



# RAMTIC Air Modifcation

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## Introduction

This project has been based around the in house developed system, Renishaw automated milling turning inspection centre known in Renishaw as the RAMTIC system. A safety issue has been highlighted whereas a carousels has been dropped from a moving roller truck on removal from the MAZAK FJV 250.

## RAMTIC

RAMTIC is an in house operation used in Renishaw's machine shops. RAMTIC stands for Renishaw automatic milling turning inspection centre. This system was first developed in the early 90’s and is still utilised today. It was created through modifying already existing platforms, in our case, the MAZAK FJV 250. This involves a high degree of both automation and closed loop control meaning no manual input is needed. This is all facilitated by using the Renishaw probing system to set tools, in-process monitoring and component validation. (Renishaw, 2020)

## MAZAK FJV 250

Tabled below are the machine specifications for a MAZAK FJV 250. For the RAMTIC system to work and machine both the volume and size of some of the products. A CNC mill was needed with a high enough specification to accommodate.

MAZAK FJV 250 specification, MAZAK (2023).

|                   |                                                |                          |
|-------------------|------------------------------------------------|--------------------------|
| CAPACITY          | Maximum workpiece width (X)                    | 1,380 mm                 |
|                   | Maximum workpiece length (Y)                   | 750 mm                   |
|                   | X-axis                                         | 1,020 mm                 |
|                   | Y-axis                                         | 510 mm                   |
|                   | Spindle head: up & down travel amount (Z-axis) | 460 mm                   |
| SPINDLE           | Rotating speed maximum                         | 12,000 min <sup>-1</sup> |
|                   | Motor output (15 minute rating)                | 22.0 kW                  |
| MACHINE DIMENSION | Length                                         | 2,995 mm                 |
|                   | Width                                          | 2,365 mm                 |

## Carousels

A carousel is used to load billets and tools onto a MAZAK FJV 250 . Each carousel will carry around 70 wings, some tooling wings and some billet wings. The carousel will be loaded to the MAZAK FJV 250 using a roller and the harting plug and air will be attached.



RAMTIC Carousel being loaded onto a MAZAK FJV using a roller truck.

## Project Aims

- Design an ergonomic solution to the carousel tipping issue.
- Comply with all the relevant safety regulations.
- Document the process.

## Problem

This project was developed due to the risk of carousel being tipped when being removed from the MAZAK FJV 250. This can Easily be done by not unplugging the hearting plug and air supply. The carousels weigh between 800kg and 1200kg depending on what product the carousel is carrying. Besides the health and safety concerns and risk to life of carousels being dropped. This heavily effect production in terms of downtime. When RAMTIC is in a downtime state, £65 an hour is lost. Over a 4 week period, the average time for a replacement carousel to be built, RAMTIC will lose £43,680 in earnings.

4 weeks is equal to 28 days

28 days X 24 hours = 672 hours

672 hours X £65 = £43,680



Harting plug and air supply

## Solution

Modifying the pneumatic air fitting which supplies the carousel with pneumatics. The design elongates the existing air fitting to allow access for a spring, as well as a round plate. The spring will exert force against the round plate forcing tension on the harting plug. The concept will sit parallel with the with the harting plug and will create a physical barrier to stop the harting plug being removed Unless the concept has been removed, the harting plug will stay in place meaning that the gullwing doors will remain shut and not allow for the carousel to be removed.



Solution in practice

## References

MAZAK. (2023), MAZAK FJV 250. Available at: <https://www.mazakeu.co.uk/machines/fjv-250/>

Renishaw. (2020) A brief history. Available at: <https://www.renishaw.com/en/heritage--32458#:~:text=Our%20company%20was%20establishe d%20in,Olympus%20engines%20used%20in%20Conc orde.>