clamp



(5/3) >-W7



>-B2  
Photo Level 1 Receiver

Aspect :  
+A1  
Screw Compactor Power Panel

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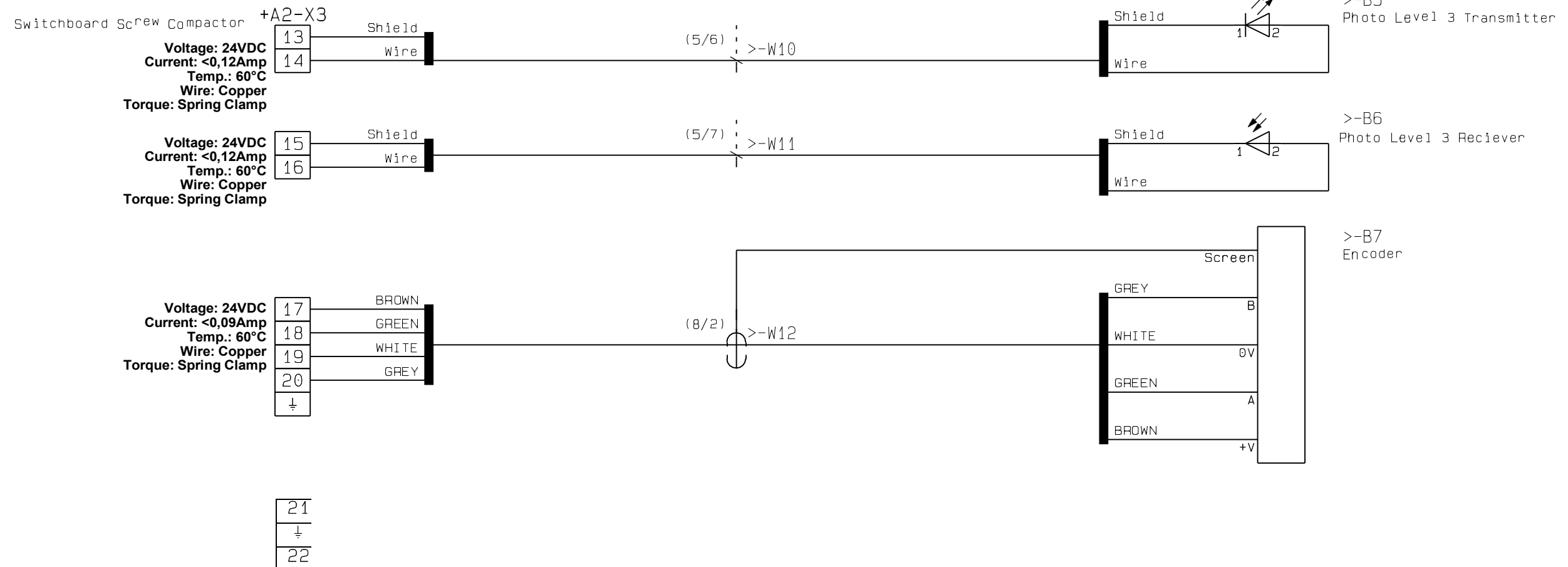
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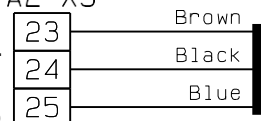
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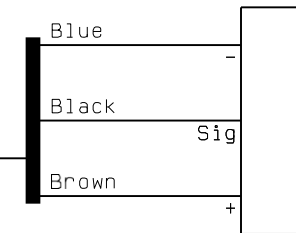


Aspect :  
 +A1  
 Screw Compactor Power Panel

Switchboard Screw Compactor +A2-X3  
**OPTIONAL**  
**NOT CONNECTED**  
**Voltage: 24VDC**  
**Current: <0,1Amp**  
**Temp.: 60°C**  
**Wire: Copper**  
**Torque: Spring Clamp**

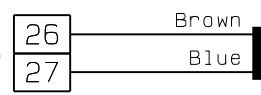


(9/5) >-W14

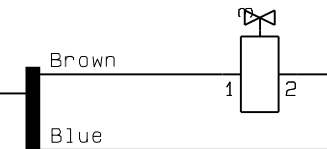


>-B9  
Rotating Level Switch

**Voltage: 24VDC**  
**Current: <1,16Amp**  
**Temp.: 60°C**  
**Wire: Copper**  
**Torque: Spring Clamp**

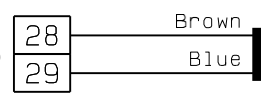


(11/1) >-W15

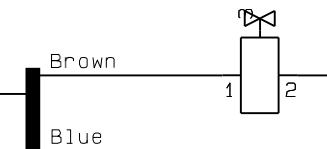


>-Y1  
Valve Open Jaws

**Voltage: 24VDC**  
**Current: <1,16Amp**  
**Temp.: 60°C**  
**Wire: Copper**  
**Torque: Spring Clamp**



(11/2) >-W16



>-Y2  
Valve Close Jaws

Aspect :  
+A1  
Screw Compactor Power Panel

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Switchboard rew mpactor +A2-X4

**Voltage: Foreign Voltage - Unknown**  
**Max: 230VAC / 30VDC**  
**Current: <4,5Amp**  
**Temp.: 60°C**  
**Wire: Copper**  
**Torque: Spring Clamp**

1
2
3
4
5
6

Aspect :

+A1  
Screw Compactor Power Panel

 <b>UNI-EL A/S</b> <small>Dybdalvej 4, Rimmerhus 6920 Videbæk, Denmark Tel: +45 9716 6311 Fax: +45 9716 6366 Web: www.uni-el.dk Mail: uni-el@uni-el.dk</small>	<h2>Switchboard Data</h2> <h3>SK200 Screw Compacter UL/CSA Model</h3>
<b>Case No:</b>	2000000609-RUNI
<b>Construction date/year:</b>	02-2017
<b>Article / Constructor:</b> UE Type UE Archive / Drawing Constructor	2000000609-RUNI 3-356-232 KB
<b>Standard:</b>	EN 60204-1
<b>Rated operating voltage:</b> Main circuits Voltage Ue Control circuits Voltage Ue Frequency	3x480VAC 24VDC 60Hz
<b>Rated current:</b> Rated Current In Largest Inductive Consumer FLA Largest Non-Inductive Consumer FLA	10A 4KW N/A
<b>SCCR Short Circuit current Rating:</b> Icf Min Icf Max	Icf 10kA rms symmetrical max. 480VAC
<b>System grounding:</b>	Solidly Grounded Wye Source (TN-S)
<b>Supply Fuse - Field Provided Fuse:</b> Rated current Type Characteristics	Max 16Amp NH gL/gG
<b>Switchboard dimensions:</b> No 1: Height x Width x Depht No 2: Height x Width x Depht	600 x 300 x 200mm Control Panel 600 x 300 x 200mm Power Panel
<b>Enclosure Type:</b>	NSYS3D Painted Sheet Iron Enclosure
<b>IP-Class:</b>	NEMA1 (IP54)
<b>Form (Internal Separation):</b>	
<b>Ambient Temperature:</b> Max - Degrees Centigrade Min - Degrees Centigrade	30 0
<b>EMC-Class:</b>	
<b>Polution Class:</b>	
<b>Working conditions:</b>	Non-Corrosive Environment









## ERKLÆRING

Produkt: SK200 Screw Compacter UL/CSA Model

Fabrikeret af: Uni-El AS  
Dybdalvej 4 - Rimmerhus  
6920 Videbæk - Denmark

Model/Type: 2000000609-RUNI/ 3-356-232  
Konstruktions år: 02-2017

Undertegnede erklærer hermed at enheden er fremstillet i overensstemmelse med de væsentlige sundheds- og sikkerhedskrav i maskindirektivet 2006/42/EF.

