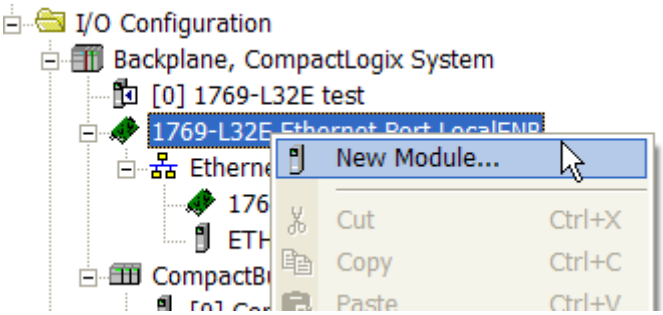
PLC Setting Example

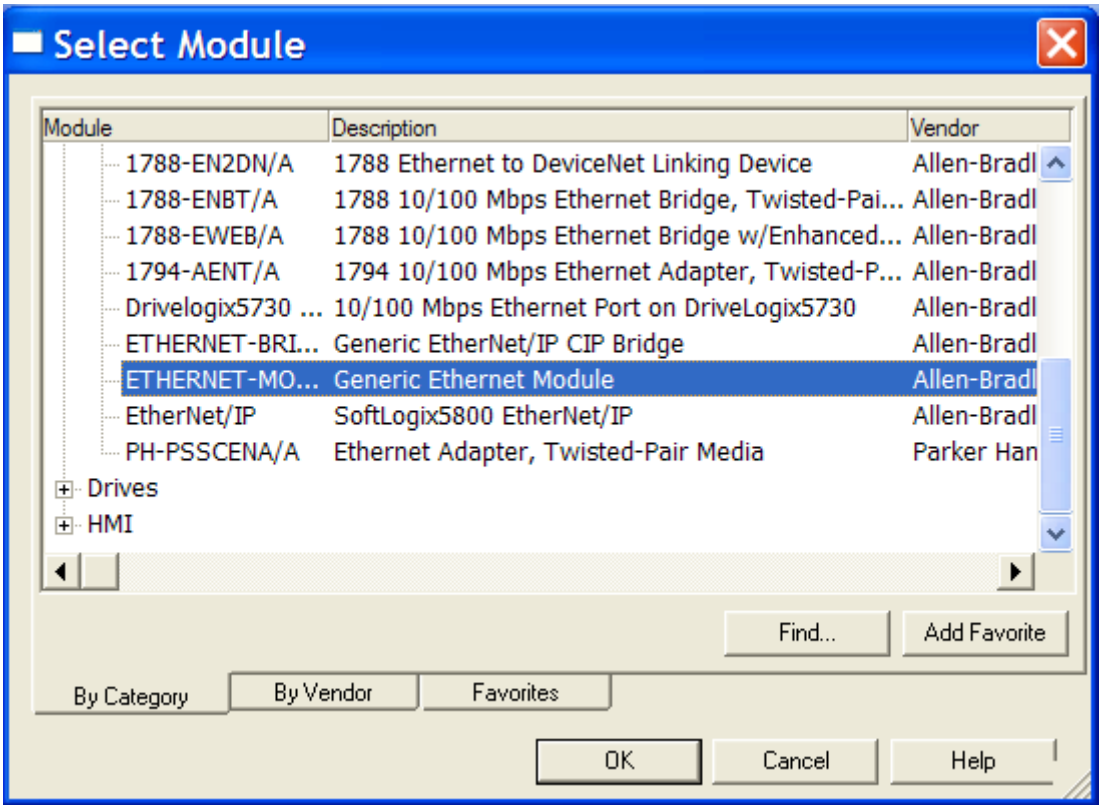
This procedure is written for using Rockwell Automation RSLogix5000 V15.02.00 and Allen Bradley CompactLogix L32E. If the system is not the same as listed above, setup may be different. Please contact to PLC manufacturer for detail as each PLC may be different

1. Register MASTER Controller Fieldbus unit to network

In the PLC I/O configuration, right click on “Ethernet Port Local ENB” and select “New Module”

