PROJECT 3:

ASSEMBLY, PROGRAMMING AND COMMISSIONING OF A PRODUCTION LINE INCLUDING HANDLING STATION AND ASSEMBLY STATION

Weighting (points out of total)	t max	Information
38/100	360 min	also on USB-Stick

SCENARIO

You are responsible for the delivery of a Handling Station with Assembly Station purchased by a customer in the world to be used in the partial automation of its production process.

TASK

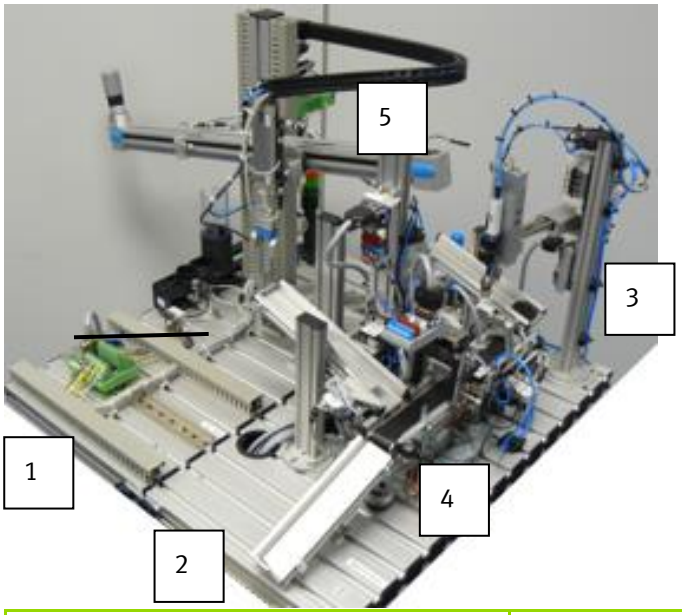
Assemble, wire and tube the production line on the profile plate according to this documentation.

Your task is complete as soon as:

1. The production line has been mechanically assembled, correctly wired, connected and its correct operation is guaranteed (based on evaluation using the simulation box).
2. Correct execution of the program with PLC activation (based on evaluation with PLC) is guaranteed.
3. The system meets the specifications (in accordance with the 'Agreement on Professional Practice' which has been handed out separately).

The system will be sent to the customer as soon as you are finished. You will have no opportunity to make improvements later. Hardware problems during the evaluation phase can be solved afterwards.

PRODUCTION LINE LAYOUT



1. Handling station (HS)	2. Assembly Station (AS)
3. Module Pick and Place	4. Module Conveyor with stopper
5. Module Lift/Turn with measuring table	

INITIAL POSITIONS:

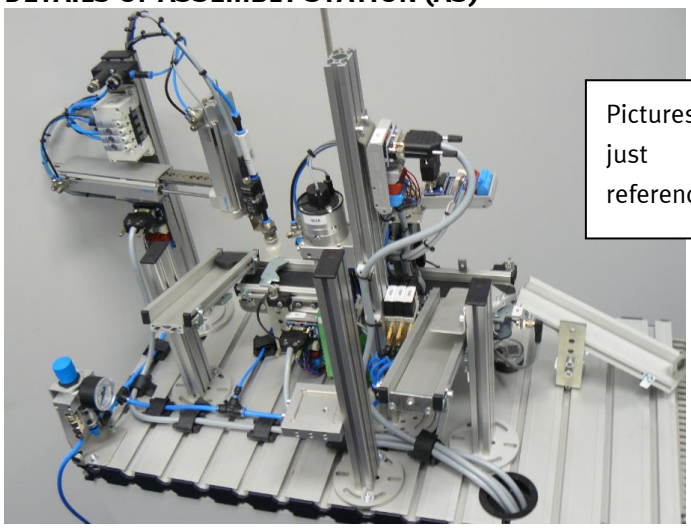
HS:

