E-OCGM

User Manual

TOPFIBRA

EFFECTIVE FILAMENT WINDING® PIONEERS

E-OCGM

USER MANUAL

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1. INTRODUCTION

1.1. Purpose of this document

The operating instructions are intended for all users of the cutting and grinding machinery. They provide the necessary information for the simple, safe, and smooth operation of the system. The individual screen images of the operator panel, the methods of system management, and the described procedures in case of errors or congestion are also explained.

Any person working with the system should read the operating instructions. Instructions for use must always be available in the main cabinet to users.

1.2. Definitions and abbreviations

In this document, the following definitions and abbreviations are used:

PLC - Programmable Logic Controller;

HMI - Human Machine Interface, operating panel.

1.3. General

The cutting and grinding machinery may only be operated and maintained by persons designated by the investor and qualified to work on such a system. In addition to the instructions for use and the accident prevention regulations applicable in this area, the operator must also comply with the technical rules for the safe and appropriate operation of the system.

These instructions provide basic information to be observed during operation and maintenance. It is therefore essential that operators, maintenance staff, and anyone else working with the line, reads them before starting work and that they are always available at the point of use.

In addition to the safety instructions in the "Safety" section, all safety instructions in the field of Occupational Health and Safety must be observed.

To ensure a trouble-free operation of the system, the following conditions must be met:

- The system must be properly set up and maintained;
- Work and maintenance personnel must be properly selected and trained;
- Operators must be well informed about the functions, capabilities, and limitations of the equipment;
- Operators must read and follow the instructions for the use and maintenance of the equipment;
- An adequate set of spare parts must be provided.

1.4. Machine conversion

Modifications, additions, or modifications to the system are not permitted without the consent of the Manufacturer. Written permission from the Manufacturer is required for all recovery operations. Parts of the system that are not in perfect condition must be replaced immediately! Use only original spare parts!

1.5. Extinguishing the fire

When extinguishing a fire, be sure to turn off the main switch of the machine, otherwise, the effective extinguishing of electrically conditioned fires is not possible!

Read the instructions carefully before using the device and save them for future reference.

Be sure to switch off and lock the main switch before carrying out maintenance work on the system.

The person in charge of maintenance work is responsible for safety during maintenance work. The Manufacturer is not responsible for irregularities in case of improper use, unqualified and unauthorized persons, various modifications inconsistent with the rules, or the use of non-original parts. The operator is responsible for the proper operation and regular inspection of the surroundings of the transport system. Lifting, transport, installation, and maintenance must be carried out by a qualified person.

Inspect the system regularly for damage or malfunctions.

Only an authorized and qualified person may interfere with the main cabinet and other electrical cabinets. Study the wiring diagrams before the procedure.

Before intervening on any part of the equipment, exclude the possibility of accidental activation. Observe the principles of safe work and safety regulations.

It is forbidden to interfere with the PLC, as it may cause the program to be deleted or affect the security functions of the system. Prolonged power shutdowns may cause the program and/or settings to be deleted.

In the case of manual or service mode, the operator who manages the system is responsible for the operation, safety, and consequences.

Never leave a working system unattended.

The cutting and grinding machinery is not intended to be used by persons with a lack of experience and knowledge unless they are supervised or advised by the person responsible for their safety.

When finished, turn off and lock the main switch.

2. DESIGN OF CUTTING AND GRINDING MACHINERY

2.1. General

The cutting and grinding machinery is designed as an auxiliary device in the production of pipes. It is intended for cutting and grinding pipes from size ND 12" to ND 120".

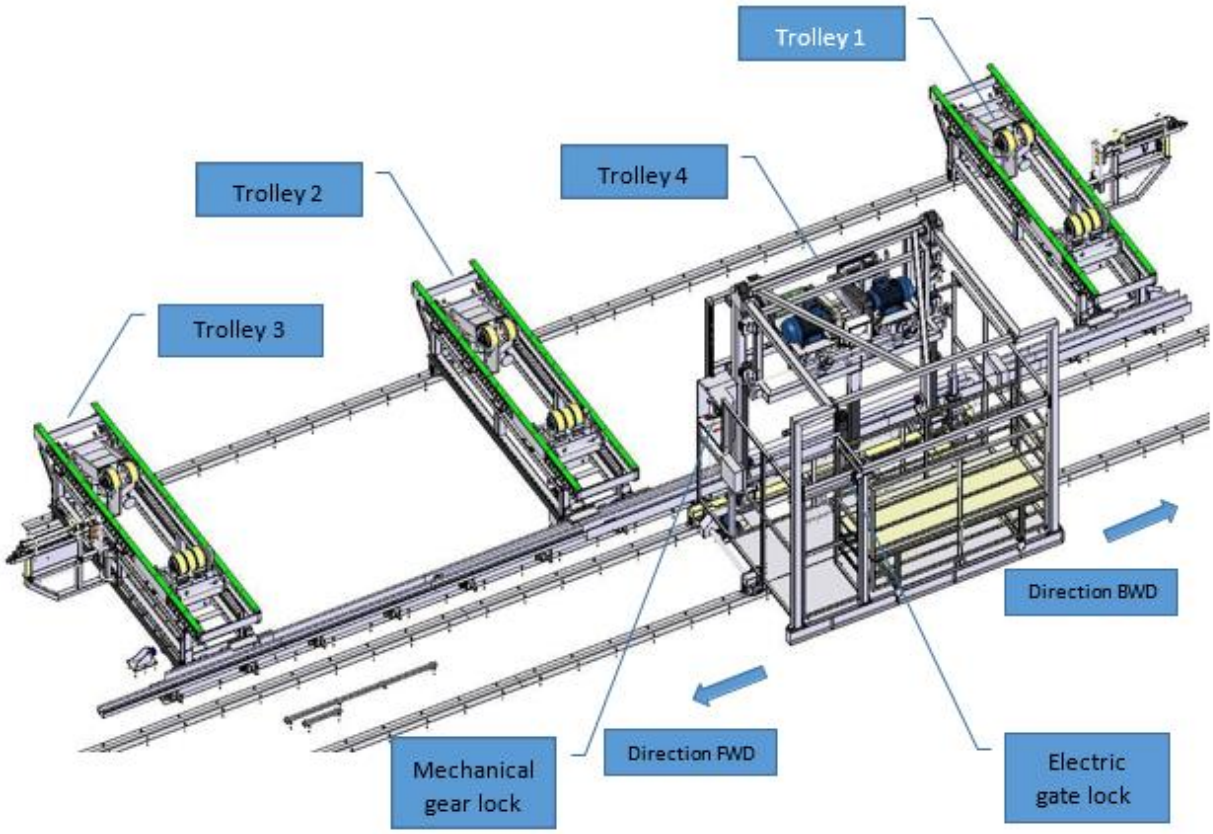


Figure 1: E-OCGM

The cutting and grinding machine consists of:

- One manual moving trolley for pipe support;
- Two motorized moving trolleys for pipe support;
- One motorized trolley for grinder and saw;
- Metal rails for trolleys;

- Safety equipment (railings and safety devices).

2.1.1.Trolleys for pipe support (Trolleys 1 to 3)

Trolleys 1 to 3 are intended for receiving pipes from a mobile trolley. The pipe on the trolleys is supported by two wheels. The first and third trolleys have a driven wheel for pipe rotation. Each trolley is equipped with its relative hydraulic equipment. In the horizontal direction, two trolleys are moved by the gear motor, and one trolley is moved manually. Motors for trolley movement and wheel rotation are controlled by frequency inverters.

For safety reasons in the direction of trolley movement, all driven trolleys are equipped with safety devices that stop the trolley in case of activation.

2.1.2.Trolley for grinder and saw (Trolley 4)

This trolley is controlled by an operator, who is located on the trolley. Movement in the horizontal direction is carried out by a gear motor. For safety reasons, the operator moves the trolley in the horizontal direction with a two-hand control system. The grinder and saw are mounted on a platform that is movable in a vertical direction and driven by a servo drive. The operator only chooses the pipe diameter. The platform then positions itself automatically in the right position. The platform for the grinder and saw can be also manually moved in the horizontal direction (limited to 100 – 200mm) to achieve the exact position for cutting the pipe. To help an operator find the exact position for grinding and sawing, two laser markers project a red laser line on the pipe.

The grinder is moved manually towards the pipe. When the grinder touches the pipe, the operator starts measuring the depth of the grinding. Grinding depth can be watched on the local display. For processing pipes with a bigger diameter, a separate elevated platform is provided to enable the operator to get a better view when grinding and sawing large-diameter pipes. The platform must be set up manually.

The grinder and saw motors are equipped with soft starters. The motor for horizontal movement is equipped with a frequency inverter. A servo drive is provided for the ascent and descent of the platform on Trolley 4.

There is a fence with a gate around the operator's zone on the trolley. The gate must be closed and locked to enable the moving of the platform.

On the front and rear sides of the trolley, safety devices are mounted, which stop the trolley in case of activation.

2.2. Software

The SIEMENS ET200SP distributed system with a PROFINET bus is used to control the system, which, in addition to a more transparent design of connecting electrical elements, also enables easier system upgrades and communication from remote desktops.

The system is operated via buttons on the control panels and via a touch-sensitive HMI screen. The system management application enables to:

- Display the operation system elements;
- Change the settings;
- Editing the pipe data;
- Display the alarms.

2.3. Electrical equipment

The electrical equipment consists of various components, ranging from simple keys, signal lamps, and sensors to frequency regulators and safety components. Among them is also a series of devices for the management, control, and protection of the transport system. Fuses and motor protection switches provide overload control and short-circuit protection for various parts of the system. A rectifier is used to provide a lower voltage constant. Soft starters enable motor soft starts. The frequency regulators make it possible to change the speed of rotation of

the pipe and the two-speed movement of the trolley 4. The servo drive serves to lift the platform of Trolley 4. The PLC and distributed input-output components make up the central control part of the system. They respond to various input signals and control the output signals accordingly. For the safety of workers, safety components are installed in appropriate places to shut down the system in the event of an emergency. All safety components are connected to the safety modules of the safety controller.

2.3.1. Marking of electrical equipment

To facilitate the identification of electrical elements and the diagnosis of operating and alarm conditions, the elements of the device are marked accordingly.

Sensors, circuit breakers, drives, and other electrical equipment are marked according to the page in the project documentation. For example, a sensor that detects the lower position of the Trolley 1 rotating wheel is marked with = 01-S30.1. = 01 means that it is mounted on trolley 1, S means that it is a sensor, and 30.1 means that it is shown in the wiring diagram on page 30. The same applies to all other sensors, signals, and keys.

3. SAFETY

3.1. General

The operating instructions contain basic information to be observed when operating and maintaining the cutting and grinding machinery. For this reason, it is essential that they are read in full and that they are always available at the place of use.

Regulations and measures to ensure the safety of workers were taken into account when designing the system. In addition to safety devices, hazard warning labels are also affixed to potentially hazardous locations. The system of safety devices is designed to ensure the safe operation of the machine.

Operators and maintainers must be familiar with all elements of device management and control. During operation, the cutting and grinding machinery must be monitored and appropriate action taken concerning the condition of the system and the status of warnings and alarms. Emergency procedures should be performed regularly.

In the event of a warning or alarm, the following must be carried out:

- Analyse a warning or alarm;
- If necessary, carry out emergency operations (e.g. shutdown of the drive,...);
- Inform the responsible supervisor and equipment maintainer.

Safety devices installed on the system are intended to protect workers working with or maintaining the system. As a result, they should in no way be removed or disabled. It is also prohibited to remove security labels.

Operators or system maintainers must ensure that safety devices function properly. They must also ensure that the safety labels are legible.

If any safety element does not work properly, operating the cutting and grinding machinery is not permitted.

Be sure to turn off the main switch before performing maintenance.

When working with electrical assemblies, always obtain the permission of the responsible person. Switch off the power supply before repair or maintenance work. During maintenance work, take care not to damage the wiring.

Do not touch the areas of moving parts as they can cause serious injury or even death. Wear suitable protective equipment when working near moving parts.

After completing maintenance work, always test the machine in manual mode.

3.1.1.General safety instructions

DANGER!
The operator may only use the machine in accordance with its intended use in a safe and technically perfect condition!

DANGER!
Competent personnel must ensure that unauthorized persons avoid dangerous areas!

DANGER!
The electrical equipment of the machine must be tested regularly. Defective cable insulation, loose connections, and burnt cables must be removed immediately. The main electrical cabinet must always be locked. Only authorized personnel are allowed access.

DANGER!
Work on the electrical system may only be carried out by competent and authorized workers! There is a risk of electric shock, which can range from severe burns to heart failure!

WARNING!
Observe all safety and accident prevention regulations!

WARNING!
When carrying out hazardous work, the main switch must be switched off and secured against being switched on again!

WARNING!
When installing the machine, the relevant safety rules must be observed and accidents must be avoided by prudent handling! This mainly concerns the use of safe means of transport and lifting devices! In addition, all dangerous places created, even if only temporary, must be adequately insured!

3.2. Safety functions

The cutting and grinding machinery contains the following safety features:

- Emergency stop (function to switch off the system in case of activation of the STOP button);
- Stopping an individual trolley (function to turn off an individual trolley in the event of an interruption of the safety edge while moving the trolley, or an interruption of the scanner safety zone);
- Control of exceeded platform positions of Trolley 4;
- Control of the gear lock to prevent the platform from moving on the Trolley 4;
- Locking and checking the gate closure to access the platform on Trolley 4;
- Control of switching on the main contacts;
- Confirmation of reconnection of safety functions.

If the safety function is activated, the alarm must be confirmed and the failed safety element must be reactivated.