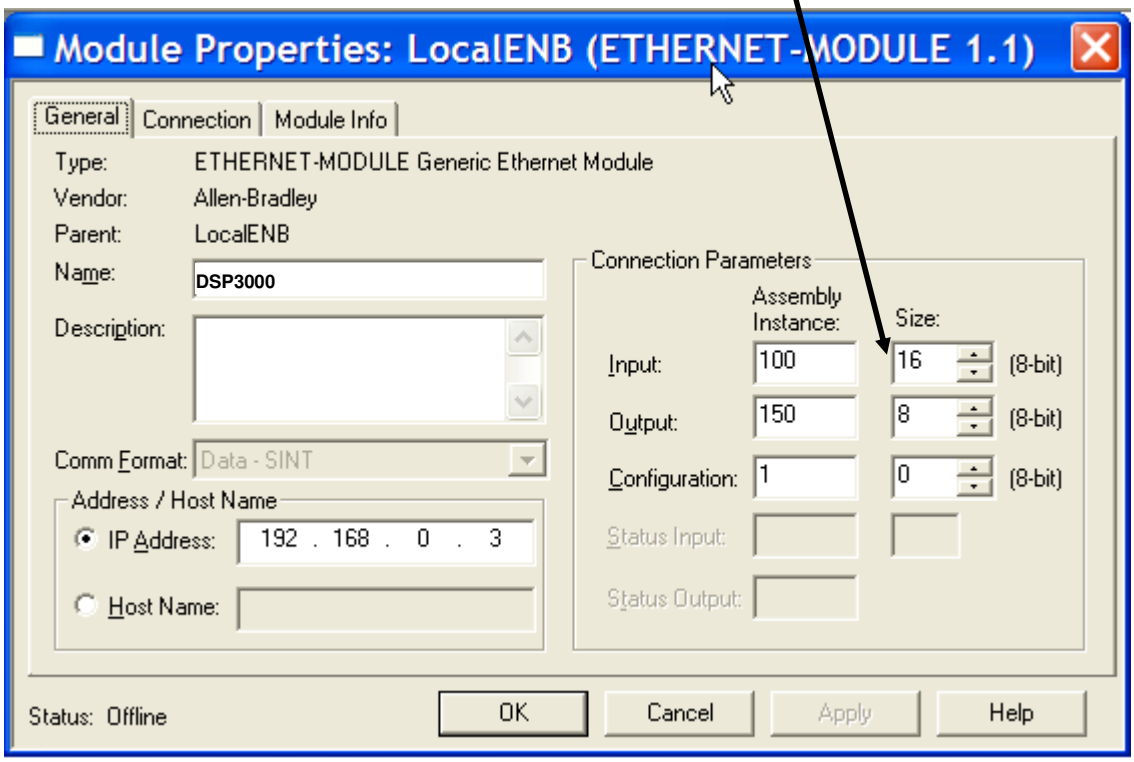


Select “Generic Ethernet Module” from “module” list and click the OK button.

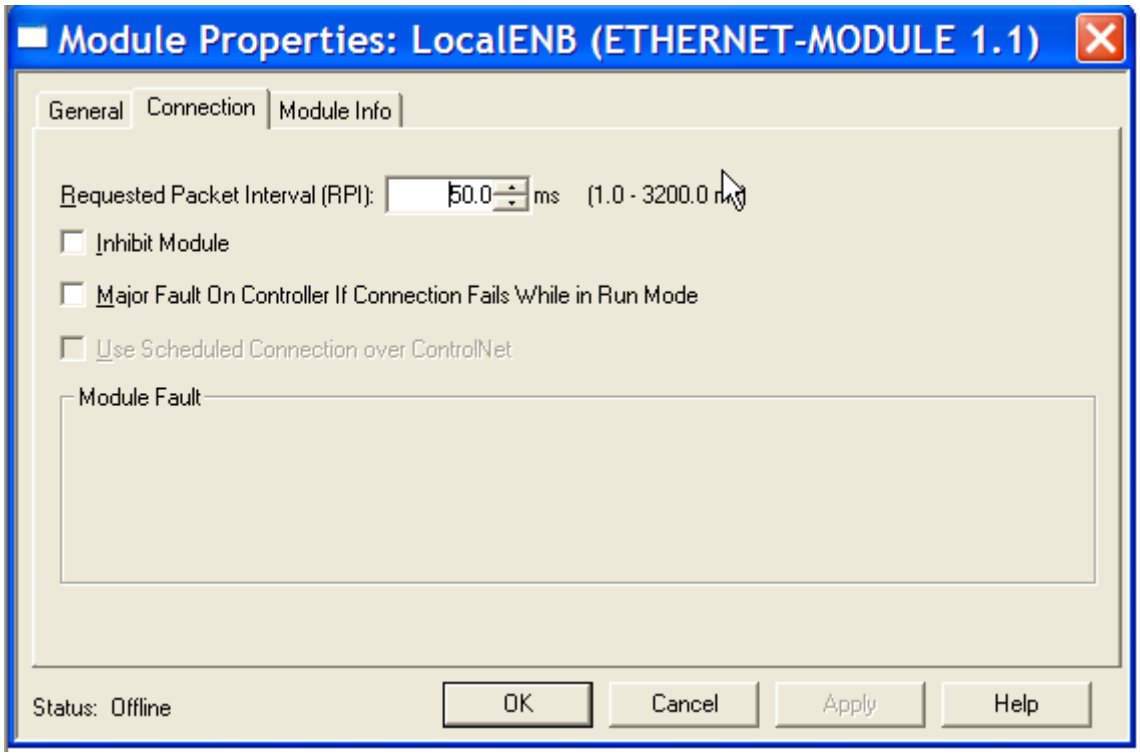


Specify “Name” (FEC DSP3000), “IP address”, and “Connection Parameters” that matches the parameters set to the Fieldbus setup using the DSP3000 User Console software.

