

The Right Components, Engineered as One

Inside our live pneumatic safety demonstration at the 2026 Advanced Manufacturing Expo

A safety sensor can detect a person. A safety valve can remove pneumatic energy. A brake can hold a load. But none of them solves the problem alone. **The hard part isn't sourcing good components; it's knowing which ones belong together, and engineering them to behave as one system.**

Donald Engineering's partnerships give our engineers access to leading machine safety and fluid power technologies. Our engineering experience is what makes those technologies work together as a complete solution. A pneumatic safety demo we featured at the 2026 Advanced Manufacturing Expo (AME) shows exactly what that looks like, live, working, and built from third-party certified components from our vendor partners.

OUR APPROACH

A safety system is only as good as the components it is built from and only as safe as the engineering that ties them together. Third party certified, high-quality components from trusted vendor partners are the starting point. Selecting the right ones for the application and integrating them so they behave as one verified safety function is what actually reduces risk.

Inside the Pneumatic Safety Demo

The setup: a vertically mounted rodless pneumatic cylinder operating inside a radar-monitored safety zone. The Inxpect sensor is the input device, a Keyence safety controller is the logic device, and two ROSS Controls safety valves are the output devices, one governing the motion circuit, one governing the brake circuit. Input, logic, and output, specified and integrated as a single predictable safety function.



Inxpect Radar Safety Sensor | Cat. 3, PLd

Detects a person entering the monitored zone and initiates the safety sequence. Its certified response time is a specified value, and it is one of the inputs used to size the zone.



Parker Origa Vertical Rodless Cylinder

The vertical axis being safeguarded. Its integrated brake is a static holding brake: it holds a load that is already stopped, it does not stop a moving one. That single characteristic drives the entire control sequence.



ROSS DM2 Valve | Cat. 4, PLc

Exhausts the brake circuit once motion has stopped, engaging the spring-applied brake to hold the vertical axis.



ROSS RSE Safe Exhaust Valve | Cat. 4, PLc

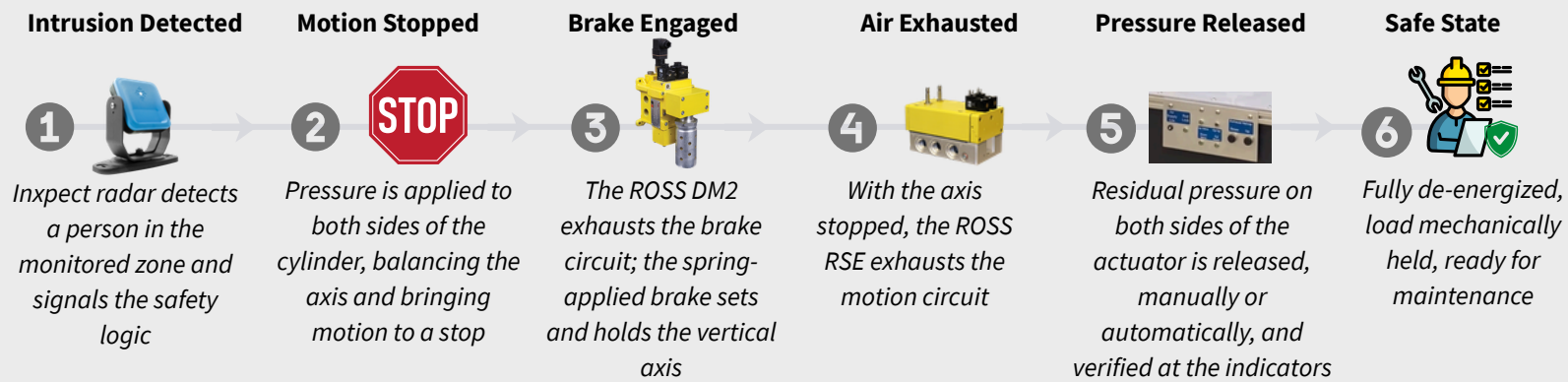
Controls pneumatic energy to the motion circuit. Motion is first brought to a stop, then air is exhausted so residual pressure cannot drive unexpected movement.

Manual Reset Panel & Pressure Indicators

Allows residual pressure on both sides of the actuator to be released and visually verified before anyone works on the machine.

From Intrusion to Safe State

Here is what visitors watched, step by step. When a person entered the monitored zone, the safety sequence was triggered:



Order matters. Engaging a holding brake against a moving load, or exhausting the motion circuit before the axis is stopped, would each produce a different and less safe outcome.

Why This Matters

Compressed air is stored energy. Even after a stop command, remaining pressure can create hazardous motion, and on a vertical axis, gravity is a second energy source that never switches off. When the sensor detects an intrusion, the first job is not to dump air, it is to stop the axis. Pressure is applied to both sides of the piston so the cylinder is balanced and motion is brought to a controlled stop. Only then is the motion circuit exhausted through the ROSS RSE.

