

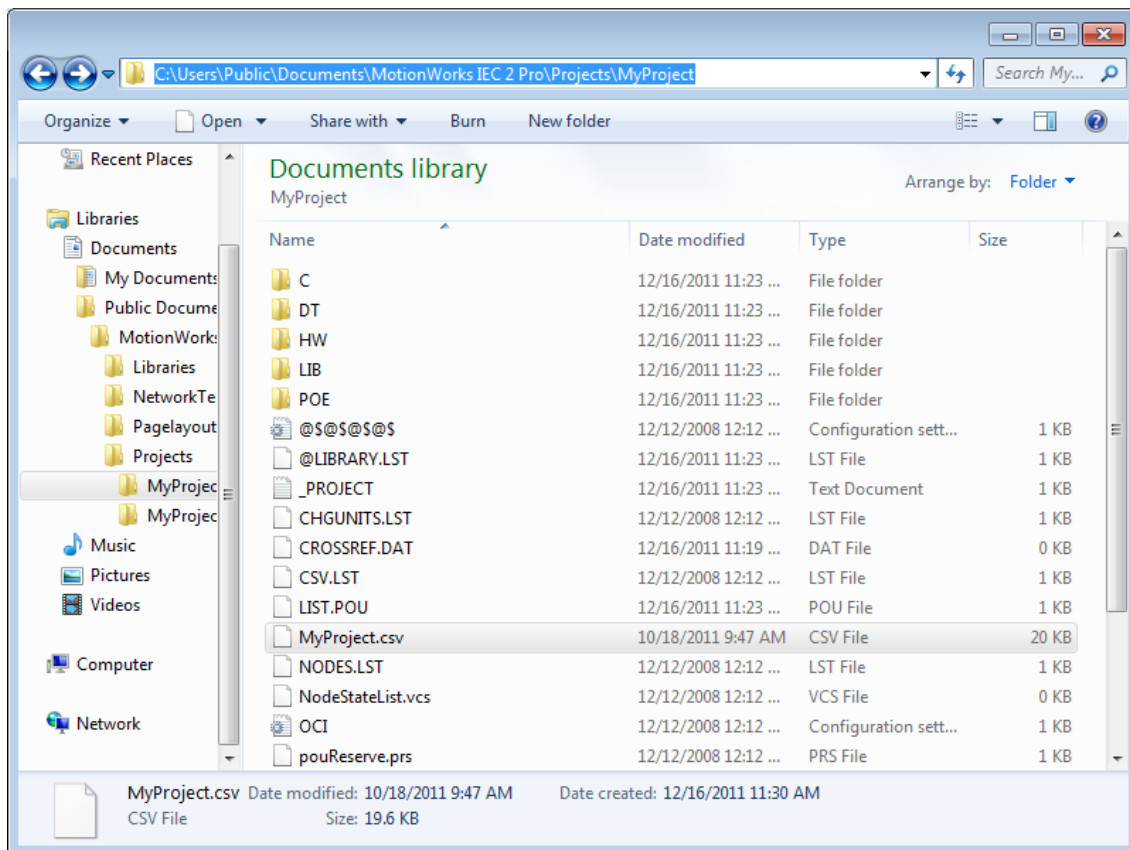
Product: MotionWorks IEC Express & Pro	Doc#: PN.MWIEC.01
Title: Importing tags from a Yaskawa MPiec controller project	

## 1 Overview

MotionWorks IEC will create an HMI file listing the user variables available via Modbus/TCP or Ethernet/IP. This comma separated value (CSV) file is located in the top level project directory, and is named the same as the project. The file contains the variable name, MotionWorks IEC address, data type, data size, configuration name, and resource name for each Modbus/TCP or Ethernet/IP variable.

## 2 File Location

A CSV file named the same as the project is updated in the project directory each time the MotionWorks IEC application is saved. For example, if the project is named “MyProject”, the file would be named MyProject.csv and be located in the MyProject directory, as shown by the image below.



### 3 File Format

The file contains comma separated values (CSV) data. The first row of the file is a header row column headings, “Tag or variable name”, “IEC Address”, “Data Type”, “Data Size (Bytes)”, “Configuration name”, “Resource name”. The subsequent rows contain the data for each variable. The details of each column are described below.

The following is an example of the CSV data as viewed with Microsoft Excel.