Følgende harmoniserede standarder er anvendt:

- EN 60204-1: Elektrisk materiel på maskiner.
- EN 61439 : Lavspændingstavler.
- EN ISO 13850: Nødstop
- EN ISO 13849: Sikkerhedsrelaterede dele af styringssystemer

Disse standarder er kun anvendt i det omfang det er relevant i forbindelse med koblingsanlæggets individuelle udførelse.

Andre harmoniserede og internationale standarder er fulgt, når dette er krævet ifølge de ovenfor med nummer refererede standarder.

Sted og dato: Rimmerhus, den: 10-02-2017  
Ansvarlig Underskriver: Managing Director Aksel Graversen or Appointed Project Engineer  
*Nim Bøgh Jensen*



## DECLARATION

Product: SK200 Screw Compacter UL/CSA Model

Manufacturer: Uni-El AS  
Dybdalvej 4 - Rimmerhus  
6920 Videbæk - Denmark

Model/Type: 2000000609-RUNI/ 3-356-232  
Construction year: 02-2017

It is hereby declared that the Unit is made in accordance to the essential health- and safety demands in the Machine Directive 2006/42/EF.

The following harmonized standards are used:

- EN 60204-1: Electrical materiel on machinery
- EN 61439 : Low-voltage switchgear and controlgear assemblies
- EN ISO 13850: Emergency Shutdown
- EN ISO 13849: Safety related parts of the control systems

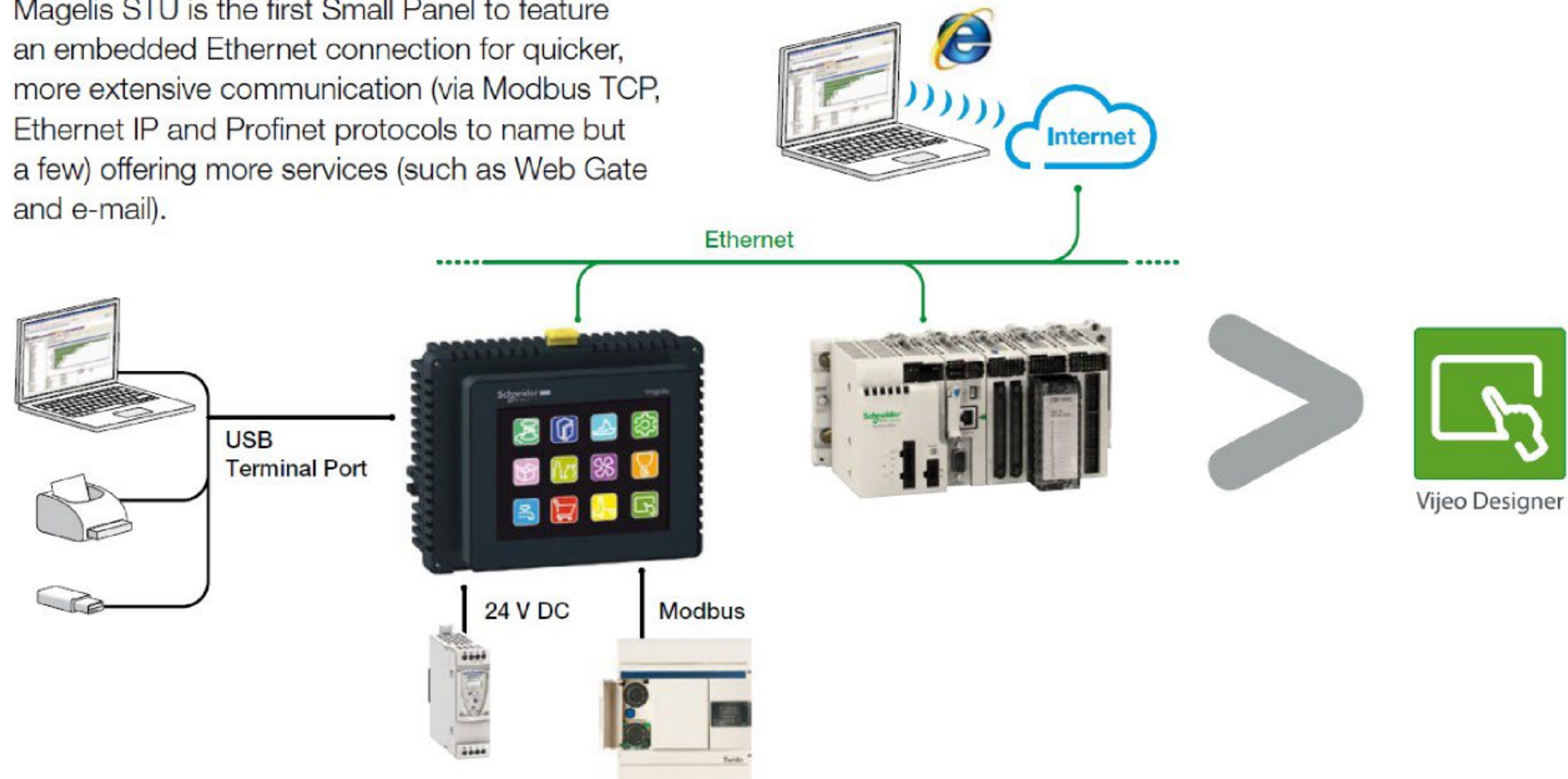
These standards are only used to the extent it is relevant in connection with the part-machines individual performance.

Other harmonized and international standards are complied with when this is required according to the above referenced standards.

Time and place: Denmark - Rimmerhus, Date: 10-02-2017  
Responsible signer: Managing Director Aksel Graversen or Appointed Project Engineer  
*Nim Bøgh Jensen*

## > More open communication

In addition to the standard RJ45 serial link, the Magelis STU is the first Small Panel to feature an embedded Ethernet connection for quicker, more extensive communication (via Modbus TCP, Ethernet IP and Profinet protocols to name but a few) offering more services (such as Web Gate and e-mail).



### REMOTE MONITORING - ISOLATED NETWORK WITH HMI AND 1 PC:

INSERT AN UNMANAGED ETHERNET SWITCH ON THE CONECTION BETWEEN THE PLC AND THE HMI.  
 IP.ADR OF THE HMI PANEL IS: 192.168.1.3, ASSIGN A FIRM IP-ADR IN THE SAME RANGE TO THE PC'S ETHERNET PORT - EXAMPLE: 192.168.1.61 - WARNING - DO NOT USE .001 OR .002  
 CONNECT AN ETHERNET CABLE FROM THIE INSERTED SWITCH AND DIRECTLY TO THE ETHERNET PORT ON THE PC.  
 ON THE PC INSTALL THE SCHNEIDER WEBGATE CLIENT FILES PLUGIN TO INTERNET EXPLORER.  
 USE THE INTERNET EXPLORER ON THE PC TO CONNECT TO THE INTREGATED WEBGATE IN THE HMI. GAIN ACCESS BY ENTERING THE HMI IP: 192.168.1.3  
 SELECT MONITORING AND LOGIN AS ON THE HMI WHEN PROMPTED.

