MONZESI®

inFactory
TECHNICAL ANNEX

FOSTER THE
GROWTH

www.**monzesi**.com

inFactory Suite End-User

The advantages that result from the implementation of inFactory Suite for a manufacturer who is interested in the development of an Industry 4.0 system that is connected to at least one machine manufactured by Monzesi Srl are described in detail in this document.

Introduction

The inFactory Suite solution was developed to meet the requirements of small and medium-sized SMEs in the manufacturing sector. In the context of continuously faster industrial development and guided by problems related to the software integration in the production environment, Intelligentia has developed an information system that is able to react to the latest safety, reliability and thus also operating parameters that are furthermore required by law.
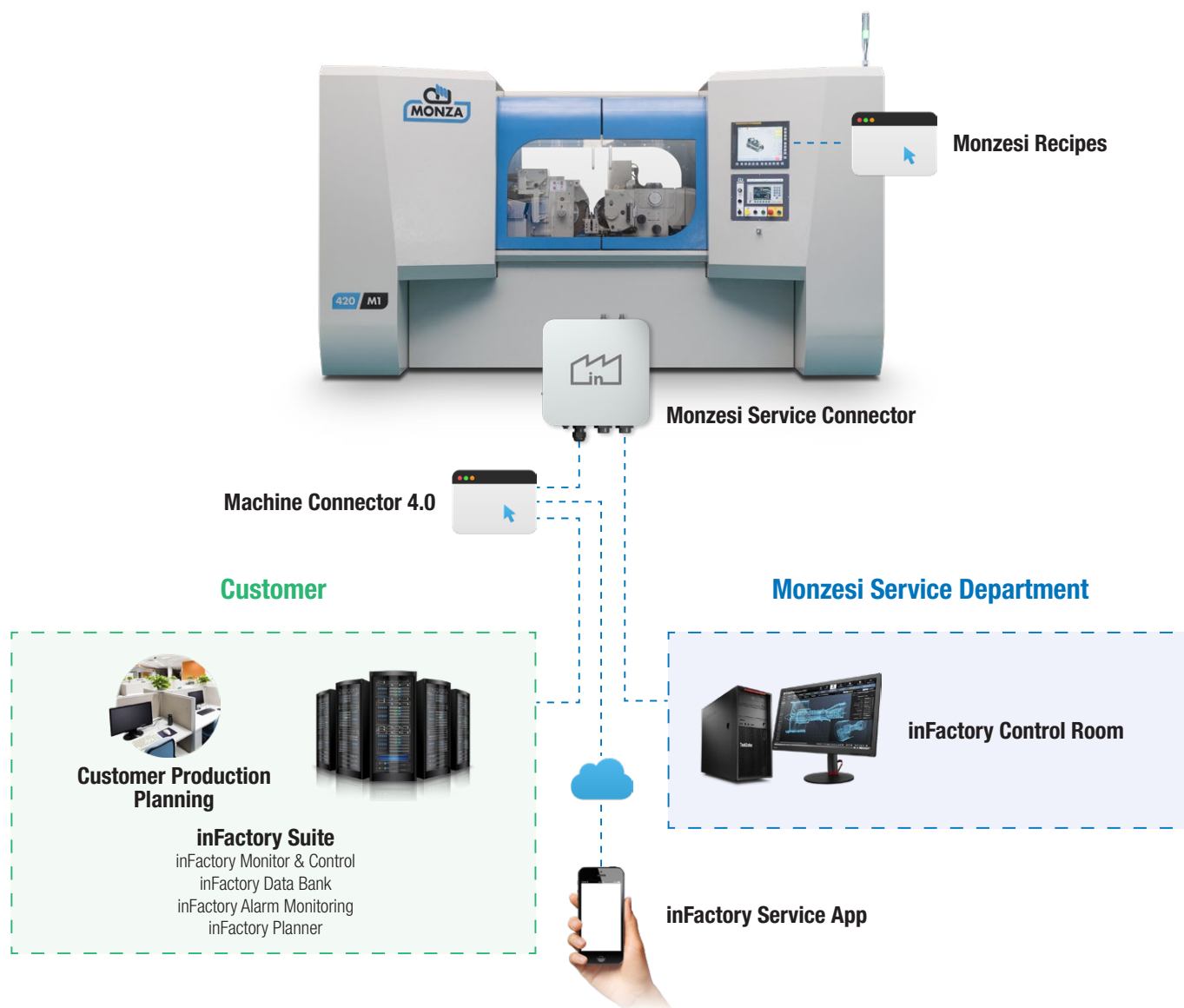
inFactory was created to respond quickly and with a targeted solution to the needs of the machinery for the purpose of monitoring and controlling production lines as well as Interconnected individual machines in a production environment. The solution was designed to carry out its work directly from the Cloud and therefore without requiring any prerequisite or ICT competence from the end customer.