3.2.1. Emergency STOP button

The emergency stop button is located on the main electrical cabinets and control boxes. Activating the key stops the movement of the machine.

Figure 2

Procedure for reactivating the security module:

- Ensure safe operation of the machinery;

- Turn the activated key clockwise to return to the working position;
- Reset the security alarm on the HMI;
- Switch on the safety circuit with the »POWER ON« button on the main electrical cabinet.

3.2.2.Safety edge

The safety edges are located on the edges of the Trolleys 2 to 3. They prevent the trolley from moving in the event of accidental interference with the trolley movement area. Activation of the safety edge causes the device safety circuit to fail in the direction of the affected edge.

Figure 3

Procedure for reactivating the security module:

- Check and remove the cause of the safety edge activation;
- Ensure safe operation of the device;
- Reset the alarm;
- Move the trolley in the opposite direction.

3.2.3. Safety laser scanner

The safety scanners are located on the front and back of the Trolley 4. They prevent the trolley from moving in the event of interference in the safety area. The laser scanner scans two areas. In the event of an intervention in the warning area, the trolley stops. It is no longer possible to move in the interrupted direction, but it is possible to move the trolley in the opposite direction. Entering the safety zone of the device causes the safety circuit of the trolley to fail.

Figure 4

Procedure for reactivating the security module:

- Check and remove the cause of entering the safety zone of the device;
- Remove the object from the safety area of the device;
- Ensure safe operation of the device;
- Switch on the safety circuit by pressing the "X-axis main power ON" button on the HMI display screen.

3.2.4. Safety gate lock and switches to control pin and position of the lever to prevent platform vertical movement

A safety switch with a lock is located on the Trolley 4 gate. When moving the trolley platform, the gate must be closed and can only be opened when the gear rack to mechanically prevent

the platform from vertical moving is blocked. The Trolley 4 gate is equipped with a lock. The lock is locked in case the platform gear rack is not blocked (provided that the gate is previously closed). It is unlocked by locking the gear rack to move the platform. From the inside of the trolley, the gate can also be unlocked by pressing the corresponding HMI button. The safety switches are intended to control the pin and the position of the lever that mechanically prevents the Trolley 4 platform from moving. The switches also lock or unlock the Trolley 4 gate.

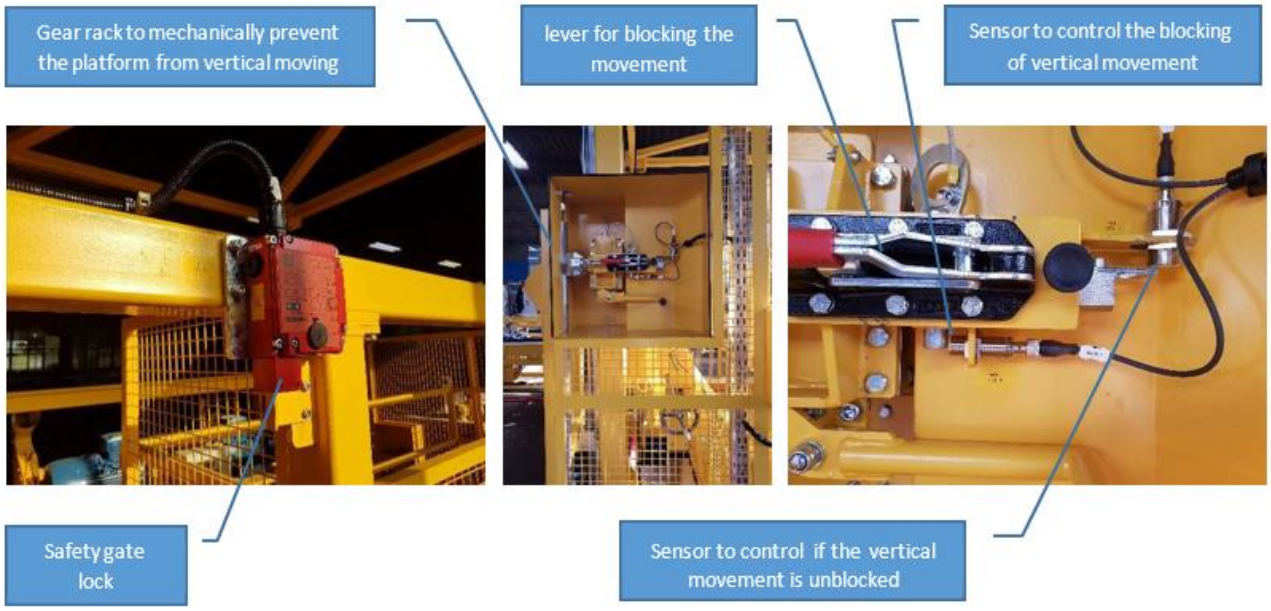


Figure 5

Procedure for locking the gate:

- Check that all drives on Trolley 4 are switched off;
- Check that gate is properly closed;
- Remove the locking pin on the lever;
- Use the lever to unblock the gear rack which mechanically prevents the vertical movement of the platform.

Procedure for unlocking the gate:

- Check that all drives on Trolley 4 are switched off;
- Use the lever to block the gear rack to mechanically prevent the vertical movement of the platform;
- Install the locking pin to prevent the lever from moving;
- Check if the gate is locked.

3.2.5. Limit switch for exceeded position

The limit switch for the exceeded position of the platform is used to turn off the drive in case of failure or malfunction of the switch for detecting the end position of the platform. If the drive the override switch switches off, the operation of the limit switch or any other device malfunctions must be checked and the causes for activating the safety function must be rectified.

Figure 6

3.2.6. Safety reset in case of safety module passivation

The safety reset function is necessary in the following cases:

- Before starting the device for the first time after switching on the main switch;
- After deactivation of safety elements (STOP keys, safety switches,…);
- After the time has elapsed to control the channel discrepancy of the safety function;
- After the reintegration of safety modules.

4. OPERATING MODES

4.1. General

The cutting and grinding machinery can operate in manual mode. In this case, the individual functions of the device are performed by pressing the appropriate buttons.

4.2. Manual mode

In manual mode, the devices are switched on and off using the buttons on the main electrical cabinet and control boxes. The same applies to the movement of the trolleys. The movement lasts as long as the button is kept pressed (and the safety conditions are met), and in the case of the start and stop buttons, as long as the safety conditions are met or until the stop button is pressed.

5. CONTROL AND SIGNAL ELEMENTS

5.1. Main electrical enclosure = GS1

The main switch allows safe operating and maintenance conditions of the cutting and grinding machinery. There is a fundamental need to use all the safety and lockout procedures. The main switch can be locked with a padlock. After installing the padlock, it shall be marked that the maintenance work is in progress.

The auxiliary voltage switch is intended for switching the transformer on and off for cabinet lighting and the socket for external devices.

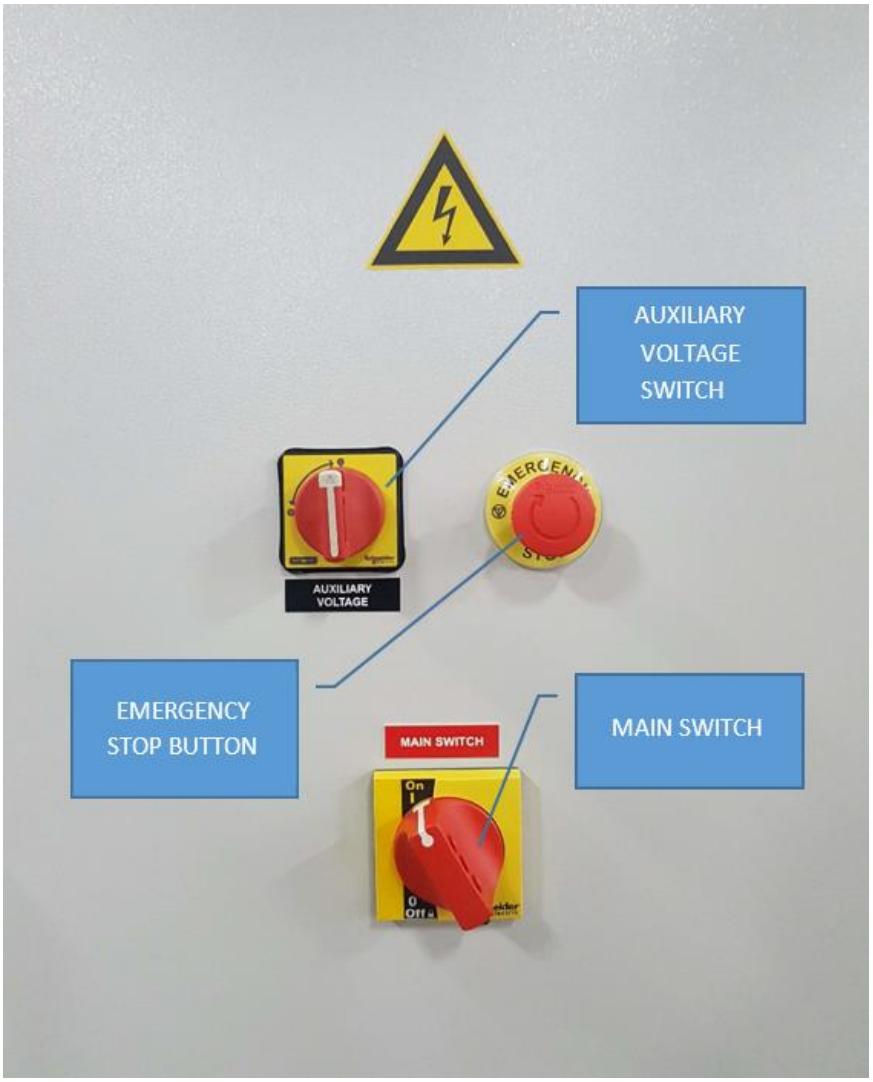


Figure 7

Description of control and signal elements on the main control cabinet:

BUTTON	FUNCTION	DESCRIPTION
	SWITCH DISCONNECTOR	Cutting and grinding machinery main power on switch.
	SWITCH DISCONNECTOR	Auxiliary voltage power on switch.
	EMERGENCY STOP PUSH BUTTON	Switch off the main safety circuit in case of an emergency.

5.2. Control Panel =123CP1

The cutting and grinding machinery has a control panel on which there are control and signalling elements for the main functions of the system. The control panel =123CP1 is intended for the management of Trolleys 1 to 3. Through it, we also exchange signals with the pipe transport trolley for loading and unloading pipes. All functions are performed manually.

Figure 8: E-OCGM Control panel

Description of control and signal elements on the control panel:

BUTTON	FUNCTION	DESCRIPTION
	EMERGENCY STOP PUSH BUTTON	Switch off the main safety circuit in case of an emergency.
	ILLUMINATED PUSH BUTTON	Cutting and grinding machinery enable safety. Signal states of the LED: **OFF** – at least one safety edge activated on trolleys 1-3 **FLASHING** – the conditions for resetting the safety edges are me (no activation of the safety element) **ON** – the safety edges circuit is switched on
	ILLUMINATED PUSH BUTTON	Cutting and grinding machinery power supply ON. Signal states of the LED: **OFF** – activated safety element (power condition not met) **FLASHING** – the conditions for switching on the power are met (no activation of the safety element) **ON** – the safety circuit is switched on (power supply is ON)

BUTTON	FUNCTION	DESCRIPTION
	PUSH-BUTTON	Turn OFF the Cutting and grinding machinery power supply.
	SIGNAL LIGHT	PLC or HMI circuit breaker tripping. Signal states of the LED: **ON** - Circuit breaker tripped **OFF** - Circuit breaker OK
	SIGNAL LIGHT	Trolleys 1-3 safety edges error. Signal states of the LED: **ON** – at least one of the safety edges is broken or the safety edge control module is not switched on **FLASHING** – the safety edge control module is not switched on **OFF** – safety edges OK
	ILLUMINATED PUSH BUTTON	Movement of Trolley 2 in the forward direction (away from the main electrical enclosure). Signal states of the LED: **OFF** – the trolley does not have a command to move

ON – the trolley has a command to move
FLASHING – the limit switch for moving the trolley in the forward direction is activated

BUTTON	FUNCTION		DESCRIPTION
	ILLUMINATED BUTTON	PUSH	Movement of Trolley 2 in the backward direction (toward the main electrical enclosure). Signal states of the LED: **OFF** – the trolley does not have a command to move **ON** – the trolley has a command to move **FLASHING** – the limit switch for moving the trolley in the backward direction is activated
	ILLUMINATED BUTTON	PUSH	Movement of Trolley 3 in the forward direction (away from the main electrical enclosure). Signal states of the LED: **OFF** – the trolley does not have a command to move **ON** – the trolley has a command to move **FLASHING** – the limit switch for moving the trolley in the forward direction is activated

ILLUMINATED BUTTON	PUSH	Movement of Trolley 3 in the backward direction (toward the main electrical enclosure). Signal states of the LED: **OFF** – the trolley does not have a command to move **ON** – the trolley has a command to move **FLASHING** – the limit switch for moving the trolley in the backward direction is activated

BUTTON	**FUNCTION**	**DESCRIPTION**
	SIGNAL LIGHT	Signalling of the permitted position of Trolley 1 for loading pipes. Signal states of the LED: **ON** - Trolley 1 is in a position where pipe loading is possible **OFF** - Trolley 1 is in a position where pipe loading is not possible
	Signalling	Signalling of the permitted position of trolley 2 for loading pipes. Signal states of the LED: **ON** - Trolley 1 is in a position where pipe loading is possible **OFF** - Trolley 1 is in a position where pipe loading is not possible

BUTTON	FUNCTION		DESCRIPTION
	SIGNAL LIGHT		Signalling of the permitted position of Trolley 3 for loading pipes. Signal states of the LED: **ON** - Trolley 1 is in a position where pipe loading is possible **OFF** - Trolley 1 is in a position where pipe loading is not possible
	ILLUMINATED BUTTON	PUSH	Moving the rollers up or down on Trolley 1 is enabled.
	ILLUMINATED BUTTON	PUSH	Moving the rollers up or down on Trolley 2 is enabled.
	ILLUMINATED BUTTON	PUSH	Moving the rollers up or down on Trolley 3 is enabled.