Aspect :

# Terminalblocks

Name	Description
-X1	Main Circuit
-X2	Signal exchange between Power & Control Unit
-X3	24VAC/DC
-X4	Potentialfree signals
-X5	Various
-X6	
-X7	
-X8	
-X9	
-X10	
-X11	

# Control Components

Type	Colour	Description
Lamps	White	Normal State
	Green	Running / Operation
	Yellow	Abnormal state
	Red	Alarm / Emergency state
	Blue	
Buttons	Green	Start
	Red	Stop
	Black	Stop or activation of other functions than start
	White	Start
	Blue	Reset function
	Red on yellow surface	Emergency Stop

## Function Aspects (=)




# Aspects

+A1	Screw Compactor Power Panel
+A2	Screw Compactor Control Panel

## Location Aspects (+)



# Wires - Marking, Colours and Signal symbols

Number	Description	Colour	Signalsymbol
000	Neutral wire in main circuits (Before the first transformer)	Light Blue	 / $\longrightarrow$ N
001	Phase no 1 in main circuits	Black	 / $\longrightarrow$ L1
002	Phase no 2 in main circuits	Black	 / $\longrightarrow$
003	Phase no 3 in main circuits	Black	/
004	AC Wire with voltage above 50V - Constant (example with 230VAC)	Red	/
005	AC Wire with voltage above 50V - Cut off by Emergency stop (example with 230VAC)	Red	/
010, 011, 012...*)	AC Circuits with voltage above 50V	Red	/
**)	Neutral wire in AC circuit above 50V	Red w/stripes	/
006	+24VDC Wire - Constant	Dark Blue	/
007	+24VDC Wire - Cut off by Emergency stop	Dark Blue	/
010, 011, 012...*)	+DC circuits	Dark Blue	/
**)	-DC circuit	Dark Blue w/stripes	/
008	AC Wire with voltage below 50V - Constant (example with 24VAC)	Red	/
009	AC Wire with voltage below 50V - Cut off by Emergency stop (example with 24VAC)	Red	/
010, 011, 012...*)	AC Circuits below 50V	Red	/
**)	Neutral wire in AC circuit below 50V	Red w/stripes	/
010, 011, 012...*)	Potential free or External circuits (Foreign Voltage)	Orange	/
010, 011, 012...*)	Analog Circuits or circuits with alternating signaling	White	/
**)	Protection wire (Earth)	Yellow/Green	 / $\longrightarrow$ ⚡

\*) PART OF AN AUTOMATIC NUMBERING SYSTEM STARTING FROM NO. 010 (PRECEDING "0"'S ARE NOT MOUNTED ON WIRES)

\*\* ) NUMBERED BY ITS COLOUR - NUMBER ONLY ASSIGNED IF THERE'S MULTIPLE POTENTIALS WITH THIS COLOUR

	L2
L3	→ L3
L1-230V	→ L1-230V
L1-230V-E	→ L1-230V-E
1, 2, 3...	→ 1, 2, 3...
L2-230V	→ L2-230V
+24VDC	→ +24VDC
+24VDC-E	→ +24VDC-E
1, 2, 3...	→ 1, 2, 3...
0VDC	→ 0VDC
24VAC	→ 24VAC
24VAC-E	→ 24VAC-E
1, 2, 3...	→ 1, 2, 3...
0VAC	→ 0VAC
1, 2, 3...	→ 1, 2, 3...
1, 2, 3...	→ 1, 2, 3...



# Component List

Name	Page	Description (English)	Type	Article	Product
-B1	5/2	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-B2	5/3	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-B5	5/6	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-B6	5/7	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-B9	9/6	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-S2	4/3	Emergency stop pushbutton Ø40 push-pull 2NC	XB4BS8444	7517808934	Schneider Electric
-S3	4/4	Emergency stop pushbutton Ø40 push-pull 2NC	XB4BS8444	7517808934	Schneider Electric
-W15	11/1	Plast Cable 3x1mm2 H05VV-F, Black, 50RG PKAJ	Plastkabel PKAJ	5432521259	
-W16	11/2	Plast Cable 3x1mm2 H05VV-F, Black, 50RG PKAJ	Plastkabel PKAJ	5432521259	
-Y1	11/1	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
-Y2	11/2	Not Delivered by Uni-El A/S	Ikke lev. af UNI-EL	-	-
+A1-F1	9/2	Auxiliary contact 1NO+1NC, frontmounted	GVAE11	7522401410	Schneider Electric
+A1-F1	3/7	Hand-operated Motor Protection 6,0-10A 50kA/415V	GV2ME14	7522402778	Schneider Electric
+A1-F2	9/2	Auxiliary contact 1NO+1NC, frontmounted	GVAE11	7522401410	Schneider Electric
+A1-F2	3/8	Hand-operated Motor Protection 1-1,6A 50kA/415V	GV2ME06	7522402671	Schneider Electric
+A1-F4	3/2	Fuse Class CC, 2A, 600VAC - 200kA / 300VDC - 100kA, UL 248-4 E2137 / CSA C22.2 n	ATQR2	ATQR2	Mercen Ferraz Shawmut
+A1-F4	3/2	Fuse base 3P 1-30A Class CC, 600VAC - 200kA, UL 512 / CSA C22.2 Class 6225 01	USBCC3	USBCC3	Mercen Ferraz Shawmut
+A1-K5	3/5	KW Measuring 3x230-575VAC , w/ Analog output 0-10V / 4-20mA	APM380	APM380	UniPower
+A1-Q1	10/1	Contacteur 9A 3P+1NO+1NC, Uc 24V DC	LC1D09BL	7522405911	Schneider Electric
+A1-Q1	3/7	Contacteur 12A 3P+1NO+1NC, Uc 24V DC	LC1D12BL	7522407197	Schneider Electric
+A1-Q3	10/2	Contacteur 9A 3P+1NO+1NC, Uc 24V DC	LC1D09BL	7522405911	Schneider Electric
+A1-T1	3/3	Power Supply 120W 24VDC 5A, 200-500VAC	WDR-120-24	WDR-120-24	Mean Well
+A1-X1	3/7	2-CONDUCTOR THROUGH TERMINAL BLOCK, DIN 35	2002-1201	4017332999168	Wago
+A1-X1	3/7	2-CONDUCTOR EARTH TERMINAL BLOCK, CENTRE-/ LATERAL MARKING, CARRIER RAIL DIN 35	2002-1207	4017332999212	Wago
+A1-X2	3/5	2-CONDUCTOR THROUGH TERMINAL BLOCK, DIN 35	2002-1201	4017332999168	Wago
+A2-K1	4/6	Safety modul cat.3, 3NO(s)+1sst, 24VAC/DC	XPSAC5121	7524682567	Schneider Electric
+A2-K2	5/1	Socket, DIN rail/surface mounting, 11-pin, screw terminals (IEC/VDE)	PF113A-N	4536853879891	OMRON Electronics A/S
+A2-K2	5/1	Amplifier Relay Photosensors Conquest C2002N/P 24VDC	C2002N/P	C2002N/P	Conquest
+A2-K3	5/5	Socket, DIN rail/surface mounting, 11-pin, screw terminals (IEC/VDE)	PF113A-N	4536853879891	OMRON Electronics A/S