In the context of the characteristics reported in Law 232/2016 and the subsequent amendments, inFactory can be easily integrated into the customer's production environment to support existing factory information systems to implement the characteristics necessary to create an Industry 4.0 ecosystem.

In the case of Monzesi machinery, the integration of inFactory is a sufficient requirement to guarantee and certify a correct interconnection of the machinery in compliance with the legal requirements. For further regulatory details, see section 3.

The summary model of the inFactory application ecosystem for the purposes of factory interconnection is summarized in the following diagram, in which different application modules can be identified which can be activated on request.

What is shown in the diagram is compatible with both a cloud installation (i.e. in the absence of server devices at the customer's plant) but it is possible to adopt the applications and on-premise services at the customer's plant under specific infrastructure simplifications.

Monzesi Recipes

Monzesi Service Connector

Machine Connector 4.0

Customer

Monzesi Service Department

Customer Production
Planning

inFactory Suite
inFactory Monitor & Control
inFactory Data Bank
inFactory Alarm Monitoring
inFactory Planner

inFactory Control Room

inFactory Service App

The main modules of the inFactory architecture therefore concern both the data collection policies on site as well as their processing on cloud systems, and therefore the distribution of information to the machinery.

The objective of this proposal is to illustrate the costs to be covered by the customer for the products and services of his direct interest, by defining a minimum package necessary to cover all regulatory and functional needs.

Technical details of the software package

Below you find the most important information on the modules that make up the inFactory software package, with which an Industry 4.0 basic ecosystem can be created for the end customer.

On-Board-Software

- Monzesi Recipes
- Machine Connector 4.0

Components on the machine

- inFactory Service Connector

inFactory Cloud Services

- inFactory Monitor & Control
- inFactory Data Bank
- inFactory Alarm Monitoring
- inFactory Service App
- inFactory Planner

Compatible machines

The compatibility of the InFactory package is guaranteed for newer machines of the Monza and Viotto family. In any case, a service for checking the software compatibility is available for older machines.

The standard installation of the 4.0 package on compatible machines requires software that is hosted on the control panel (Machine Connector 4.0) and the hardware device for communication with the central system (inFactory Service Connector).

Component details

Below you find the details of the hardware and software components.

On-board software

Monzesi Recipes

The on-board machine recipe archive was developed with the aim of making it possible to manage different sets of processing parameters that can be reused over time by the operator.

The application is integrated into the standard graphical interface of the machine: the operator can use the application at any time pushing the appropriate button and load, delete, create or edit the recipes in the archive.

The recipe archive is kept in a folder normally directly available on the machines' PC, however it is also possible to have remote management of the recipes. For further information refer to the dedicated document.

Machine Connector 4.0

The inFactory Machine Connector 4.0 component was created to be installed in the on-board PC of the machine with the aim of collecting all the data generated by the sensors and by the numerical control of the machine (CN), then making them available to the inFactory Service Connector component to pre-process them locally and send them to the cloud for the subsequent historicization and processing phases.

On-board machinery components

inFactory Service Connector

In order to read the status of the CN and the variables that will be of interest for the implementation, a Service Connector hardware device will be installed on each individual machine to be interconnected (see figure).

