

# Maintenance Manual for CP Systems

# FESTO

**CP Systems**

Maintenance Manual



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# **1 General Information**

The CP Factory and CP Lab Systems from Festo Didactic have been developed using high-quality components to ensure a long service life. Nevertheless, any improper use can lead to failures. With this maintenance manual, we would like to give you an overview of the service-related activities to be performed on CP systems.

Before carrying out maintenance work, the entire station must be switched off and the power supply must be disconnected. Robot systems and CP-Factory storage systems must be secured against being switched on again during maintenance activities. Assembly work inside the CP-Factory storage is only permitted in the lower end position of the Z-axis or with mechanically locked Z-axis! If the activities are to be carried out with the control system switched on, the operator must define additional protective measures to ensure safe personal protection (e.g. mark with a sign on the system).

The following is a checklist of inspections that Festo Didactic recommends in each case after the specified time interval has elapsed. If the inspection reveals that the specified components are not in an acceptable condition, this must be rectified immediately.

Maintenance activities should always be carried out by qualified personnel only.

## 2 Visual Inspection

Visual inspection shall be performed to determine external defects and shall be performed on each working day. Particular attention shall be paid to the following (if applicable):

- Any damage
- Pollution / dust deposits (e.g. on conveyor belt, workpiece carrier, camera, etc.)
- Loosening of door locks and hinges
- All cables and connectors are connected as intended
- Condition of the mains plug as well as the mains connectors and conductors
- Defects of the strain relief of the power cord
- Power cord defect
- Condition of the anchorage, cable clamp, of the accessible fuse link.
- Damage to the housing and protective cover, which could allow access to live or dangerous moving parts
- Signs of overload, overheating or improper use
- Signs of improper modification
- Signs of contamination, corrosion and improper deterioration
- Dirt, clogging of the cooling openings, e.g. the air filter
- Density of the tank for water, air or other medium, condition of the pressure regulating valve.
- Usability of switches, control and setup devices
- Legibility and completeness of all safety-related markings or symbols, characteristic data and position indicators
- All externally accessible fuses comply with the data specified by the manufacturer (rated current, characteristic data)
- Evaluate the relevant accessories together with the device (e.g. detachable or fixed connection cables and protection).
- Defect due to overbending of cables, wires, pipes, and hoses
- Obstacles and hazards in the vicinity of the system and on paths of the Robotino
- Safety areas free of workpieces and other material
- Signs of smoke, heat, noise or deformation on (rechargeable) batteries

The above information has been compiled in all conscience and is in part taken from DIN EN 50699. In general, the attention of all responsible persons, who deal with the system on a daily basis, is required.

### 3 Safety Checklist

The safety functions of the entire system should be checked monthly to ensure correct operation. The applicability of the test steps listed below depends on the respective system configuration:

Operating Resource	Activity	Interval	Criteria
Emergency Stop	Perform a cyclical function test for each individual emergency stop button. To do this, press the button and then check whether the emergency stop chain is triggered. Then acknowledge using the reset button and check whether all components are unlocked.	1 month	function test
Operator Safety	Perform a cyclical function test for each safety door switch and for each safe inductive proximity sensor, if any. To do this, open the safety door during operation or remove a material box from the conveyor belt so that the safety switch triggers a safety stop. Check whether the components enclosed by the housing come to a standstill. Then close the safety door or push the material box back into position and check the automatic restart or the acknowledgement function.	1 month	function test
Enabling Device of Robot Applications	Set the machine to be tested to manual mode and push the enabling switch to the center position. While moving an axis in any direction, press the enabling switch fully (panic position). The axis should come to an immediate stop. Then continue to move the axis (with the enabling switch in the center position) while releasing the enabling switch. Again, the axis should stop moving immediately.	1 month	function test
Safety Sensor	Cyclical function test of all safety sensors (laser scanner, light curtain, safety mat), if any, according to manufacturer's specifications.	1 month	function test
Universal Robots Backdrive	Testing of the "Backdrive" safety function according to manufacturer's specifications.	1 month	function test