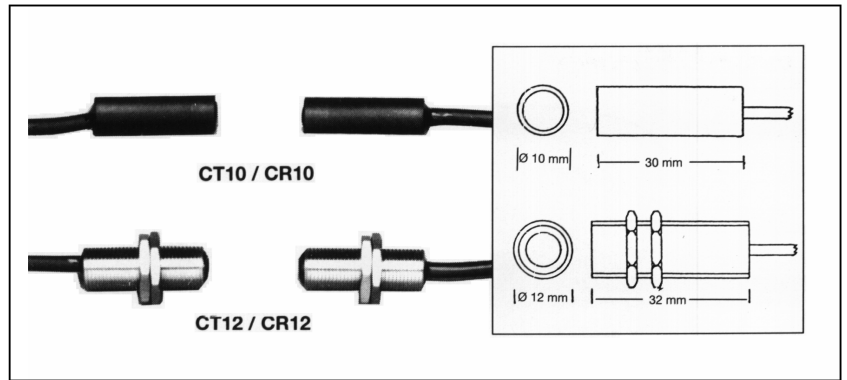




# Appendix 9

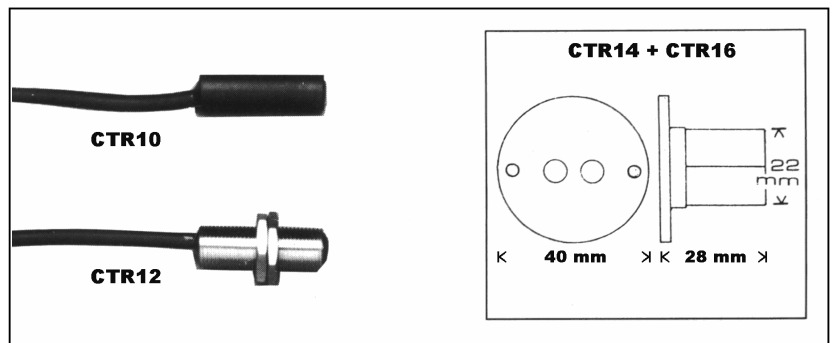
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# Transmitter CT and receiver CR for amplifier



TYPES	CT10	CR10	CR10B	CR10C	CT12	CR12	CR12B	CR12C
<b>Sensing distance</b>								
Through-beam:	-	<b>20 M</b>	<b>10M</b>	<b>5M</b>	-	<b>20M</b>	<b>10M</b>	<b>5M</b>
Diffuse reflection:	-	<b>2M</b>	<b>1M</b>	<b>0,5M</b>	-	<b>2M</b>	<b>1M</b>	<b>0,5M</b>
Retroreflective:	-	<b>10M</b>	<b>5M</b>	<b>1M</b>	-	<b>10M</b>	<b>5M</b>	<b>1M</b>
Housing	Noryl (black)				Acid-resistant stainless steel			
Ambient Temperature	- 20° C.....+ 70° C							
Protection	> IP 67							
Cable	5 m - 10 m - or 15 m standard shielded							

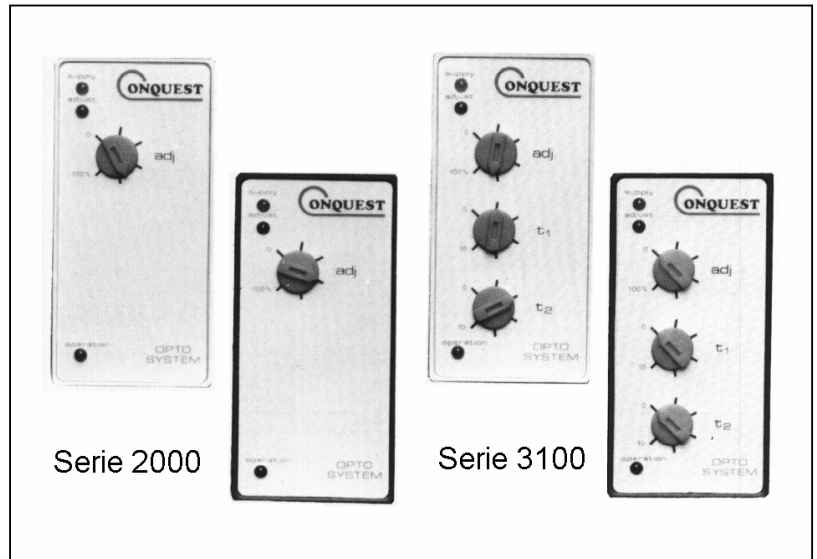
# Proximity Sensors CTR for amplifier



TYPES	CTR10	CTR14	CTR16	CTR12
<b>Sensing distance</b>	<b>50 mm</b>	<b>750 mm</b>	<b>2000 mm</b>	<b>50 mm</b>
Housing	Noryl (black)		Stainless steel	
Ambient temperature	- 20° C.....+ 70° C			
Protection	> IP 67			
Cable	5 m - 10 m - or 15 m standard shielded			

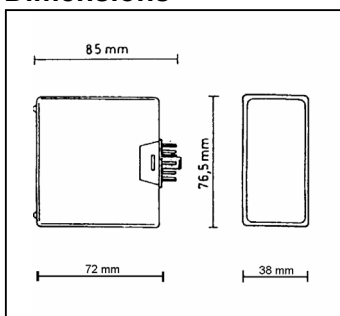
Other types and length of cable by request!

# Amplifiers

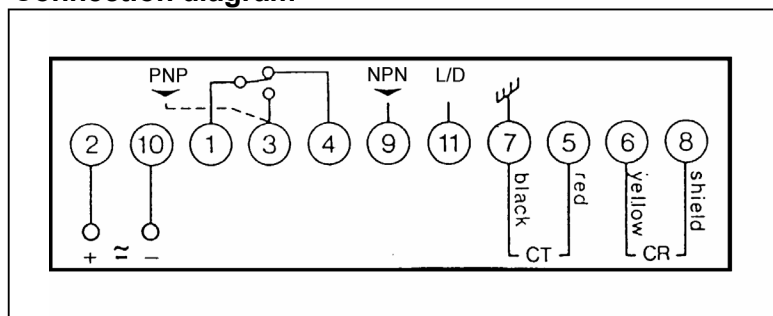


TYPES	C2000	C2001	C2002	C3100	C3102
Supply options	24 VAC/DC 230VAC	24 VAC/DC 230VAC	24 VDC	24 VAC/DC 230VAC	24 VDC
Output	Relay NPN	Relay	PNP NPN	Relay NPN	PNP NPN
Automatic self-adjustment and RELATIVE sensitivity (Add A to type number)	YES	NO	YES	YES	
Time delay	-----			on/off delay t1, t2, = 0-10 sek.	
Load	Relay max. 8 A, NPN/PNP max. 100 mA at 30 VDC				
Response time	Relay output = 25 mSek., NPN/PNP output = 10 mSek.				
Ambient temperature	- 20° C ..... + 60° C				
Housing	Noryl (grey and red)				

