



## TECHNICAL SPECIFICATION

### HYDRAULICS CLIP STORAGE AND DELIVERY

**PROJECT INDUSTRIAL CADETS****REVISION 01****DATE 04/12/2024**

#### Contact Information

Responsible: Sally Lessing  
Telephone: +447557182736  
Email: Sally.Lessing@uk.bosch.com

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## 1. Introduction

Technical Specification provided to students of Industrial Cadets- Gold.

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## 2. Background

Throughout the assembly of all hydraulics units at the Worcester Bosch factory, many wire clips are fitted. These clips are stored on each station on the assembly line in production bins and often become tangled. Where only 1 clip is to be picked and fitted to a product, this entanglement can create an additional task within the assembly process. The additional complexity in the task also increases the process time.

In 2025 the business is predicted to see an increase in demand on the final assembly lines, which will mean an increased demand from the hydraulics sub-assembly line. The current cycle time of the production cell is 41 seconds, but next year the line will need to run at 38 seconds. Any non-value-added time in production must be reduced or removed.

The project proposed is a redesign of the process of delivering clips to the hydraulics assembly line at Worcester Bosch. The new process must consider the improved storage of the parts on the assembly line, so that clips have a reduced rate of entanglement, for easier assembly and reduced assembly time. Many clips of similar likeness are included on each assembly station and so the sorting of these clips could also be considered in the project scope.

### 3. Specifications

#### 3.1. Process

Wire clips are decanted from supplied bags into production bins and placed on the hydraulics sub-assembly line.



Variants of wire clips fitted into hydraulics assemblies:



#### 3.2. Quality

At the point of use by the associate, the wire clips are often tangled. Typically, only 1 clip is required at a time and therefore, the additional task of de-tangling the clips adds to the non-value-added assembly time. The improved process design must reduce or remove this risk, by ensuring a more reliable process.



### **3.3. Cycle Time**

Each 'shake' arm movement applied to the process incurs a time cost of 0.36 seconds. The business aims to reduce the cycle time of the assembly line from 41 seconds to 38 seconds which leaves very little time for non-value-added processes.

### **3.4. Efficiency**

The system should be tested for machine reliability with a capability study. A minimum pass rate of 85% is expected.

### **3.5. Safety**

Safety features must be considered in the workstation design, this includes guarding around trapping points, enclosures around bright lighting, and emergency stop buttons if appropriate. All designs should be free from sharp corners or edges.

### **3.6. Construction**

Construction of any equipment or devices to be completed off site from Worcester Bosch, with a plan for installation on-site.

#### **3.6.1. Ergonomics**

All equipment must meet Bosch ergonomics standards, please see attachments. Delivery of wire clips must be within working reach dimensions.

#### **3.6.2. Life Time Expectancy**

The system components and equipment must have a life-time-expectancy of 5 or more years. The number of standard components are to be maximised where possible to minimise the cost and difficulty to replace parts in the case of damage/wear.

#### **3.6.3. Materials and Components**

Materials and components must be standardised where possible.

#### **3.6.4. Maintenance Requirements**

TPM (Total Productive Maintenance) guidance should be provided with troubleshooting support for the process design.

### **3.7. Layout**

The improved process will run in-line and therefore must be a suitable size to fit within an assembly line. Specific racking/layout dimensions available on request.

### **3.8. Tooling, Jigs and Fixtures**

Any system fixtures or devices should be suitable for multiple variant changeovers.

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## **4. Attachments**

[Ergonomics Blue Data Cards](#)