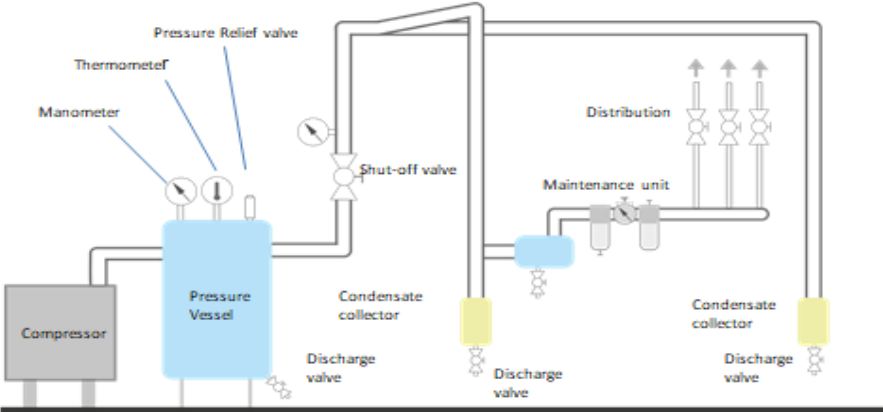




Best Practice	SWITCH-OFF OF APPLIANCES IN NON-OPERATIONAL TIMES	CAIR-03
Application	Compressed Air Systems	
SME sector	Industrial	
SME Sub-sector	All	
Technical description	In many factories the compressed air system runs overnight or on weekends and holidays although the production stands still in these times. 95% of leakages occur in the distribution system which causes the system itself to consume unnecessary energy during down times of production.	
Recommendation for optimisation	<p>During times, in which production stands still, and thus no users are active in the system, it is recommended to shut down the compressed air system completely or at least unused parts of it.</p> <p>There are several possibilities:</p> <ul style="list-style-type: none"> • Automatic separation of the distribution network from the compressors In this scenario losses can be reduced by separating the system, or at least parts of it from the compressors. This can be done by an automatic valve with a time switch. It is important that the time switch is programmed correctly. About 30 min after end of production the valve closes and leaves the compressor and dryers running. 30 min before beginning of production the valve opens slowly and fills the network gradually with compressed air to avoid overload of the processing units such as dryers and filters. • Automatic switch-off of the whole system This requires the installation of a control system with electrically operated valves. The timer should be set in a way that the compressed air treatment units are fully operating when starting the compression again. • Automatic decoupling of network parts This method decouples parts of the system from the compressors and compressed air treatment units and switches those appliances off. This requires an automatic valve and switch system with electrically operated valves. The switch off system should be programmed in such a way that the compressed air treatment units are fully ready at the beginning of production. Additionally, manual switches should be installed so it is possible to separate the compressor from the distribution system during non-business hours (in case the automatic system fails). • Manual switch decoupling of network parts The principle is the same as the automatic shut off only for the steps to be done manually. It is important to give the employees, responsible for the compressed air system, the proper training for this method to avoid damages to the system. Also a few notes should be placed at the valves and switches. 	



Schemes and diagrams	 <p style="text-align: center;">Scheme of an industrial compressed air system</p>
Economics	From 50 EUR per timer device
Energy savings	Potential energy savings of 20 to 25%
Economic savings	About 20%
Average Payback Time	Less than 3 years
Emissions	0.702 kgCO ₂ /kWh _{el} (CO ₂ emitted by production for one hour of 1 NI/min of compressed air)
Environmental benefits	Reduction of CO ₂ emissions due to lower energy requirements
Main NEBs (Multiple benefits)	<input type="checkbox"/> Environmental benefits <input checked="" type="checkbox"/> Increased productivity <input checked="" type="checkbox"/> Work environment/ Health/Safety <input type="checkbox"/> Increased competitiveness <input checked="" type="checkbox"/> Maintenance
Replicability	High



Related measures	<ul style="list-style-type: none"> • CAIR-01: Optimisation of compressed air users/appliances • CAIR-02: Optimisation of the pressure in the system • CAIR-04: High Level Control • CAIR-05: Sizing and type of compressor • CAIR-06: Network Optimization • CAIR-07: Reduction of leakages • CAIR-08: Heat recovery
Case study	<p>Time devices installation (Austria, 2010)</p> <ul style="list-style-type: none"> • Initial Situation: compressors operating outside working hours • Description of the optimisation: by installing a time switch and valves the compressors are turned off over the night, saving 6,500 kWh/year • Implementation costs: unit cost of a timer 50 EUR • Payback Time: 2 months
References	<p>Kulterer, K., Huber J., Ruthner H., Oetiker H., Pucher C., Steinbrugger, C.: Leitfaden für Energieaudits zur Optimierung von Druckluftsystemen, klimaaktiv energieeffiziente betriebe, Wien 2015</p> <p>Larrabee C.: Managing Multiple-Compressor Systems: Utilizing Controls to Improve Performance</p> <p>3E Strategy, Department of Mechanical engineering, University of cape town: How to save energy and money in compressed air systems</p>

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