- See Task 1

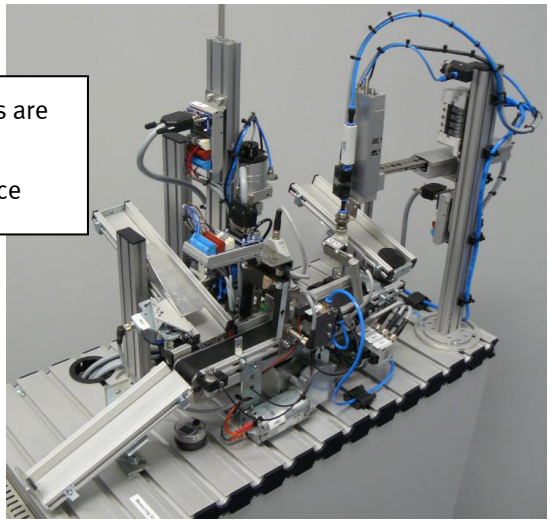
AS:

- Module conveyor belt motor off
- Module conveyor stopper extended
- Module conveyor separator not switched
- Module Lift/Turn Gripper open
- Module Lift/Turn Gripper in up position
- Module Lift/Turn Gripper in conveyor position
- Module Pick and Place vacuum Gripper up
- Module Pick and Place vacuum Gripper off
- Module Pick and Place vacuum Gripper retracted

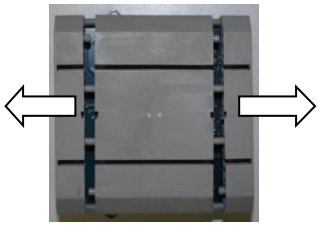
DETAILS OF ASSEMBLY STATION (AS)

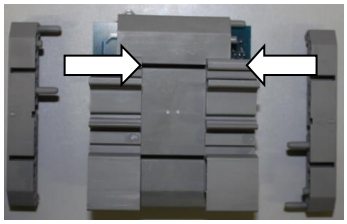


Pictures are just reference

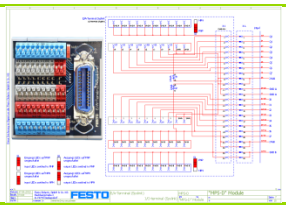
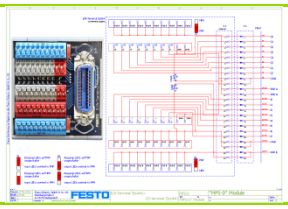
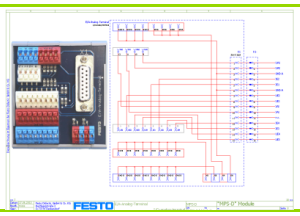


I/O TERMINAL ASSEMBLING OF FEET FOR DIN-RAIL

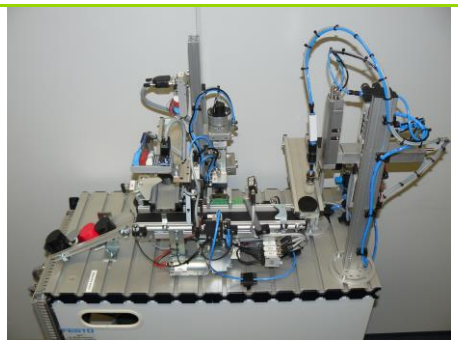
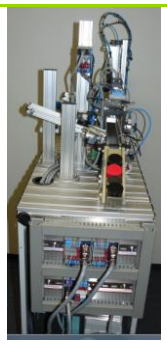
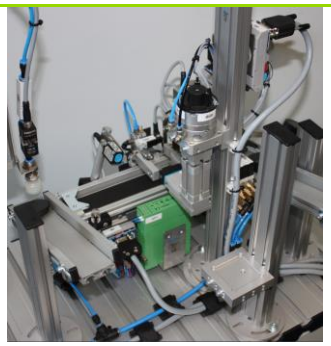