## Dimensions



## Connection diagram



**Other types and time intervals by request!**

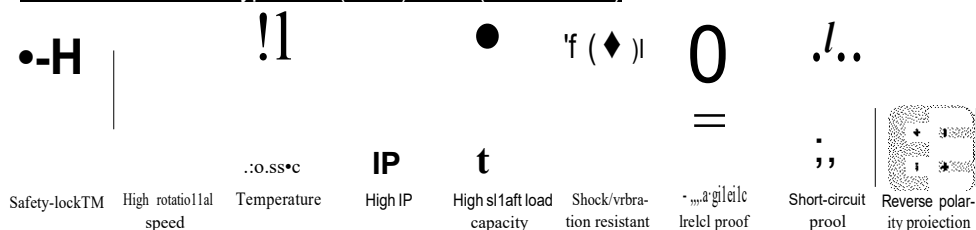


# Appendix 10

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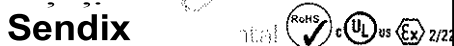
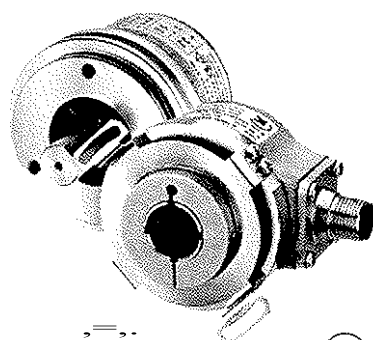


**Sendix incremental Type 5000 (Shaft) / 5020 (Hollow shaft)**



**Flexible in use:**

- The right connection variant for every application: Cable, M23 connector or M12 connector
- Reliable mounting in a wide variety of installation situations: Comprehensive and proven mounting options
- Standard encoder for use worldwide: compatible with all US and European standards, supply voltage 5 ... 30 V DC, various interface options, max. 5000 ppr.



**Compact**

- Can be used even where space is tight: outer diameter 50 mm, installation depth max. 47 mm.

**Rugged & Tough**

- Increased resistance against vibrations and installation mistakes: Avoids machine stops and repair work
- Sturdy "Safety-Lock 1 Design" bearing structure
- Remains sealed, even in roughest environments: ensures highest safety against field breakdowns and is thus suitable also for outside use Resistant die-cast housing and protection upto IP67
- Can be used in a wide temperature range: Wide temperature range (-40°C...+85°C)
- also available in seawater resistant version, certified acc. to salt-spray test IEC 68-2-11 => 672 hours.

**Mechanical characteristics:**

Speed IP 65 <sup>1</sup> :	max. 12000 min <sup>-1</sup>	Weight	approx. 0.4 kg
Speed IP 5721:	max. 6000 min <sup>-1</sup>	Protection acc. to EN 60 529 without shaft sealing:	IP 65
Rotor moment of inertia:		Protection acc. to EN 60 529 with shaft sealing:	IP 67
Shaft version:	approx. 1.8 x 10 <sup>-6</sup> kgm <sup>2</sup>	EX approval for hazardous areas:	optional zone 2 and 22
Hollow shaft version:	approx. 6 x 10 <sup>-6</sup> kgm <sup>2</sup>	Working temperature:	-40 °C <sup>3</sup> ) ... +85 °C
Starting torque:	<0.01 Nm, IP 65	Shaft:	stainless steel,
	<0.05 Nm, IP 67	Shock resistance acc. to DIN-IEC 68-2-27:	2500 m/s <sup>2</sup> , 6 ms
Radial load capacity shaft	BON	Vibration resistance to DIN-IEC 68-2-6:	100 m/s <sup>2</sup> , 10...2000 Hz
Axial load capacity shaft:	40N		
<sup>1</sup> For continuous operation 6000 mm <sup>-1</sup>	<sup>3</sup> 1 with connector +40 °C,		
<sup>2</sup> For continuous operation 11011 max. 3000 m <sup>-1</sup>	cahnel,xed: -30 °C, cable mod +20 °c		

**Electrical characteristics:**

Output circuit:	RS 422 (TTL compatible)	RS 422 iTTL compatible)	Push-Pull	Push-Pull (17272)
Supply voltage:	5 ... 30VDC	5V±5%	1L30VDC	L30VDC
Power consumption (no load):	typ. 40 mA / max. 90 mA	typ. 40 mA / max. 90 mA	typ. 50 mA / max. 100 mA	typ. 50 mA / max. 100 mA
Permissible load/channel:	max. ±20 mA	max. ±20 mA	max. ±30 mA	max. ±20 mA
Pulse frequency:	max. 300 kHz	max. 300 kHz	max. 300 kHz	max. 300 kHz <sup>31</sup>
Signal level high:	min. 2.5 V	min. 2.5 V	min. UB • 1V	min. UB-2.0 V
Signal level low:	max. 0.5 V	max. 0.5 V	max. 0.5 V	max. 0.5 V
Rise time tr	max. 200 ns	max. 200 ns	max. 1 µs	max. 1 µs
Fall time tf	max. 200 ns	max.200ns	max. 1 µs	max. 1 µs
Short circuit proof outputs:	yes <sup>2</sup> )	yes <sup>2</sup> 1	Yes	yes

Conforms to CE requirements acc. to EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3  
RoHS compliant acc. to EU guideline 2002/95/EG

Yes

00

1) If supply voltage correctly applied  
2) Only 0110 channel allowed to be shorted-out:  
(If UB\*5 V, short-circuit to channel, 0 V, or +UB Is permitted.)  
(If U8co5-30 V, short-circuit to channel or 0 Vis permitted.)

3) Max. recommended cable length 30 m

12/2008

[www.kuebler.com](http://www.kuebler.com) 43

**Jfll3i9is.i4.MW.li i@R0tIP@MUMQ.**

Terminal assignment:

Signal:	OV GNO	+Us	OV Sens	+Ub Sens	A	A	B	S	0	0	Shield
M23, 12 pin connector, Pin:	10	12	11	2	5	6	8	1	3	4	(1)
M128 pin connector, Pin:	1	2			3	4	5	6	7	8	(1)
MIL IMS styled). 10 pin con. Pin:	F	D		E	A	G	B	H	C	I	(1)
Cable colour:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RO	Shield

1) Shield is attached to connector housing

Isolate unused outputs before normal startup

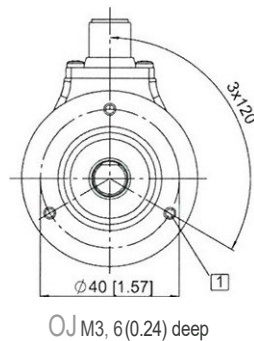
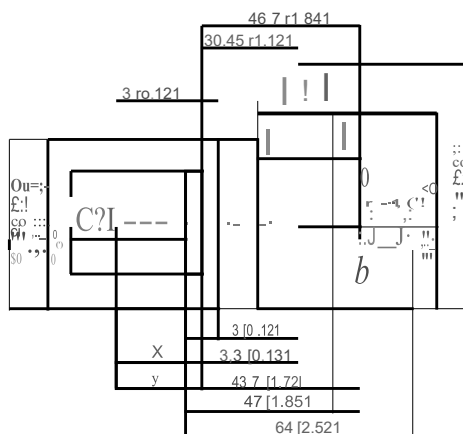
Top view of mating side, male contact base:

Type	8 pin M12 connector	12 pin M23 connector	MIL connector 10 pin
View			
Order code:	8.5000.XXX3.XXXX 8.5000.XXX4.XXXX	8.5000.XXX7.XXXX 8.5000.XXX8.XXXX	8.5000.XXXY.XXXX
Corresponding mating connector:	05.CM8-8181-0	8.0000.5012.0000	8.000.05062.0000

Dimensions shaft version:

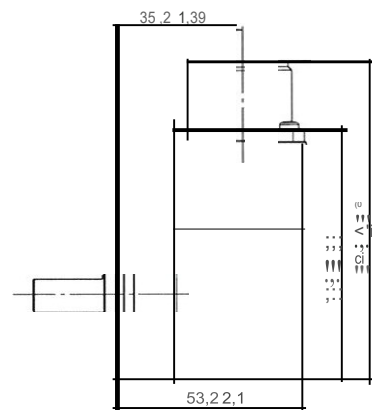
**Synchronous flange**

ø 50,8 mm [2.0 inch]  
M12, M23 and cable version  
IFlange type 5 and 6)



**Synchronous flange**

ø 50,8 mm [2 inch]  
MIL-connector version



**Shaft versions**

Order code for shaft	Shaft	length X	length Y
1	06mm	10mm	13.3mm
2	0 1/4"	5/8"	3/4"
3	010mm	20mm	23.3mm
4	03/8"	5/8"	3/4"
5	012mm	20mm	23.3mm
6	08mm	15mm	18.3mm

**Mounting advice**

The flanges and shafts of the encoder and drive should not both be rigidly coupled together at the same time! We recommend the use of suitable couplings (see Accessories section).