BUTTON	FUNCTION		DESCRIPTION
	ILLUMINATED BUTTON	PUSH	Upward movement of rollers on enabled trolleys. Signal states of the LED: **ON** - The rollers on enabled trolleys are in the final upper position **OFF** - The rollers on the enabled trolleys are not in the final upper position
	ILLUMINATED BUTTON	PUSH	Downward movement of rollers on enabled carriages. Signal states of the LED: **ON** - The rollers on enabled trolleys are in the final lower position **OFF** - The rollers on the enabled trolleys are not in the final lower position
	ILLUMINATED BUTTON	PUSH	Switching on or off the pipe holding valve on Trolley 1. Signal states of the LED: **ON** – The pipe holding valve is on **OFF** – The pipe holding valve is off
	ILLUMINATED BUTTON	PUSH	Switching on or off the pipe holding valve on Trolley 3. Signal states of the LED: **ON** – The pipe holding valve is on **OFF** – The pipe holding valve is off

BUTTON	FUNCTION		DESCRIPTION
	SIGNAL LIGHT		Signalling for the position of the pipe holder on Trolley 1. Signal states of the LED: **ON** – Pipe holding cylinder is removed **OFF** – Pipe holding cylinder is not removed (loading or unloading of the pipe is not possible)
	SIGNAL LIGHT		Signalling for the position of the pipe holder on Trolley 3. Signal states of the LED: **ON** – Pipe holding cylinder is removed **OFF** – Pipe holding cylinder is not removed (loading or unloading of the pipe is not possible)
	SIGNAL LIGHT		Signalling that pipe rotation is possible. Signal states of the LED: **ON** – Pipe rotation is possible **OFF** – There are no conditions for pipe rotation (power on, roller enabled, enabled rollers in upper position)
	ILLUMINATED BUTTON	PUSH	Start the pipe rotation. Signal states of the LED: **OFF** – The pipe rotation is not running. **ON** – The pipe rotation is running.

BUTTON	FUNCTION		DESCRIPTION
	PUSH-BUTTON		Stop the pipe rotation.
	ILLUMINATED BUTTON	PUSH	Start pipe acceptance - signal exchange for the pipe transport trolley. Signal states of the LED: **OFF** – pipe acceptance is not in progress **FLASHING (SLOW)** –pipe is waiting on the pipe transport trolley but trolleys are not in the allowed position **FLASHING (FAST)** – pipe is waiting on a pipe transport trolley, and trolleys are in the allowed position (the pipe acceptance is possible –> press the button) **ON** – the pipe acceptance is in progress
	ILLUMINATED BUTTON	PUSH	Finish pipe acceptance - signal exchange for the pipe transport trolley. Signal states of the LED: **FLASHING (SLOW)** – the pipe is transferred from the pipe transport trolley to the trolleys -> press the button **OFF** – pipe acceptance is not in progress

BUTTON	FUNCTION		DESCRIPTION
	ILLUMINATED BUTTON	PUSH	Start pipe removal - signal exchange for the pipe transport trolley. Signal states of the LED: **OFF** – pipe removal is not in progress or has already been finished **FLASHING (SLOW)** –grinding is finished (the button was pressed) **ON** – the pipe removal is in progress (the pipe transport trolley is ready for pipe acceptance)
	ILLUMINATED BUTTON	PUSH	Finish pipe removal - signal exchange for the pipe transport trolley. Signal states of the LED: **OFF** – pipe removal is not in progress or has already been finished **FLASHING (SLOW)** – the pipe transport trolley has finished pipe acceptance -> press the button

5.3. Trolley 4 electrical enclosure = 04GS1

The main switch cabinet of Trolley 4 is located at the back of the trolley. The operator panel and control elements for moving the grinding table are installed on the cabinet.

Figure 9

Description of control and signal elements on the trolley 4 main electrical cabinet:

BUTTON	FUNCTION	DESCRIPTION
	SIGNAL LIGHT	PLC or HMI circuit breaker tripping. Signal states of the LED: **ON** - Circuit breaker tripped **OFF** - Circuit breaker OK
	PUSH-BUTTON	Movement of the grinding table in the upward direction. **Note:** **the movement lasts as long as the key is held.**
	PUSH-BUTTON	Movement of the grinding table in the downward direction. **Note:** **the movement lasts as long as the key is held.**
	EMERGENCY STOP PUSH BUTTON	Switch off the main safety circuit in case of an emergency.

5.4. Control Box =04CP1

The control box is located on the lifting platform of Trolley 4 between the saw and the grinder. An operator panel is installed on the control box. In addition to the operator panel, there are also control and signalling elements for the saw and grinder.

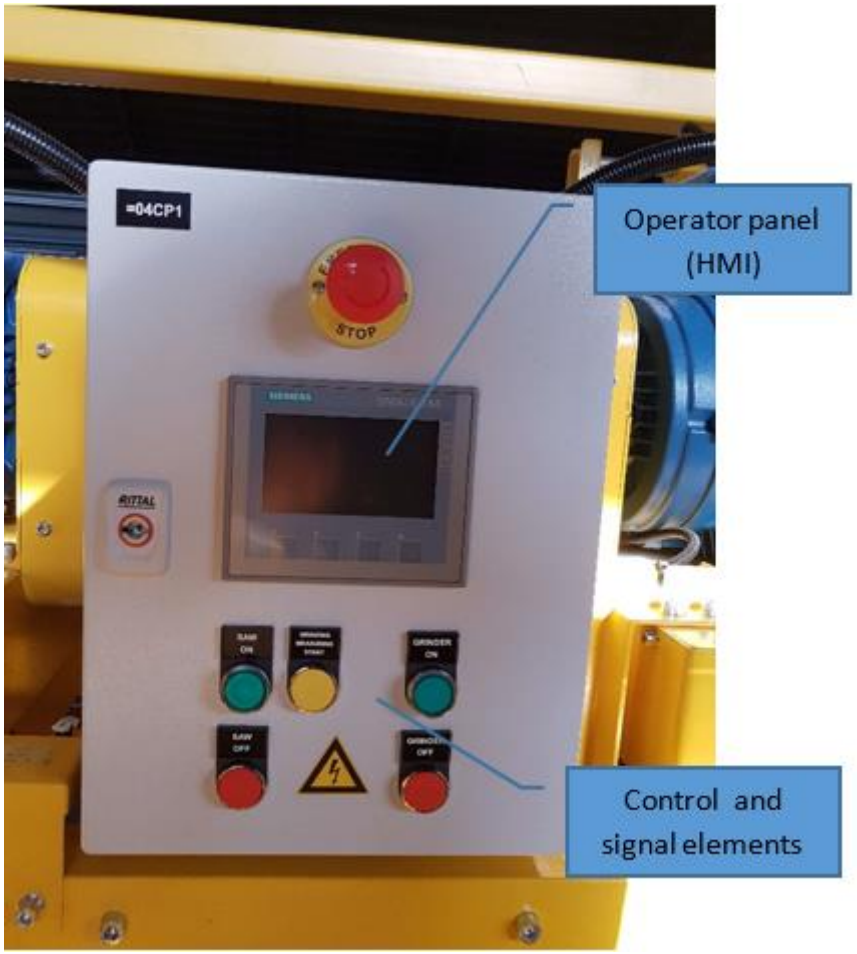


Figure 10

Description of control and signal elements on the control box:

BUTTON	FUNCTION	DESCRIPTION
	EMERGENCY STOP PUSH BUTTON	Switch off the main safety circuit in case of an emergency.
	ILLUMINATED PUSH BUTTON	Switching on the saw. Signal states of the LED: **OFF** – The saw is switched off **FLASHING** – The saw is switched on but is still in the start-up process **ON** – The saw is switched on
	PUSH-BUTTON	Switch off the saw.
	ILLUMINATED PUSH BUTTON	Switching on the grinder. Signal states of the LED: **OFF** – The grinder is switched off **FLASHING** – The grinder is switched on but is still in the start-up process **ON** – The grinder is switched on

BUTTON	FUNCTION	DESCRIPTION
	PUSH-BUTTON	Switch off the grinder.
	PUSH BUTTON	Zeroing the value to move the grinder back and forth.

5.5. Control Boxes =04CP2 and 04CP3

The control boxes are located in Trolley 4, on which are the keys for moving the carriage and turning on and off the lasers for positioning the saw and the grinder.

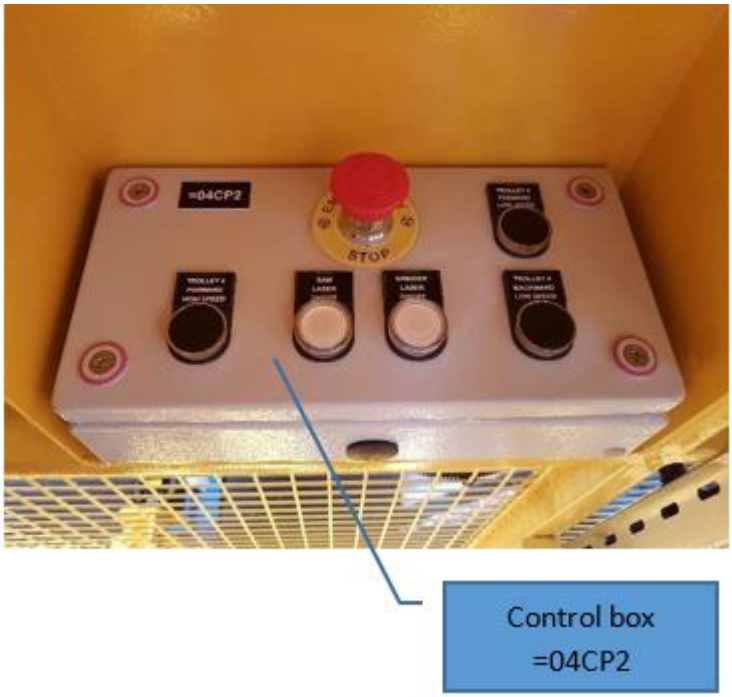


Figure 11

Figure 12

Description of control and signal elements on the control boxes:

BUTTON	FUNCTION	DESCRIPTION
	PUSH-BUTTON	Move Trolley 4 in the forward direction (away from the main electrical enclosure) at a low speed. **Note:** **the movement lasts as long as the key is held.**
	PUSH BUTTON	Move Trolley 4 in the forward direction (away from the main electrical enclosure) at a high speed. **Note:** **the movement lasts as long as the key is held.**
	PUSH BUTTON	Move Trolley 4 in the backward direction (toward the main electrical enclosure) at a low speed. **Note:** **the movement lasts as long as the key is held.**
	PUSH BUTTON	Move Trolley 4 in the backward direction (toward the main electrical enclosure) at a high speed. **Note:** **the movement lasts as long as the key is held.**

BUTTON	FUNCTION	DESCRIPTION
	ILLUMINATED PUSH-BUTTON	Turning on or off the laser marker that determines the positions of the saw. Signal states of the LED: **ON** – the laser marker is on **OFF** – the laser marker is off
	ILLUMINATED PUSH BUTTON	Turning on or off the laser marker that determines the positions of the grinder. Signal states of the LED: **ON** – the laser marker is on **OFF** – the laser marker is off
	EMERGENCY STOP PUSH BUTTON	Switch off the main safety circuit in case of an emergency.

5.6. Light and sound signalling

Light and sound signals are used to report various warnings, faults, or transport conditions. The light signals on the control components are described in the previous section. The signal tower is mounted on the Trolley 4 electrical enclosure.

Figure 13

The light signals have the following messages:

RED	———	The device is in an alarm state.
	- - - - -	Safety laser scanners are bypassed.
YELLOW	———	The device is in a high warning state.
	- - - .	The device is in a low warning state.
	- - - - -	Safety laser scanners are bypassed.
GREEN	———	Trolley 4 is moving.

The audible signal has the following messages:

SOUND		Trolley 4 has started to move (depending on the sound setting).
		Trolley 4 is moving (depending on the sound setting).
		The Trolley 4 safety gate is not closed.
		Trolley 4 is in a forbidden position and/or the safety laser scanner is bypassed.

6. HUMAN-MACHINE INTERFACE

6.1. General

The touch-sensitive operator panels of the cutting and grinding machinery offer high functionality and a user-friendly interface. They are designed for the easy and safe operation of the device. The status of the device and its elements can be monitored via screens, errors can be diagnosed.

There are two operator panels on the device. The main HMI is located on the electrical enclosure =04GS1 of Trolley 4, and the auxiliary one on the control box =04CP1 on the lifting platform.

The panel detects only one keystroke. Pressing two keys at the same time will not perform the desired function.

Note:

when the power supply is switched on, communication is established between the panel and the PLC, so wait until the main page is displayed.

6.1.1. Enter parameter values

The new values of the variables are entered via the dial, which is displayed on the screen when the field of the desired variable is pressed.

The value is entered by pressing the corresponding numbers and confirmed by pressing the "ENTER" key.