Tag or variable name	IEC Address	Data Type	Data Size (Bytes)	Configuration Name	Resource Name
NewVar1	%IX 24560.0	BOOL	1	MyConfiguration	MyResource
NewVar2	%IX 24560.1	BOOL	1	MyConfiguration	MyResource
NewVar3	%IX 24560.2	BOOL	1	MyConfiguration	MyResource
Counter	%IW 24562	INT	2	MyConfiguration	MyResource
Health	%IX 24560.3	BOOL	1	MyConfiguration	MyResource
V048	%IX 24560.4	BOOL	1	MyConfiguration	MyResource
V049	%IX 24560.5	BOOL	1	MyConfiguration	MyResource
Data	%M 343222	XYDataStruct	64018	MyConfiguration	MyResource
XTest	%QL 24576	LREAL	8	MyConfiguration	MyResource
JogIncrement	%MF 20788.0	LREAL	8	MyConfiguration	MyResource
Positions	%MB 20928.0	PosArr	36	MyConfiguration	MyResource
ErrorIDs	%MB 20964.0	ErrArr	36	MyConfiguration	MyResource
AxesStat	%MB 21000.0	StatArr	9	MyConfiguration	MyResource
OutToPC	%MB 1120	PCio	120	MyConfiguration	MyResource
InFromCNC	%MB 1000	PCio	120	MyConfiguration	MyResource
SquareOffset	%MF 15746.0	LREAL	8	MyConfiguration	MyResource

#### 3.1 Tag or Variable Name

A tag is a global variable in either a Modbus or EtherNet/IP memory region. The maximum character limit for the tag name is 24 characters.

#### 3.2 IEC Address

The IEC Address is formatted as follows.

- The first character is always ‘%’
- The second character indicates the type: I=Input to MP controller, Q=Output from MP controller, M=Memory mapped data.
- The third character corresponds to the data type. (For details see section 3.3 below.)
- Next, the IEC address specifies the byte offset.
- For bit data, the bit number is specified by appending decimal point followed by the bit offset, starting at 0.

Who the byte offset maps to the Modbus register or EtherNet/IP instance and offset in the next is described below.

### 3.2.1 Mapping IEC Address to Modbus Registers

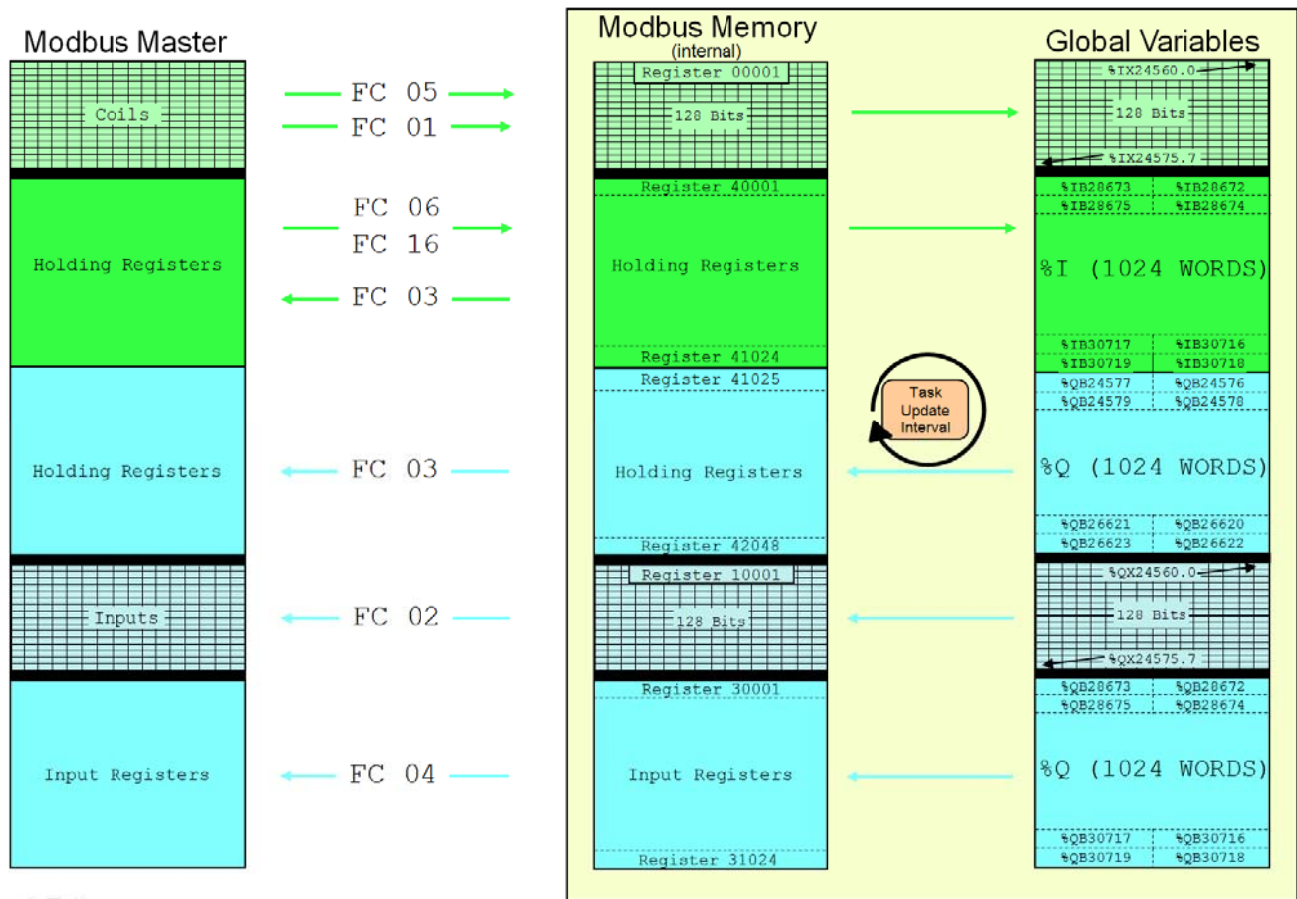
The following memory map describes how IEC addresses relate to Modbus registers.

