ABB Robot Specification

Asia-Pacific Driveline

SD-2040

ISSUED   February 25, 2020
REVISED

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1. Scope

The specification contains principles, guidelines, and requirements for the design, redesign, and implementation of robotic workcells containing one or more ABB robots for use in process or manufacturing at Nexteer Automotive.

2. General

2.1 Purpose

The purpose of this specification is to make common incoming robotic workcells to provide the Nexteer Automotive manufacturing community (including engineers, skilled trades, safety personnel and equipment suppliers) with the knowledge, tools, and methods to achieve safe robust robotic workcells.

2.2 Deviations

Any deviations from this standard shall be addressed during Design Reviews and Machine Risk Assessment development with alternative solutions documented and approved by the Nexteer Purchasing Engineer, Controls Engineer, and H&S Representatives. Any approved deviations shall only apply to that specific instance and shall not be considered a change to this specification or acceptable for future M&E purchases.

3. Robot Selection

3.1 Selecting a Robot

The supplier is required to analyze workcell requirements to determine max payload and reach dimensions needed for the application. Suppliers shall consult ABB if they are not capable to determine max payload and reach dimensions. The appropriate robot model shall be selected from the latest version of SD-2007, Approved Components List. The Nexteer Purchasing Engineer shall review with Plant Personnel regarding preferred / common robot models in a specific Plant.

3.2 Required Options

Nexteer requires all incoming robots to have the following options, at a minimum; other options may be needed specific to individual applications.

3.2.1 ProfiNet Communication Port

3.2.2 UL Options

1. Door Interlock (744-1 or 742-1)

2. Operating mode selector limited speed max 250 mm/s (735-2 or 735-4). Below full speed manual option in red circle is not allowed.

4. Workcell Safety

General Safety: refer to SD-011 (Specification for Safety Circuits) and SD-012 (Design-In Health and Safety Specification) for general safety requirements.
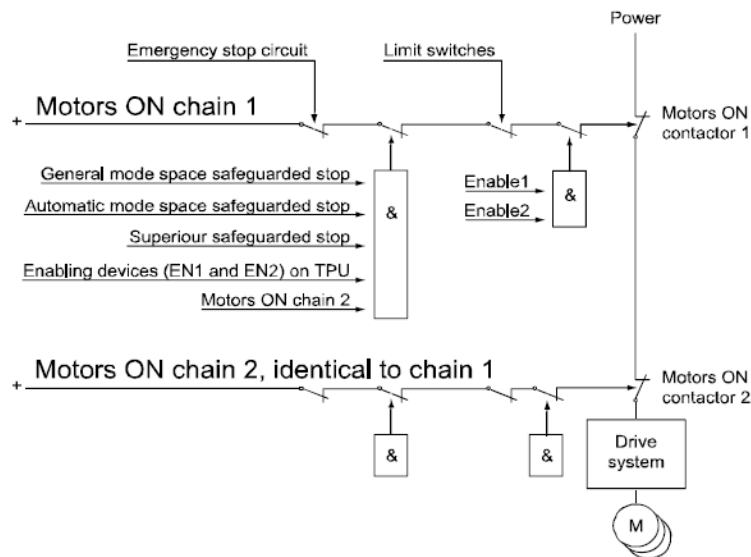
4.1 Guarding

Robot shall be enclosed with guarding that meets SD-012 specification and any standards referenced in SD-012.

Supplier shall review cell layout and any specific floor plan restrictions that could affect placement of guarding with Nexteer Purchasing Engineer. Examples: support beams, walkways, building equipment, and ductwork.

4.2 Safety Circuits

4.2.1 Basic Circuit

4.2.2 AS (Automatic Mode Space Safeguarded Stop): This safety input works only in Automatic Mode. All interlocked safety door switches, and any other safety inputs required while automatic mode is selected, are to be connected to this channel.

4.2.3 GS (General Mode Space Safeguarded Stop): This safety input workings for both Automatic and Manual Modes. Safety Inputs, such as light curtains required while the robot is powered, are to be connected to this channel.

4.2.4 Emergency Stops:

4.2.5 X5 terminal block (Safety Stop by AS and GS) / Reference Only

4.2.6 X1 and X2 terminal block (Emergency Stop)

Below diagram shows default jumper setting. If there are more E-Stop Inputs, that can be connected below red line. Between X1-3 & X1-4 and X2-3 and X2-4.

5. QUALIFICATION

5.1 Runoff

Refer to SD-001 (General Manufacturing and Equipment Specifications) and SD-002 (Manufacturing Equipment Statistical Qualification Requirements) for general qualification requirements in addition to the requirements below.

5.1.1   Mounting

Robot shall be mounted to ABB specifications. Baseplate shall be from ABB or an exact match of their drawing and shall include the proper datum features.

Tie-Bars (locating jigs) should be used to position the robot in relationship to the other machines / objects within the workcell.

5.1.2   Mastering

Suppliers shall demonstrate the robot is mastered properly and provide zero-position program.

5.1.3   Payload & Inertia

Accurate payload and center of inertia data is critical to proper robot performance. Suppliers shall be responsible for providing this information and setting up the proper motion profiles for the robot; both with and without parts.

5.1.4   Faults / Recovery

The Supplier shall provide a complete robot process fault list.

Suppliers shall provide a fault recovery matrix that shall explain how to recover from robot process faults.

Recovery shall be demonstrated by stopping the robot at various positions within the cycle and observing that the robot recovers without Operator intervention.

6.   Documentation Requirements

Backups of all robots shall be provided by the supplier. A backup of the robots as received from ABB and as shipped from the supplier build site shall be provided. These backups should include program files. Files shall be provided on a USB flash drive.

A hardcopy and digital copy of the following shall be provided by the supplier.

- Robot, Controller and Teach Pendant Serial Numbers.
- Robot programs, with description of task being performed.
- Payload and inertia information for both empty tool and tool with parts.
- Flow chart of robot programs.
- Any applicable robot registers used in programming (registers, position registers, vision registers, etc.).
- Inputs / Outputs (digital, robot, group, user, etc.).
- Positions of user frames.
- Position of user tools.

Additionally, all documentation provided by the robot manufacture shall be provided by the Supplier.

RECORD OF REVISIONS

Revision No	Date	Section	Description
001	25FE20	ALL	Initial release.
002			
003			
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