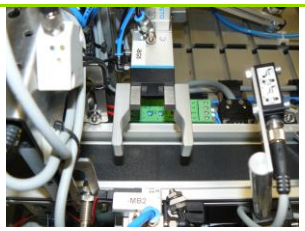
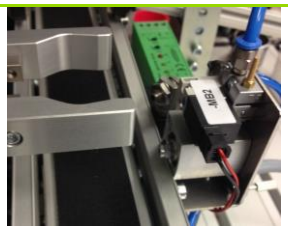


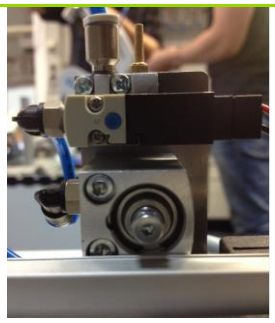
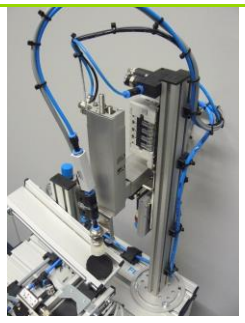
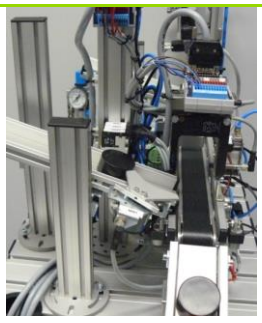
I/O TERMINAL BOARD IN THE A4 FRAME ON THE PROFILE PLATE

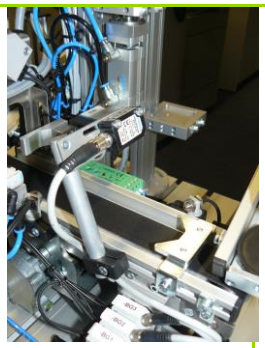
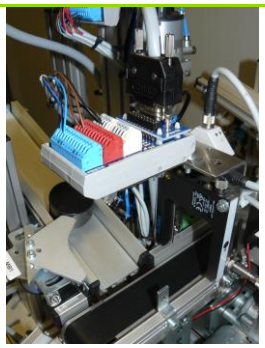
I/OTerminal 1 (see evaluation sheet) SysLink to PLC	**I/OTerminal 2 (see evaluation sheet)** SysLink to PLC	
		
I/O Terminal Analogue cable to PLC		
	ATTENTION! Be sure the “PNP/NPN” switches are BOTH in the PNP position!	

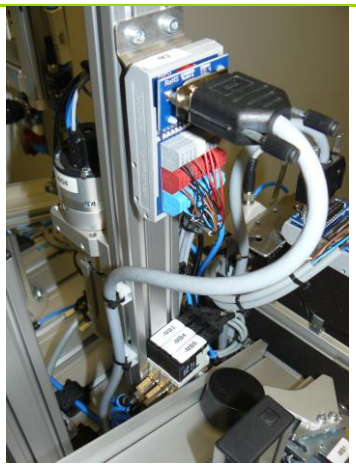
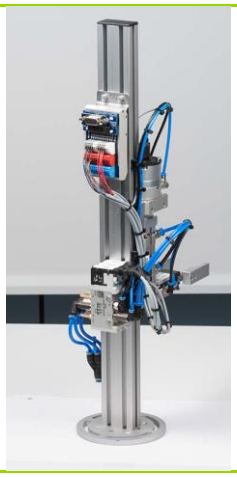
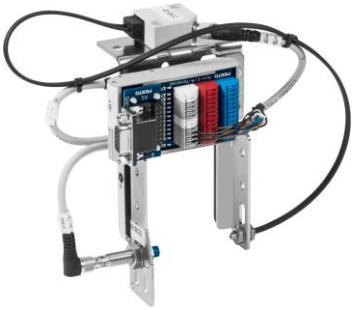
DIFFERENT REAL VIEWS

