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Ontologically Controlled Autonomous Systems: Principles, Operations and Architecture presents the main principles, operations and architecture involved in the design of a novel type of supervisory controller called an ontological controller. An ontological controller can be used to supervise any type of controller; however its intended applications are industrial-strength complex autonomous control systems using advanced programmable controllers. An ontological controller supervises a programmable controller in order to: + Detect dynamically when the programmable controller is in a problematic control situation due to a violation of ontological assumptions and thus unable to achieve a pre-specified control goal (i.e. the identification operation), and + When possible, move the programmable controller into such a state from which it can regain its control and eventually achieve the pre-specified control goal in spite of the previous violation of ontological assumptions (i.e. the recovery operation). Ontologically Controlled Autonomous Systems: Principles, Operations and Architecture presents for the first time a complete formal framework and results for ontological control. All results presented in the book originate from the practical industrial experience of the author. The intended readers for Ontologically Controlled Autonomous Systems: Principles, Operations and Architecture are professionals and students working in industrial control, discrete control, discrete-event systems, artificial intelligence, autonomous systems, programmable (logic) control design, robotics, real-time planning, safety-critical systems, Petri nets and PLC standards such as IEC1131.