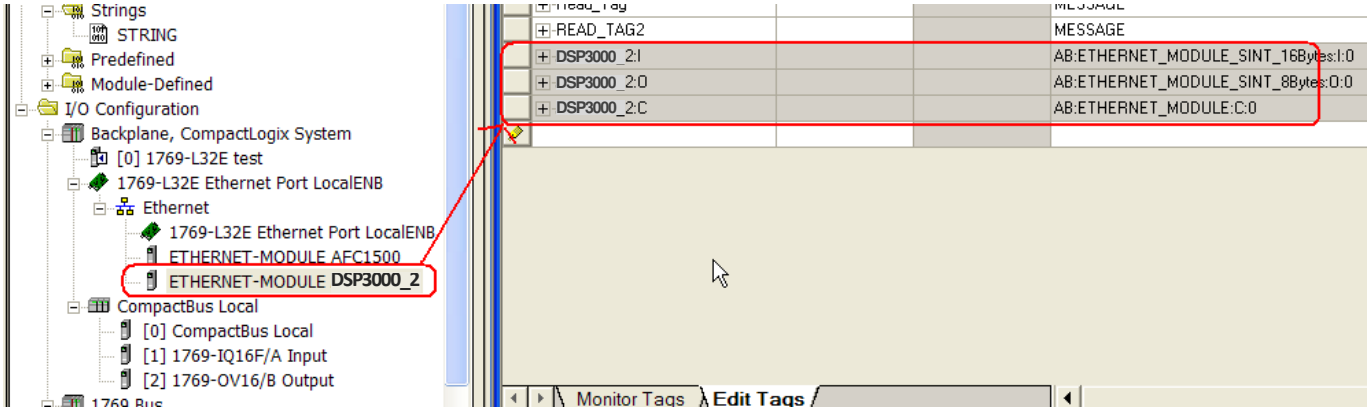
Note: Input / Output size MUST match the settings programmed in the Ethernet I/P setting of the DSP3000 Fieldbus setup or a PLC (Ethernet I/P) error will occur.



Click on the “Connection” tab and set connection setup as below.



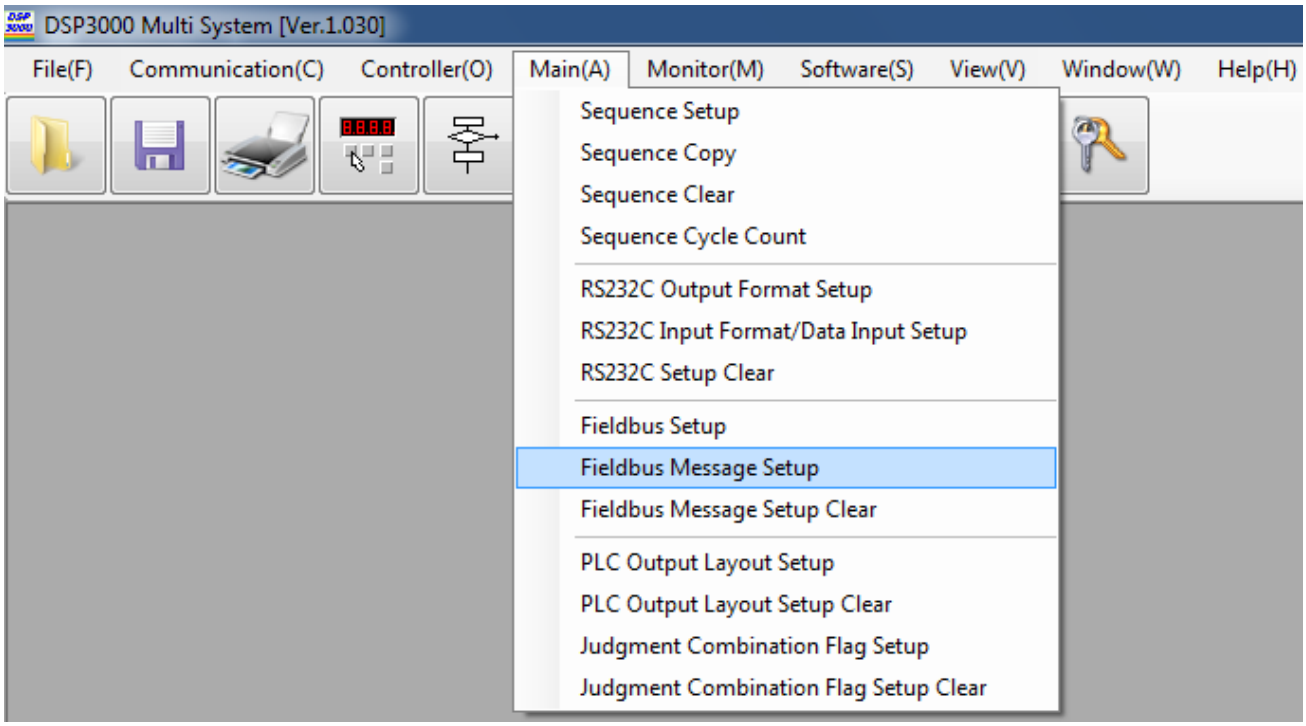
When the Master Controller Fieldbus unit is added to the I/O configuration, the data table will be added to the controller tags automatically.



DSP3000_2:I
Input signals from DSP3000 controller. (FEC to PLC)
DSP3000_2:O
Output signals to DSP3000 controller. (PLC to FEC)
DSP3000_2:C
Message communication data from the DSP3000 controller. (Press Controller to PLC for pressing result data.) An additional program/command needs to be added for sending/retrieving the data.

