

Maximum variable allocation in the IEC controllers

MP2300Siec

Both the MP2300Siec and MP2310iec controllers allow users access to the data area settings (these settings are not available on the 2600). With the default settings shown below, the user is able to define about 1516 K bytes of non retained variables.

Non retain	
Start user:	0
End user / Start system:	20000
End system (max 1572863):	1572862
Reserve per POU:	100

Retain	
Start user:	1572864
End user / Start system:	1572872
End system (max 1753080):	1753076
Reserve per POU:	10%

Declare user memory automatically

This total non retained memory is shared by the global variables and any local variables defined within a POU.

The total available memory for MP2300Siec (within 1 K) is:

1516K non retained

159K retained

Defining one more kilobyte of retained or non-retained variables will generate a compile error.

Removing the Reserve per POU values and setting the non-retained end user value to 0 results in the following:

The screenshot shows a dialog box titled "Data Area" with a close button (X) in the top right corner. The dialog is divided into two main sections: "Non retain" and "Retain".

Non retain section:

- Start user: 0
- End user / Start system: 0
- End system (max 1572863): 1572862
- Reserve per POU: 0

Retain section:

- Start user: 1572864
- End user / Start system: 1572872
- End system (max 1753080): 1753076
- Reserve per POU: 0

At the bottom of the dialog, there is a checked checkbox labeled "Declare user memory automatically". On the right side of the dialog, there are three buttons: "OK", "Cancel", and "Help".

The absolute maximum total available memory for MP2300Siec with settings above is:
1535.875K non retained
175.9766K retained

This makes sense because the total non-retained memory is 1,572,862 bytes or 1535.99 K bytes and the total retained is $1,753,076 - 1,572,864 = 180,212$ bytes or 175.98 K bytes.

The Reserve per POU values have nothing to do with the amount of memory available for a given POU. Setting these values only results in a lower amount of user memory available for declaring variables. The system uses the Reserve per POU values during the patch POU operation, which is not allowed on IEC controllers.

Data Area [X]

Non retain

Start user: 0

End user / Start system: 0

End system (max 1572863): 1572862

Reserve per POU: 100

Retain

Start user: 1572864

End user / Start system: 1572872

End system (max 1753080): 1753076

Reserve per POU: 10%

Declare user memory automatically

OK

Cancel

Help

For comparison, a system with data area values as shown above and 6 POU's declared will allow the following:

Total memory:

1535.125K non retained

159.88K retained

MP2310iec

Data Area [X]

Non retain

Start user: 0

End user / Start system: 20000

End system (max 1572863): 1572862

Reserve per POU: 100

Retain

Start user: 1572864

End user / Start system: 1572872

End system (max 2524152): 2524148

Reserve per POU: 10%

Declare user memory automatically

OK

Cancel

Help

Total available memory with a default data area (shown above) is:

1516K non retained

844K retained

Defining one more kilobyte of retained or non-retained variables will generate a compile error.

MP2600

Total available memory is:

974K non retained

175K retained

Defining one more kilobyte of retained or non-retained variables will generate a compile error.

Conclusion

The data area settings exposed for the MP2300Siec and MP2310iec controllers is misleading. The reserve per POU value does not actually reserve any memory for user declared variables in the POU.

The total system memory should be thought of as a pool, and declaring any variable anywhere will use resources from that pool.

The values in the data area setting should not be changed if the application does not have a memory issue. Setting the “End user” non-retained value to zero and the reserve per POU values to zero results in a slightly higher (depending on the number of POU’s declared) total amount of memory available for user declared variables.