



## How to prevent unexpected start-up in whole body applications with Robot Systems

The ISO standard for Safety Requirements for Industrial Robots (ISO 10218:2011) has been adopted across a wide number of regions, including the US (RIA 15.06 - 2012), Canada (CSA Z434 – 2014), Australia (AS 4024.3301/2:2017) and India (IS 14530:2019) making it quite possibly the most well harmonised machinery safety standards. This is great news for anyone who is involved in the design, manufacture or use of robots, especially across multiple countries and regions as the requirements will be identical between them.

Whole body access is any situation where an individual can be completely inside the perimeter of the safeguarded space. Robot systems often have large safeguarded systems associated with them and therefore whole-body access is something that must be considered. ISO 10218-2:2011 gives very clear guidance on how to prevent the unexpected start-up of a robot system while an operator is within the safeguarded space.

Firstly, if possible, the start and reset actuating controls should allow a clear and unobstructed view of the safeguarded space. This seems simple, however is often difficult to achieve with large areas, especially where machinery or supplementary equipment blocks the view or in dark or dusty environments.

If this is not practicable then presence sensing should be used. This can include light curtains, laser scanners, safety mats, radar etc. For small and simple areas this can be very effective in avoiding any undetected individuals within the space. However, again, in large and complex areas this can be difficult to ensure full coverage without blind spots, the affect of light/visibility conditions also needs to be considered, along with the cost implications of presence sensing across a large area.

If the first two options are not practicable, and sometimes in addition if called for by the risk assessment, other protective means should be used to prevent unexpected start-up. Examples include measures to lock a guard in the open position (such as trapped key systems incorporating safety keys or interlock blocking devices), multiple means for the isolation and lockout of the hazardous equipment located within the safeguarded space or time limited reset devices within the safeguarded space to facilitate a walkthrough check before reset.

Only if there are no other means possible to prevent unexpected start-up then an audio-visual pre-start warning can be used along with enough easily identifiable and accessible

emergency stop devices in case someone was to be alerted by the signal while inside the safeguarded space. Fortress interlocks has a wide range of products to help you reduce the risk of unexpected start-up in a robot system including a range of fully mechanical or electromechanical gate interlocks which can be fitted with safety keys, including forced extraction safety keys. We also have a mechanical, retrofittable interlock blocking device which can be added to existing systems without changing the existing interlocks or wiring.

Contact your local Fortress representative if you have any questions or enquiries.

Means to prevent unexpected start-up, in the order to consider them.

- 1 • Give a clear and unobstructed view of the safeguarded space from the start/reset device
- 2 • Use presence sensing devices to detect operators throughout the safeguarded space
- 3 • Provide other protective measures:
  - Multiple means for the isolation and lockout of the hazardous equipment
  - Measures to lock a guard (gate) in the open position
  - Additional time limited reset devices located inside the safeguarded space
- 4 • Audio-visual pre-start warning signal that can be heard inside and give enough time to get out