Digital Factory 4.0 Alarms User Manual

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Worldwide technical support and product information:

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Glossary of terms

In the section below it is defined the terminology adopted in this manual

Program and Software are synonyms in this manual.

Kernel is the abbreviation of the software Digital Factory 4.0 Kernel.

Frontend is the abbreviation of the software Digital Factory 4.0 Frontend.

Alarms is the abbreviation of the software Digital Factory 4.0 Alarms.

ConFiguretor is the abbreviation of the software Digital Factory 4.0 ConFiguretor.

Calendar is the abbreviation of the software Digital Factory 4.0 Calendar.

Settings Manager is the utility software for TOOLS for SMART MINDS Digital Factory 4.0.

Production Line is a group of machines belonging to the same production line that is configured with Kernel.

Area displayed - Factory area. Machines can be grouped not only into production lines but also into display areas (see *Factory Area Display Panel*).

Login. Authentication procedure, access to certain functions is reserved for administrator users.

Logout. Authenticated user exit procedure.

Utility is the program that manages a complementary function to Digital Factory 4.0.

Dashboard - Chart panel is the information visualization system characterized by easy and immediacy of reading, provides a chart view in real time.

Recipe is the configuretion of machinery parameters for the production of a certain article.

Machinery and machine are synonyms in this manual.

Introduction

Alarms is Digital Factory 4.0 alarm management program. It shows in a single panel all the alarms with the necessary information to solve them.

Available as part of Digital Factory 4.0 Suite, thanks to the functional and intuitive alarm management you have full control of your company in real-time.

Digital Factory 4.0 is a suite of programs for the various needs of companies, presented in the next paragraph.

In this manual will be illustrated the operation of the program Digital Factory 4.0 Alarms.

Digital Factory 4.0 Suite

Digital Factory 4.0 is characterized by a modular which makes it highly adaptable to progressive expansions - additions of machinery or other communicating software - or integrations with third-party platforms such as MES, ERP, or analysis systems; locally or in Cloud.

Digital Factory 4.0 Suite is composed by the following programs:

- **Digital Factory 4.0 Kernel** – *Essential for operation*
- **Digital Factory 4.0 Frontend** – *Essential for operation*
- **Settings Manager** – *Essential for conFiguretion*
- **Digital Factory 4.0 ConFiguretor** – *Optional for operation*
- **Digital Factory 4.0 Alarms** – *Optional for operation*
- **Digital Factory 4.0 Calendar** – *Optional for operation*

Dital Factory 4.0 implements various functionalities including real-time visualization of the status of all machinery and all process and production information, in text or chart form. It activates, by choice, the switching on of sirens, the sending of emails to a list of recipients, the activation of a telephone switchboard.

With the extention **Calendar** it is possible to set the activation of the actions during or outside working hours; this makes the reporting of anomalies more effective. For example, the activation of a siren for an electrical fault may not be effective if the company is closed, while sending an email or a call allows you to keep the system under control even from further away.

Also useful is the display of information and technical documentation relating to a machine, which can be consulted at any time and quickly and easily.

Digital Factory 4.0 is the only platform of its kind that currently provides the possibility to make data analysis for predictive maintenance and plant optimization with the support of Artificial Intelligence, namely machine learning algorithms able to find hidden patterns and optimal global settings from parameter and setting data and physical environmental or machinery conditions.

The features available with Digital Factory 4.0 currently present are countless, to know all the possibilities useful to your company contact one of our expert (email: info@toolsforsmartminds.com).

The following chapters present the programs that are part of the suite.

Digital Factory 4.0 Kernel

Data processing centre

It is the data processing center of the suite. It takes care of data transfer and bidirectional communication, as well as the creation of alarms and associated events. All information from third party machinery and software

such as project management software, MES or ERP, first passes through here where it is analyzed and sent to Frontend for viewing. This program is essential for the operation of Digital Factory 4.0 and is basic included.

Digital Factory 4.0 Frontend

Data Visualization Center

It shows all the information coming from Kernel in real-time, including the results of machine learning and predictive maintenance algorithms that are running. This specific program will be covered in this user manual. This program is essential for the operation of Digital Factory 4.0, it is the display part. It is included as a basic part of the package.

Settings Manager

ConFiguretion Utility

Digital Factory 4.0 software utility. It configures some parameters of the program and the management of users, passwords, backups and licenses. It is included in the basic package.

Digital Factory 4.0 ConFiguretor

Image ConFiguretor

It allows you to configure the images shown in Frontend and to set up independently new production lines. This program is an accessory to Digital Factory 4.0 operation.

Digital Factory 4.0 Alarms

Alarm management

It shows in a single panel all the alarms with the information needed to resolve them. This program is accessory to the operation of Digital Factory 4.0.

Digital Factory 4.0 Calendar

Calendar Utility

It allows you to create a calendar of company working hours that Digital Factory 4.0 will base your actions on. This program is accessory to the operation of Digital Factory 4.0.

Software structure

The programs essential to the operation of Digital Factory 4.0 are Kernel, which takes care of the data processing, and Frontend, which allows its visualization.

Below there is the explanatory diagram about the communication of the various programs in the suite, both among themselves and with external systems, such as databases or project management software, and data collection.

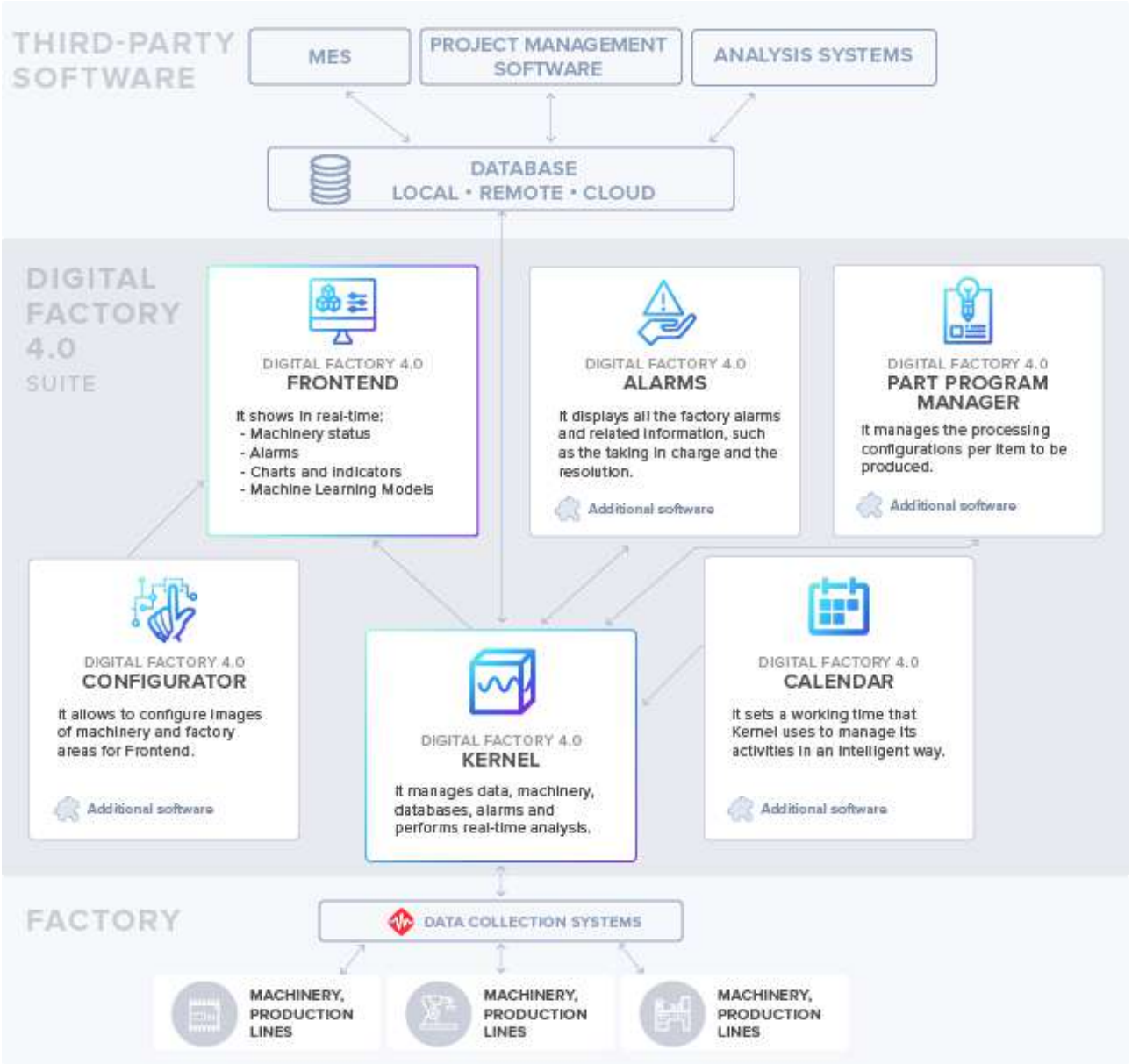


Figure 1 - Digital Factory 4.0 Suite Communication Diagram

Requirements

In this section requirements for using Alarms are listed.

Minimum Hardware Requirements

Ensure that your computer fulfills the following hardware requirements:

- Dual core CPU or higher.
- 4 GB RAM
- Display resolution FULL HD 1920x1080.
- 500 MB free space on disk required by Alarms.
- Mouse or other pointing device.

:

Minimum Software Requirements

Ensure that your computer fulfills the following software requirements:

- OS: Windows 10

Installation

The installation of the software involves the conFiguretion of various parameters and the database by the T4SM team.