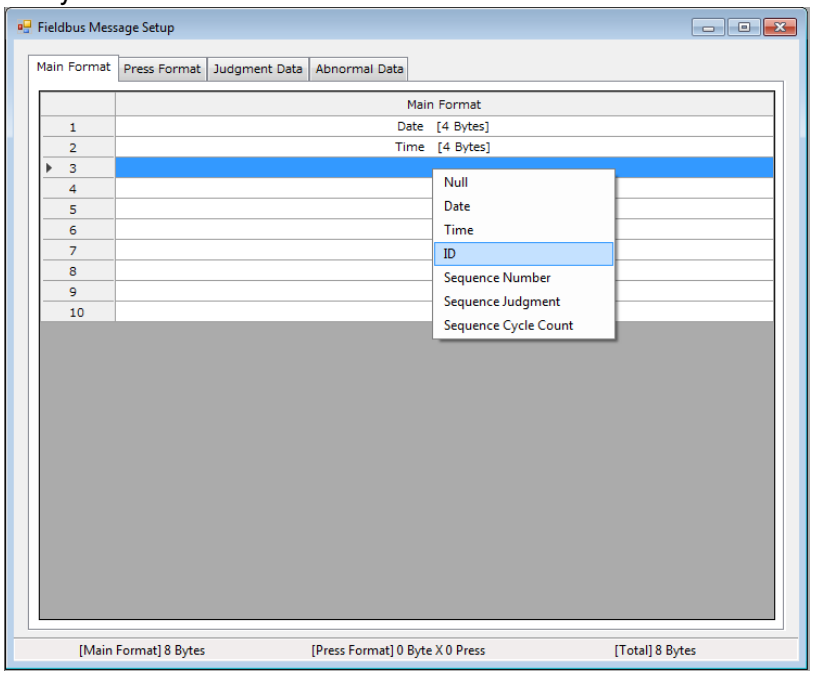
2. Transferring the fastening result data using the MSG function.

For setting up the MESSAGE function, first the DSP3000 needs to be configured for the data type that needs to be sent to the PLC. Configuration is done in the DSP3000 Userconsole Software. Select "Field Bus Message Setup" from "Multi" pull down menu.



Select the DATA TYPE format (BCD or ASCII).

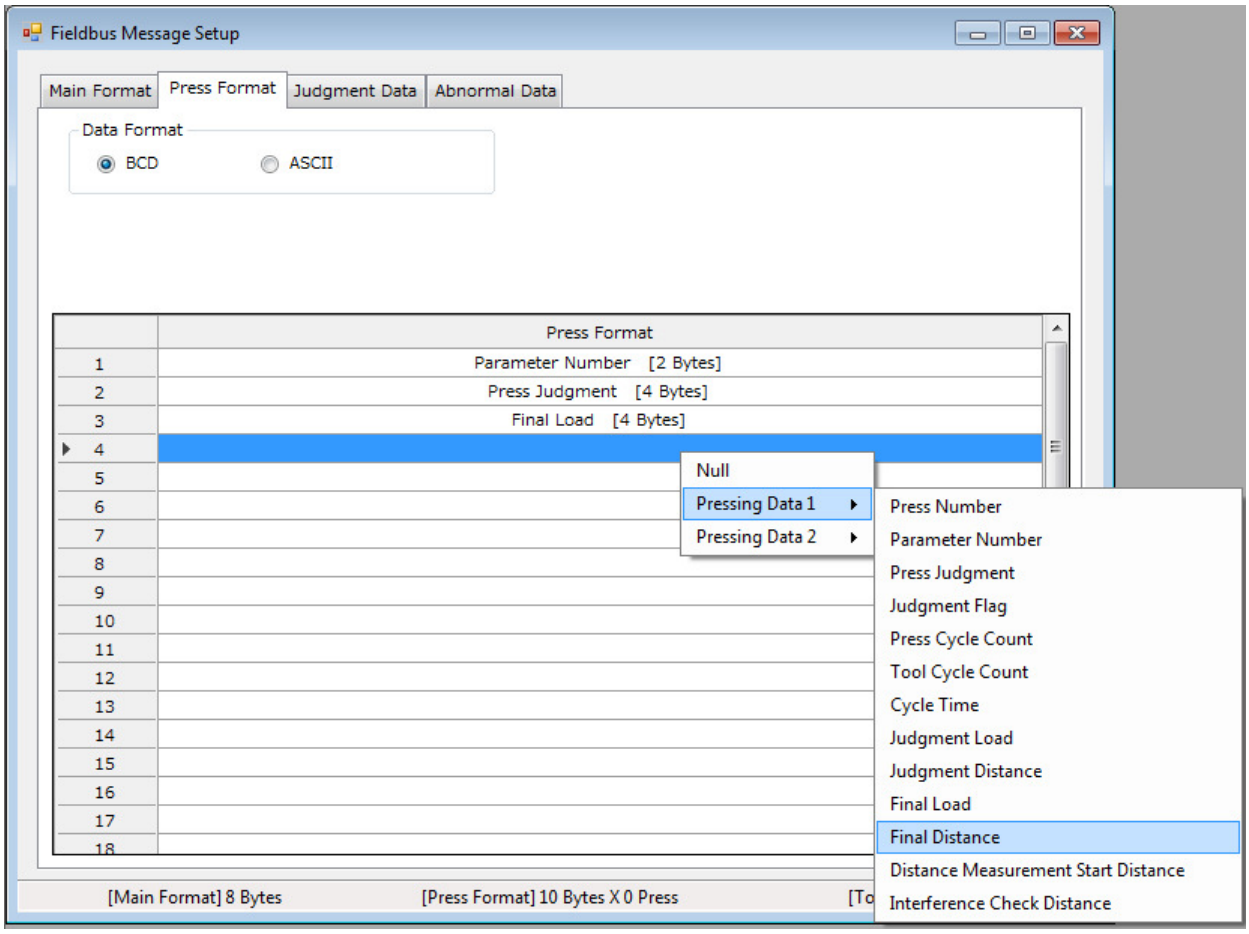
Data from the Master (Multi Format tab) and Press (Press Format tab) must be configured in the table below each tab. The Multi format contains the "Header" data (such as Date, Time, Sequence #, Cycle Count, etc. – aka data that comes from the Master Unit) The Press format contains the actual pressing data (such as Load, Distance, etc.) Right click on the table and select the item from the pop up window that you wish to be transferred.