## 4 Components Checklist

Operating Resource	Activity	Interval	Criteria
Residual Current Devices (RCD)	Testing by means of suitable measuring and RCD testing equipment by a qualified electrician or electrically instructed person in non-stationary operation.	1 month	effectiveness
	Functional test by pressing the RCD test button in stationary operation	6 months	function test
	Functional test by pressing the RCD test button in non-stationary operation	1 day	function test
Conveyor Belts	Visually inspect the condition of the belts for erosion (fraying/small cracks). Replace if necessary.	3 weeks	visual inspection
	Visually check whether the belts are centered between the guide rails. If necessary, align the belt position by means of the adjusting screws on the deflection heads.	3 weeks	visual inspection
Stopper	Check whether the stopper reaches the end positions in approx. 200 ms (see HMI), adjust pressure or throttling if necessary.	3 weeks	visual inspection
	Check that the cylinder surface and seal are clean. If necessary, clean with a dry cloth.	3 weeks	visual inspection
Fan	Cleaning the ventilation grilles of all fans (robot controller, MES PC, etc.)	6 months	visual inspection
Linear Axes	Check linear axes (e.g. CP-AM-DRILL) for pollution and clean with a dry cloth, if necessary	3 weeks	visual inspection
	Maintenance according to the manufacturer's operating instructions	according to manufacturer	according to manufacturer
Compressors	Drain condensation water	weekly	period
	Maintenance according to the manufacturer's operating instructions	according to manufacturer	according to manufacturer
Label Printer	Empty label compartment	if required	visual inspection
	Change label roll	if required	visual inspection
Robot Applications	Check tool mounting screws	3 months	function test
	Check vacuum suction heads for cracks and pollution	6 months	visual inspection
	Maintenance of the robot system according to the robot manufacturer's operating instructions	according to manufacturer	according to manufacturer
Mitsubishi Robot	Replace the batteries in the robot base. The batteries should be replaced when the robot is switched on and the emergency stop button is pressed.	1 year	period
	Controller type CR750-D only: Check the battery level of the robot. This can be done directly on the teach box of the robot (menu: "Maintenance Forecast"). The battery should be changed before the forecast time has expired: <ol style="list-style-type: none"> <li>1. Turn the controller power ON once. (For approx. one minute.)</li> <li>2. Turn OFF the power supply of the controller and open the interface cover of the operation panel. The battery is in the interface cover.</li> <li>3. Pick and pull up the connector of the old battery and</li> </ol>	3 weeks	visual inspection

	remove from battery holder. 4. Fix the new battery into the battery holder. Install so that the lead may come out to the front. 5. Connect the connector of the new battery cable. Connect so that the red lead may become left-hand side. Complete the work within 3 minutes after removing the old battery. 6. Close the interface cover of the operation panel certainly.		
	Check toothed belt and replace if necessary	1 year	period
	Lubricate gearbox in each axis according to manufacturer's instructions	3 years	period
KUKA Robot	Replace timing belt A3 and A5	1 year	period
	Grease the inside of the covers A1, A2, A3 and A5.	1 year	period
	Replace system board battery	10 years	period
UR Robot	Inspect blue lids on all joints for any cracks or damage according to manufacturer's specifications	6 months	visual inspection
	Inspect that screws for the blue lids are in place and properly tightened according to manufacturer's specification	6 months	visual inspection
	Inspect flat rings for wear and damage according to manufacturer's specifications	6 months	visual inspection
CNC Machines	Carefully clean the working area from chips and other dirt	1 day / as needed	visual inspection
	Manually open and close the vise once after each system startup	1 day / as needed	period
	Check coolant and lubricant level	1 day	visual inspection
	Cleaning and oiling of bare parts	1 week	period
	Check the fluid level in the separator tank and the oil level of the compressed air oiler of the pneumatic maintenance unit.	1 week	visual inspection
	Before longer standstill (> 6 months), coat bare parts with anti-corrosion coating.	-	period
	Maintenance depending on the respective machine type according to the manufacturer's operating instructions	according to manufacturer	according to manufacturer
3D Printer	Clean the build platform and the working area	1 week / as needed	visual inspection
	Change filament	1 year / as needed	period
	Maintenance of technical components (belts, axles, nozzle, etc.) according to the manufacturer's instructions.	according to manufacturer	according to manufacturer
MES-PC	Operating system upgrades only after prior consultation with Festo Didactic technical support	according to availability	according to availability
	Operating system updates according to availability from the manufacturer	according to availability	according to availability
Sinema RC-Server	Operating system updates according to availability from the manufacturer	according to availability	according to availability



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