The folder where all Digital Factory 4.0 programs are installed is as follows:

C:\Program Files (x86)\TOOLS for SMART MINDS

User Interface Overview

The main panel expands across the entire width of the monitor and is shown in the figure below.

In this chapter there is a description of the functions available for each section.

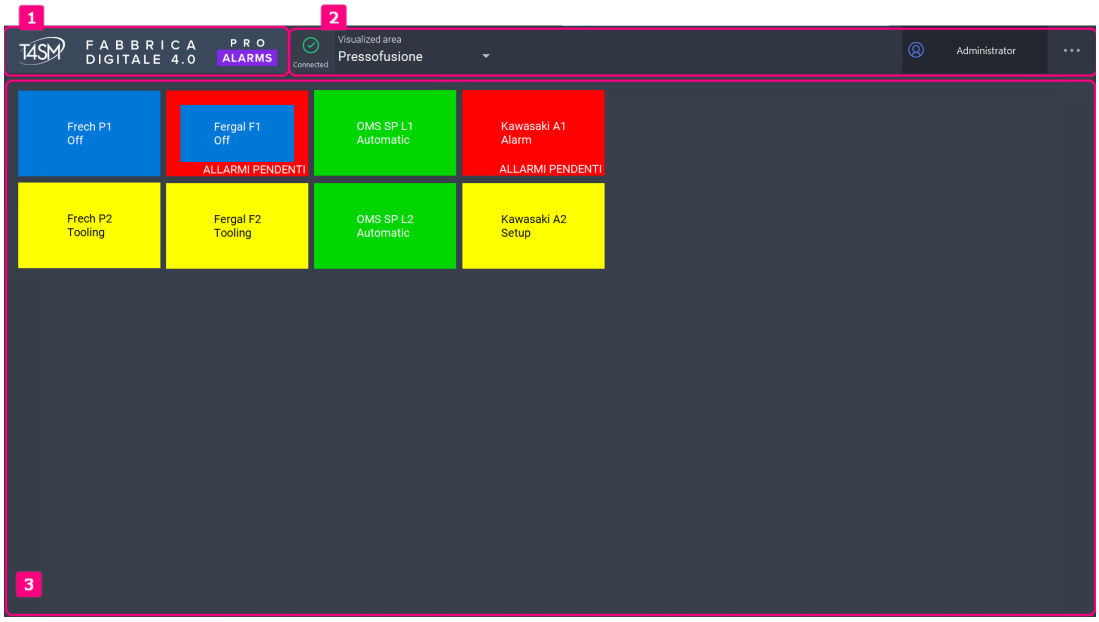


Figure 2 – Main Panel

These are the main sections that can be found in the main panel, see the numerical references in the Figure above.

1. **Program Label**. When you click it, it opens splash page with information about the software such as version and license.
2. **Main menu bar**. It contains the program status information and the main commands.
3. **Factory alarm display panel**.

In the following chapters each section is described.

Program Label

It shows the program name and logo T4SM.

Figure 3 – Program Label

When it clicked,it opens the splash page shown below

Figure 4 - Splash page

Splash page presents:

- Activation Code used (Activation)
- License Code
- License Status
- - Licence expiry date (Expiration)
- Program Version (Release)
- - Version of the database used by the program (DB Release)
- Web Site Link (*Info* icon)

Main menu bar

The functions contained in the main menu bar refer to the whole factory.

Figure 5 – Main Menu Bar

These are the main sections that can be found in the main panel, see the numerical references in the previous figure.

1. **Kernel connection indicator**. It indicates the status of the connection to Kernel. It can be connected or disconnected.
2. **Visualized Area**. It allows you to select the area to be displayed in the factory zone display panel. It refers to the factory area display panel
3. Users. It allows access and disconnection from your user profile and shows the authenticated username.
4. **More Option.** It opens Online Guide, Minimize and Exit functions.

Each function is described in the following chapters.

Kernel connection indicator

It indicates the status of the connection to Kernel. It can be connected or disconnected.

If disconnected, the data is not visible.

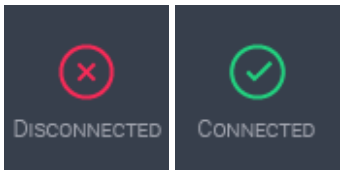


Figure 6 - Kernel Connection Indicator

Visualized Area

It allows you to select the area to be displayed in the factory alarms display panel

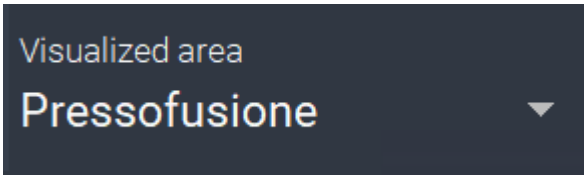


Figure 7 - Button and indicator of Visualized Area

To add or remove areas you need Configurator, one of Suite program (in editing mode for Frontend, see the relevant guide).

Users

It allows access and disconnection from your user profile and displays the authenticated username.

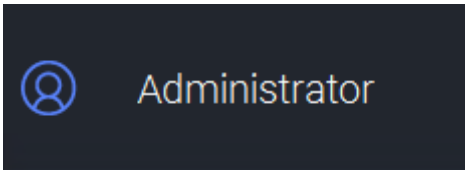


Figure 8 - Login/Logout Buttons and User Indicator

You can use the Default User that is set when the program is started. This is a profile without administrator privileges, to avoid changes by unauthorized personnel.

By **right-clicking** on the button you can **change the password** by re-entering the old one.

Login Window

At the click of **Users** button (Figure 10), it opens the login window to log in. Select a user from the available choices and enter the password.

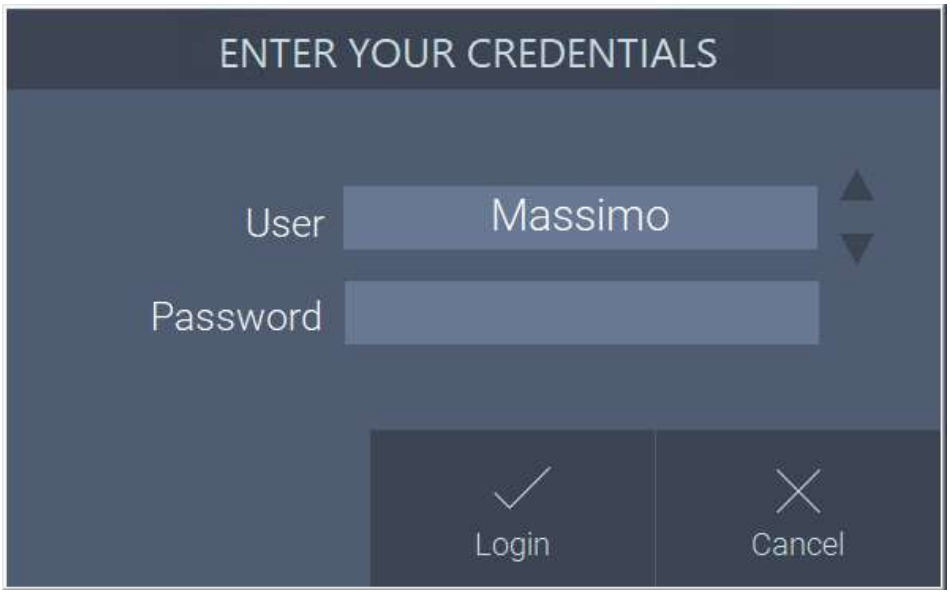


Figure 9 – Login Window

Note: It isn't possible to type in the username, but only use one of those available and configured.

Other Option: Online Guide - Minimize - Exit

It has a submenu with other functions.

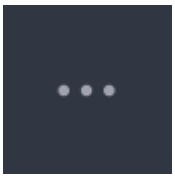


Figure 10 – More Option Button

Figure 11 – Online Guide, Minimize, Exit Button

1. Select Language. It allows you to change the language of the program
2. Online Guide. It opens this user manual on web site, updated to the latest version.
3. Minimize. It minimizes the program.
4. Close. It stops the program.

Factory alarm display panel

All alarms divided by areas of the factory are displayed. In Digital Factory 4.0 an area can be a representation of a real area of the factory, separated from the others by type of processing or real physical division - such as different floors, rooms or sheds - or the zoom of parts of the production line, or even different shots of the same machinery.

To change the visualized area, use the drop-down button in the main bar at the top right (see *Visualized Area*).

