

IRC5

Advanced Programming stage 1

Course Outline

Duration 5 days

Beneficial to Supervisors, Team Leaders, Setters, Programmers, Advanced Operators

Students must have attended the IRC5 Programming and Operation Course or have an extensive working knowledge of the topics covered.

Subject areas

Introduction and Safety

Complex Tool Centre Points

Default Orientation
Tool Centre Point & Z
Tool Centre Point with X & Z
Stationary Tools

Work Objects

Reasons and Uses
Definition of Work Objects
Mirroring

Review

FlexPendant
Instructions
Techniques
Procedures
Data types
Optional Arguments

Modules

Program and System Modules
File Names & Module Attributes
Local & Global Data
Loading and Unloading during execution.
Task Structure

World Co-ordinate System

Reasons for use and comparison to other systems
Definition of World co-ordinates

World Zones

Definition of temporary and stationary World Zones

Working with Numbers

Assigning a value to data
Instruction / Operator definition
Incrementing and Decrementing and Clearing Values
Read a clock used for timing
Checking numerical data values using "IF" and "TEST"
Common Numeric Functions

Cycle Timing Instructions

Reset, Start and Stop a clock used for timing
Clock Data

Configuration Instructions

Robot configuration control during Joint and Linear motion
Interpolation method through Singular Points

Functions

Displacing a robot position
Reading the robot current position e.t.c.

Searching

Linear search for position
Circular search for position

Routine Handling

Explanation and Uses
Instructions and data
Backwards Handling
Error and Undo Handling

Position Displacement

Activating program displacement
Deactivating program displacement
Activating program displacement by specifying a value

Interrupts

Connecting a variable to a trap routine
Interrupt from a Digital Input Signal
Interrupt from an Analog Input Signal
Timed interrupts
Activating individual interrupts
Deactivating individual interrupts
Enabling all interrupts

Trap Routines

Uses
Commonly Used Instructions

Continued:

IRC5

Advanced Programming stage 1

Subject areas continued

Event Handling

Power on
Start
Restart
Stop
Qstop
Reset

Logical Instructions

For
While
Goto and Label

Advanced I/O Instructions

Changing Analogue Output values
Changing the value of a group of Digital Output signals
Waiting and testing for Inputs
Group/Binary signals
Cross Connections

Trigg Instructions

Defining a fixed position I/O event
Defining a fixed position Interrupt event

Performance Instructions

Reducing acceleration
Changing program velocity
Defining the payload of the robot
Soft Servo
External Axes activation & deactivation

Creating Your Own Instructions

Functions & Instructions

Communication Instructions

TPWrite, TPErase, TPReadFK & TPReadNum
User Interaction Instructions & Functions

Objectives

On completion, participants will be able to:

- Practise all areas of robot safety
- Perform basic programming techniques
- Create and properly use complex tool centre points
- Define and use World and work object co-ordinate systems
- Use numerical data instructions
- Perform String Manipulation
- Use instructions for avoiding singularity areas
- Use search and error handling instructions
- Use program displacement instructions
- Use interrupt instructions and trap routines
- Use event routines and backward handling
- Use Error Handlers and Undo Handlers
- Use communication instructions
- Use advanced I/O instructions
- Use instructions to enhance robot performance
- Create basic 'user' instructions and functions