Programming Languages

Instruction List

Instruction list is a low-level programming language for SoMachine Basic. It uses a single memory location called an accumulator to load and combine values before the result is stored in an object. It is not the easiest programming language but it is the most flexible as results can be achieved that are not possible in other programming languages. However, as SoMachine Basic has the ability to switch between Instruction List and other programming languages some restrictions are placed on this flexibility.

The following is an example of Instruction List program.

```
LD          %I0.7
OR          %Q0.2
AND NOT     %I0.6
STR         %Q0.2
```

When a SoMachine Basic application is downloaded to the M221 Logic Controller, the program is converted to Instruction List as this is what the controller actually processes. This can lead to some programming errors only being discovered when the application is downloaded.

Ladder

Ladder is a popular programming language as it is similar to electrical diagrams and visually, it is very easy to see what the program is doing. With the addition of in-line status display, it is also very easy to debug.

It consists of a series of program lines or rungs, so called because they look like the rungs of a ladder. To the left of the rung are a set of inputs and conditions that must be solved. To the right of the rung is an object (or objects) defining what to do with the result.

A ladder rung may look something like the following:

```
%I0.0  %I0.1              %Q0.7

--]  [------]  [-----------------(  )--
```

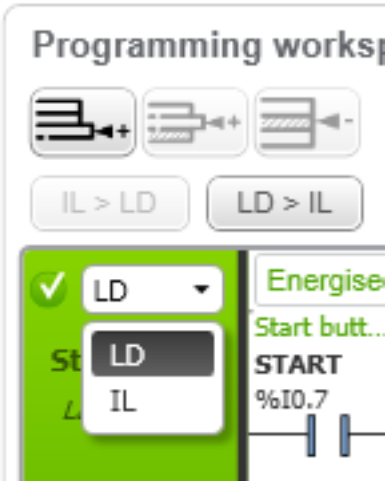
Ladder does have some limitations though. It cannot perform all functions due to limitations in the programming rules and it must be converted to Instruction List before it is processed by the logic controller.

Programming Languages (cont.)

Switching Between Languages

There are two ways to switch between languages in SoMachine Basic.

To change the language of a single rung, drop down the language selection box in the rung and choose the required language.



To change all the rungs at the same time, click either the **IL > LD** button or the **LD > IL** button.