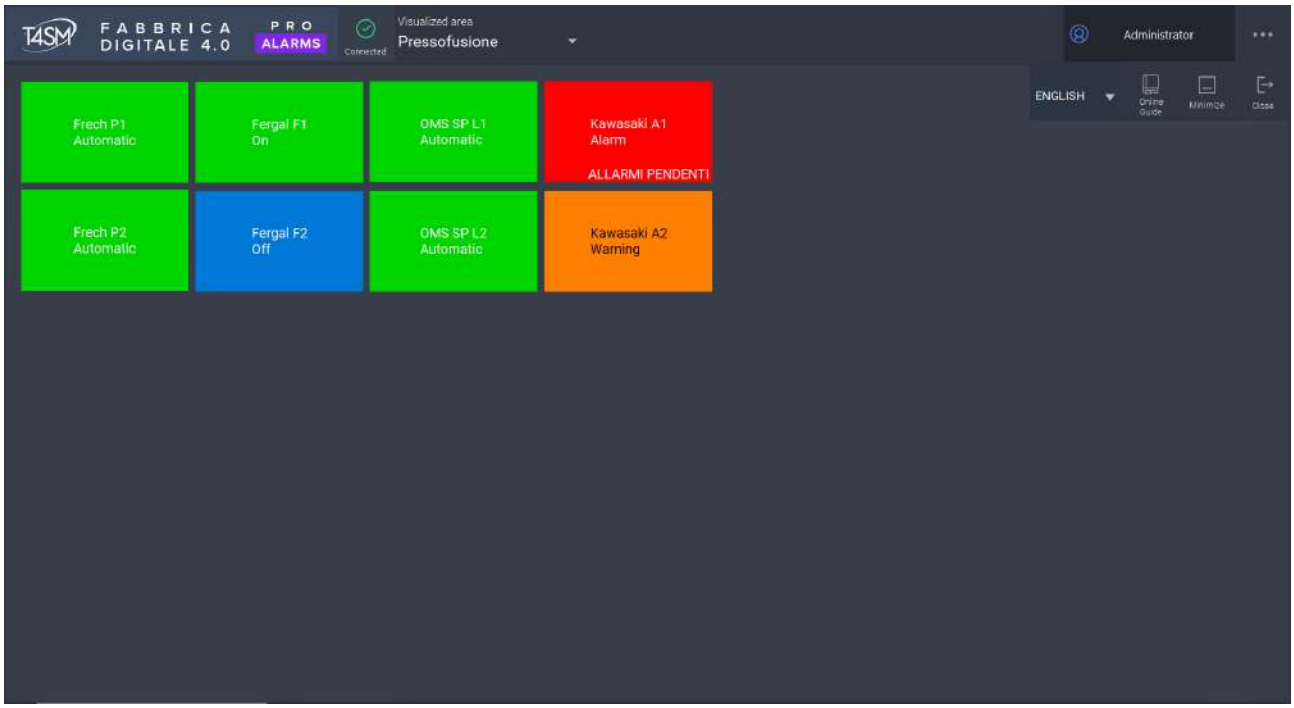


Figure 12 - In the example six machines in the "Die-casting" area

The colors indicate the state of the machinery.

Below there are the colors associated with the states present by default, although for each company they may vary according to custom configurations.

- **Red**: In alarm
- **Green**: Automatic or On
- **Blue**: Off
- **Yellow**: Tooling

The display can be chequered as in Figure 14, with a neutral background, or you can configure the alarms at any point in the available space, with a representative background of the installation such as real photographs, perspective drawings, installation layouts or any type of two-dimensional image.

Alarms management

Through the alarm management it is possible to:

- View warnings;
- View alarms
- View alarm notes;
- Take charge of alarms;
- Enter notes about alarms and resolutions made.

In the same window there is a series of commands associated with the machine that allow you to:

- View alarm history;
- View process data;
- Execute a specific command;
- View multimedia files related to the machine and the article being produced on the machine (such as a tooling card).

To open the alarm management, click the alarm indicator box for the machine, as in the following figure.

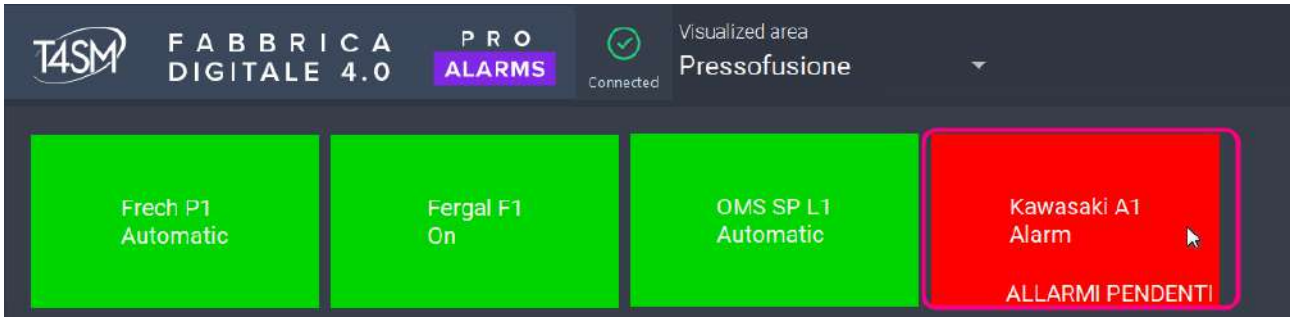


Figure 13 - Click on the machine indicator to open the Alarms Management

The following window opens when you click.

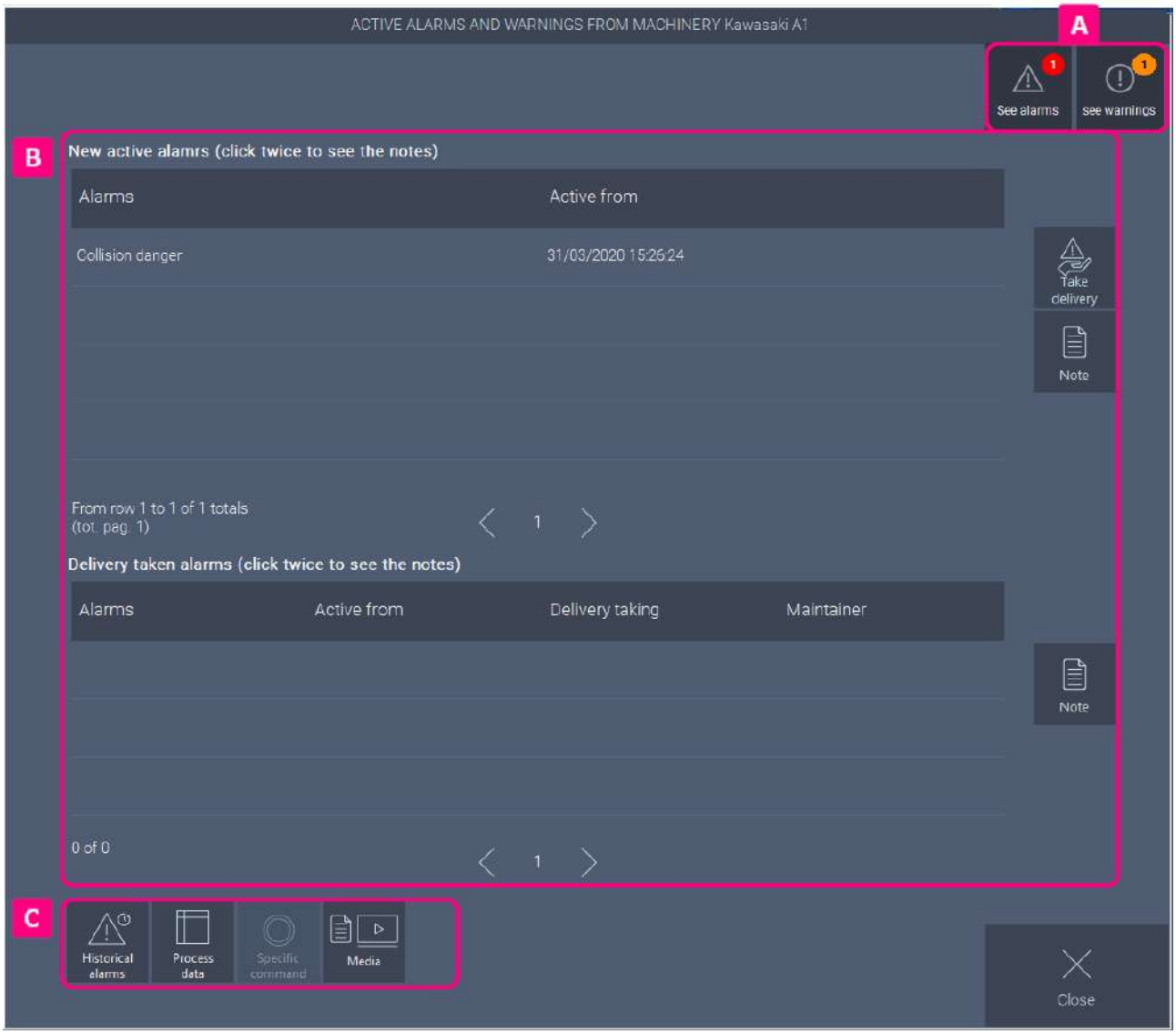


Figure 14 - Machinery Alarm Management Panel: display alarms

Alarms are displayed when opened. Using the buttons at the top View Alarms and View Warnings (box A) you can change the display, which changes in the central part of the window (box B).

Figure 15 and 16 - Buttons to show respectively Alarms and Warnings in the window

The number within the colored circle of buttons each indicates the number of alarms or warnings active on the machine in real-time.