			
A: Top view	B: Side view (the slide on the left and the feed cylinder of the P&P on the right are allowed to protrude beyond the profile plate)	C: Front view	D: Back view

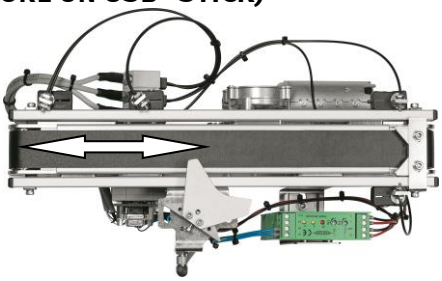
			
E: Gripper	F: Stopper + Gripper	G: Optical sensor tower	H: Wiring to the terminal board in front

			
I: Stopper front	J: Stopper back	K: Pick & Place Vacuum	L: Distributing slide

			
M: Distributing Stopper	N: Analog Sensor	O: Module Identification	P: Module Identification

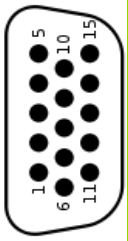
		
Q:	R: Module Lift/Turn	
		
S: Assembling of the Mini I/O-Terminal	T: Component Reflex light sensor / analogue over the belt	U: Module Indentification
		
V: Module Pick and Place	Distribution stopper coil spring of the tall cap slide might have to be adjusted	

DETAILS OF MODULE CONVEYOR 350 X 40 (MORE ON USB –STICK)

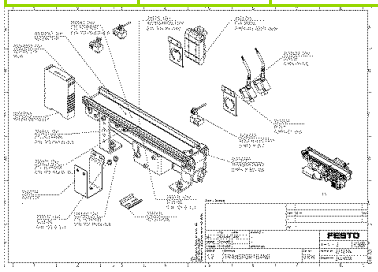


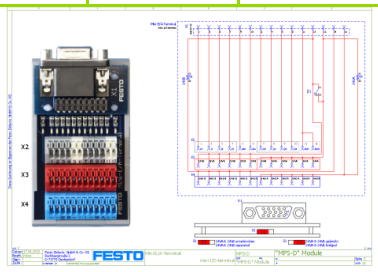
Pictures are just reference

ELECTRICAL INFORMATION - WIRING ALLOCATION MINI-TERMINAL

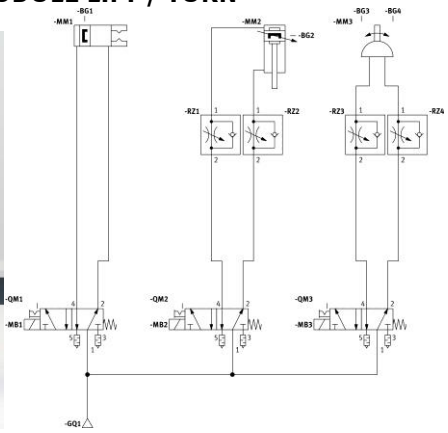


PIN on SUB-D	Colour DIN47100	Pin I/O-Mini-Terminal	Pin-Function	Pin I/O-Terminal Fill in by yourself	Function
1	White	1	I0	T1 / I0	Workpiece at conveyor end position
2	Brown	7	Q0		Conveyor belt moves to Pick and Place module
3	Green	2	I1		Workpiece at module Pick and Place assembly position
4	Yellow	8	Q1		Conveyor moves to output slide
5	Grey	3	I2		Workpiece at module Lift/Turn place/pick up position
6	Pink	9	Q2		Retract Stopper (place/pick up position)
7	Blue	4	I3		digital measuring result okay (no function test, only wiring)
8	Red	10	Q3		Switch separator (input slide tall cap)
9	Black	5	AI0		value of the workpiece height
10	violett	6	AI1		Not used
11	Gray-rose	11+12	AQ0		Not used
12	Red-blue	24VA	VCC-Out		
13	White-green	24VB	VCC – In		
14	Brown-green	GND A	GND Out		
15	Whith-yellow	GND B	GND In		