The Service Connector is the component delegated to periodically interrogate the CN and to process secure telemetry packages to be transmitted to the central server of the Control Room.

The device is normally installed in the electrical cabinet.

The Service Connector can guarantee the following features:

- Introduction of two SIM traffic based data lines on the machine (GPRS/3G/4G/LTE)
- Access via WiFi as an alternative to SIM cards also for customer purposes (e.g. access to the Service Connector via the factory WiFi network);
- Access via Ethernet if the machine is interconnected via cable to the production network which allows access to the Internet;
- A permanent on-site storage of about 10GB to be used for recording data, events and service logs related to the working status of the machinery
- Ability to send the historical data within the storage to the Control Room both spontaneously (spontaneous telemetry), and on request (requires service package for the inFactory Control Room software);
- Registration of the parameters loaded on the machine when a machine alarm is detected and sent;
- Dedicated connection to the central cloud via encrypted communication channel (adoption of banking standards);

Cloud Services in Factory Suite

The inFactory suite of applications is the proposal of cloud and on-premise software solutions that Intelligentia intends to offer giving value-added services for the world of Cloud and industrial IoT.
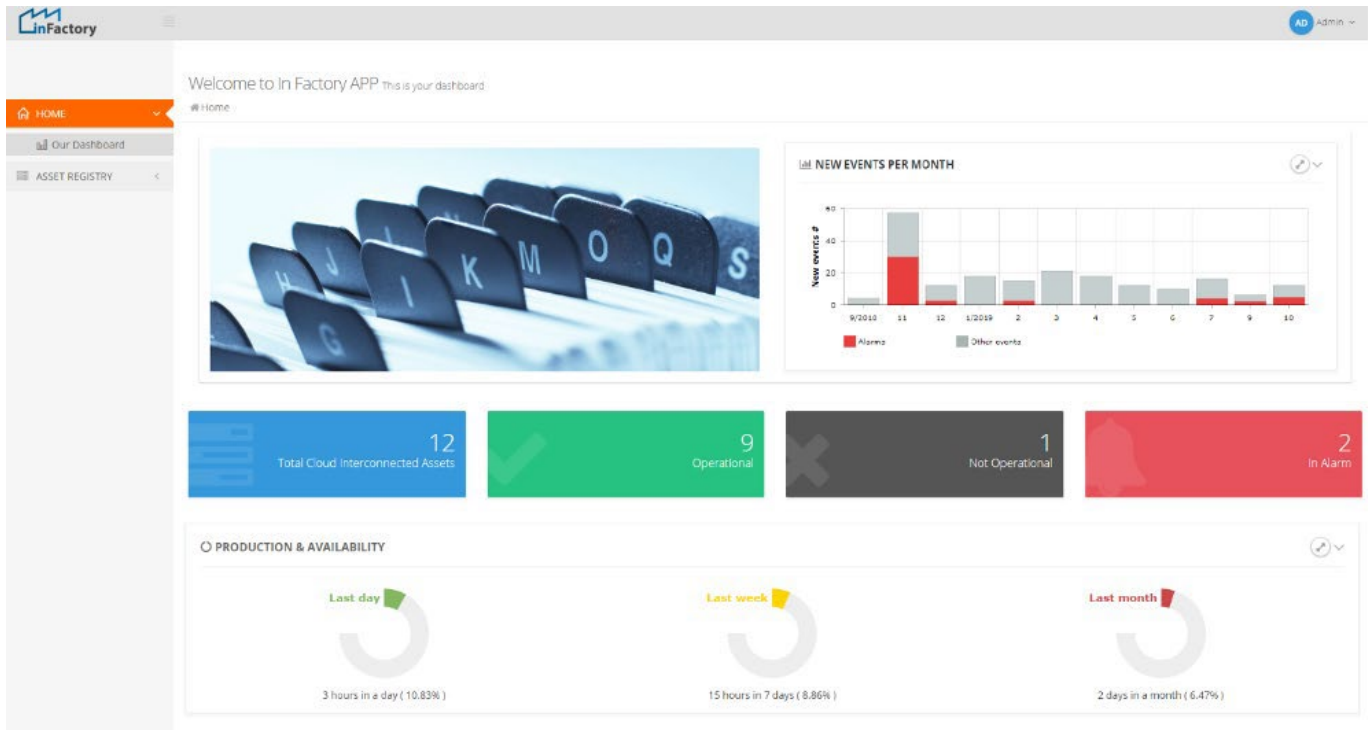
With the purchase of inFactory and the successful interconnection of at least one machine, the customer will have access to a dedicated web portal from which it is possible to monitor the collected telemetry. Furthermore, access to the visualization software of the production plan set for a specific machine directly via the HMI interface installed on the machine operator panel will be given.