Selecting View Warnings, the box marked B changes as shown in the following figure:

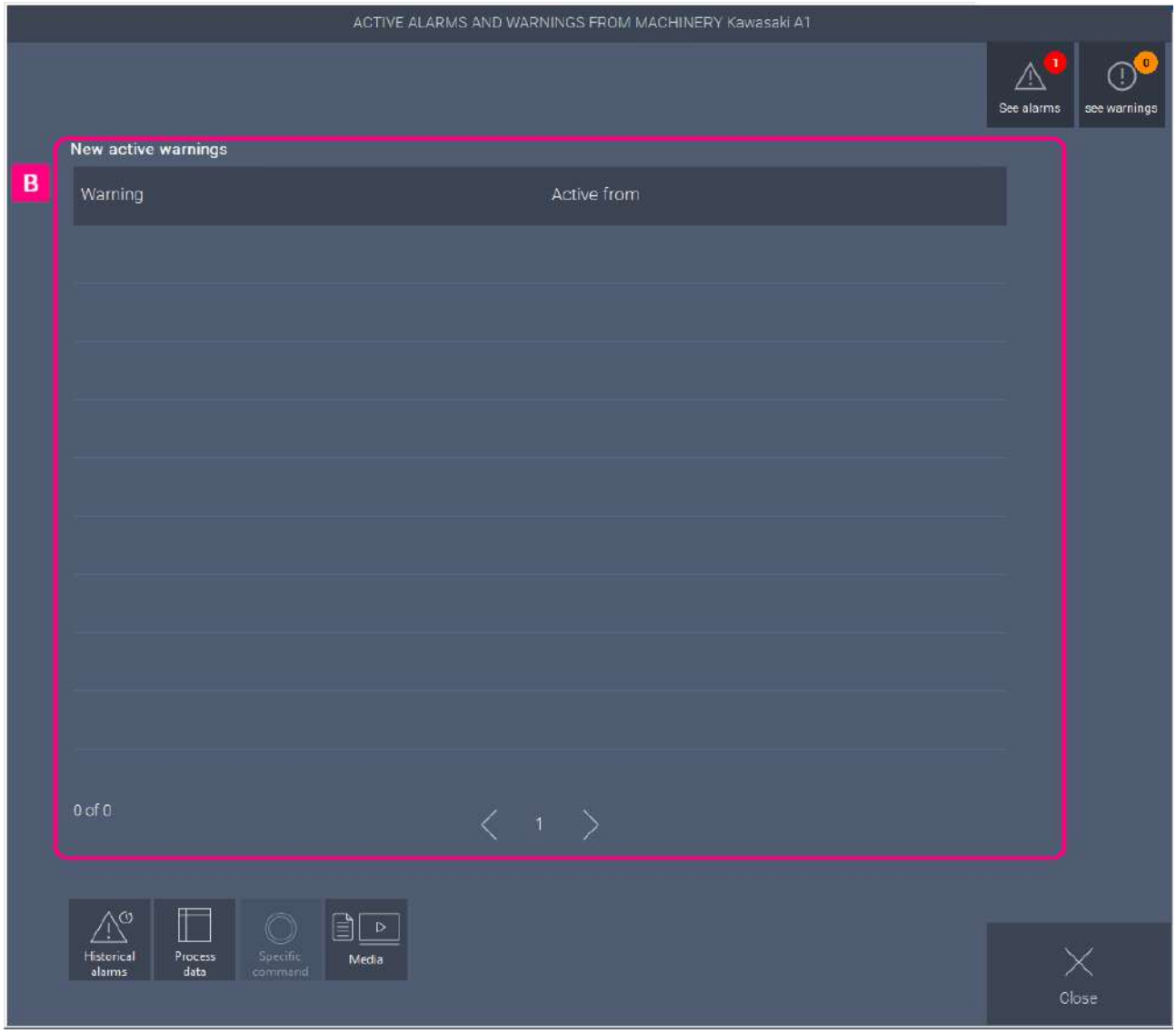


Figure 17 - Machinery Alarm Management Panel: display warnings

Taking charge of alarms

Using the previous indications in the Alarms Management chapter, access the Alarms Management Panel of the machine in alarm. See the numbered steps in the following figure.

In the alarm display, select the alarm you wish to take charge of (number 1) and press Take charge (number 2) button on the right. The alarm automatically moves to the table of alarms taken over (number 3).

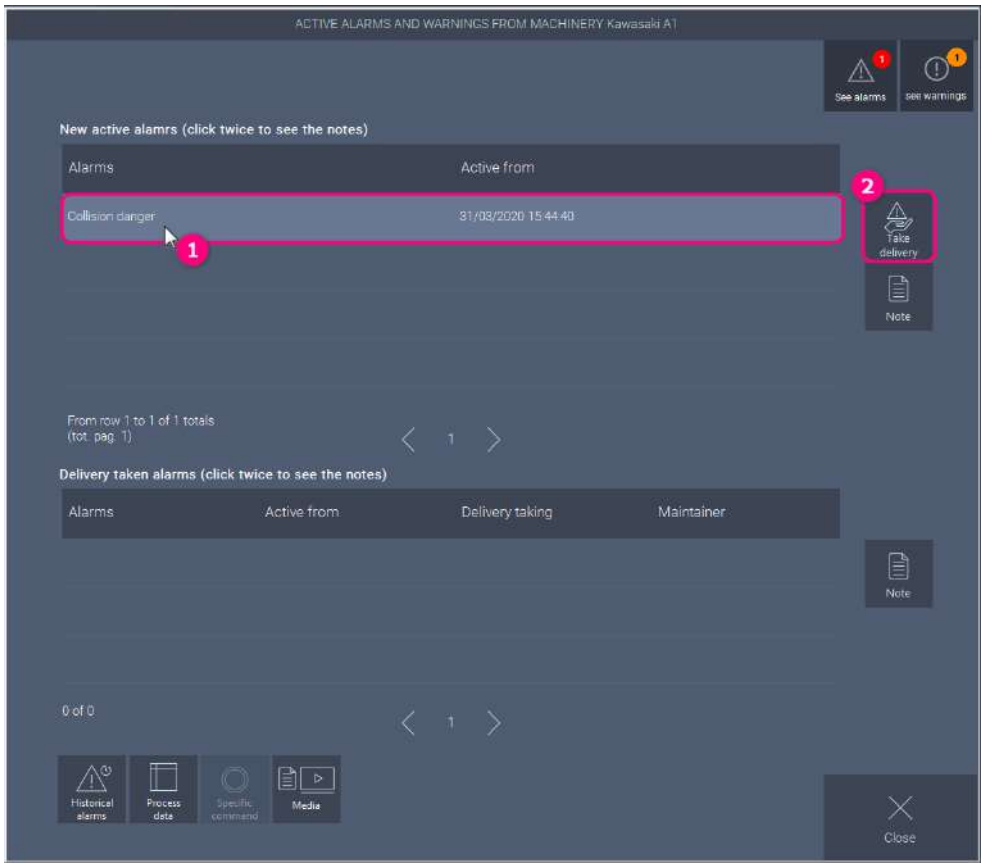


Figure 18 - Taking charge of an alarm

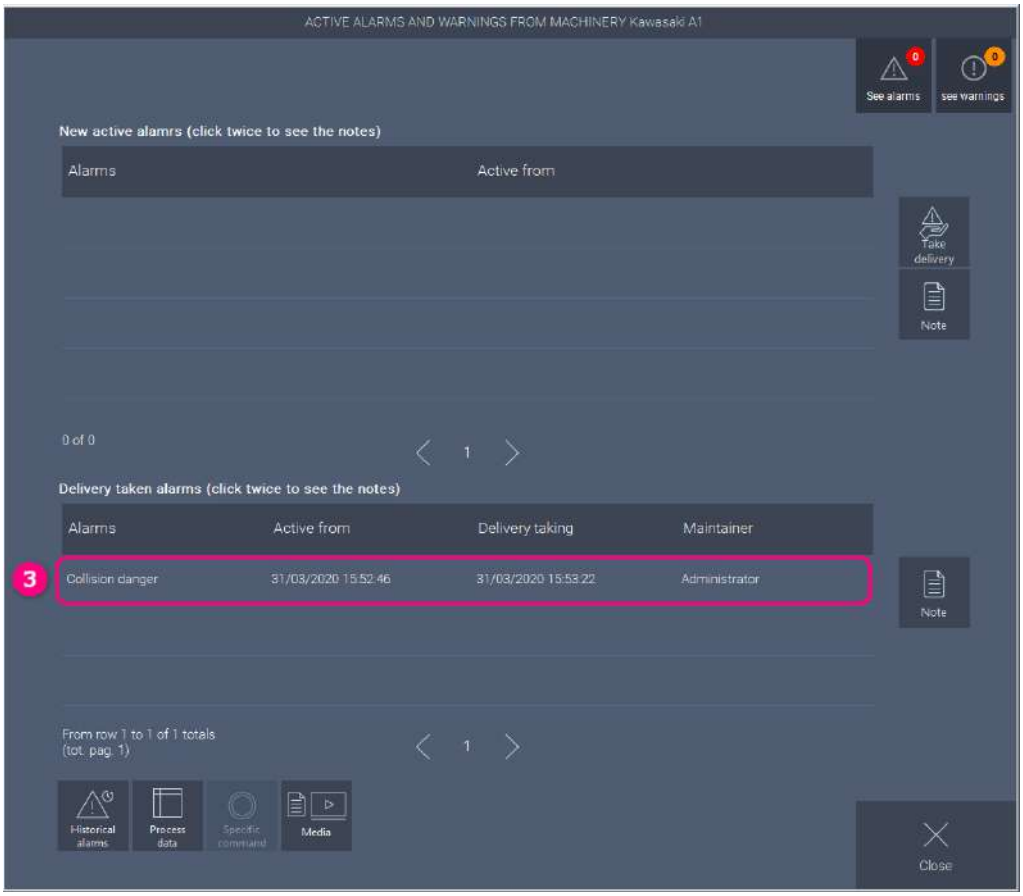


Figure 19 - Alarm taken in charge

The alarm taken in charge is automatically removed when it is released. Through the Alarms History function, it is possible to see the start and end time, the time when the maintenance technician takes charge of the alarm and any notes added.

Displaying and entering notes to alarms

Using the previous indications in the Alarms Management chapter, access the Alarms Management Panel of the machine whose alarm notes you want to see.

If the alarm has passed, use the Alarms History function (more information in the *Alarms and Warnings History* chapter).

If the alarm is on or taken over, select the alarm and click Notes button to the right of the respective table, as highlighted in the following figures. Alternatively, double-click the alarm in the table to open the notes.