(Example of Multi format selection shown above)

Note: Selecting "Null" deletes the item from the list.

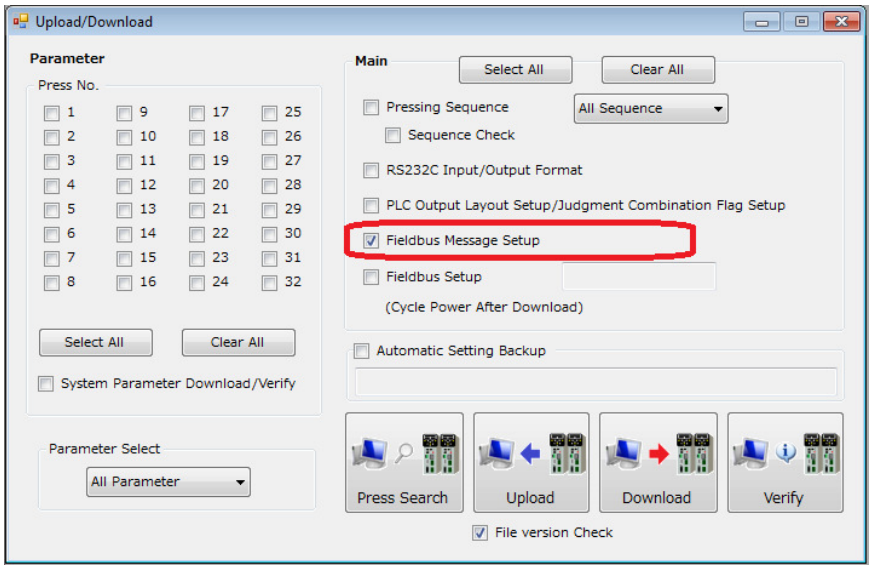
(Example of Press Format selection shown below – this format will be for EACH spindle connected in the system to the Master Unit)



When the system has more than 1 press, the data will be output in press sequential order as shown below.

Data from total pressing status (Multi data)
Data from PRESS 1
Data from PRESS 2
Data from PRESS 3
|
Data from up to PRESS 32

After the pressing result data has been setup, download the changed configuration to the Master controller.

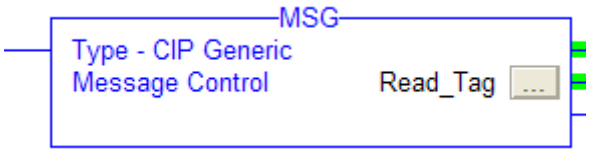


PLC program.

