Drexel University
Goodwin School of Technology and Professional Studies
Engineering Technology
MET 205: Robotics and Mechatronics
Lab 4 Sensors and Programming - DRCX

Objective:-

1. To learn interfacing sensors with the controller.
2. To run the programs in a continuous loops.
3. To pick and place objects with suction cup.

Some More Commands:

1. DO
Function: Controls ON/OFF of general-purpose output or memory output.
Format: DO <DO or MO number>, <output status>

2. TIMR
Function: Waits for a specified amount of time before advancing to the next step.
Format: TIMR <time>

3 CALL
Function: Calls and executes another program.
Format: CALL <program number>, <number of times>

Exercise:

1. Write a program so that the robot moves in a square until the stop button is hit.

2. Write a program to pick an object at PT1 and place the object at PT2.
   Hint: DO(0) is the output to control the suction cup.

3. Try 3 different speeds in the program in step 2. In each test, record the minimum delay for the suction cup to pick the object successfully. Plot a graph of minimum delay vs. speed percent (or speed (ipm or mm/s)).

Appendix:

Instruction	Description and Format
MOVA	Moves to point data position. MOVA <point number>, <maximum. speed>
MOVI	Moves from current position by amount of point data. MOVI <point number>, <maximum. speed>
MOVF	Moves until specified DI input is received. MOVF <point number>, <DI number>, <DI status>
JMP	Jumps to a specified label in a specified program. JMP <label number>, <program number>
JMPF	Jumps to a specified label in a specified program according to the input condition. JMPF <label number>, <program number>, <input condition>
JMPB	Jumps to a specified label when general-purpose input or memory input is in the specified state. JMPB <label number>, <DI or MI number>, <input status>
L	Defines the jump destination for a JMP or JMPF statement, etc. L <label number>
CALL	Runs another program. CALL <program number>, <number of times>
DO	Turns general-purpose output or memory output on and off. DO <DO or MO number>, <output status>
WAIT	Waits until a general-purpose input or memory input is set in the specified state. WAIT <DI or MI number>, <input status>
TIMR	Waits the specified amount of time before advancing to the next step. TIMR <time>
P	Defines a point variable. P <point number>
P+	Adds 1 to a point variable. P+
P-	Subtracts 1 from a point variable. P-
SRVO	Turns the servo on or off for all axes or a specified axis. SRVO <servo status> [,<axis>]
STOP	Temporarily stops program execution. STOP
MAT	Defines a matrix. MAT <number of rows>, <number of columns>, <pallet number>
MSEL	Specifies a matrix to move. MSEL <pallet number>
MOVM	Moves to a specified pallet work position on matrix. MOVM <pallet work position>, <maximum speed>
JMPC	Jumps to a specified label when counter array variable C equals the specified value. JMPC <label number>, <counter value>
JMPD	Jumps to a specified label when counter variable D equals the specified value. JMPD <label number>, <counter value>
CSEL	Specifies the array element of counter array variable C. CSEL <array element number>

C	Defines counter array variable C. C <counter value>
C+	Adds a specified value to counter array variable C. C+ [<addition value>]
C-	Subtracts a specified value from counter array variable C. C- [<subtraction value>]
D	Defines counter variable D. D <counter value>
D+	Adds a specified value to counter variable D. D+ [<addition value>]
D-	Subtracts a specified value from counter variable D. D- [<subtraction value>]
ORGN	Executes return-to-origin on all axes or a specified axis. ORGN [<axis>]
ACHA	Defines an arch motion by setting a position. ACHA <axis>, <position>
ACHI	Defines an arch motion by setting a distance. ACHI <axis>, <distance>
DRVA	Moves a specified axis to a specified point data position. DRVA <axis>, <point number>, <max. speed>
DRVI	Moves a specified axis a distance equal to specified point data from current position. DRVI <axis>, <point number>, <maximum speed>
SHFT	Shifts the coordinate position by amount of specified point data. SHFT <point number>
TON	Runs a specified task. TON <task number>, <program number>, <start type>
TOFF	Stops a specified task. TOFF <task number>
JMPP	Jumps to a specified label when the axis positional relation meets the specified conditions. JMPP <label number>, <axis position condition>
MOVL	Executes linear interpolation motion. MOVL <point number>, <maximum speed>
MOVC	Executes circular interpolation motion. MOVC <point number>, <maximum speed>, <locus type>