☐	<b>Modbus FC#05 Qty: 128 Coils, Address Range: %IB24560 - %IB24575</b>
☐	<b>Modbus FC#02 Qty: 128 Inputs, Address Range: %QB24560 - %QB24575</b>
☐	<b>Modbus FC#04 Qty: 1024 Input Registers, Address Range: %QB28672 - %QB30719</b>
☐	<b>Modbus FC#06,16 Qty: 1024 Registers, Address Range: %IB28672 - %IB30719</b>
☐	<b>Modbus FC#03 Qty: 1024 Registers, Address Range: %QB24576 - %QB26623</b>

For example, if a Tag is declared at IEC address %IB28674, then it is located at Modbus Holding register 40003. (The exact register depends on whether the Master starts at 40000 or 40001.)

The figure below illustrates how a Modbus Master reads and writes global variables on the Modbus Slave.

### MP2000iec as a Modbus Server / Slave



### 3.2.2 Mapping IEC Address to EtherNet/IP Instances:

The following memory map describes how IEC addresses relate to Ethernet/IP instances.

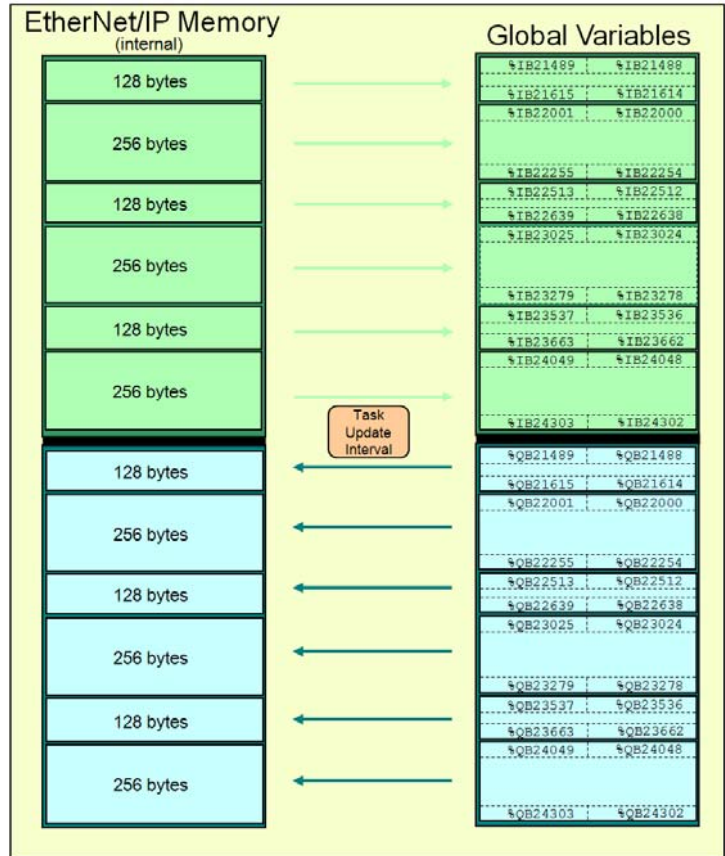
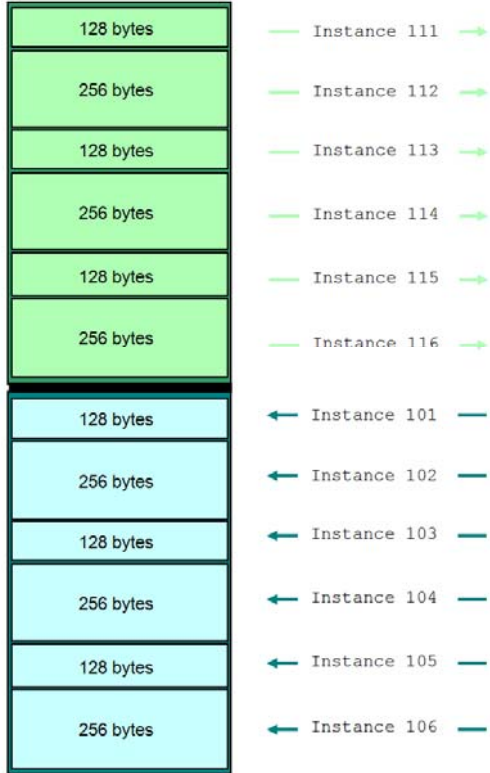
<b>E/P Output Instance #101, Qty: 128 Bytes, Address Range: %QB21488-%QB21615</b>
<b>E/P Output Instance #102, Qty: 256 Bytes, Address Range: %QB22000-%QB22255</b>
<b>E/P Output Instance #103, Qty: 128 Bytes, Address Range: %QB22512-%QB22639</b>