That order exists because of what the cylinder's brake actually is. It is a static holding brake, designed to hold a load that is already stopped, not to stop a moving one. So the brake is set second: with the axis stopped, the ROSS DM2 exhausts the brake circuit, the spring-applied brake engages, and the load is held mechanically while the rest of the system is de-energized. Reverse that order and you are asking a holding brake to do a job it was never rated for.

Choosing radar for this zone was itself a design decision. Radar presence sensing is the right technology for guarding an area a person walks into, and the zone is sized using the sensor's response time together with the machine's stopping performance, so the safe state is reached before the hazard can be. A hazard where a hand or a finger can reach the danger point calls for different detection. That decision belongs in the risk assessment, not in the catalog.

For maintenance, remaining pressure on each side of the actuator can then be manually released and verified at the pressure indicators, bringing the system to a fully de-energized state while the brake continues to secure the vertical axis.

During the live demo, Donald Engineering team members demonstrated the safety components working together and showing a safe, de-energized state ready for maintenance.



Stopping the machine and making the machine safe are not the same thing.

Restarting the Right Way

Starting back up matters just as much as stopping. When the radar confirms the monitored zone is clear, the system does not simply return to operation. The circuits are then restored in a defined order: the ROSS RSE re-pressurizes the motion circuit after a 4-second confirmation delay, and 5 seconds after that, the ROSS DM2 restores the brake circuit. The brake is not released until the motion circuit can hold the axis, the same reasoning that governs the stopping sequence, running in reverse. Our demo example featured a manual valve reset, but we do offer options for an automatic valve restart to automate the process.

Only then is the machine ready for production, a controlled sequence that returns every element to its intended condition in the proper order.

No single component made this demo work.

That's the difference between installing safety products and building a machine safety system.

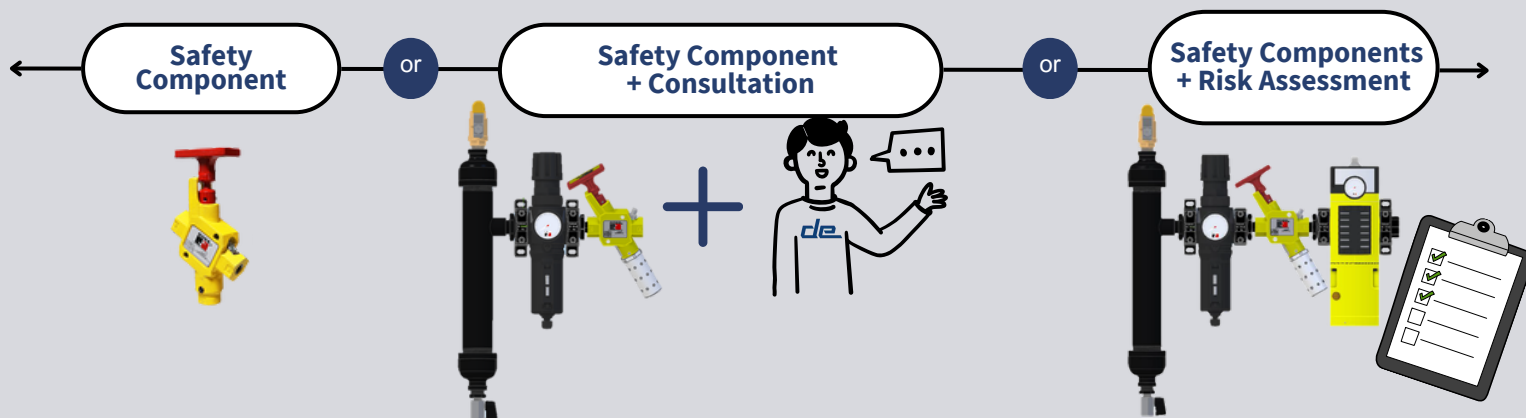
Donald Engineering Provides the Value.

Our partnerships give our engineers access to a broad toolbox of machine safety, pneumatic, hydraulic, sensing, and motion control technologies. More importantly, we understand how to select and integrate those technologies around the needs of the application.

Machine safety problems rarely fit neatly into one product category. The right solution may require several technologies working together to create one predictable response.

HOW WE HELP

The Donald Engineering Difference



We don't just recommend safety components, we help manufacturers engineer complete machine safety systems built around how the application actually behaves.

Have a machine safety challenge? Bring us the application.

Whether you need the right safety component, help applying it, or a more complete machine safety solution, our engineers can help determine the right path forward.

Contact our team today!



(616) 538-8340



sales@donaldengineering.com