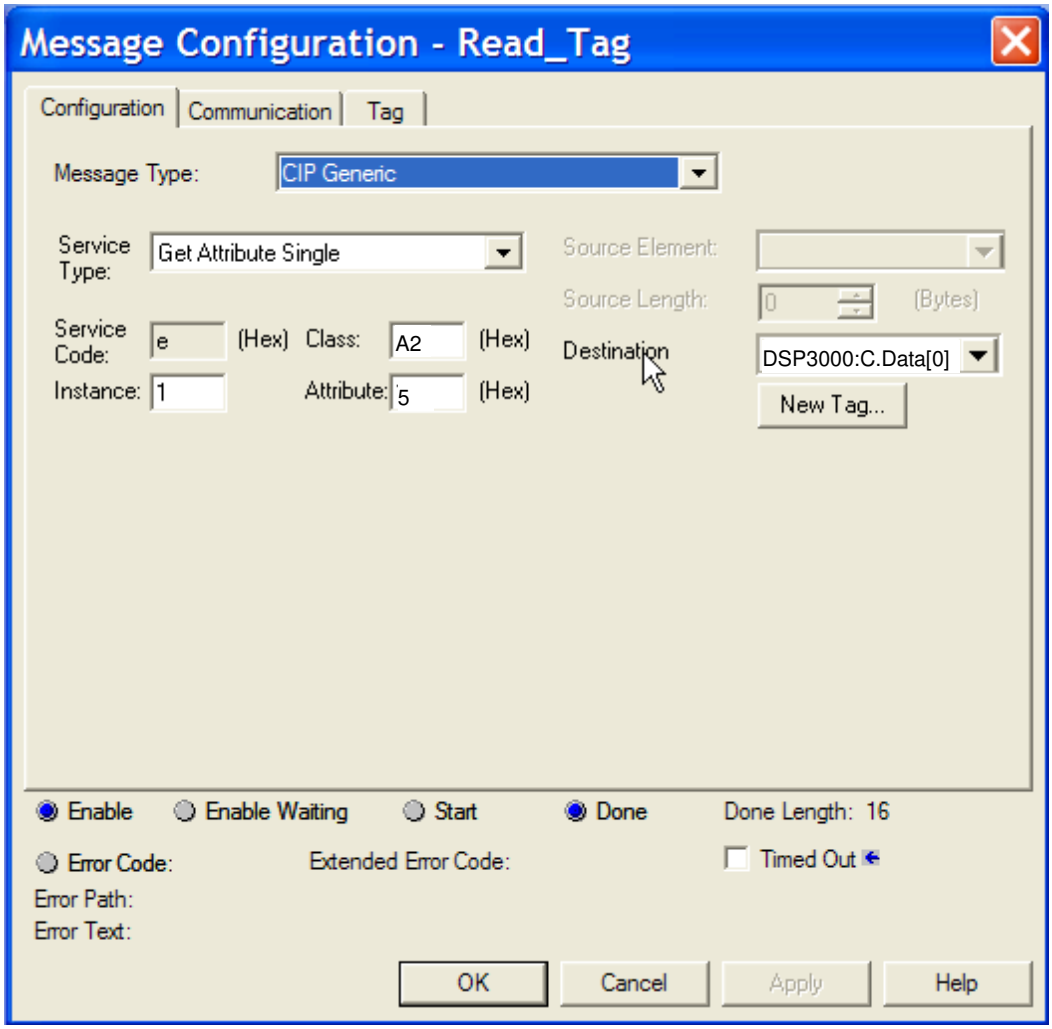
1. A Read_Tag needs to be added to the “Controller Tags” for message transfer
This data tag contains the configuration of the message transfer.
Each MSG command needs to have its own Read_Tag.

Local:1:C			AB:1769_IQ16F:C:0	
Local:1:I			AB:1769_DI16:I:0	
Local:2:C			AB:1769_DO16:C:0	
Local:2:I			AB:1769_DO16:I:0	
Local:2:O			AB:1769_DO16:O:0	
Read_Data			SINT	Decimal
Read_Tag			MESSAGE	
READ_TAG2			MESSAGE	
DSP3000_2:I			AB:ETHERNET_MODULE_SINT_16Bytes:I:0	
DSP3000_2:O			AB:ETHERNET_MODULE_SINT_8Bytes:O:0	
DSP3000_2:C			AB:ETHERNET_MODULE:C:0	

The MSG command is used for transferring the pressing result.



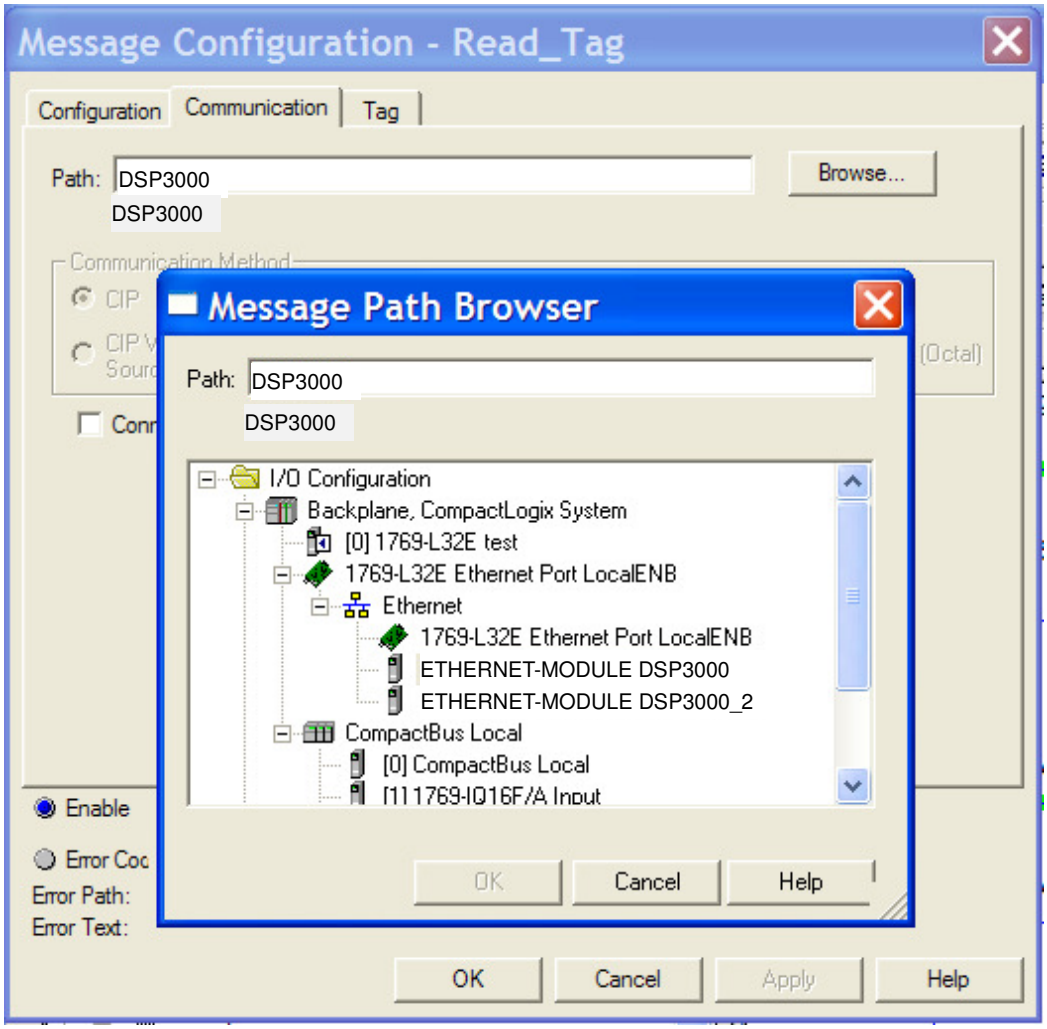
Property of the MSG command is shown below. (Right Click in MSG command)



