Skills Canada Alberta - Skill 19

Industrial Control

Post-Secondary Competition

Day 1 - 2026

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1. Introduction

1.1 General

With this project, we will assess your abilities in the following criteria:

- Ability to analyze technical data
- Quality of wiring and installation
- Capacity to implement and automated process
- Troubleshooting

1.2 Step A: Installation of Electrical Raceways and Components

Part of all process type projects is the installation of the raceways and components that function as inputs and outputs. We will assess the quality of your installation, interpretation of site drawings, and precision of equipment placement.

1.3 Step B: Wiring an automated process within a panel

As a technician, you should have the ability to completely wire a system and make the necessary modifications. We will assess the quality of your manual work, the organization of components, and the use of materials provided.

1.4 Step C: Programming the automated process

You are provided with a function, and you must program the automated process with your PLC. The system must be functional and adhere to the instructions.

1.5 Step D: Commissioning, Start-up and Troubleshooting

Your ability to validate the safety of your installation prior to power up and/or detect and solve problems will be assessed.

2. Conductors

2.1 Size and use

1. Power connections must be 14 AWG
2. DC Input/Output single conductors must be blue 18 AWG
3. DC Input/Output cables must be 18 AWG, 2-conductor
4. Ground conductors must be 14 AWG green conductors.
5. Any exceptions to paragraphs 1, 2 & 3 will be specifically mentioned on the drawings.

2.2 Colour Code

Single Phase Power	Line	Black
	Identified	White
Three Phase Power	Line 1	Red
	Line 2	Black
	Line 3	Blue
DC Control	Input/Output	Blue
	18/2 Cable	Black/White

3. General Description

3.1 Process Description

Edmonton International Airport (EIA) is the primary air passenger and air cargo facility for the Province of Alberta's capital city. It is a hub facility for Northern Alberta and Northern Canada providing regularly scheduled non-stop flights to over fifty communities in Canada, the United States, Latin America and Europe. It is Canada's largest major airport by total land area, and 5th busiest airport by passenger traffic. The Skill 19 project represents that portion of automated process for sorting and transporting passenger luggage within EIA.

3.2 Process Equipment Description

The system consists of the following components:
- Control panel equipped with:
  - Amber (L1), White (L2) indicating lights
  - Emergency Stop push-pull button (PB1)
  - Green (PB2), Red (PB3) and Black (PB4) momentary push buttons
  - Maintained 3 positions selector switch (SS1 & SS2)
  - Green (L4), Blue (L5) and Red (L6) pilot lights
- Unidirectional Sorting Belt Conveyor, driven by the motor M1 (fed by K1 contactor)
- Bidirectional Distribution Belt Conveyor, driven by the motor M3 (fed by K3 Contactor)
- Bidirectional Size Belt Conveyor, driven by the motor M2 (fed by K2 contactor)
- Optical sensors [replaced by limit switches for the purpose of this contest] (LS1 to LS4)
- A pneumatic actuator, driven by a solenoid (SOL) (White Pilot Light)

3.3 Process Diagram
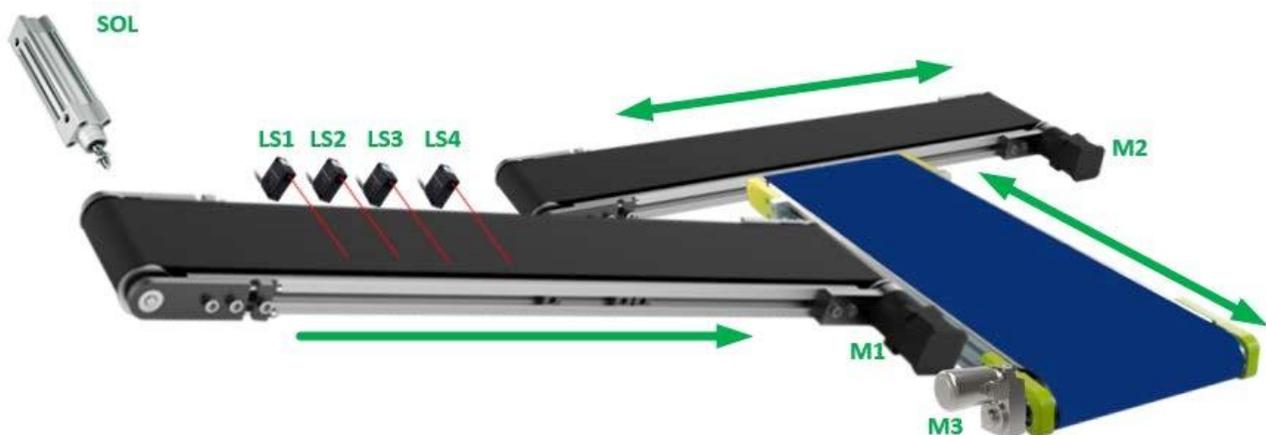
4. Technical Details

4.1 Emergency Stop Circuit

The system is equipped with a general Emergency Stop push-pull button.

The Emergency Stop button mounted on the Control Panel Door will be used in conjunction with a 24 VDC relay (non-PLC) to create a Master Control Relay (MCR)/Emergency Stop Circuit. The 24 VDC relay will be equipped with both normally open and normally-closed contacts, as required.

When the Emergency Stop button is depressed, The Master Control Relay/Emergency Stop Circuit will de-energize all of the PLC's outputs.

All of the PLC's outputs shall remain de-energized until the Emergency Stop button is reset (pulled).

The following tables are a recommended assignment of the inputs and outputs for your programmable control. As controllers vary in how they are connected and function, you must check your PLC to see if these assignments are suitable.

4.2 Input Table

Input Detail	Symbol	Contact Type	PLC inputs Assignment
Master Control Relay / Emergency Stop Circuit	MCR	NO	In0
Green push button	PB2	NO	In1
Red push button	PB3	NC	In2
Black push button	PB4	NO	In3
3 positions Selector Switch 1 - Left Position	SS1_1	NO	In4
3 positions Selector Switch 1 - Right Position	SS1_3	NO	In5
3 positions Selector Switch 2 - Left Position	SS2_1	NO	In6
3 positions Selector Switch 2 - Right Position	SS2_3	NO	In7
Optical sensor 1	LS1	NO	In8
Optical sensor 2	LS2	NO	In9
Optical sensor 3	LS3	NO	In10
Optical sensor 4	LS4	NO	In11

4.3 Output Table

Output Detail	Symbol	PLC outputs Assignments
Amber indicating light - Wall	L1	Q0
White indicating light - Wall	L2	Q1
Solenoid (White Pilot Light)	SOL	Q2
Green pilot light - Door	L4	Q3
Blue pilot light - Door	L5	Q4
Red pilot light - Door	L6	Q5
Contactor K1	K1	Q6
Contactor K2 Forward	K2_F	Q7
Contactor K2 Reverse	K2_R	Q8
Contactor K3 Forward	K3_F	Q9
Contactor K3 Reverse	K3_R	Q10