Alternatively, a customized installation on PAD touch 7" can be provided.

In defining a package of services and basic applications in order to meet regulatory requirements, Monzesi and Intelligentia have developed a software package which consists of the following software modules:

- inFactory Monitor & Control
- inFactory Service Data Bank
- inFactory Alarm Monitoring
- inFactory Service App
- inFactory Planner (BASE)

The Monzesi machinery equipped with the listed software modules is completely suitable for the industry 4.0 certification as per law 232/2016 and its subsequent revisions.

inFactory Monitoring & Control

The software module allows to implement a virtual Control Room from where the customer can view the entire machinery that is installed and interconnected to the central cloud, operated and managed by Intelligentia, on graphic dashboards.

The data presented for each individual machine will concern all the telemetry from the components installed.

The main functions of the Control Room include:

- Asset management of the entire network of installed machinery (also geo-localized with visualization on the map);
- View of all machinery with "active alarms" within a specific dashboard;
- Detailed analysis of the data history of interconnected machinery;
- KPI dashboards relating to the lifetime of the machinery;

For each machine it will be possible to check the status of the machine directly via remote. For example, it will be possible to view and "reset" the alarm status of a machine, as well as to view and control the telemetry sending settings of the cloud connector for the machine.

Once the license for each interconnected machine is activated, it will be valid for 12 calendar months (365 days). At the end of the period, the license can be renewed or the machine will no longer transmit data to the Control Room.

After 60 days from the expiry of the license (and non-renewal), it will be considered as decommissioned.

Reactivating a license for a decommissioned machine will result in the payment of a new license.

inFactory Data Bank

The software module offers the possibility of storing all the data acquired by the machine for a fixed time window. The goal is to classify and group the information from the machinery in order to generate data tracks that can be processed by software modules that use them to detect malfunctions or to determine the status of the main processing KPIs.