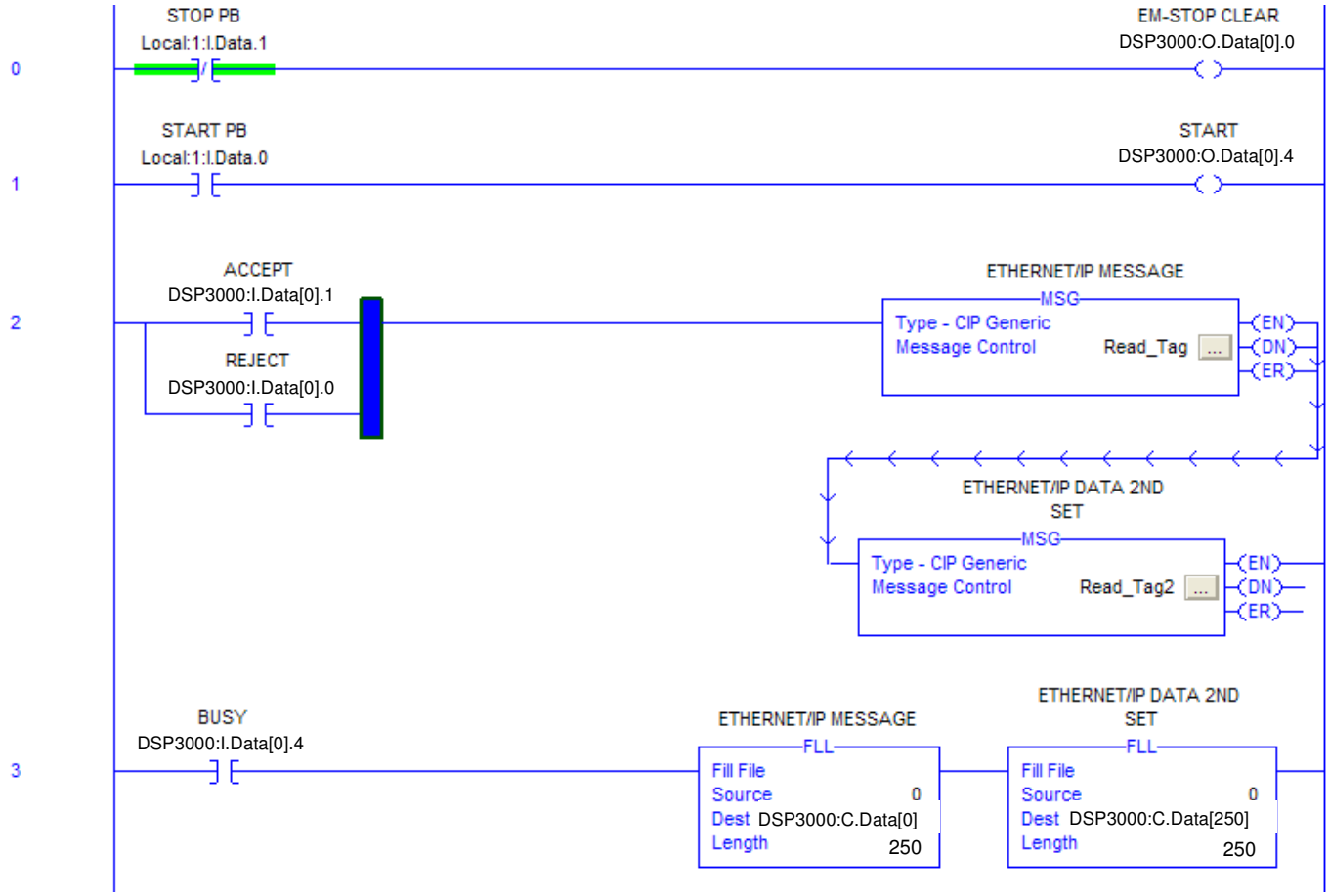
Message Type	CIP Generic
Service Type	Get Attribute Single
Service Code	E
Class	A2
Instance	1 ~ 17
Attribute	5
Destination	The controller tag “C” should be selected