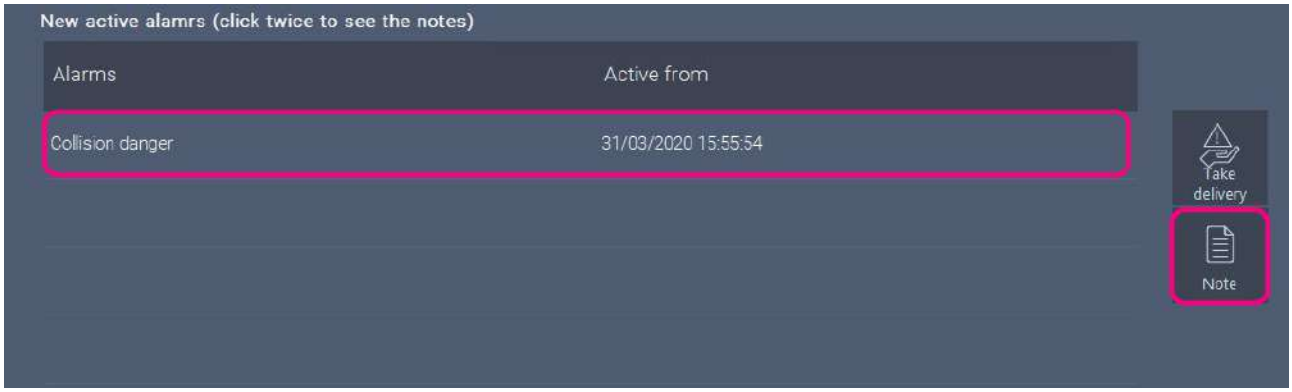


Figure 20 - How to access the notes in the active alarm table

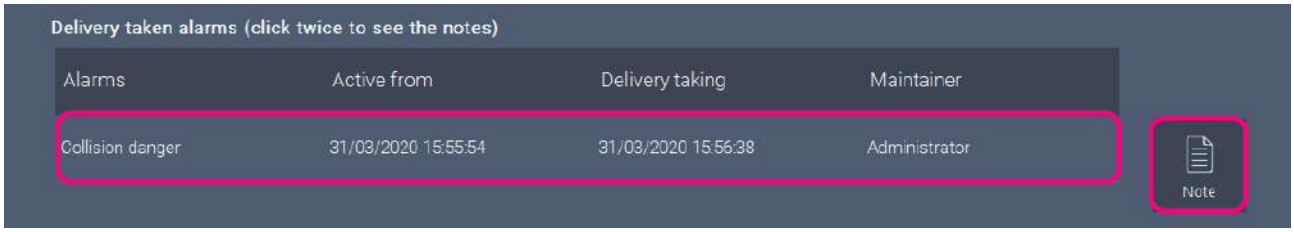


Figure 21 - How to access the notes in the table of the alarms taken in charge

The notes window that appears is shown in the figure below.

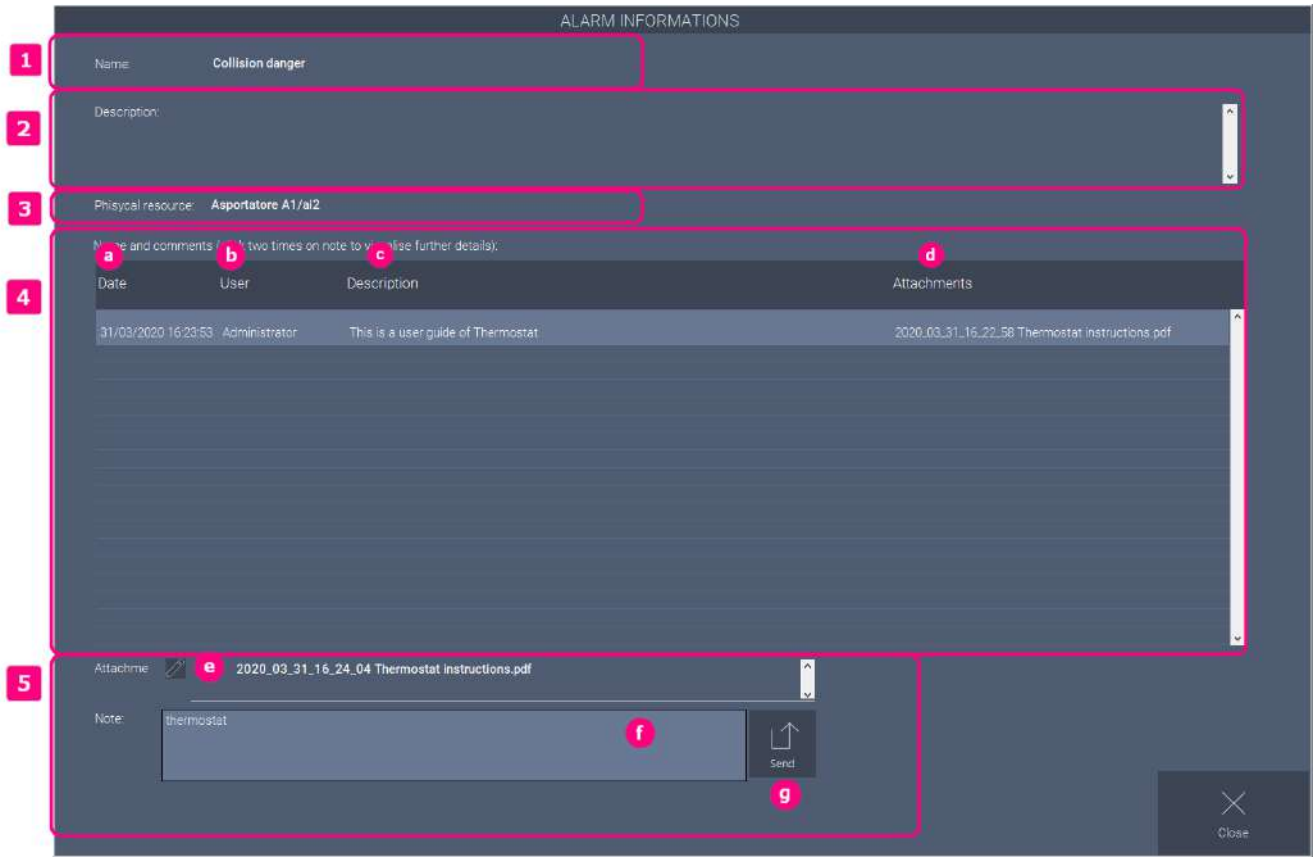
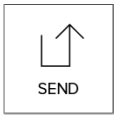


Figure 22 – Notes Window

Refer to the numbers on the figure for descriptions of the elements.

1. **Alarm Name**. It shows alarm name
2. **Description**. It shows whether the alarm description is present.
3. **Physical resource**. It shows the physical resource that detected the alarm.
4. **Notes Table.** The table has the following columns:
   a. **Date.** It shows the date and time when the note was entered..
   b. **User.** It shows the user who entered the note.
   c. **Description.** It shows the text of the note.
   d. **Attachments.** It shows any attachments that may be present. Click on the attachment to access it.

   Double click on the note to display the detail window, see the chapter *Alarm Note Detail*.

5. **Note entry tool and attachments.** Select an attachment using the pencil (e) function, type the note in the **Note** field (f) and press **Send** (g) 

to enter the alarm. If done correctly it is displayed in the note table. Once you have entered the note, you can no longer delete it, including attachments.

Selecting the icon to load the attachments it opens the following window.

Figure 23 - Loading attachments

Refer to the numbers for descriptions of the elements present.

1. **Table of attachments**. It shows the inserted alarms and the path in which Alarms saved them.
2. **Add**. It allows you to add the desired attachments.
3. **Delete**. It deletes the attachment selected in the table. Once you have entered the note and sent it, you will no longer be able to delete the attachments.
4. **Visualize.** It displays the selected attachment in the table. You can also double-click the attachment in the table.

Alarm Note Detail

The note details window can be accessed by double-clicking on the note itself in the Alarm Information table (Machine Active Alarms and Warnings > Notes > Alarm Information window).