inFactory Alarm Monitoring

The Alarm Monitoring component allows the introduction of analysis routines to identify any alarms (e.g. threshold exceedances and/or anomalies) in the data collection and historicization process.
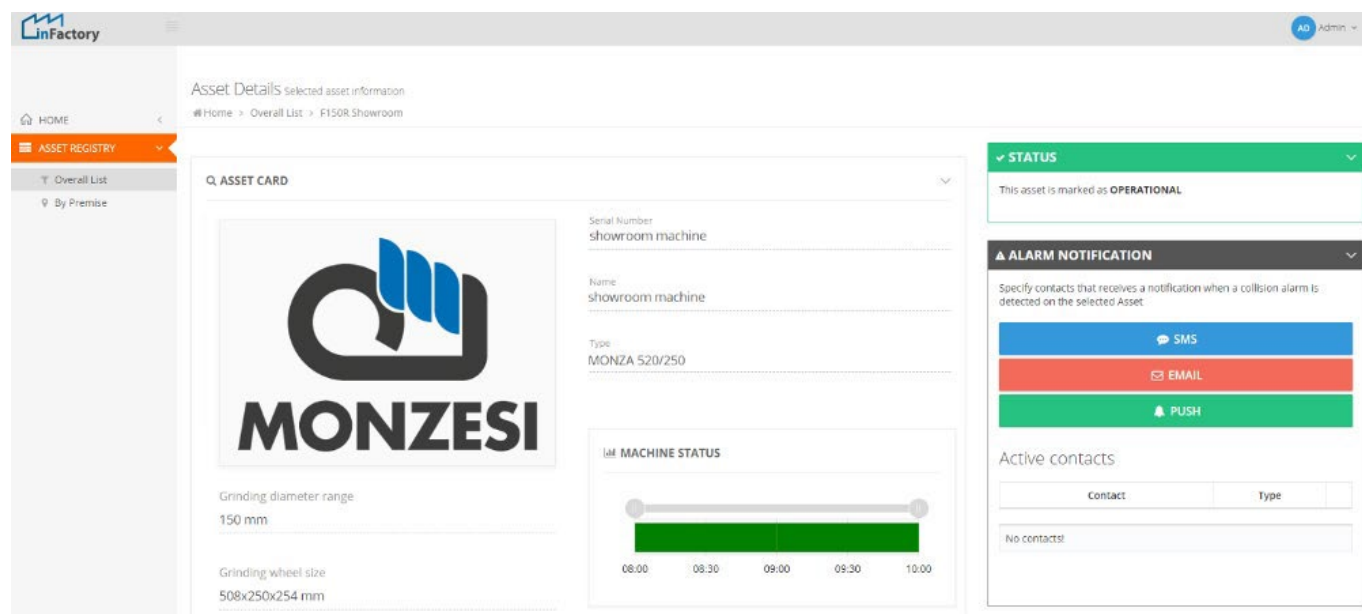

The software module offers the possibility of issuing bulletins and reports on the alarms identified and processed by the machinery to operators/managers through digital communications (e.g. SMS, e-mail, PUSH app).

Due to its peculiar characteristic of flexibility, it is always possible to introduce new alarm management plug-ins into inFactory that make use of the most varied analysis techniques both real-time (live data) and off-line (historical data).

inFactory Service App

The InFactory Suite software package offers the possibility of using a dedicated app for both Apple and Android devices. The app gives the possibility to access all the information available for each machine to its employees present in the field engaged in resolving a fault and/or checking the operating status.

In practice, the app will allow you to access the machine card from your tablet/smartphone and therefore be able to analyze the possible presence of alarms and/or anomalies reported.
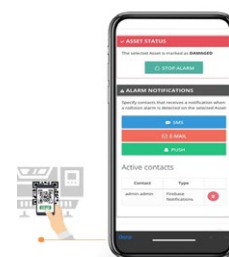
inFactory Planner (Base)

The inFactory Planner module allows you to introduce the planning of the processes to be developed with the interconnected machinery directly from the web. The software module is made up of:

1. a web environment potentially accessible from anywhere in the world through access credentials;
2. a graphic HMI on the machine (inFactory Planner HMI) that will present the operator with the sequence of activities planned for that machine

The operator through the HMI on the machine can selectively:

• confirm the start of a process
• report a break during a process (e.g. coffee break, lunch break, technical consultation)
• report the stop of a process by indicating the number of "good" pieces and "bad" pieces produced (in order to calculate the efficiency of the machine)

When the process is stopped, an "end of work" notification is sent to the specific workstation. This happens in order to activate any logistics operations for the recovery of the product components and the payment to the warehouse, or possibly for tac-time to other processing stations.

It will therefore be possible to report the final times recorded by the machinery for each process and then evaluate the total performance of the process.

If the planning concerns production lines, the customer can also activate at a later time the "advanced" version of the Planner module which implements an automated industrial planner capable of automatically programming the production of the whole plant according to the phases of processing, constraints on the availability of goods, technical and functional characteristics of the machinery.

Further features

Access to the inFactory software system even in the case of a single integrated machine gives access to all the updates offered on a semi-annual basis by Intelligentia according to the product development plans.