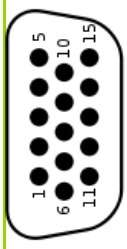




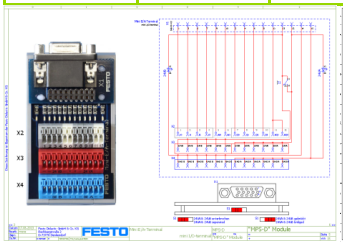
DETAILS OF MODULE LIFT / TURN

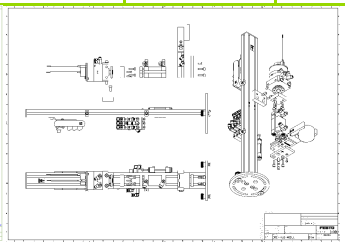


ELECTRICAL INFORMATION - WIRING ALLOCATION MINI-TERMINAL

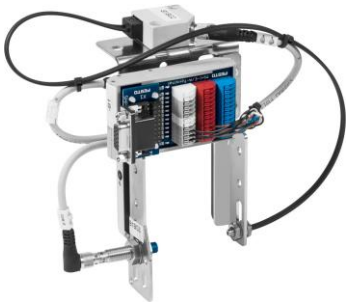


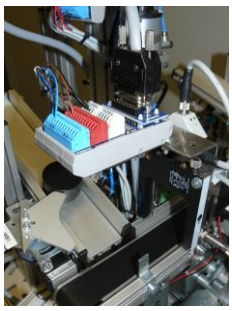
PIN on SUB-D	Colour DIN47100	Pin I/O-Mini-Terminal	Pin-Function	Pin I/O-Terminal Fill in by yourself	Function
1	White	1	I0	T2 / I4	Gripper is open
2	Brown	7	Q0		Open gripper
3	Green	2	I1		Gripper is up
4	Yellow	8	Q1		Move gripper down
5	Grey	3	I2		Gripper is in conveyor-belt position
6	Pink	9	Q2		Move gripper to workpiece in / out position
7	Blue	4	I3		Gripper is in workpiece in / out position
8	Red	10	Q3		Not used
9	Black	5	AI0		Not used
10	violet	6	AI1		Not used
11	Gray-rose	11+12	AQ0		Not used
12	Red-blue	24VA	VCC-Out		
13	White-green	24VB	VCC - In		
14	Brown-green	GND A	GND Out		
15	White-yellow	GND B	GND In		