If the newly entered value needs to be corrected, press the "Del" key to reset the value to 0.0, or "←" to delete the last dialed number. When confirming the entry with the "ENTER" key, the dial is closed and the newly entered value is displayed in the selected field.

Figure 14

You can also close the dial by pressing the X key in the upper right corner of the screen. In this case, the value of the variable remains unchanged. and the value change can also be cancelled.

6.2. The main HMI on the =04GS1

6.2.1.Screen navigation

At the bottom of the screen is a navigation field that allows you to navigate between the various screens of the operator panel. It also shows the name of the screen you are currently on or the currently active alarms.

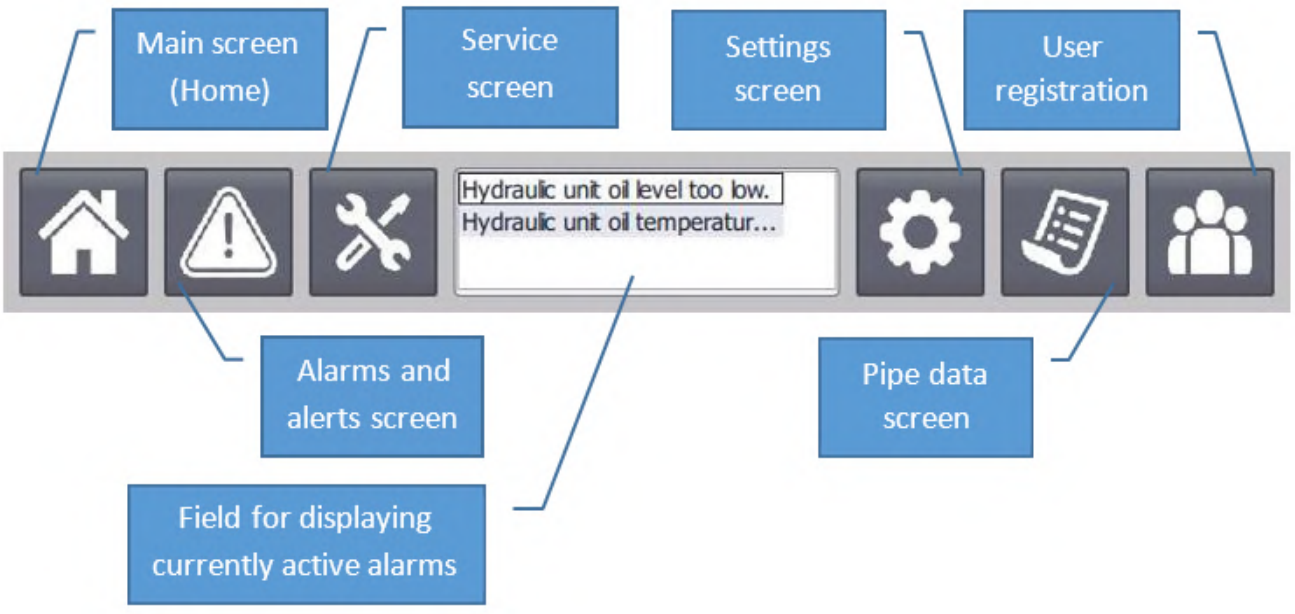


Figure 15

6.2.2.Main screen

In the presence of the control voltage, the main screen is displayed on the operator's panel. You can also access it at any time by pressing the "Home" button in the screen navigation. This is the most important screen of the application for working with cutting and grinding machinery. On this screen, you can select the type of pipe to be processed, enter the testing time and starting pressure, and monitor the current condition and test result.

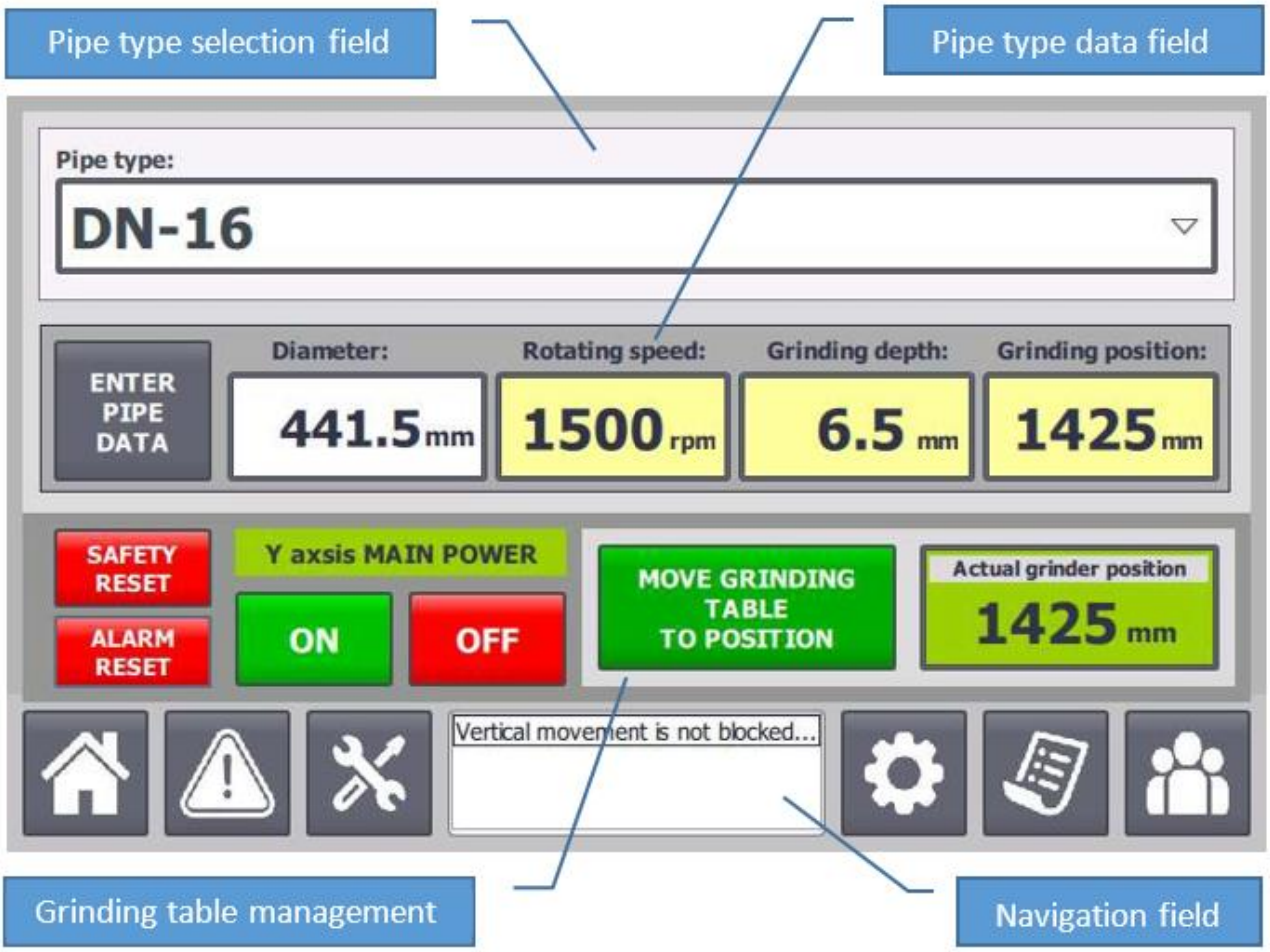

Pipe type selection field
Pipe type data field
Pipe type:
DN-16
ENTER PIPE DATA
Diameter:
441.5 mm
Rotating speed:
1500 rpm
Grinding depth:
6.5 mm
Grinding position:
1425 mm
SAFETY RESET
ALARM RESET
Y axsis MAIN POWER
ON
OFF
MOVE GRINDING TABLE TO POSITION
Actual grinder position
1425 mm
Vertical movement is not blocked...
Grinding table management
Navigation field

Figure 16

6.2.2.1. Pipe type selection field

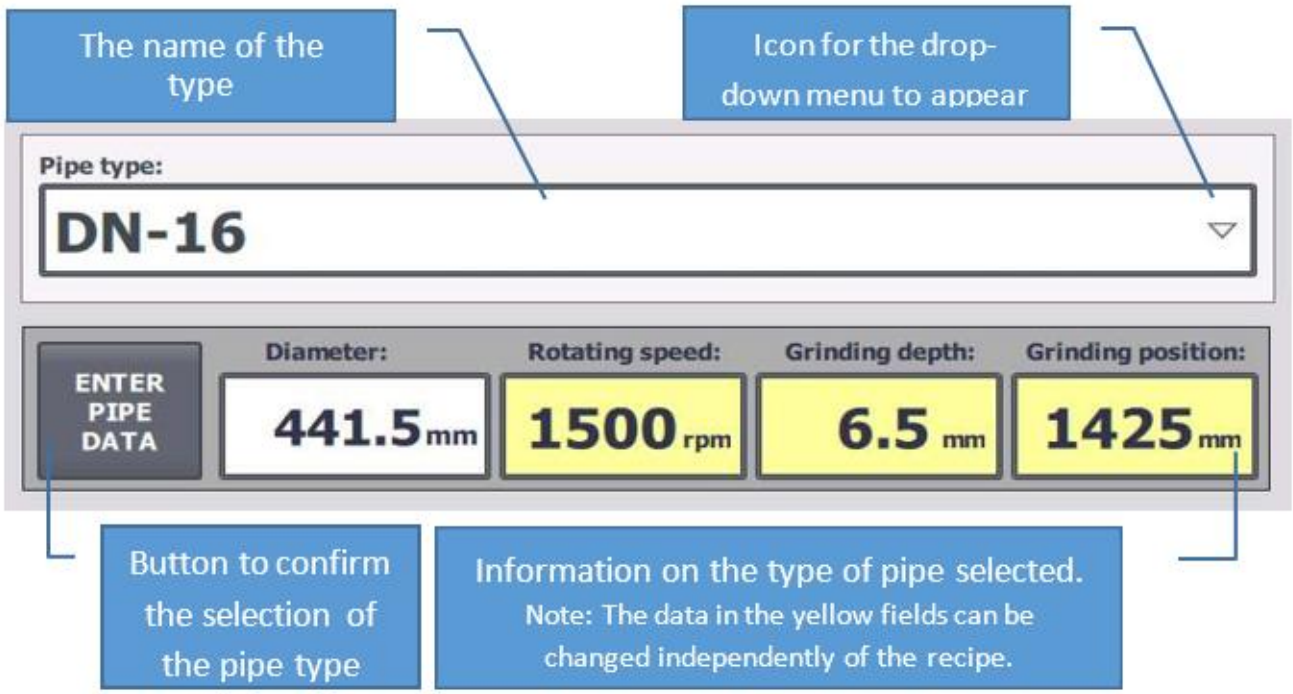


Figure 17

6.2.2.2. Grinding table management

Once the pipe type is selected and the data is transferred to the PLC by pressing the »ENTER PIPE DATA« button, we can start with the cutting and grinding process. The data in the yellow fields can also be changed as desired, regardless of the stored values. It is only important to do this at the start.

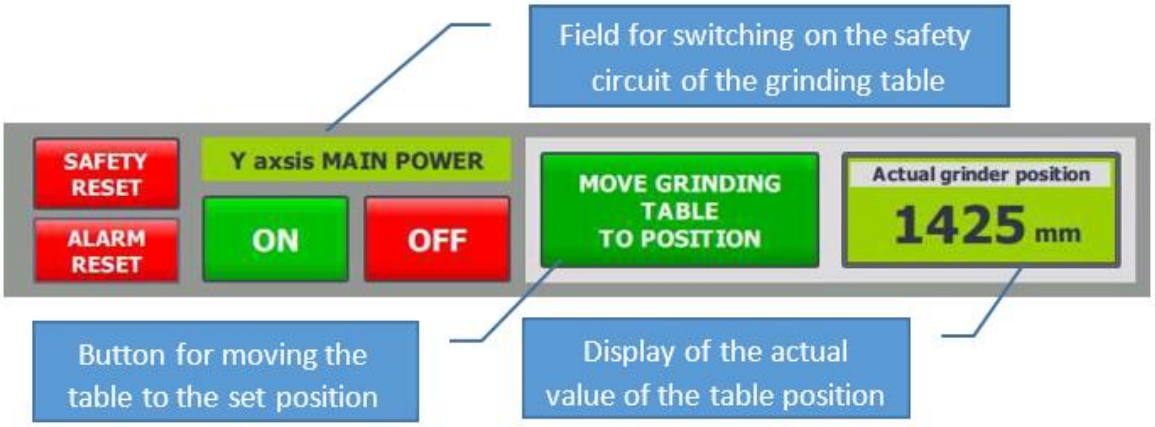
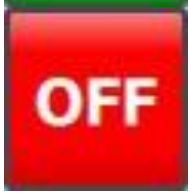


Figure 18

Before starting the grinding and cutting, the height of the grinding table must be set. We do this via the table position adjustment field. First, turn on the safety circuit by pressing the ON button. Then move the table to the selected position by pressing the »MOVE GRINDING TABLE TO POSITION« key. Scrolling lasts as long as the key is pressed. When the table is in the selected position, the actual position value field turns green. When the grinding table is in the set position, we can start grinding and cutting the pipe.

Description of buttons and signalling fields:

BUTTON	DESCRIPTION
	Confirmation of failure of one or more security functions of the device.
	Acknowledgement of alarms on the device.
	Y-axis main power supply ON.
	Y-axis main power supply ON.
	Y-axis main power status signalling. Background signal states: **Green** - power is on **Grey** - power is off
	Button for moving the grinding table to the desired position. **Note:** **the movement lasts as long as the key is held.**

Field to display the actual position of the grinding table.

Background signal states:
Red - the table is not in the set position
Yellow - the table moves to the set position
Green - the table is in the set position.

6.2.3.Alarms and warnings screen

Alarms and abnormal conditions may occur during the operation of the cutting and grinding machinery.

You can view active alarms or alerts at any time on the "ALARMS" screen.

After correcting the cause of the alarm activation, the alarm must be reset by pressing the corresponding key in the navigation.

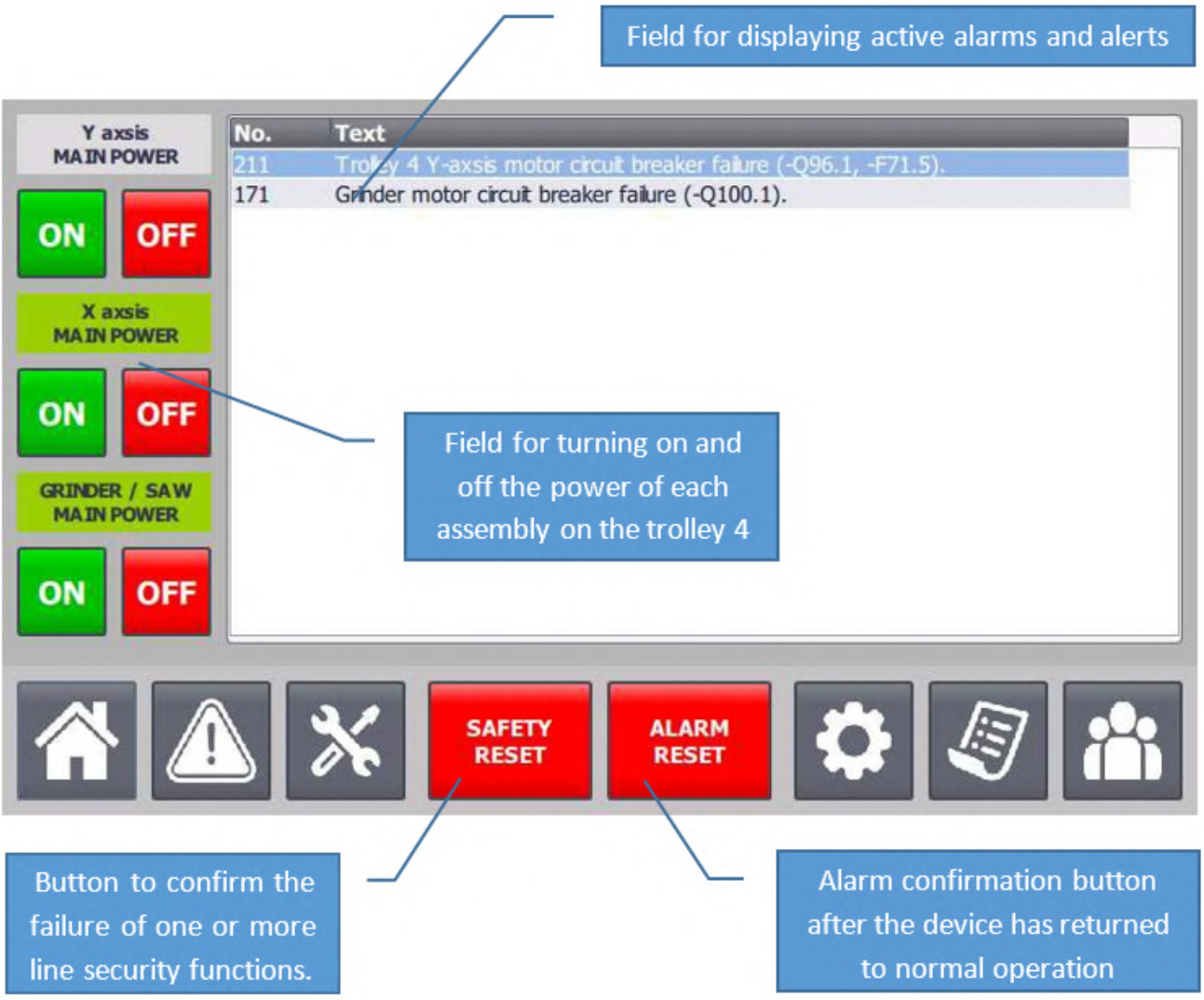


Figure 19

Before resetting the alarms, it is essential to repair all the causes that triggered the alarm and the consequences caused by the alarm and to ensure the safe switching on of the device.

6.2.3.1. List of alarms

C. BREAKER PLC, HMI (signal light on main control cabinet).	• check the condition of the circuit breaker; • check the power supply.
Activated safety STOP button on XX.	• check which key is activated; • eliminate the causes and consequences of activation; • deactivate the key; • reset safety on HMI; • turn on the power.
Trolley 4 front/back safety laser scanner zone activated.	• check which safety zone is activated; • eliminate the causes and consequences of activation; • move the trolley in the opposite direction; • reset safety on HMI; • turn on the power.
The Y safety edge of the trolley X is in fault (-KXX.X).	• press the safety reset button; • press the enable safety button.

The Y safety edge on the trolley X is activated.	• check which safety edge is activated; • eliminate the causes and consequences of activation; • move the trolley in the opposite direction; • reset safety on HMI; • enable safety; • turn on the power.
The Y safety edge of the trolley X needs a reset.	• press the safety reset button; • press the enable safety button.
Trolley 4 X-axis front/back safety zone activated.	• check which safety edge is activated; • eliminate the causes and consequences of activation; • move the trolley in the opposite direction; • reset safety on HMI; • turn the on power.
Failure of the safety module for switching on XX. Press the safety reset button.	• press the safety reset button.

XX circuit breaker failure.	• check the condition of the circuit breakers; • check auxiliary switches of the circuit breakers; • check the possibility of a short circuit; • turn on the circuit breaker again.
XX motor circuit breaker failure.	• check for mechanical failure; • check for the possibility of a drive failure; • check for motor overload; • turn the switch on again; • if it fails again, call a maintenance or equipment supplier; • reset the alarm on HMI.
XX soft starter error.	• check for mechanical failure; • check for the possibility of a drive failure; • check for motor overload; • check the error reported by soft start;

	• push the reset button on the soft starter; • reset the alarm on HMI; • if the error occurs again, call the equipment maintainer.
XX soft starter error.	• check for mechanical failure; • check for the possibility of a drive failure; • check for motor overload; • check the error reported by soft start; • push the reset button on the soft starter; • reset the alarm on HMI; • if the error occurs again, call the equipment maintainer.
The soft starter of the XX does not bypass the required time.	• check for mechanical failure; • check for the possibility of a drive failure; • check for motor overload; • check the correct bypass time setting; • reset the alarm on HMI.

XX inverter communication error (-UXX.X).	• check the operation of the inverter; • check the wiring; • switch the main cabinet switch off and on again; • if the alarm does not disappear, call the maintenance or equipment supplier.
XX inverter in fault (-UXX.X).	• check the possibility of mechanical failure; • check the possibility of motor failure; • check the possibility of motor overload; • check the error reported by the regulator; • eliminate the causes and consequences of the error; • reset the alarm.
XX rotation braking resistor temperature too high (-RXX.X).	• stop operation until the temperature of the resistor drops; • check the possibility of mechanical failure of the drive.

Both sensors on the rollers lift arms of Trolley X are activated at the same time.	• check the operation of the switches on the lifting arms of the trolley.
The Trolley X is positioned in the forbidden area (-SXX.X).	• move the trolley to the permitted area so that the pipe transport trolley can load the pipe; • check the operation of the switch for detecting the forbidden area of the trolley.
The switch that prevents Trolley X from moving forward/backwards is activated.	• move the trolley in the opposite direction; • check the operation of the switch.
Failure of trolley X pipe holding cylinder or limit switch on a cylinder.	• check the operation of the cylinder end position detection switch; • check valve and cylinder operation.
Trolley 4 Y-axis servo drive inverter in fault (-U96.1).	• check the possibility of mechanical failure; • check the possibility of motor failure; • check the possibility of motor overload;

	• check the error reported by the regulator; • eliminate the causes and consequences of the error; • reset the alarm.
Trolley 4 Y-axis servo drive inverter communication error (-U96.1).	• check the operation of the inverter; • check the wiring; • switch the main switch cabinet off and on again; • if the alarm does not disappear, call the maintenance or equipment supplier.
The trolley 4 lifting table exceeded the final position in the upward direction along the Y-axis.	• check the operation of the end position detection switch on the grinding table; • check the actual position of the grinding table; • move the table to the work area.

The trolley 4 lifting table exceeded the final position in the downward direction along the Y-axis.	• check the operation of the end position detection switch on the grinding table; • check the actual position of the grinding table; • move the table to the work area.
The trolley 4 lifting table servo drive an has incorrect reference. Perform manual referencing.	• check the operation of the referencing switch; • perform referencing in manual mode.
The Trolley 4 lifting table servo drive is not ready for operation.	• check the operation of the servo drive; • check the wiring; • check the regulator protections; if the alarm does not disappear, call the maintenance or equipment supplier.
The pipe type is not selected (grinding position or grinding depth is zero). Grinding is not possible.	• select the type of pipe; • enter the value of grinding depth and grinding table position.

The rated current of the grinder motor is exceeded.	• stop the forward movement of the grinder; • check the grinding load; • check the no-load current of the grinder; • check the condition of the grinder.
The rated current of the saw motor is exceeded.	• stop the forward movement of the saw; • check the cutting load; • check the no-load current of the saw; • check the condition of the saw.
The front/back-end position limit switch is activated.	• check the operation of the end position detection switch on the Trolley 4. • check the operation of the inductive proximity sensor for the end position.

6.2.3.2. List of warnings

Main cabinet cooling circuit breaker failure (-F5.1).	• check the condition of the circuit breakers; • check auxiliary switches of the circuit breakers; • check the possibility of a short circuit;

	• turn on the circuit breaker again.
The "Enable power" switch (-S61.1) is in the "0" position.	• check that switching on the power of the device is safe and possible; • turn the switch to position "1".
Trolley 4 main cabinet cooling circuit breaker failure (-F70.1).	• check the condition of the circuit breakers; • check auxiliary switches of the circuit breakers; • check the possibility of a short circuit; • turn on the circuit breaker again.
Rollers of enabled trolleys are not up. Pipe rotating is not possible.	• move the lifting arms on the enabled trolleys to the upper position; • check the operation of the lifting arms detection limit switch.
Vertical movement is not blocked. The gate is locked.	• the lifting table is not mechanically blocked; • check the operation of the switch for

	• detecting the mechanical blocking of the lifting table.
The gate is not closed. The vertical movement must be blocked!!!	• the lifting table is not mechanically blocked; • check the operation of the switch for detecting the mechanical blocking of the lifting table; • check the operation of the electrical lock on the gate to access the lifting table.
To switch on the Y-axis power, the vertical movement lock must be removed.	• no one should be present near the grinding (lifting) table; • close the lifting table access gate; • remove the mechanical blocking of the movement of the lifting table.
A safety reset is necessary.	• press the safety reset button.
The grinder is switched on. It is not possible to switch on the saw at the same time.	• if you want to turn on the drive of the saw, you must first turn off the drive of the grinder.

The saw is switched on. It is not possible to switch on the grinder at the same time.	• if you want to turn on the drive of the grinder, you must first turn off the drive of the saw.
The grinder is not retracted. Moving is not possible.	• move the grinder back to its final position; • check the operation of the limit switch.
The saw is not retracted. Moving is not possible.	• move the saw back to its final position; • check the operation of the limit switch.
Bridging the security laser scanner is active. Before moving, make sure it is safe.	 Bridging the safety element can only be performed by a qualified person designated by the employer to carry out service interventions.

6.2.4.Service screen

On the service screen, it is possible to switch on an individual drive by pressing the corresponding button. Switch states are also visible. We have separate access to the service subpages for Trolleys 1 to 3, Trolley 4, and the lifting (grinding) table.