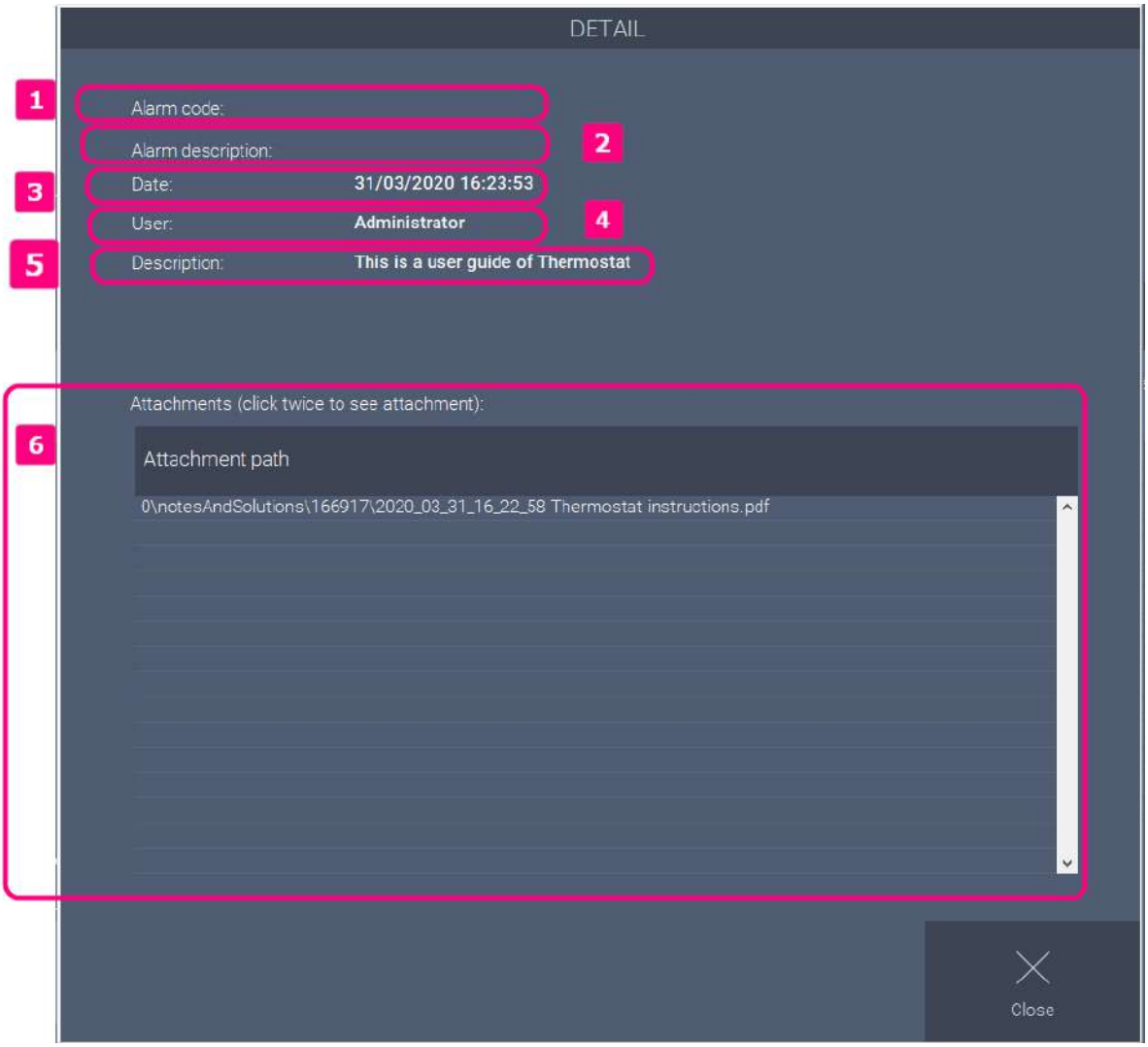


Figure 24 - Alarm note detail

See below the descriptions of the items by referring to the numbers on the figure.

1. Alarm code. It shows the alarm code if present.
2. Alarm description. It shows the alarm description if present.
3. Date. It shows the date of the alarm
4. User. It shows the user who wrote the note.
5. Description. It shows the text of the note.
6. Attachment table. It shows the attachments, if any. Double-click to view them.

Historical Alarms and Warnings

The alarm and warning history function allows you to view past alarms and warnings and all related information.

To view the history, click the desired machine indicator on the main screen and select Historical Alarms

in the window that appears. The window is shown in the following figure.

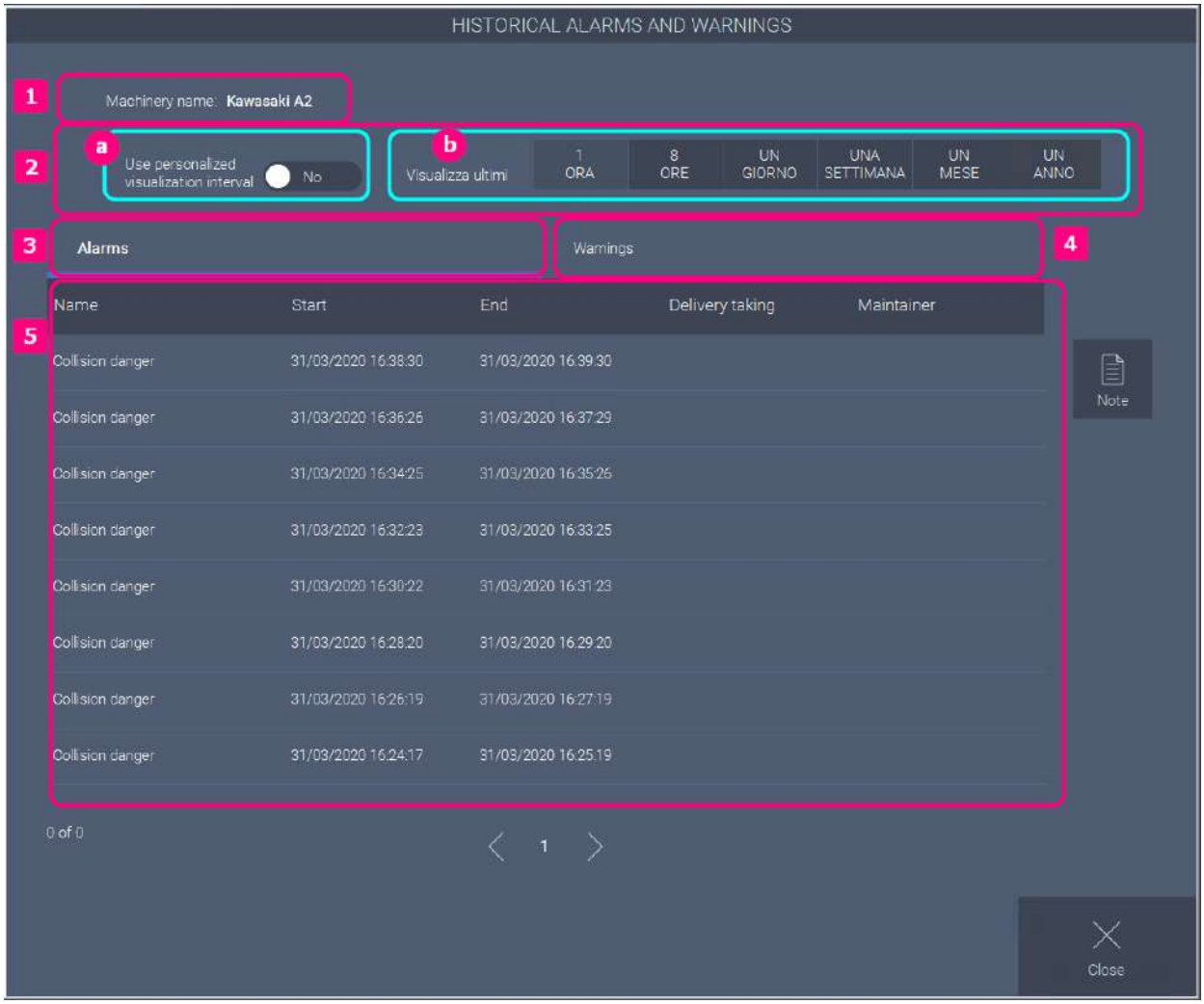


Figure 25 – Historical Alarms and Warnings

See below the descriptions of the items by referring to the numbers on the figure.

1. **Machine name**. It shows the name of the machine to which the historian refers.

2. **Interval**. It shows and allows you to change the time interval to be displayed, either by default (b) or custom using the Use custom display interval function (a).

3. **Alarms Tab.** It allows you to display the table with the alarms in step 5.

4. **Warnings Tab**. It allows to visualize in point 5 the table with the alarms.

5. **Table with alarms or warnings and associated information.** It is different depending on the selected tab.

6. **Notes.** It allows you to view the notes associated with the alarms.

Display Range

The alarm history display range is fully configurable as required.

By using the buttons on the right it is possible to select an interval in a quick way, activating instead the switch on the left it is possible to select a customized range with the window visible in Figure 40.

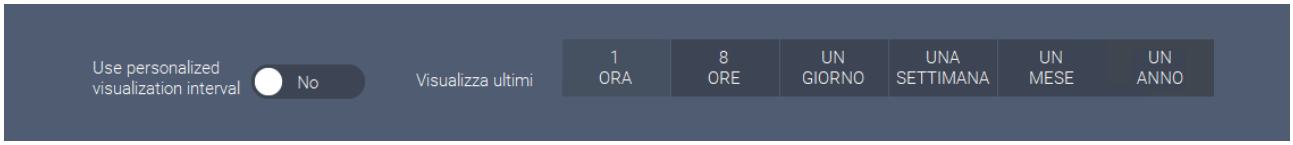


Figure 26 - Standard alarm and warning history display interval

The following figure shows what the custom range looks like.

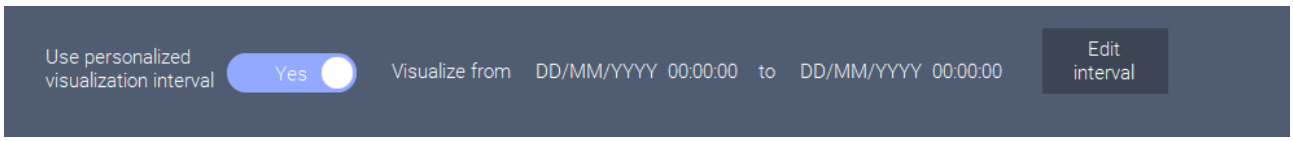


Figure 27 - Customized alarm and warning history display interval

To change it, select **Mode Range** and re-enter the desired range.

The following figure shows the custom interval selection window.

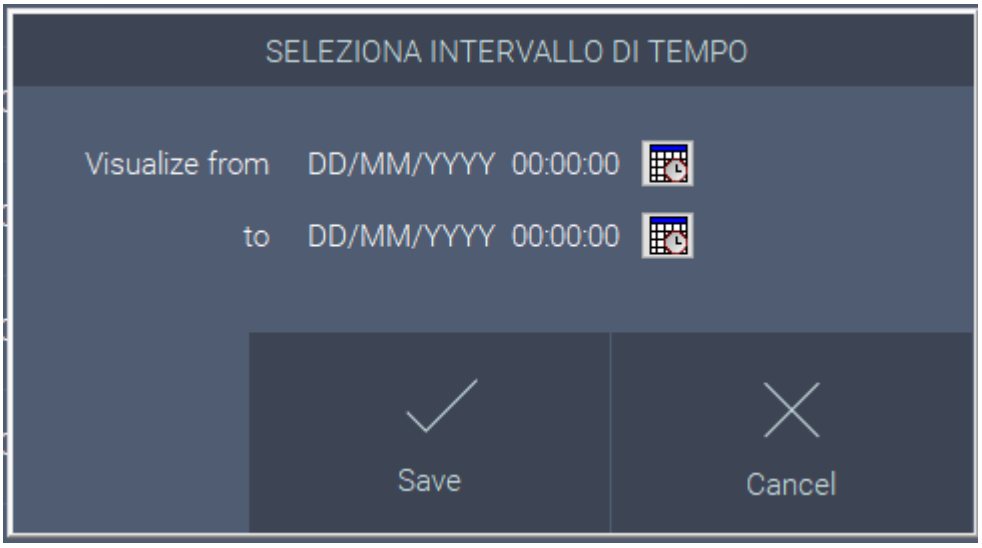


Figure 28 - Peronalized interval selection window

Process data

The process data function allows all process data to be displayed.

To view the process data, click on the indicator of the desired machine on the main screen and select Process Data

in the window that appears.

The window is shown in the following figure.

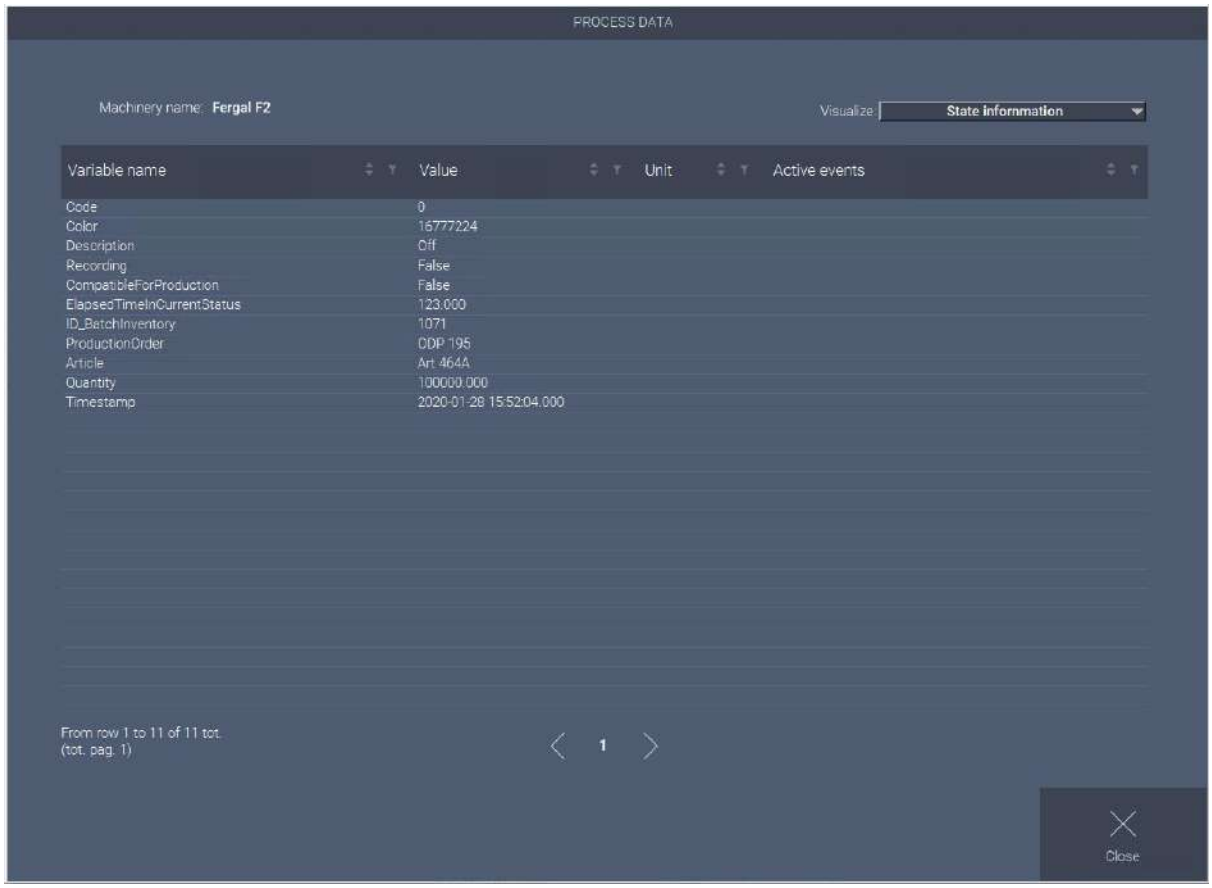


Figure 29 - Process data, Status information

Through the View function you can filter by:

- Status information
- Events
- Virtual signals
- Data from iDaq
- All data

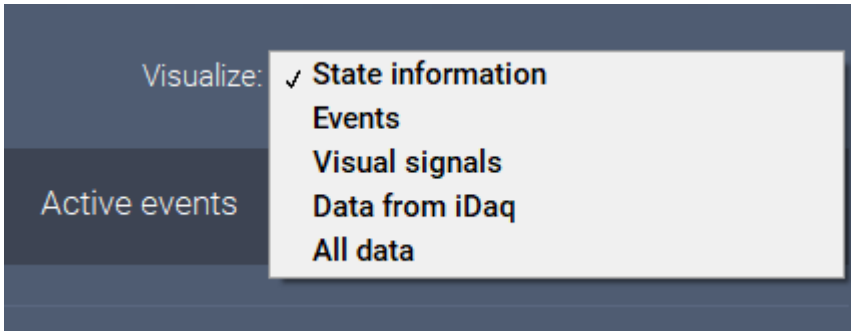


Figure 30 - Process data filter

Below there is another example with unfiltered data.

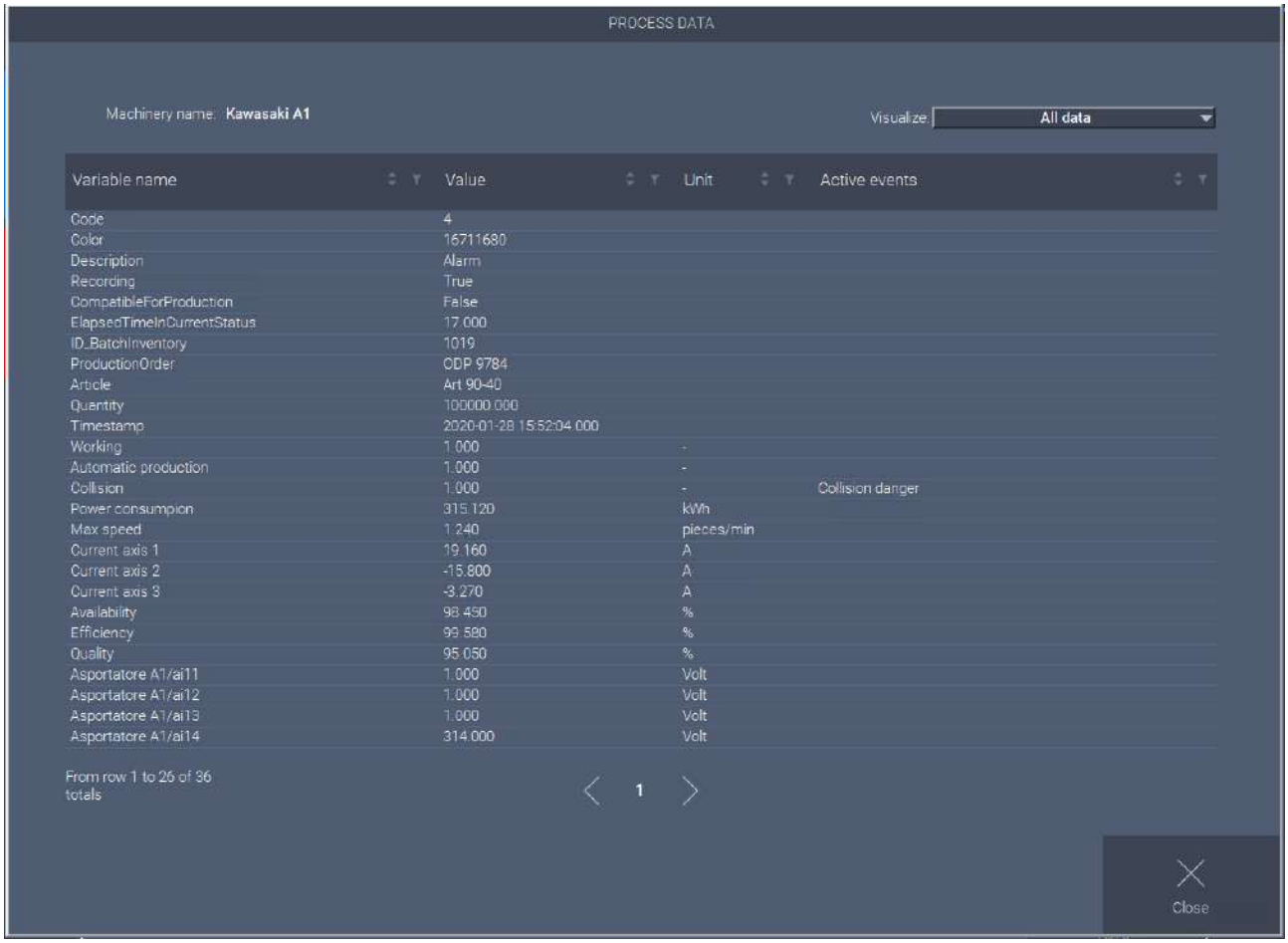


Figure 31 - Process data, all data

Specific Command

The Specific Command function allows you to execute a specific Command of your choice for each machine that can be set in Kernel.