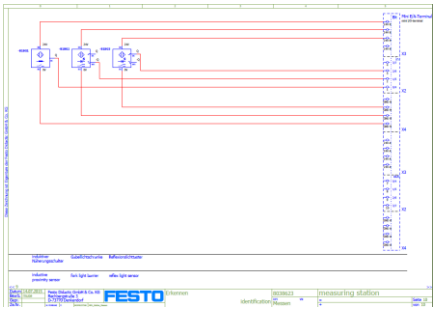




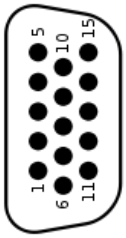
DETAILS OF MODULE IDENTIFICATION



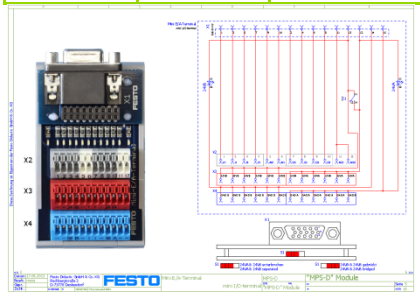




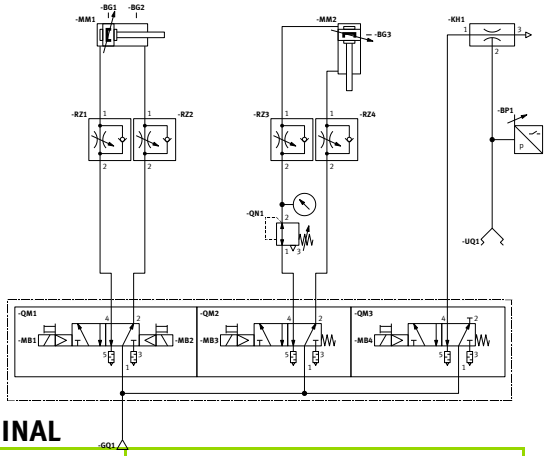
ELECTRICAL INFORMATION - WIRING ALLOCATION MINI-TERMINAL



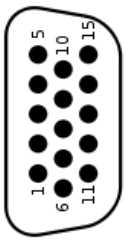
PIN on SUB-D	Colour DIN47100	Pin I/O-Mini-Terminal	Pin-Function	Pin I/O-Terminal Fill in by yourself	Function
1	White	1	I0	T1 / I4	Inductive Sensor
2	Brown	7	Q0		Not used
3	Green	2	I1		Optical sensor: Light barrier
4	Yellow	8	Q1		Not used
5	Grey	3	I2		Optical sensor: Reflex light
6	Pink	9	Q2		Not used
7	Blue	4	I3		Not used
8	Red	10	Q3		Not used
9	Black	5	AI0		Not used
10	violett	6	AI1		Not used
11	Gray-rose	11+12	AQ0		Not used
12	Red-blue	24VA	VCC-Out		
13	White-green	24VB	VCC - In		
14	Brown-green	GND A	GND Out		
15	White-yellow	GND B	GND In		



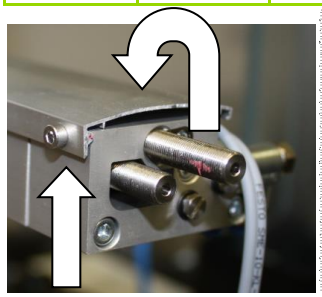
DETAILS OF MODULE PICK & PLACE STANDARD VIEW (MORE ON USB –STICK)

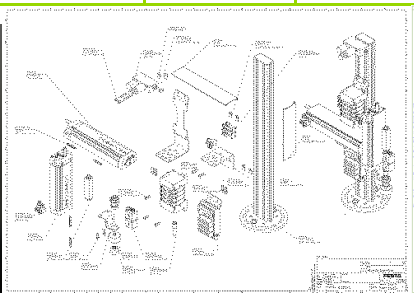


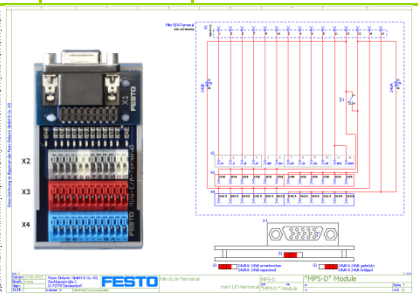
ELECTRICAL INFORMATION - WIRING ALLOCATION MINI-TERMINAL



PIN on SUB-D	Colour DIN47100	Pin I/O-Mini-Terminal	Pin-Function	Pin I/O-Terminal Fill in by yourself	Function
1	White	1	I0	T1 / I4	Slide is retracted
2	Brown	7	Q0		Retract slide
3	Green	2	I1		Slide is extended
4	Yellow	8	Q1		Extend slide
5	Grey	3	I2		Z-Axis is up
6	Pink	9	Q2		Z-Axis down
7	Blue	4	I3		Vacuum is on
8	Red	10	Q3		Vacuum on
9	Black	5	AI0		Not used
10	violett	6	AI1		Not used
11	Gray-rose	11+12	AQ0		Not used
12	Red-blue	24VA	VCC-Out		
13	White-green	24VB	VCC - In		
14	Brown-green	GND A	GND Out		
15	White-yellow	GND B	GND In		