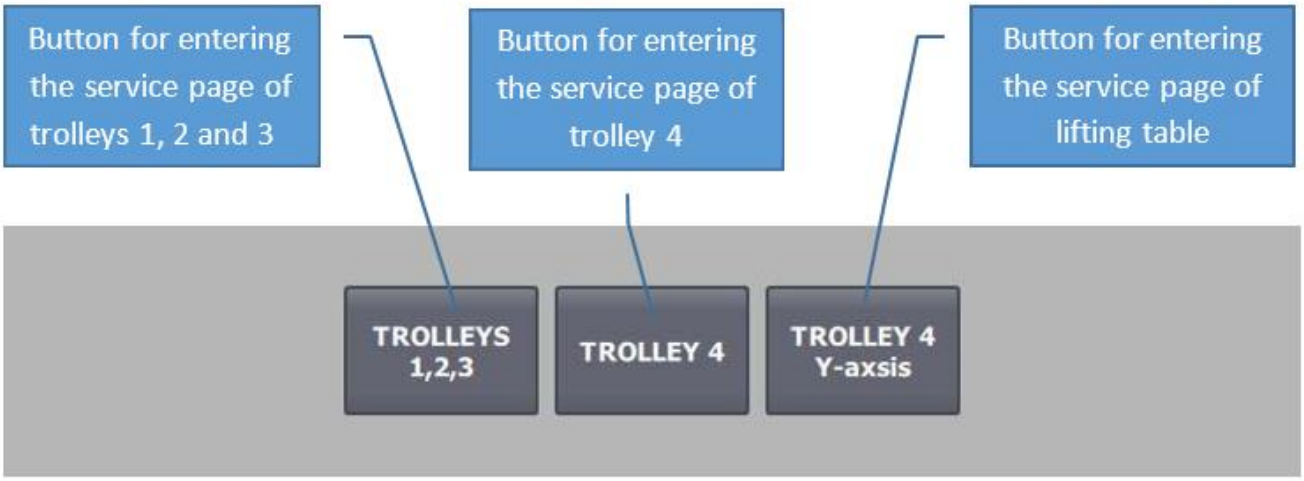


Figure 20

6.2.4.1. Trolleys 1,2 and 3 service screen

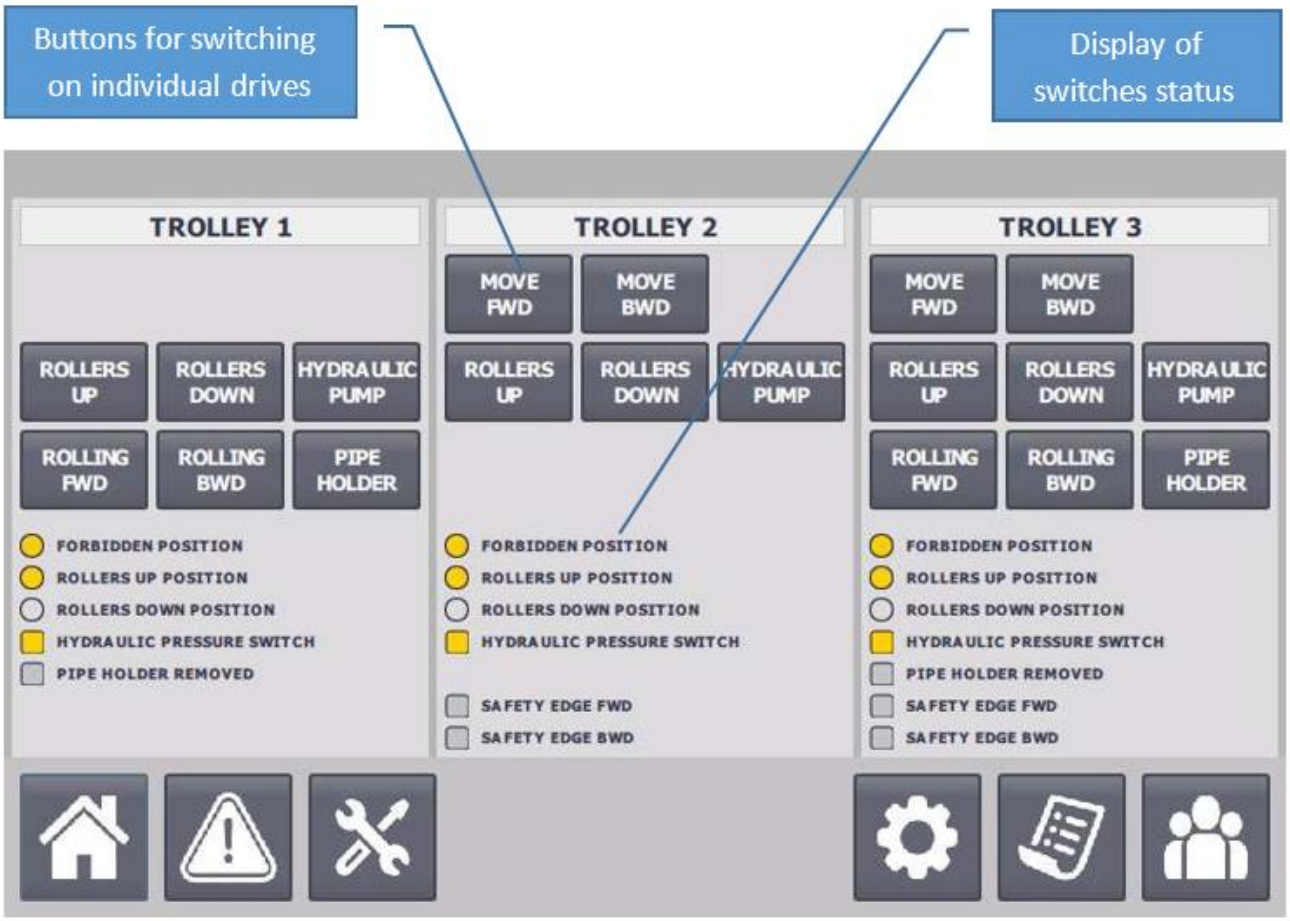


Figure 21

Note:
the drive works as long as the button is pressed.

Meaning of sensor colours:

BUTTON	DESCRIPTION
	The switch is activated.
	The switch is inactive.

6.2.4.2. Trolley 4 service screen

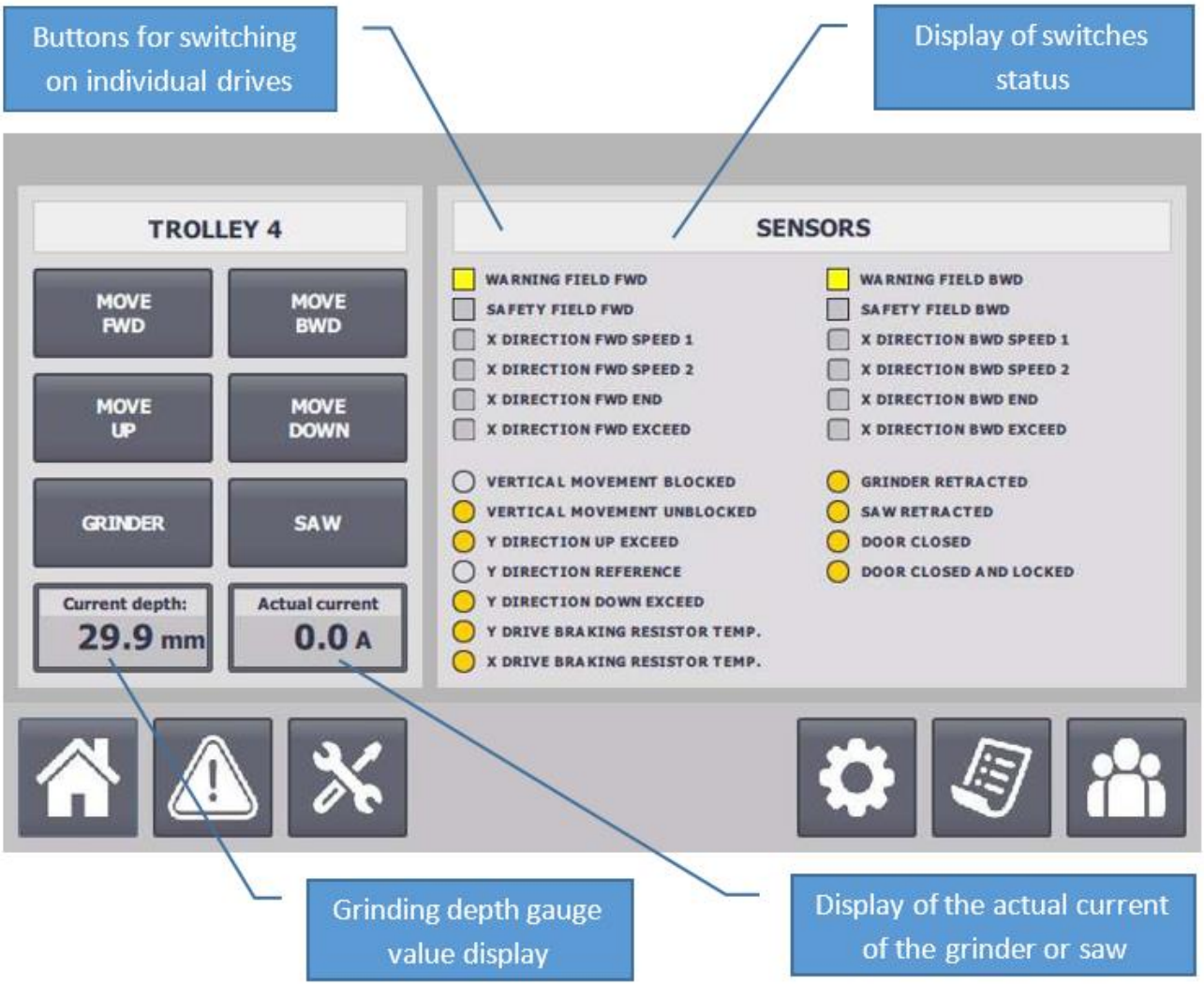


Figure 22

Note[1]:

the drive works as long as the button is pressed.

Note[2]:

only the actual current of the drive that is currently on (either the saw or the grinder) is displayed.

Meaning of sensor colours:

BUTTON	DESCRIPTION
	The switch is activated.
	The switch is inactive.

6.2.4.3. Lifting (grinding) table service screen

On the lifting table service screen, by pressing the appropriate button, the drive can be turned on in the desired direction. We can also perform referencing, and positioning, monitor the status of the inverter, cancel errors or change the movement settings. The switches and drive states are also visible.

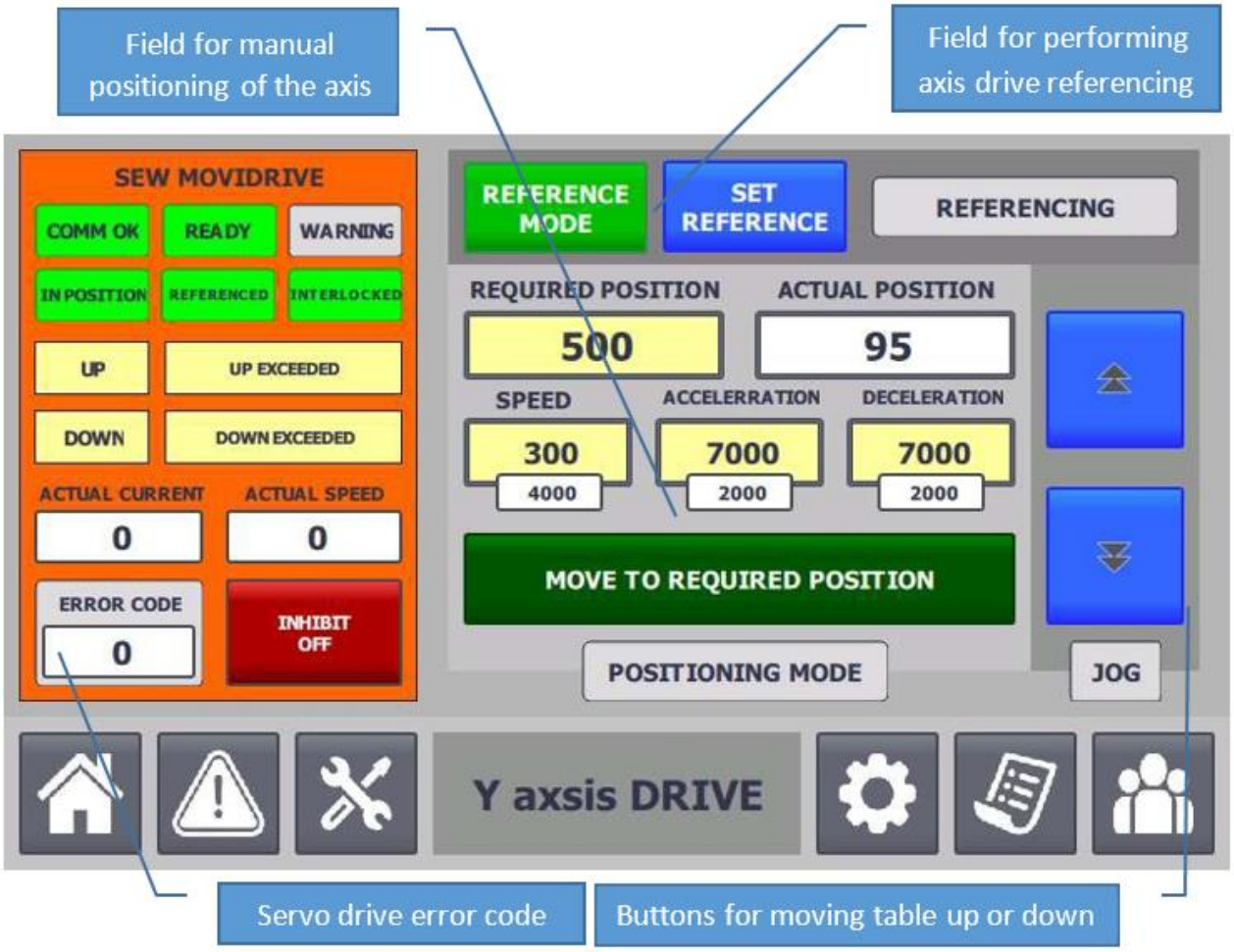
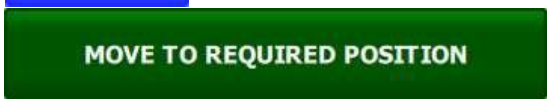


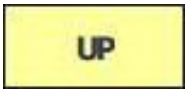
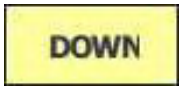
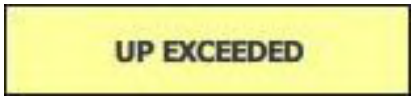
Figure 23

Description of buttons and signalling fields:

BUTTON	DESCRIPTION
	Button for moving the grinding table up. **Note:** **the movement lasts as long as the key is held.**
	Button for moving the grinding table down. **Note:** **the movement lasts as long as the key is held.**
	Button for moving the grinding table to the required position. **Note[1]:** **the movement lasts as long as the key is held** **Note[2]:** **when the button is released, the drive stops following the preset deceleration ramp.**
	Disabling the lock of the servo drive  **Disabling the servo drive lock can only be performed by a qualified person in conjunction with the equipment manufacturer.**
	Turning on the referencing mode of the lifting table.
	Signalling that the referencing mode is on and a button to turn off the referencing mode.
	Button to confirm the lifting table reference.