To execute the command, click on the indicator of the desired machine on the main screen and select Specific Command

in the window that appears.

By way of example and not exhaustive, some possibilities are:

- open a data analysis web app in Cloud;
- open a specific file of any type (instructions in PDF or video, ...);
- open the machine manufacturer's web page for assistance requests;
- view the security camera in real time;
- start other programs.

Viewing multimedia files

You can view media files associated with the machine and the current production on the machine using the Media function. The configuration is done in Kernel.

Some examples of files that might be useful for quick reference:

- have manuals and instructions for use available at all times;
- overhauls of machinery;
- tooling guide, etc..

Supported formats depend on the formats that computer, on which Frontend is installed, can read.

The most commonly used formats are PDF, Microsoft Word, mp4.

To execute the command, click the indicator of the desired machine on the main screen and select **Media**

in the window that appears.

The window is shown in the following figure, which has two tabs for the display of:

- **Files associated with the machine**. List of files always present.
- **Files associated to production orders.** List of files associated to the processing in progress or to the processing programmed for the machine. This is very useful, for example, for a product-specific tooling sheet.

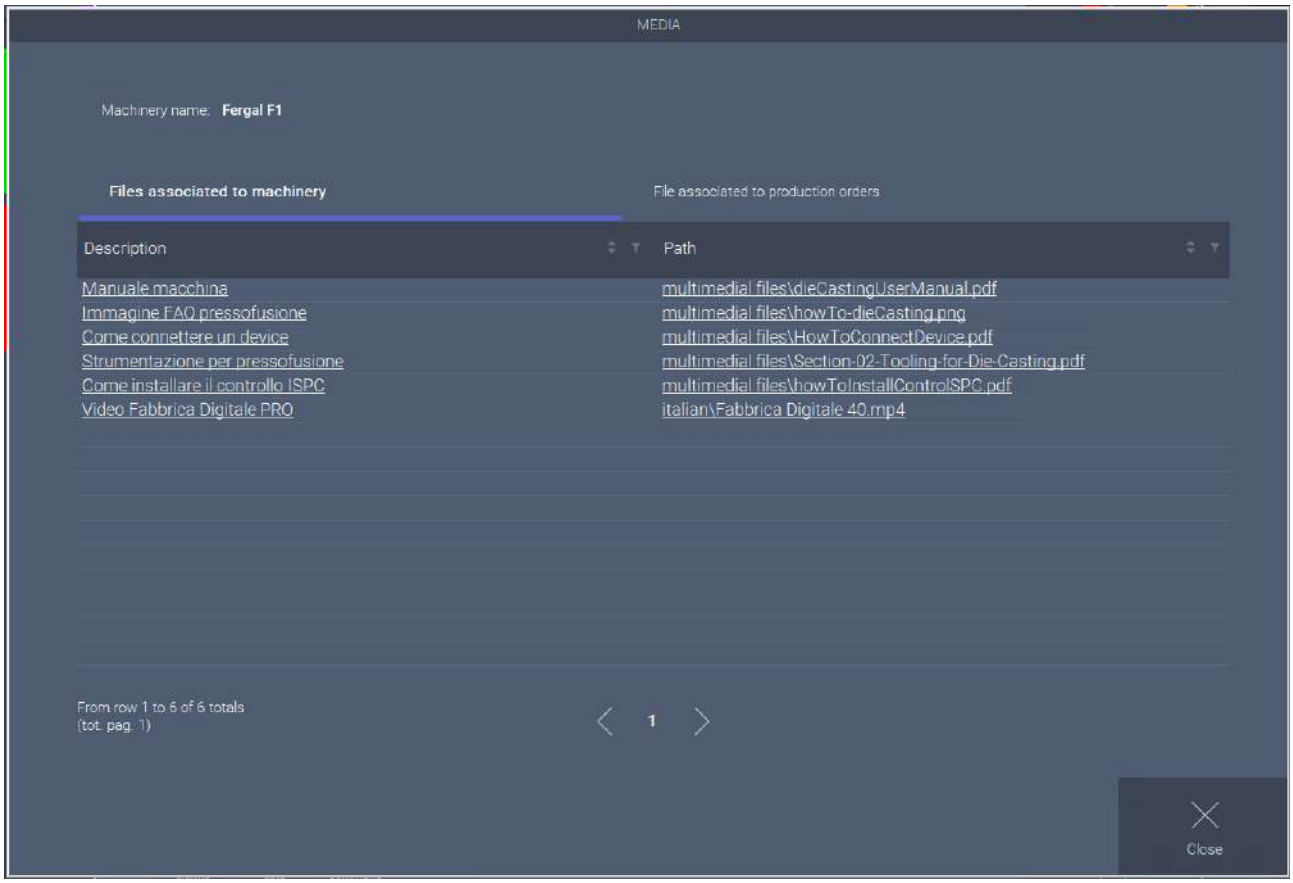


Figure 32 - Media - Files associated with the machine

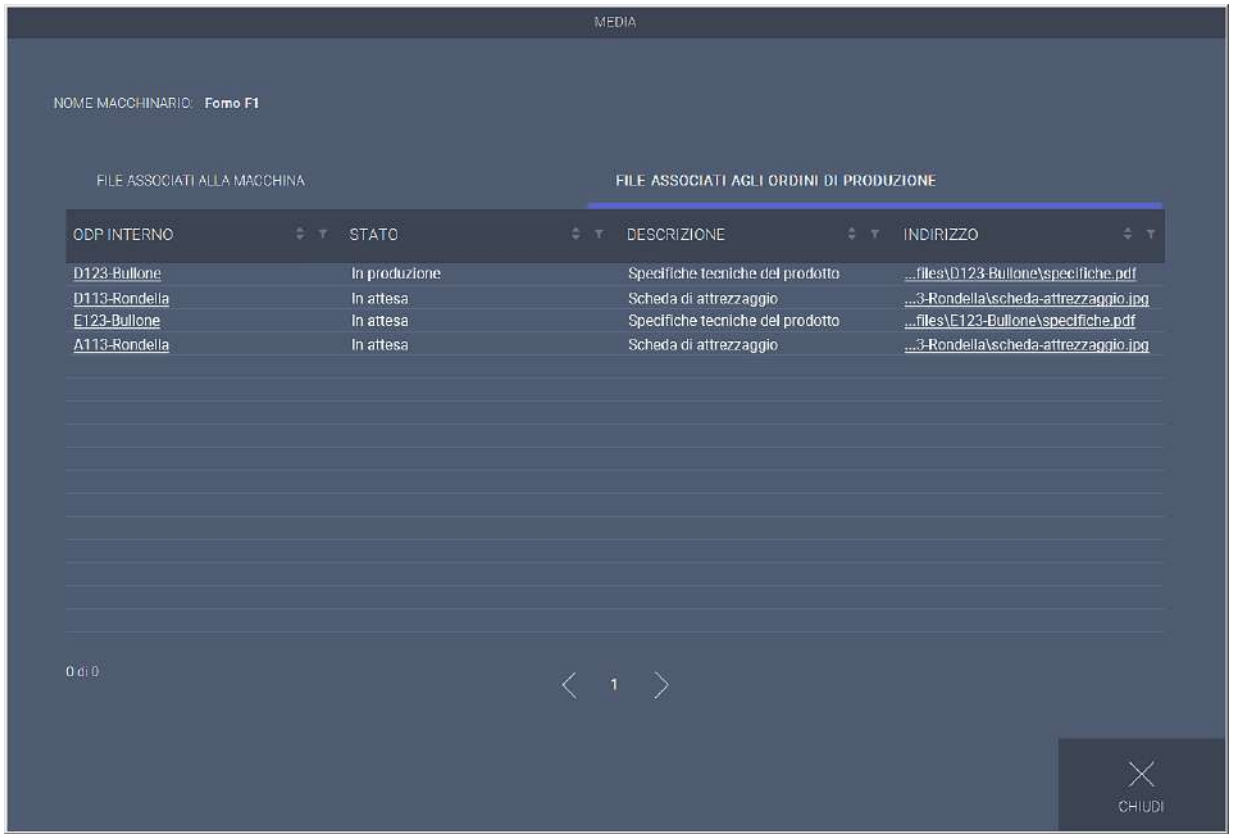


Figure 33 - Media - Files associated with production orders

Useful information

Assistance

Send an email to TOOLS for SMART MINDS

info@toolsforsmartminds.com

Company

TOOLS for SMART MINDS SRL

+39 030 268 1510

www.toolsforsmartminds.com

Via Padania, 16 Castel Mella 25030 Brescia (Italy)

Useful Link

Web site: https://www.fabbricadigitale40.it

TOOLS for SMART MINDS web site: https://www.toolsforsmartminds.com

TOOLS for SMART MINDS Youtube Channel: https://www.youtube.com/user/toolsforsmartminds/videos

LinkedIn: https://www.linkedin.com/showcase/fabbricadigitale40