Upon entering into the inFactory service for the own environment, each customer receives credentials to access a cloud information system to be used both to report any software problems (bug tracker), and to report and/or force the development of new features in the Intelligentia plan.

Components and services price list

With regard to the components and services price list, see annex "Monzesi EndUser 2020 price list".

Monzesi, inFactory and the Industry 4.0 plan in Italy

Monzesi machines equipped with the inFactory system can cover all necessary and sufficient legal restrictions imposed by Law 232/2016 for the Industry 4.0 plan proposed by the Italian government.

What characteristics must exist to benefit from tax relief?

All 5 characteristics listed below **must be demonstrated**.

Required restrictions	Evaluation	Comment
Control by CNC (Computer Numerical Control) and/or PLC (Programmable Logic Controller)	**COMPLIANT**	Monzesi machines are controlled by a Fanuc/Siemens CNC.
Connection to factory IT systems by downloading instructions and/or part programs	**COMPLIANT**	Monzesi machines are connected to the inFactory cloud thanks to a software module and hardware components, with which you receive processing instructions or information on controlling production progress and planned tasks.
Automated integration in the factory logistics system or in the supply network and/or in other machines in the production cycle	**COMPLIANT**	With the inFactory Planner software module, the number of parts to be produced can be defined for each production lot. The machine operator can also specify the number of OK parts and NOK parts produced and mark the activity as completed by sending the Control Room an automatic notification of the end of processing, which can be used to activate the factory logistics regarding the produced batch and track the completion status of an order.
Simple and intuitive interface between man and machine	**COMPLIANT**	Monzesi machines are equipped with intuitive on-board HMIs that support both technical and monitoring activities in a timely manner. In addition, the HMI of the inFactory Planner software module is available on the machine panel (in the models that allow this or alternatively by using a pad), which displays the machining queue programmed by the Control Room at any time and communicates machining feeds to the machine operator.
Compliance with the latest security parameters, health and hygiene in the workplace	**COMPLIANT**	Monzesi machines comply with the latest safety, health and hygiene regulations in the workplace.

In addition, **at least 2** of the following additional functions must be present:

Optional restrictions	Evaluation	Comment
Remote maintenance and/or remote diagnosis and/or remote control systems	**COMPLIANT**	Monzesi machines have a version of Team Viewer pre-installed to make it easier for the manufacturer service to provide remote support in the event of malfunctions and/or customer inquiries. In addition, the introduction of the inFactory Control Room package enables the end customer to have the machine operating status under control in time.
Continuous monitoring of working conditions and process parameters through suitable sensors and adaptability to processes	**COMPLIANT**	Continuous monitoring of working conditions is ensured by the machine routines on board of the machine, which determine the correct operating state of the machine in response to the inputs of the machine's sensors. Everything is immediately readable on the machine fields, which show the status of all axes and the status of the most important physical quantities. In addition, the alarm information is immediately sent to the cloud and then sent to the service and control room staff via notification (SMS, push, email) in order to implement a dynamic ecosystem that responds to the process problems that have arisen.
Integration features between physical machine and/or modeling system and/or simulation in the process (cyber-physical system)	**NOT COMPLIANT**	At the time of drafting this document, the failure to comply with the requirement is declared.

As can be seen from the table above, the Monzesi-inFactory machine combination is sufficient to meet all the requirements of Law 232/2016 and is therefore a sufficient prerequisite for the activation of the intended tax benefits.

Conclusion

Monzesi and Intelligentia are the ideal partners to support your company in preparing a plan to update your production ecosystem towards the logic of Industry 4.0.

Technical documentation is provided certifying the parameters of the interconnection carried out at the end of the verification and validation activities of the integration process. This documentation can be used as a technical appendix to the declaration of the legal representative as well as a possible technical report on the machines connected to the inFactory system.

Monzesi
Via Dalmazia, 16/18
20834 Nova Milanese (MB) • Italy
Phone: +39 039 731200 • Fax: +39 0362 41839
sales@monzesi.com • www.monzesi.com

FOSTER THE GROWTH

www.**monzesi**.com