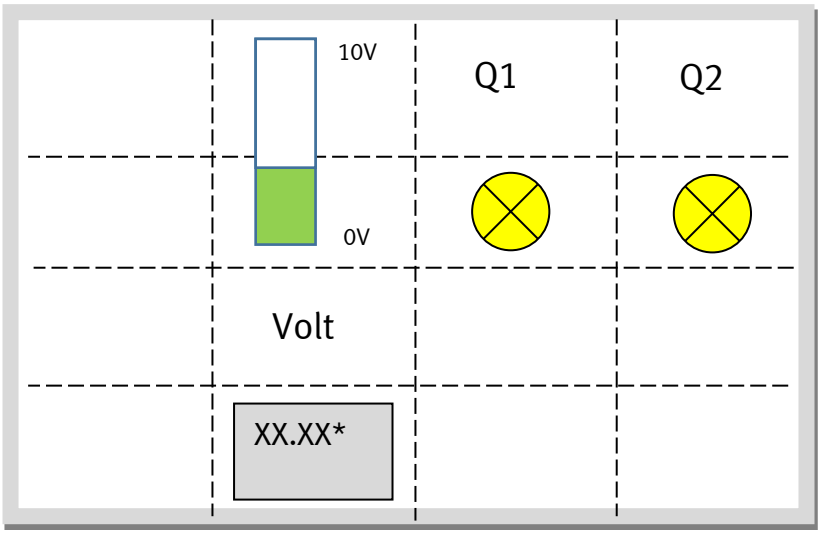


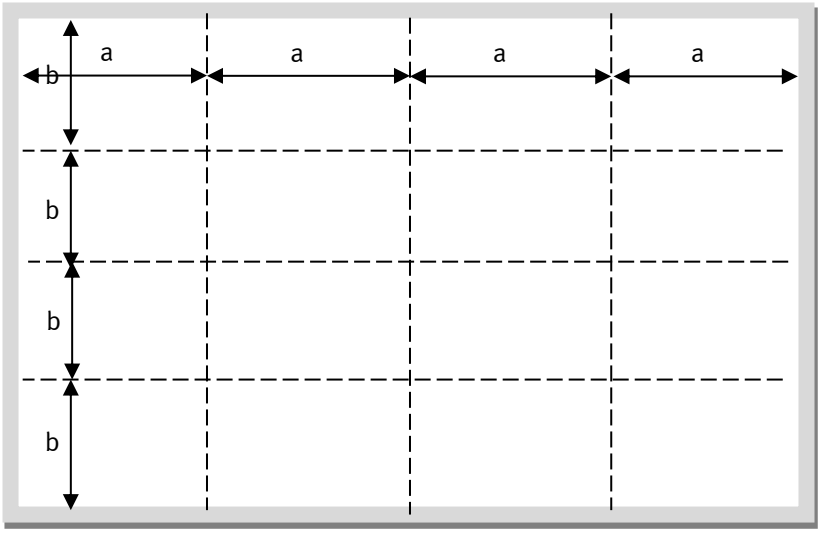




DETAILS OF TOUCHPANEL

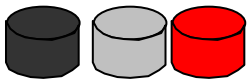
Field 1	Field 2	Field 3	Field 4
Field 5	Field 6	Field 7	Field 8
Field 9	Field 10	Field 11	Field 12
Field 13	Field 14	Field 15	Field 16





*Dynamic value

ACCORDING TO THE COLOUR AND ORIENTATION THE WORKPIECE WILL BE TRANSPORTED TO DIFFERENT POSITIONS.

	UPSIDE DOWN	RED	BLACK	SILVER
Process after identification and mounting cap				
Type of cap	None	**small**	**tall**	**small**
To Slide in AS	**X**		**X**	
Back to HS and slide Nr.		**1**		**2**

“PLACE ON …” MEANS: