



PROJEKT 5:

OPTIMIZATION OF A PRODUCTION LINE INCLUDING HANDLING STATION, ASSEMBLING STATION

Weighting (points out of total)	t max	Information
16/100	90 min	Also on USB-Stick

SCENARIO

The production line needs to be optimized and you have to plan and test this optimization to reduce the production time and to find the most energy efficient production process.



TASK

Your task is to add components for the measurement of airflow and to optimize the production process to produce 5 workpieces in the shortest possible time and with most air efficiency.

Your task is complete when:

1. Correct execution of the program with PLC activation (based on evaluation/PLC board) is guaranteed.
2. The system meets the specifications (in accordance with the 'Agreement on Professional Practice').

You will have no opportunity to make improvements later.

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PROCEDURE OF OPTIMIZATION:

Safety:

You are not allowed to work at the stations while the stations are running!

**Target:**

- Fast, energy efficient and dependable production line
- Conditions:
 - It is allowed to modify the PLC – program
 - You have to assemble a Flow meter in the main tube to the system and do the wiring and tubing (see images).
 - You have to assemble the Flow meter into the Handling E Station and connect the tube for HS, AS
 - The focus on energy consumption is on air
 - 5 work pieces from the magazine will be Assembled (or not) and placed on the slides like in the tasks before
 - Max. 6 bar working pressure
 - Max. 24 Volt power supply
 - No collisions are allowed (Workpiece on workpiece side by side is not a collision)
 - During your commissioning evaluation and testing you can stop the calculation of the flow-sensor via the stop function in the RECORDER mode.
 - It is allowed to adjust the sensors within the station but the function must remain the same.
 - It is not allowed to use tape in the process line.

Exceptions:

- More than 1 workpiece on the production belt is allowed
- Press start only one time (5 workpieces are running automatically)
- The workpieces are moving without manual help
- No evaluation about behavior of the lamps except start lamp at beginning of evaluation and signal lamps at the end.
- Switch on the GREEN, RED and YELLOW signal lamp after the 5th workpiece is placed on the top of the slide
- The timing and air flow measurement stops when the GREEN, RED and YELLOW signal lamp is ON and the 5th workpiece is placed on the top of the slide.

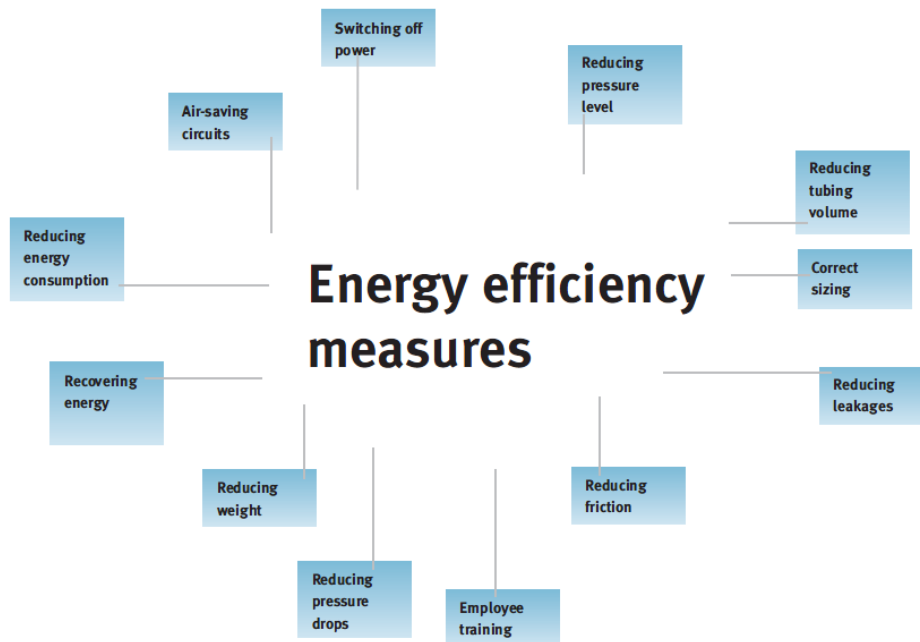
After a max. of 90 Minutes optimization the system has to be prepared to run:

- There are no points for the preparation time
- All modules and components are fixed and adjusted.
- The station layout must be the same as in the tasks before.
- The stations are ready to get the START signal via the Control Panel in HS; therefore the START lamp must be ON in HS.

After the optimization time 3 members of the evaluation team will take the production time and note the air consumption. The average of these 3 times will be calculated.



YOUR GUIDE TO ENERGY EFFICIENCY



ENERGY MEASUREMENT FOR AIR CONSUMPTION

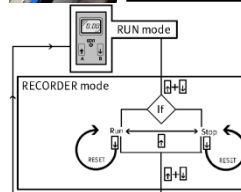


Connect only the 24V/0V to the I/O-Terminal in the station
Measure the air flow for the whole system.
Don't cut the cable short (keep it as a ring)



• Wire the SFAB as follows:

Pin	Assignment	Core colours ¹⁾	Plug ²⁾
1	DC +24 V operating voltage	brown (BN)	
2	Binary outputs B (Out B)	white (WH)	
3	0 V	blue (BU)	
4	Binary output A (Out A)	black (BK)	
5	Analogue output C (Out C) ³⁾	grey (GY)	



Select RECORDER mode
Start / Stop and RESET the measurement via the sensor buttons

RECORDER MODE

In the RECORDER mode, a manual accumulated air consumption measurement can be performed.

1. Press the A button and B button at the same time. The SFAB is in the RECORDER mode. The status of the air consumption measurement [Run] or [Stop] is displayed.
2. If [Stop] is displayed, press the A button. [Run] and a running light is displayed. The air consumption measurement is started.
3. Press the A button again. [Stop] is displayed. The air consumption measurement is stopped.

Note:

Resetting measurement value to zero.

- Press the B button in the RECORDER mode to reset a measurement value to zero.