<b>E/P Output Instance #104, Qty: 256 Bytes, Address Range: %QB23024-%QB23279</b>
<b>E/P Output Instance #105, Qty: 128 Bytes, Address Range: %QB23536-%QB23663</b>
<b>E/P Output Instance #106, Qty: 256 Bytes, Address Range: %QB24048-%QB24303</b>
<b>E/P Input Instance #111, Qty: 128 Bytes, Address Range: %IB21488-%IB21615</b>
<b>E/P Input Instance #112, Qty: 256 Bytes, Address Range: %IB22000-%IB22255</b>
<b>E/P Input Instance #113, Qty: 128 Bytes, Address Range: %IB22512-%IB22639</b>
<b>E/P Input Instance #114, Qty: 256 Bytes, Address Range: %IB23024-%IB23279</b>
<b>E/P Input Instance #115, Qty: 128 Bytes, Address Range: %IB23536-%IB23663</b>
<b>E/P Input Instance #116, Qty: 256 Bytes, Address Range: %IB24048-%IB24303</b>

For example, if a tag is located and IEC address %QB22004, then it is linked to Instance 102, fifth byte.

The figure below illustrates how a Ethernet I/P scanner reads and writes global variables on the Ethernet/IP adaptor.

# MP2000iec as an EtherNet/IP Adapter

## EtherNet/IP Scanner



### 3.3 DataType

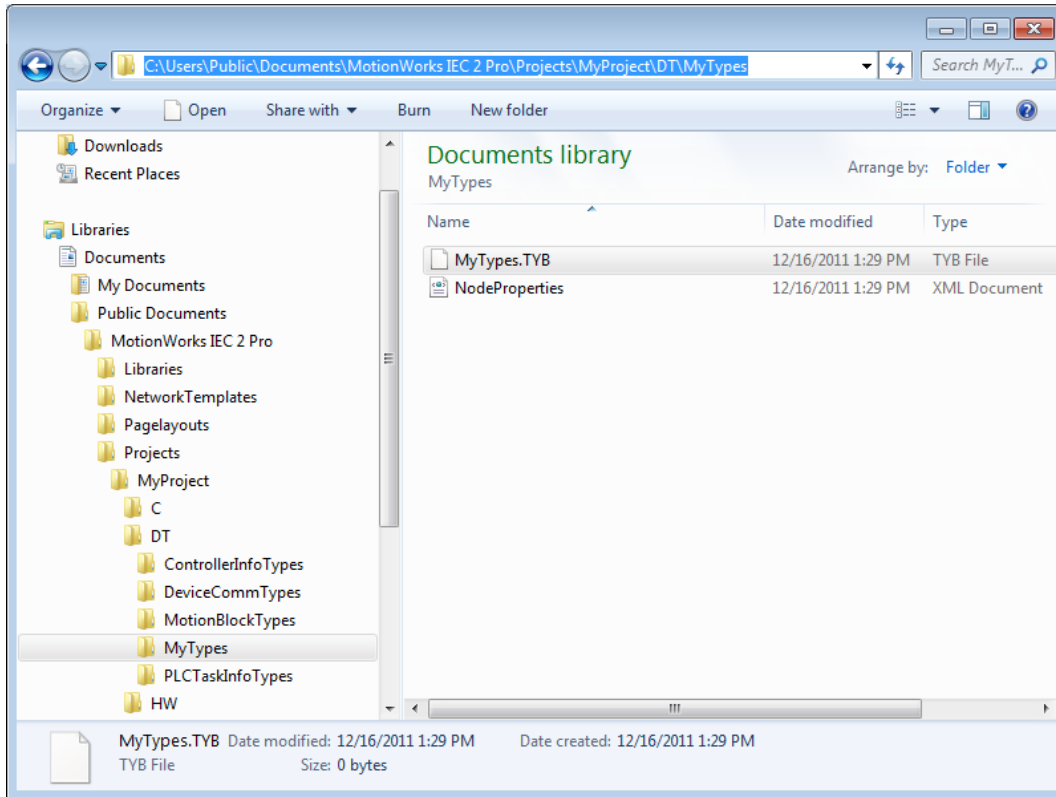
The table below list the standard data types, their range, their size and the character used in the IEC Address.

