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CO2 cooling system for Insertable B Layer detector into the ATLAS experiment

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CO2 cooling has become a very interesting technology for current and future tracking particle detectors. A key advantage of using CO2 as refrigerant is the high heat transfer capability allowing a significant material budget saving, which is a critical element in state of the art detector technologies.
At CERN new CO2 cooling system has been constructed to serve for new ATLAS Insertable B-Layer (IBL) detector. Two independent cooling units, sharing one common accumulator, placed about 100m from the heat source, are designed to cool 14 individual staves with evaporative CO2 at the given pressure.
This paper describes the general system design, innovative redundancy approach, maintenance philosophy, control system implementation and the commissioning results including the performance tests in the proximity of the detector. Additionally the different failure scenarios and recovery techniques including cooling units swap procedure will be discussed.
The system tests and challenging commissioning proved precise temperature control over the long distance and expected performance. Looking forward for the IBL detector installation, cooling system will be prepared to serve for the next Large Hadron Collider physics run.

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