BUTTON	DESCRIPTION
	Signalling that the referencing mode is active.
	Communication status between servo drive and PLC.
	Servo drive controller ready status.
	The lifting table servo drive is in a warning/error state.
	The lifting table servo drive is in the desired position.
	The lifting table drive is referenced.
	The lifting table drive is interlocked.

Description of limit switches colours:

BUTTON	DESCRIPTION
	Lifting table upper limit switch status. Background signal states: **Green** - the switch is activated **Yellow** - the switch is not activated
	Lifting table lower limit switch status. Background signal states: **Green** - the switch is activated **Yellow** - the switch is not activated
	The status of the lifting table exceeded the position switch. Background signal states: **Red** - the switch is activated

Yellow - the switch is not activated

BUTTON	DESCRIPTION
DOWN EXCEEDED	The status of the lifting table down exceeded the position switch. Background signal states: **Red** - the switch is activated **Yellow** - the switch is not activated

Referencing the lifting table

The drive of the lifting table contains an absolute position encoder, which enables continuous monitoring of the position of the height of the grinder. The information about the current position of the axis remains even after the power is turned off. However, the data may be incorrect for some reason (mechanical interventions on the axis, service interventions, equipment change...). In such a case, manual axis referencing must be performed, which establishes a reference point (the "0" position of the device) for absolute positioning.

During the referencing process, the lifting table must be constantly under the visual control of the operator. In referencing mode, the software limit switches are not active. This means that the drive can go beyond the end position during referencing. The equipment Manufacturer is not responsible for any consequences of the incorrect and uncontrolled referencing process of the manipulator.

Referencing process:

- Check that the movement of the lifting table in the selected direction is safe;
- Check the state of the inductive switch for reference;

- On the service side of the lifting table, activate the referencing mode by pressing the yellow button "REFERENCE MODE" (the button turns green and the additional button "SET REFERENCE" appears);
- In manual operating mode, move the lifting table to the referencing switch;
- **Attention!** In the referencing mode, the axis of the lifting table can be moved via software limit switches. Therefore, the movement of the lifting table must be visually monitored at all times, and in case of irregularities, the emergency shutdown button must be pressed. The person performing the referencing is responsible for any damage to the equipment;
- Verify that the reference detection console is in the centre of the referencing switch;
- Press the "SET REFERENCE" button on the HMI (the axis is now referenced);
- Check that the actual position is at 500;
- Pressing the "REFERENCE MODE" key turns off the referencing mode (the key turns yellow).

6.2.5.Settings screen

The settings are used to change the operating parameters of the cutting and grinding machinery. By setting the parameters correctly, we optimize the operation and ensure operation with as little downtime as possible. We have separate access to the settings subpages for Trolleys 1 to 3, Trolley 4, and the lifting (grinding) table. Enter the individual subpage by pressing the corresponding button.

Figure 24

To change the desired value, click on the field of the value you want to change. The keyboard is displayed, through which you enter a new value, which must be between the specified minimum and maximum values. Confirm the value by pressing the ENTER key.

6.2.6. Pipe data management screen

The pipe data is the basis for pipe turning and cutting. Each record in the database contains information about the diameter of the pipe, the speed of rotation of the pipe, the height (position) of the lifting (grinding) table, and the depth of grinding.

The program already contains a basic database of pipes, which can always be changed, added, and removed.

Enter the pipe type editing subpage by pressing the recipe button in the navigation field.

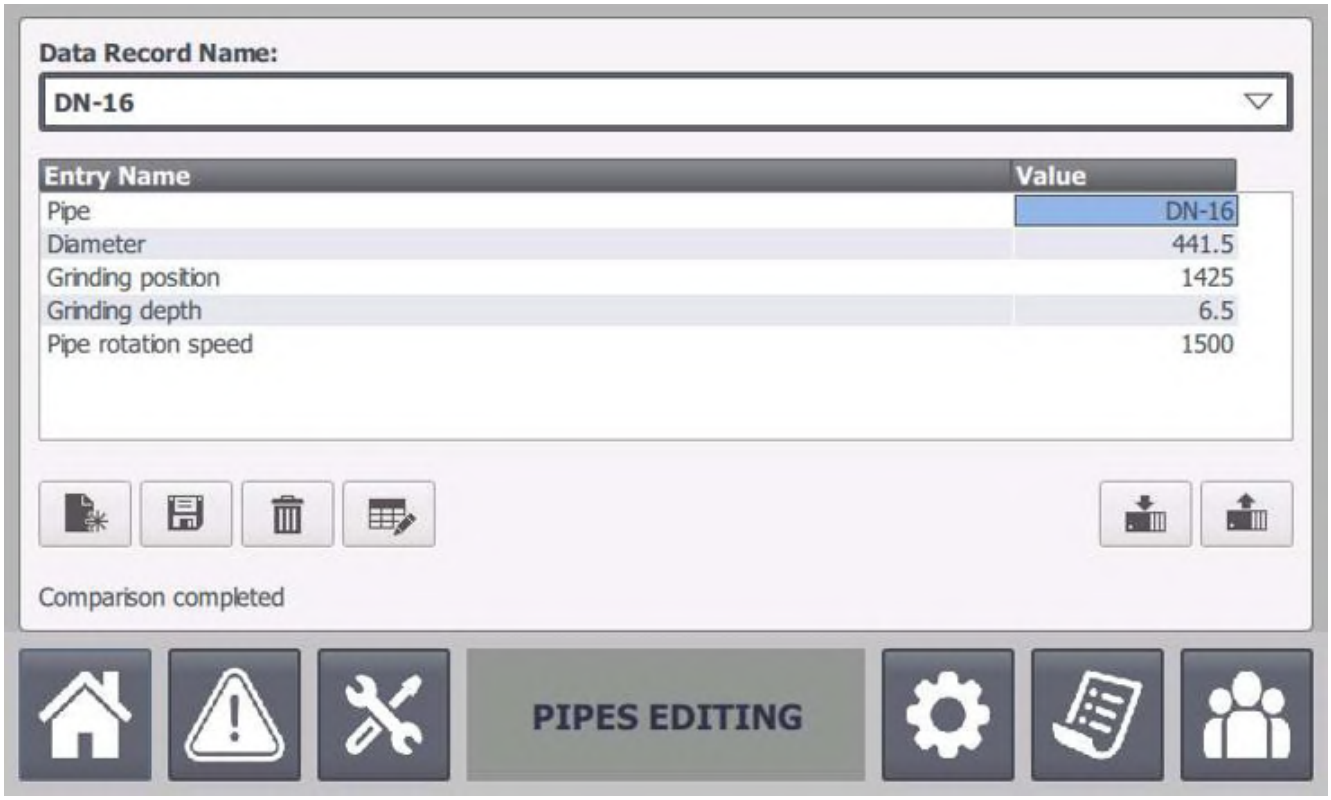


Figure 25

Meaning of buttons:

BUTTON	DESCRIPTION
	Create a new recipe.
	Save the recipe.
	Delete the recipe.

BUTTON	DESCRIPTION
	Download the recipe to PLC.
	Upload the recipe from the PLC.

6.2.6.1. Pipe recipe selection

You select a recipe by clicking on the recipe name. An extended menu is displayed through which we select any of the saved recipes. By clicking on the desired recipe, the data from the database is transferred to the table. To transfer data to the controller, press the ENTER PIPE DATA button on the main screen. If the selected recipe is not suitable, you can change it or choose another one. After confirming the recipe, it is essential to check the adequacy of the data transferred to the PLC.

6.2.6.2. Changing the recipe

In the list of recipes, select the recipe you want to change. Press the value you want to change and enter the new value via the keypad. To save the change, press the Save Recipe button.

6.2.6.3. Enter a new recipe

The easiest way to enter a new recipe is to correct one of the old recipes and save it under a new name by pressing the »Save recipe as« button.

6.2.6.4. Delete recipe

In the recipe list, select the recipe you want to delete and press the Delete recipe button.

6.3. HMI on the control box =04CP1

6.3.1. Navigation buttons

Move between the screens using the function keys on the operator panel. By pressing the key, we enter the desired page. The F4 key also serves to bypass the safety laser sensor in case of service intervention.

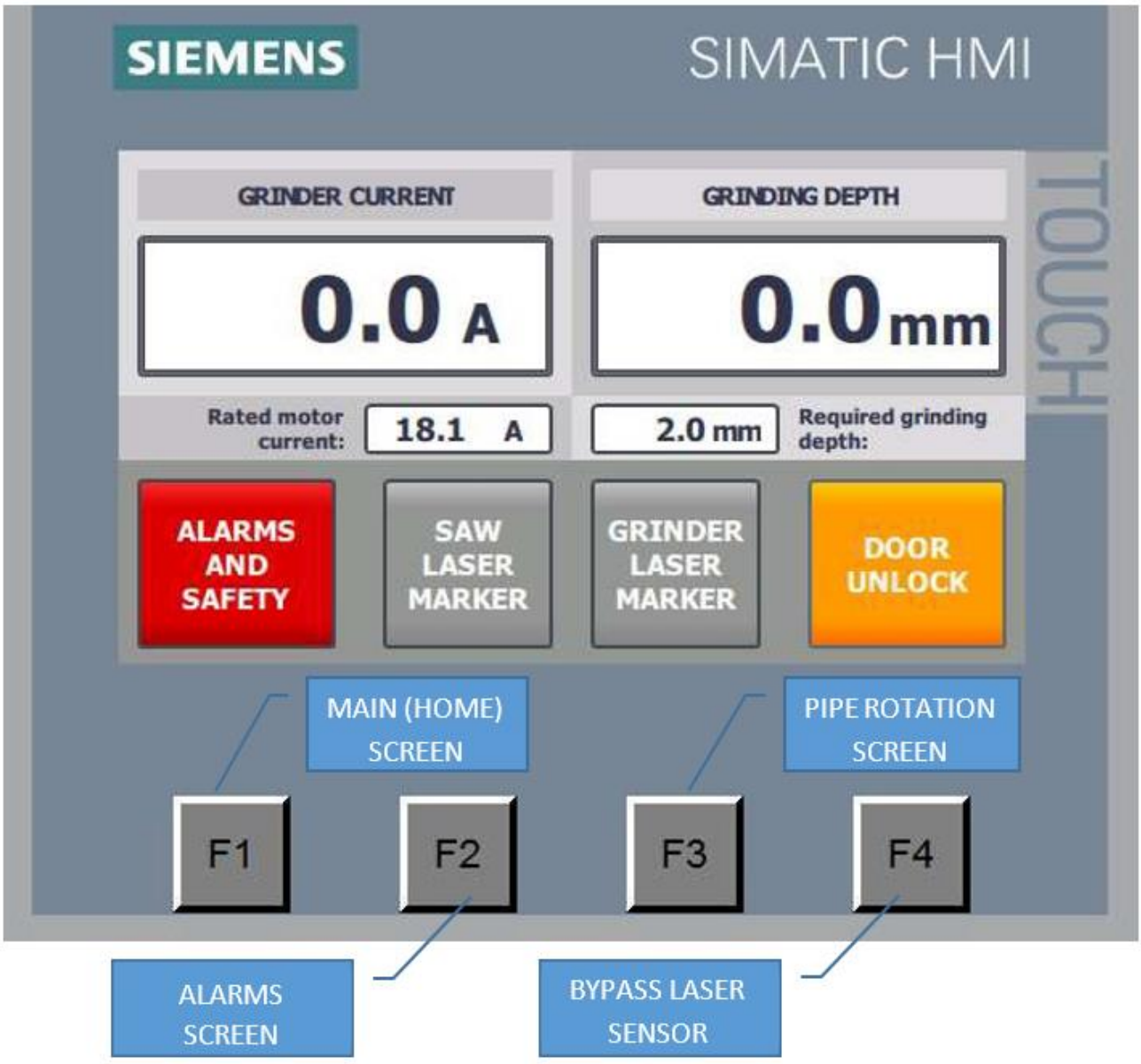


Figure 26

Note:
bypassing the safety laser sensor is time-limited. When the time expires, the bypassing process must be repeated.

Bypassing the laser sensor can only be performed by a qualified person authorized by the employer to service and maintain the equipment. The person who presses the bypass button is responsible for safety during the bypass of the safety sensor.

6.3.2.Main screen

In the presence of the control voltage, the main screen is displayed on the operator's panel. You can also access it at any time by pressing the F1 button on the panel.