Character (Represents Size)	Data type	Description	Size (bits)	Range
X	BOOL	Boolean	1	0...1
B	SINT	Short integer	8	-128...127
W	INT	Integer	16	-32,768...32,767
D	DINT	Double integer	32	-2,147,483,648 up to 2,147,483,647
W	USINT	Unsigned short integer	8	0 up to 255
W	UINT	Unsigned integer	16	0 up to 65,535
D	UDINT	Unsigned double integer	32	0 up to 4,294,967,295
D	REAL	Real numbers	32	-3.402823466 E+38 up to -1.175494351 E-38 and +1.175494351 E-38 up to +3.402823466 E+38
L	LREAL	Long real numbers	64	-1.7976931348623158 E+308 up to -2.2250738585072014 E-308 and +2.2250738585072014 E-308 up to +1.7976931348623158
D	TIME	Duration	32	0... 4,294,967,295 ms
B	BYTE	Bit string of length 8	8	0...255 (16#00...16#FF)
W	WORD	Bit string of length 16	16	0...65,535 (16#00...16#FFFF)
D	DWORD	Bit string of length 32	32	0...4,294,967,295 (16#00...16#FFFFFFFF)

In addition, the user may define custom data types. These will be difficult to represent in the HMI if the tag is comprised of a structure, although it is possible to determine the **DataSize** of the User Defined Datatype by checking column E. Refer to section 3.4 for information about user defined datatypes.

### 3.3.1 User Defined Data types

Information describing the User Defined Data Types can be found in the DT folder under the Project Name folder. The DataType information is available in simple text format. Refer to the \*.TYB file. All potentially referenced datatypes are listed here, even if the user has referred to datatypes from other libraries.



Example DataType file:

```

237 0  Toolbox_dataTypes\Toolbo  SWError_Struct  1090  8  USER  STRUCT
238 0  TrackNumber  INT  3  0
239 0  FirstOnPosition  INT  3  0
240 0  LastOnPosition  INT  3  0
241 0  AxisDirection  INT  3  0
242 0  CamSwitchMode  INT  3  0
243 0  Duration  INT  3  0
244 0  ImproperOnPosition  INT  3  0
245 0  onOFFPositionError  INT  3  0
248 0  Toolbox_dataTypes\Toolbo  SWBoolArray  1091  1  USER  ARRAY  BOOL  1
248 0  0  255
250 0  Toolbox_dataTypes\Toolbo  SWLREALArray  1092  1  USER  ARRAY  LREAL  11
250 0  0  255
252 0  Toolbox_dataTypes\Toolbo  SWDINTArray  1093  1  USER  ARRAY  DINT  4
252 0  0  255
254 0  Toolbox_dataTypes\Toolbo  TrackBoolArray  1094  1  USER  ARRAY  BOOL  1
254 0  0  31
  
```

### **3.4 Configuration Name**

This will be the same as the configuration name in the project tree, for example, "MP2000\_Series". The configuration name is important if the project contains different types of controllers, such as an MP2300Siec controller and an MP2600iec controller.

### **3.5 Resource Name**

This will be the same as the name in the project tree, for example, "MP2300Siec". This is applicable if the MotionWorks IEC project contains more than one MPiec controller. The resource is associated with the IP address of the controller.

### **3.6 DataSize**

This is the number of bytes occupied by the datatype. NOTE: BOOL indicates that it occupies one byte, but when using Modbus and Ethernet/IP, BOOL can be treated as a bit.