# Rotary Measuring Technology Incremental encoders

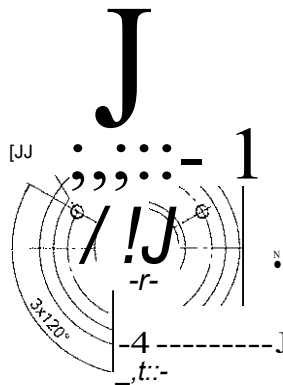
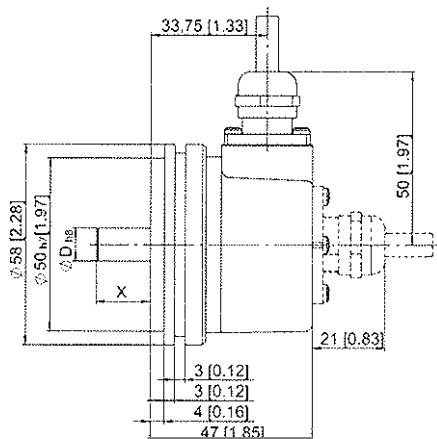
# OCIbler

## Sendix incremental Type 5000 (Shaft)/ 5020 (Hollow shaft)

Dimensions shaft version:

Synchronous flange

ø 58 mm  
M12, M23 and cable versions  
(Flange type A and B)

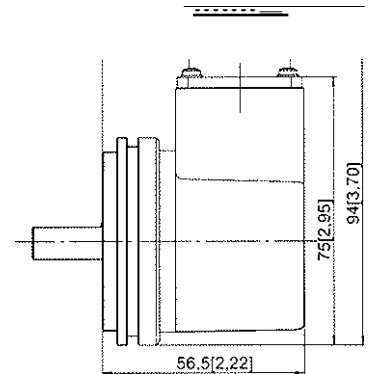


i:L 3xM4, 6[0.24] deep

Synchronous flange

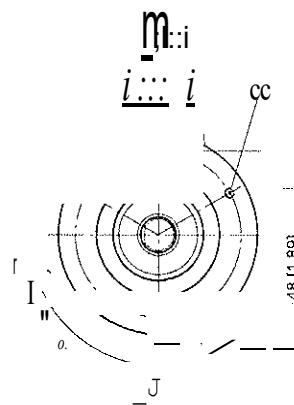
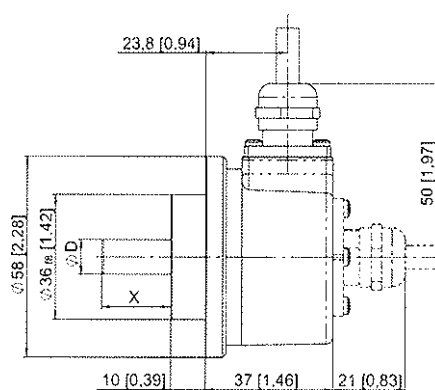
ø 58 mm  
Mil-connector version

38.5[1.52]



Clamping flange

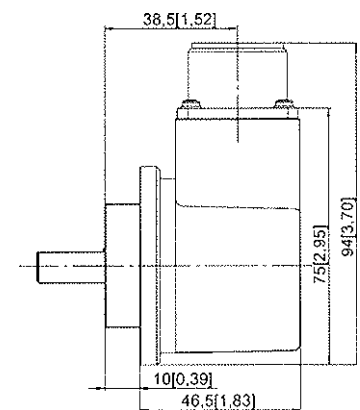
ø 58 mm  
M12, M23 connector and cable versions  
(Flange type 7 and 8)



[J] M3, 6[0.24] deep

Clamping flange

ø 58 mm  
MIL-connector version



### Shaft versions

Order code for shaft

Order code for shaft	Shaft	length X
t	Ø6mm	10mm
2	0 1/4"	5/8"
3	Ø10 mm	20mm
4	c 3/8"	5/8"
5	Ø12 mm	20mm
6	Ø8mm	15mm

12/2008

**Mounting advice:**

Tie flanges and shafts of the encoder and drive should not both be rigidly coupled together at the same time! We recommend the use of suitable couplings (see Accessories section).

**Sendix incremental Type 5000 (Shaft)/ 5020 (Hollow shaft)**

Dimensions shaft version:

Rectangular flange

C' 63,5 mm [2.5 inch]

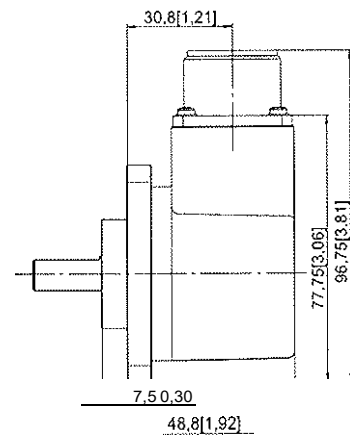
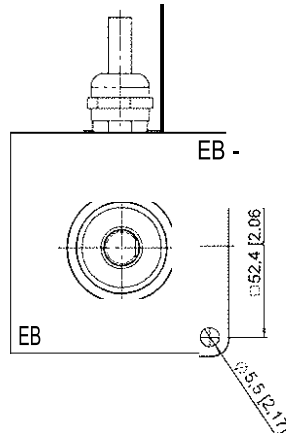
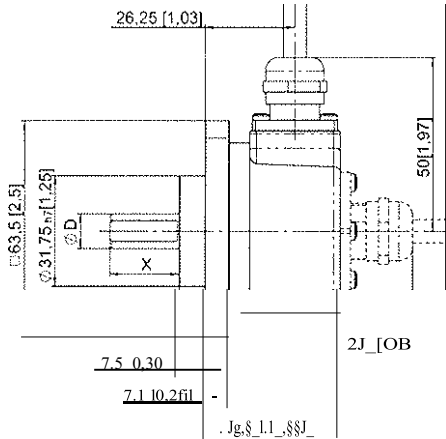
M12, M23 connector and cable versions

[Flange type C and DI]

Rectangular flange

CJ 63.5 mm [2,5 inch]

MIL•connector version



Shaft versions

Order code for shaft	Shaft length X				
1	06mm	10mm	4	e 3/8"	5/8"
2	e 1/4"	5/8"	5	012mm	20mm
3	010mm	20mm	6	08mm	15mm

Order code shaft version:

8.5000.XXXX.XXXX

( tf!J

Type

Flange

- 5 = Synchronous flange, metric, o 50,8, IP 67
- 6 = Synchronous flange, metric, o 50,8, IP 65
- 7 = Clamping flange, metric, o 58, IP 67
- 8 = Clamping flange, metric, s 58, IP65

- A = Synchronous flange, 0 58, IP 67
- B = Synchronous flange, o 58, IP 65
- C = Rectangular flange 2.5", IP 67
- D = Rectangular flange 2.5", IP 65

Shaft (0 XL)

- 1 = 06mmx10mm
- 2 = o1/4"x5/8"
- 3 = 010mmx20mm
- 4 = o3/8"x5/8"
- 5 = o12mmx20mm
- 6 = o8mmx15mm

**i Tc**

Pulse rate

- 1, 5, 10, 12, 36, 100, 200, 250, 256, **360**, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000
- (e.g. 500 pulses=> 0500)
- Other pulse rates available on request

Type of connection

- 1 = Cable axial (1 m PVC cable)
- 2 = Cable radial (1 m PVC cable)
- 3 = Connector axial 8 pin M12
- 4 = Connector radial 8 pin M12
- 7 = Connector axial 12 pin M23
- 8 = Connector radial 12 pin M23
- Y = Connector radial 10 pin MIL-specified

Note: all connector versions without mating connector

Output circuit and supply voltage

- 1 = RS 422 (with inverted signal)
- 5 ... 30 V supply voltage
- 2 = Push-pull (7272 with inverted signal)

Preferred types are indicated in bold

Stock types	
8.5000.8358.0200	8.5000.8147.2500
8.5000.8358.0360	8.5000.8147.5000
8.5000.8358.0500	8.5000.8157.1024
8.5000.8358.1000	8.5000.8157.2500
8.5000.8358.5000	8.5000.8157.5000
8.5000.6147.1000	8.5000.8354.1024
8.5000.8147.1024	8.5_Q00.8354.5000

Accessories:

www.kuebler.com

Cables and connectors see Connection

Technology section.  
Mounting attachments and  
couplings can be found in  
the Chapter Accessories

Corresponding mating  
connector:  
M12: 05.CMB-8181-0  
M23: 8.0000.5012.0000  
M11-connector  
10-pin:  
8.0000.5062.0000

5 ...  
30  
V  
supply  
voltage  
age  
4= RS 422  
(with inverted  
signal) 12/2008  
5 V  
supply  
voltage  
5= Push-pull  
{with  
inverted  
signal)10...  
30 V supply  
voltage  
• seawater resistant  
version on request

**Sendix incremental Type 5000 (Shaft)/ 5020 (Hollow shaft)**

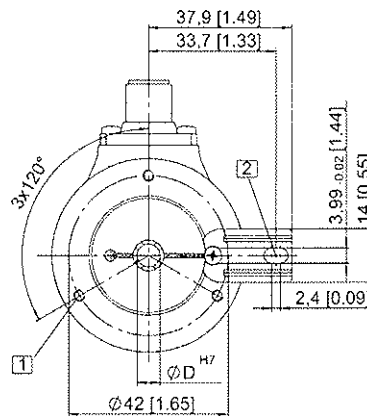
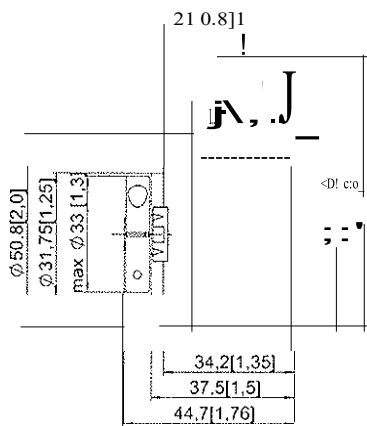
**Dimensions hollow shaft version:**

Flange with long torque stop

ø 50.8 mm [2 inch]

M12, M23 connectors and cable versions

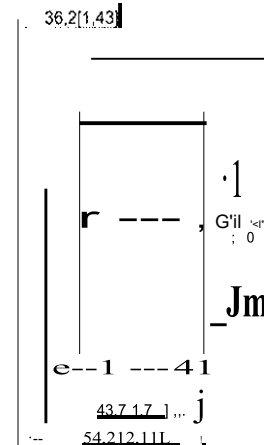
(Flange type 1 and 2)



Flange with long torque stop

ø 50.8 mm [2 inch]

MIL-connector version



[.i:] M3, 6 [0.24] deep

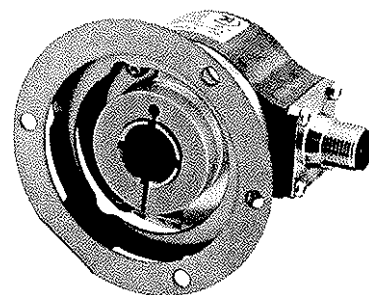
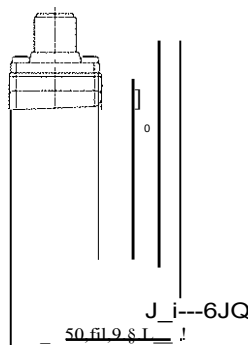
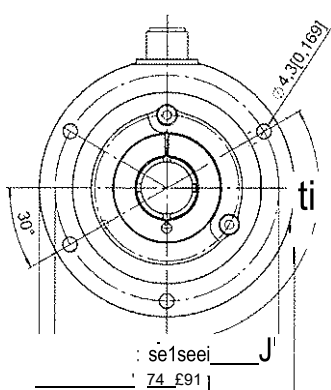
II: Torque stop slot

Recommendation: cyl. pin acc. DIN 7 o 4

Flange with stator coupling

Pitch circle 65 mm

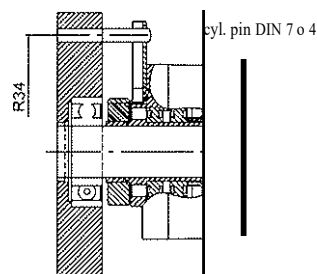
(Flange type 7 and 8)



**Mounting advice:**

The flanges and shafts of the encoder and *drive* should not both be rigidly coupled together at the same time!

We recommend the use of suitable couplings (see Accessories section).

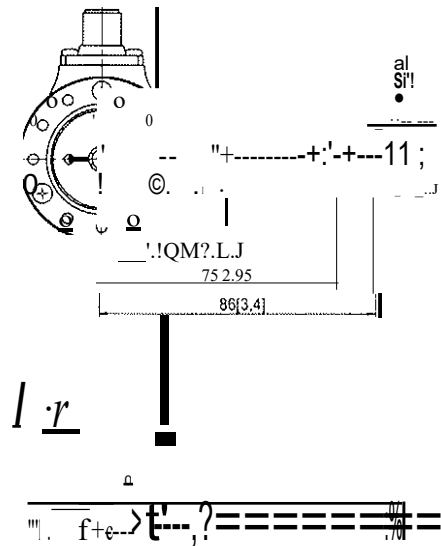




**Sendix incremental Type 5000 (Shaft)/ 5020 (Hollow shaft)**

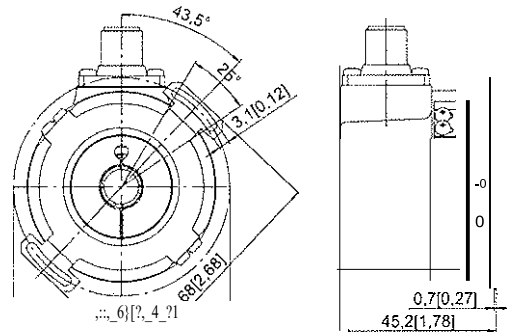
Dimensions hollow shaft version:

Flange with tether arm  
[flange type 3 and 4]

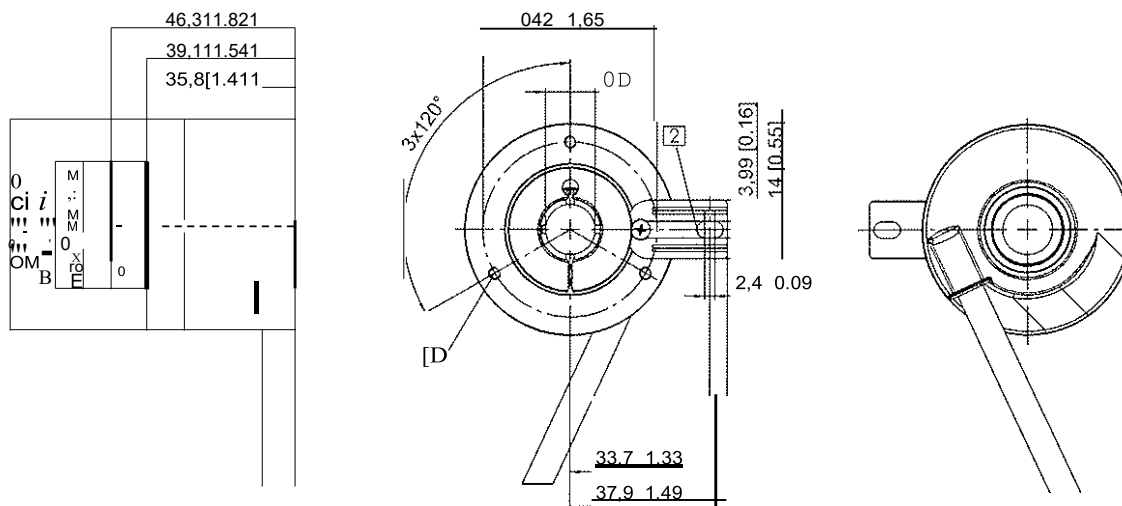


flange wnh stator coupling

pitch circle 0 63 mm  
[Flange type C and DI]



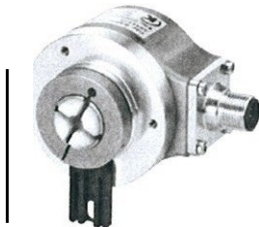
flange wnh long torque stop  
and tangential cable outlet  
(Type of connection E)



[J]: M3, 6 [0.24] deep  
IT Torque stop slot  
Recommendation: cyl. pin acc. DIN 7 0 4

**Isolation/ adapter inserts for hollow shaft encoders**

Isolation/ adapter inserts for hollow shaft encoders

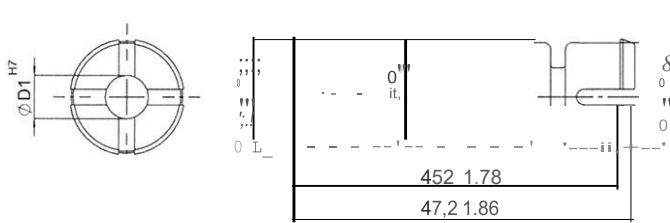


**Thermal and electrical isolation of the encoder:**

Isolation inserts prevent currents from passing through the encoder bearings. These currents can occur when using inverter controlled three-phase or AC vector motors and considerably shorten the service life of the encoder bearings. In addition the encoder is thermally isolated as the plastic does not transfer the heat to the encoder.

**Tip:**

By using these adapter inserts you can achieve six different hollow shaft diameters, all on the basis of one encoder.



Isolation insert	01 [mm]	01 [inchi]
8.0010.4021.0000	6	0,24
8.0010.4022.0000	6,35	0,25
8.0010.4023.0000	10	0,39
8.0010.4024.0000	9,53	0,38
8.0010.4025.0000	12	0,47
8.0010.4026.0000	12,7	0,50

Order code hollow shaft version:

**8.5020XXXX.XXXX**

Type

Flange

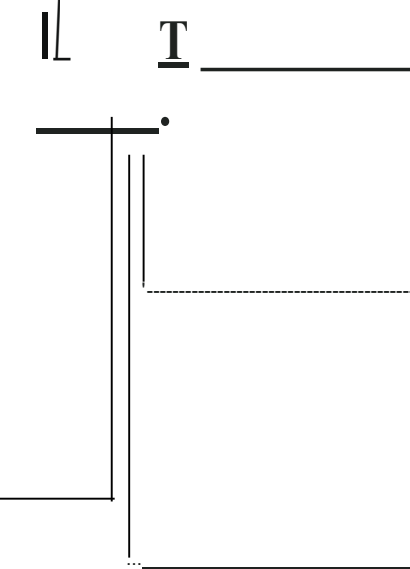
- 1 = Flange with torque stop IP 67
- 2 = Flange with torque stop IP 65**
- 3 = Flange with tether arm IP 67
- 4 = Flange with tether arm IP 65

- 7 = Flange with stator coupling  $\phi$  65 mm, IP67
- 8 = Flange with stator couplings 65 mm, IP65**
- C = Flange with stator coupling  $\phi$  63 mm, IP67
- D = Flange with stator couplings 63 mm, IP65

Shaft (end to end hollow shaft)

- 1 =  $\phi$  6 mm
- 2 =  $\phi$  1/4 inch
- 3 =  $\phi$  10 mm**
- 4 =  $\phi$  3/8 inch
- 5 =  $\phi$  12 mm**
- 6 =  $\phi$  1/2 inch
- 7 =  $\phi$  5/8 inch
- 8 =  $\phi$  15 mm**
- 9 =  $\phi$  8 mm**
- A =  $\phi$  14 mm

Stock types	
8.5020.2351.1000	8.5020.2844.5000
8.5020.2351.2500	8.5020.2844.1000
8.5020.2551.5000	8.5020.2854.0500
8.5020.2551.0500	<del>8.5020.2854.1000</del>
	8.5020.8552.5000



Pulse rate

- 1, 5, 10, 12, 36, 100, 200, 250, 256, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 (e.g. 500 pulses => 0500)
- Other pulse rates available on request

Type of connection

- 1 = Cable radial (1m PVC-cable)
- 2 = Connector radial 8 pin M12
- 4 = Connector radial 12 pin M23
- 7 = Connector 10 pin MIL-specified radial

E = Tangential cable outlet (1 m PVC-cable)

Note: all connector versions without mating connector

Output circuit and supply voltage

- 1 = RS 422 (with inverted signal) 5...30 V supply voltage
- 2 = Push-pull (7272, with inverted signal) 5...30 V supply voltage
- 4 = RS 422 (with inverted signal) 5 V supply voltage
- 5 = Push-Pull; 10..... V

Preferred types are indicated in bold

**Accessories:**

- Cables and connectors, also pre-assembled, can be found in the chapter Counting Technology
- Mounting attachments and couplings can be found in the Chapter Accessories

**with inverted signal**

- seawater resistant version on request

Corresponding mating connector:

- M12: 05.CMB.81 81-0
- M23: 8.0000.501.20000
- MIL-connector
- 10-pin: 8.0000.5062.0000