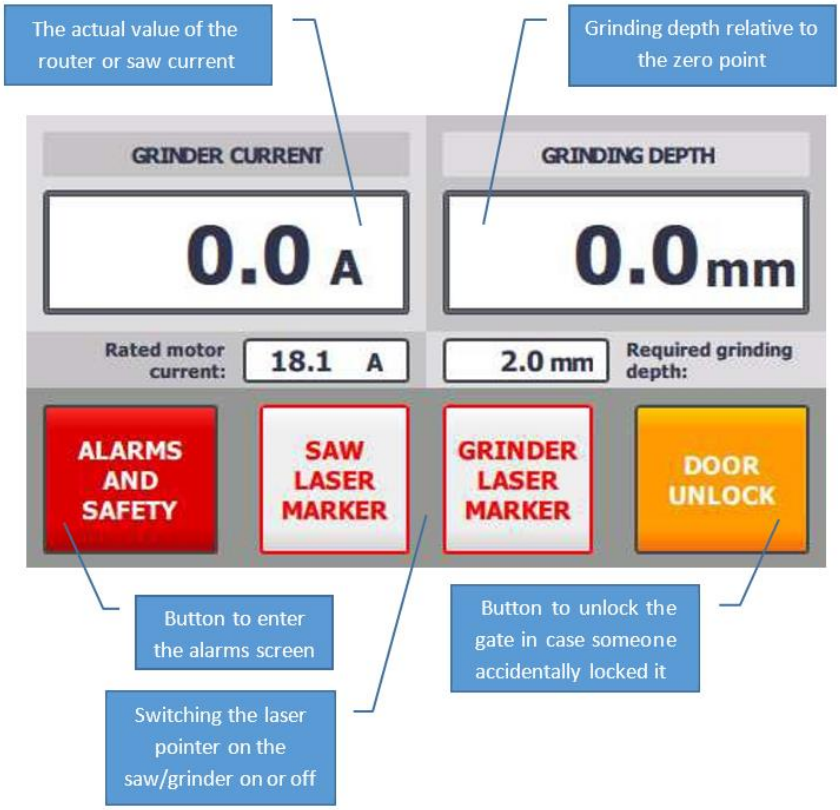


Figure 27

Note:
the actual current display depends on the device that is currently on (either a saw or a grinder).

6.3.3.Alarms and safety screen

Alarms and abnormal conditions may occur during the operation of the Cutting and grinding machinery.

You can view active alarms or alerts at any time on the "ALARMS AND SAFETY" screen.

After correcting the cause of the alarm activation, the alarm must be reset by pressing the corresponding key in the navigation.

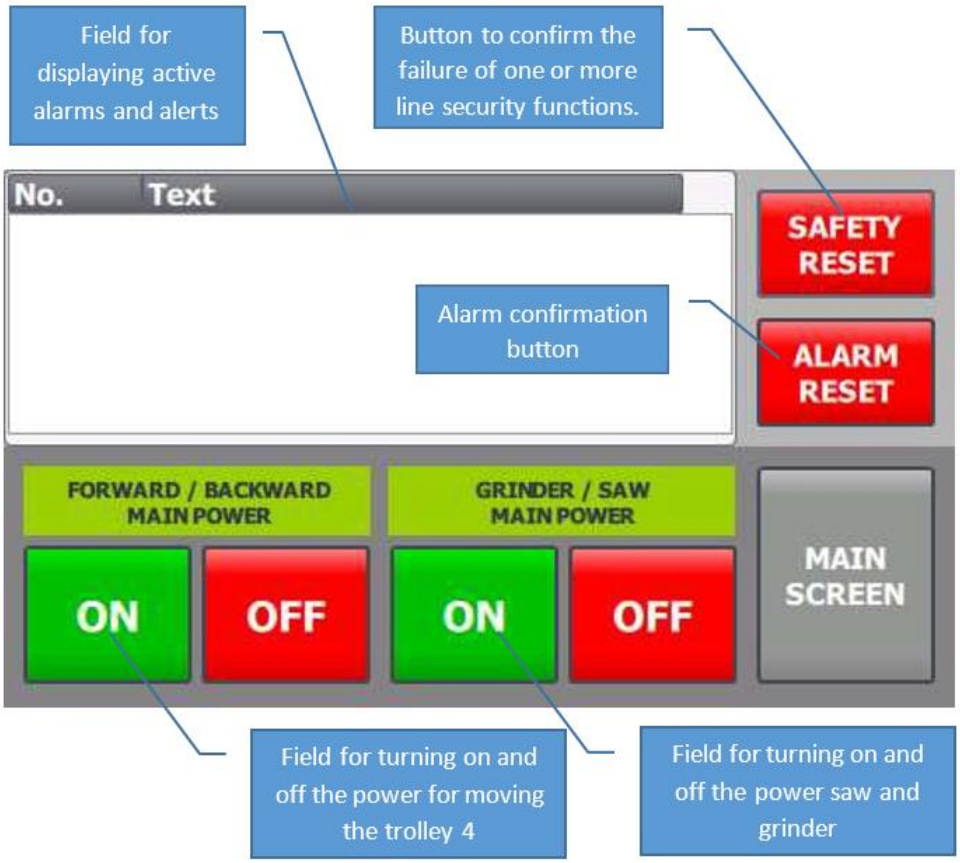


Figure 28

Before resetting the alarms, it is essential to repair all the causes that triggered the alarm and the consequences caused by the alarm and to ensure the safe switching on of the device.

Note:
the list and description of alarms and warnings can be found in chapters 6.2.3.1 and 6.2.3.2.

6.3.4. Pipe rotation screen

On this page, the rotation of the pipe lying on Trolleys 1 to 3 can be switched on or off. The speed of the pipe rotation can also be changed on it.

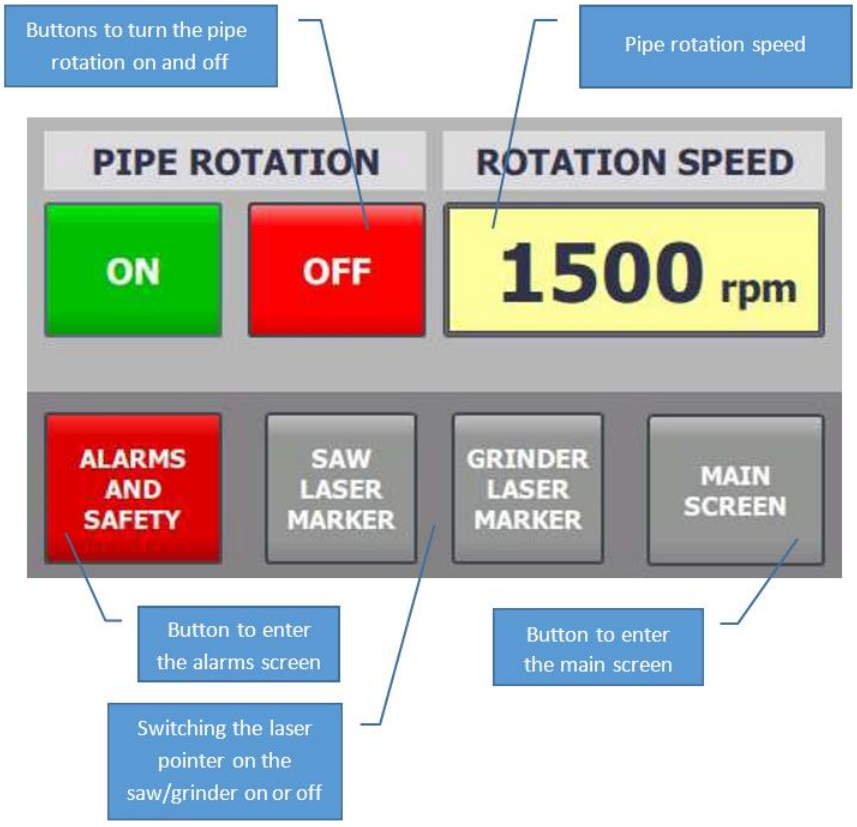


Figure 29

Note:

the main safety circuit of Trolleys 1 to 3 must be switched on for successful rotation activation.

7. OPERATING THE CUTTING AND GRINDING MACHINERY

The cutting and grinding machinery may only be operated by professionally trained operators who, in addition to the operation of the system itself, must also be familiar with the regulations on occupational safety and fire protection.

7.1. Preparation before use

- Check the condition of the machinery and correct any possible irregularities;
- Check the condition of the STOP keys and deactivate them in case of activation, after previously repairing the causes and consequences of the error;
- Check the condition of safety edges and laser scanners;
- Check the condition of the hydraulic system and the presence of air in the pneumatic installation;
- Check that there are no obstacles on the rails;
- Check that moving the trolleys is possible and safe;
- Check that loading and unloading pipes on the trolleys is possible and safe.

7.2. Start-up procedure

- Turn on the main switch on the main electrical cabinet;
- Turn the key switch selector »ENABLE POWER« to the right;
- Check the status of alarms and warnings, eliminate them and reset them (with the previous remediation of the causes of the alarm);

- Establish conditions for safe work with the machinery;
- Press the "SAFETY RESET" button on the HMI;
- Press the »ENABLE SAFETY« button on the control panel =123CP1;
- Press the "POWER ON" illuminated push button to switch on the safety circuits.

7.3. Working with the machinery

After the start-up procedure, the cutting and grinding machinery is ready for operation. The work takes place in several stages: loading the pipes on Trolleys 1 to 3, setting up the grinding table, grinding, cutting, and unloading the pipes.

7.3.1.Pipe loading

The loading and unloading of pipes are managed via the control panel =123CP1. It houses all the control elements for managing Trolleys 1 to 3 and communication with the pipe loading and unloading device (pipe transport trolley). The pipe transport trolley is an independent device and communicates with our system through alternating control signals.

Basic working principle:

1. Make sure that the movements of Trolleys 1-3 are possible and safe;
2. Wait for the pipe transport trolley to bring the pipe in;
3. Estimate how many trolleys you need to receive the pipe and enable them by pressing the "ENABLE ROLLER" buttons;
4. Move the trolleys in positions so that the pipes can be loaded from the pipe transport trolley to the trolleys (make sure the pipe transport trolley's hands do not hit the cart);
5. When the trolleys are in the correct positions for pipe acceptance, press the "START PIPE ACCEPT" button;
6. Wait for the pipe transport trolley to load the pipe on the trolleys;

7. When the pipe rests stably on the trolleys, press the "FINISH PIPE ACCEPT" button;
8. Wait for the pipe transport trolley to move out of the working area of Trolleys 1-3;
9. Raise the rollers by pressing the "ROLLERS UP" button;
10. Appropriately position and activate the side handles for holding the pipe with the buttons "TROLLEY 1 PIPE HOLD" and "TROLLEY 3 PIPE HOLD".

7.3.2. Pipe selection and lifting (grinding) table adjustment

When the pipe is loaded and held on Trolleys 1 to 3, it is ready for grinding and cutting. This part of the process takes place on Trolley 4.

Basic working principle:

1. On the main screen of the HMI, select the appropriate pipe;
2. If necessary, manually correct the data that will be used in pipe processing;
3. Check that the platform of Trolley 4 is empty and close the lifting table access gate;
4. Remove the mechanical blocking of the vertical movement of the lifting table on the side of the Trolley 4;
5. Position the lifting table to the desired value by pressing the "MOVE TO REQUIRED POSITION" button on the HMI;
6. Wait for the lifting table to come to a complete stop;
7. Check that the lifting table is in the correct position;
8. Installs the mechanical block of the lifting table and insert the pin;
9. Check that the lifting table access gate has been unlocked.

7.3.3.Grinding and cutting the pipe

When the lifting table is positioned and mechanically blocked, we can start the process of grinding and cutting the pipe.

Basic working principle:

1. Enter through the gate onto Trolley 4 platform;
2. Check that no other persons are present in the working area;
3. Turn on the laser markers by pressing the "SAW LASER MARKER" and "GRINDER LASER MARKER" buttons on the =04CP2 control panel or HMI;
4. Check that Trolley 4 is safe to move;
5. Move Trolley 4 to the appropriate position for pipe grinding (a laser marker is helpful).
6. Manually fine-tune the position of the grinder;
7. Turn on the pipe rotation by pressing the "ROTATION START" button on the control panel =123CP1 or the HMI by the lifting platform;
8. Turn on the grinder by pressing the "GRINDER ON" button;
9. Slowly move the grinder towards the pipe;
10. When the grinder touches the pipe, reset the grinding depth measurement by pressing the "GRINDING MEASURING START" button;
11. Slowly move the grinder in the forward direction to the required depth of grinding.

Important! Monitor the grinder power absorption at all times. In case of excessive current, wait with scrolling.

12. When the pipe has been ground to the desired depth, stop the grinder by pressing the "GRINDER OFF" button;
13. Move the grinder to the end position backwards;

14. Move Trolley 4 to the appropriate place for cutting the pipe (a laser marker is helpful);
15. Fine-tune the saw position manually;
16. Turn on the saw by pressing the "SAW ON" button;
17. Slowly move the saw towards the pipe until the pipe is cut.

Important! Monitor the saw power absorption at all times. In case of excessive current, wait with scrolling;

18. When the pipe is cut, stop the saw by pressing the "SAW OFF" button;
19. Move the saw to the end position backwards;
20. Turn off the pipe rotation by pressing the "ROTATION STOP" button;
21. Exit the Trolley 4 platform and close the gate behind you.

7.3.4. Removing the pipe

After the pipe is ground and cut, it is ready to be transferred to the pipe transport trolley.

Basic working principle:

1. Press the button to release the pipe holders "TROLLEY 1 PIPE HOLD." and TROLLEY 3 PIPE HOLD";
2. Press the button "START PIPE REMOVAL";
3. Wait for the pipe transport trolley to place itself in the right place;
4. Lower the rollers by pressing the "ROLLERS DOWN" button;
5. Wait for the pipe transport trolley to remove the pipe;
6. Press the "FINISH PIPE REMOVAL" key;
7. Wait for the pipe transport trolley to move out from the working area of trolleys 1 to 3.

7.4. Shutdown procedure

At the end of the work, the Cutting and grinding machinery shall be switched off in the following sequence:

- Make sure the machinery is empty or in the home state;
- Make sure the drives are at a standstill;
- Switch off the control voltage by pressing the "POWER OFF" button;
- Turn the key switch selector “ENABLE POWER” to the left;
- Turn off the main switch on the main electrical cabinet;
- Lock the main switch in the off position.

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