Note: Each message command can only handle 250 bytes. If more than 250 bytes of data needs to be transferred, another controller tag needs be added (Read_tag) for the buffer and another MSG command needs be added. The second MSG command should have its “instance” as “2” with its “Destination” address incremented to the next block of data (250, 500, 750, 1000, etc.) and so on up to a maximum of 17 for up to 4096 bytes of message data).
Example: [DSP3000:C.Data(250)] for the second block of 250 bytes

At the communication tab screen, select “Path”. The DSP3000 controller will show up in the browser as shown below.



An example of a message transfer PLC program is shown below.



This program transfers up to 250 bytes of fastening result data.
The first MSG command has “1” as the “Instance” and is sending the data into the **DSP3000:C[0]** memory block. The second MSG command has “2” as the “Instance” and sending the data into another data memory block **DSP3000:C[250]** that would have been manually added when the second Read_tag was added.

Note: The above information contained in this procedure are meant for REFERENCE ONLY when configuring an FEC Ethernet I/P interface using the FEC DSP3000 User Console Software, FEC DSP3000 Press System, Rockwell Automation RSlogix 5000 software and Allen Bradley CompactLogix L32E hardware. Actual application configuration may differ from this set-up depending on the PLC chosen for the application.

Message Data Example written for an AFC1500 System showing the :C register data
("AFC1500" would be "DSP3000" for DSP3000 system)

RSLogix 5000 - PLC_CART in PLC_CART121508.ACD [1769-L32E]* - [Controller Tags - PLC_CART(controller)]

Scope: PLC_CART

Name	Value	Force Mask	Style	Data Type	Description
AFC1500:C	{...}	{...}		AB:ETH...	
AFC1500:C.Data	{...}	{...}	Hex	SINT[400]	
AFC1500:C.Data[0]	16#00		Hex	SINT	BCD Nutrunner Message
AFC1500:C.Data[1]	16#01		Hex	SINT	Spindle#1 Peak TQ. 1.20
AFC1500:C.Data[2]	16#20		Hex	SINT	1st 2 bytes before decimal
AFC1500:C.Data[3]	16#00		Hex	SINT	2nd 2 bytes after decimal
AFC1500:C.Data[4]	16#02		Hex	SINT	Final Angle 242
AFC1500:C.Data[5]	16#42		Hex	SINT	
AFC1500:C.Data[6]	16#00		Hex	SINT	
AFC1500:C.Data[7]	16#00		Hex	SINT	
AFC1500:C.Data[8]	16#00		Hex	SINT	1st Rate .001
AFC1500:C.Data[9]	16#00		Hex	SINT	1st 2 bytes before decimal
AFC1500:C.Data[10]	16#00		Hex	SINT	2nd 2 bytes after decimal
AFC1500:C.Data[11]	16#10		Hex	SINT	
AFC1500:C.Data[12]	16#80		Hex	SINT	Accept -
AFC1500:C.Data[13]	16#00		Hex	SINT	(Refer to judgment data setup)
AFC1500:C.Data[14]	16#00		Hex	SINT	
AFC1500:C.Data[15]	16#00		Hex	SINT	
AFC1500:C.Data[16]	16#00		Hex	SINT	
AFC1500:C.Data[17]	16#01		Hex	SINT	Spindle#2 Peak TQ. 1.24
AFC1500:C.Data[18]	16#24		Hex	SINT	
AFC1500:C.Data[19]	16#00		Hex	SINT	
AFC1500:C.Data[20]	16#00		Hex	SINT	
AFC1500:C.Data[21]	16#21		Hex	SINT	Final Angle 21
AFC1500:C.Data[22]	16#00		Hex	SINT	
AFC1500:C.Data[23]	16#00		Hex	SINT	
AFC1500:C.Data[24]	16#00		Hex	SINT	

AFC - [FASTENING DATA MONITOR]

PREFERENCES | MONITOR DATA | REJ. AND ABN. | STORED DATA | DISPLAY PANEL | LAMP DISPLAY

DATE	TIME	CYC #	SEQ #	SEQUENCE NAME	BARCODE DATA					TOTAL JUDGMENT	
		SPDL#	PAR #	PTQ	F.Angle	1 Rate	2 Rate	3 Rate	CYC Time	Judge	
2/9/2009	14:35:21	30	02							ACCEPT	
		01	01	1.20	242	0.001	0.000	0.000	5.8	ACCEPT	1(
		02	01	1.24	21	0.019	0.000	0.000	1.6	ACCEPT	1(

AFC1500 User Console MONITOR Screen for above Data

Fieldbus Message Setting (PART ID Data - PLC to FEC Master Controller)

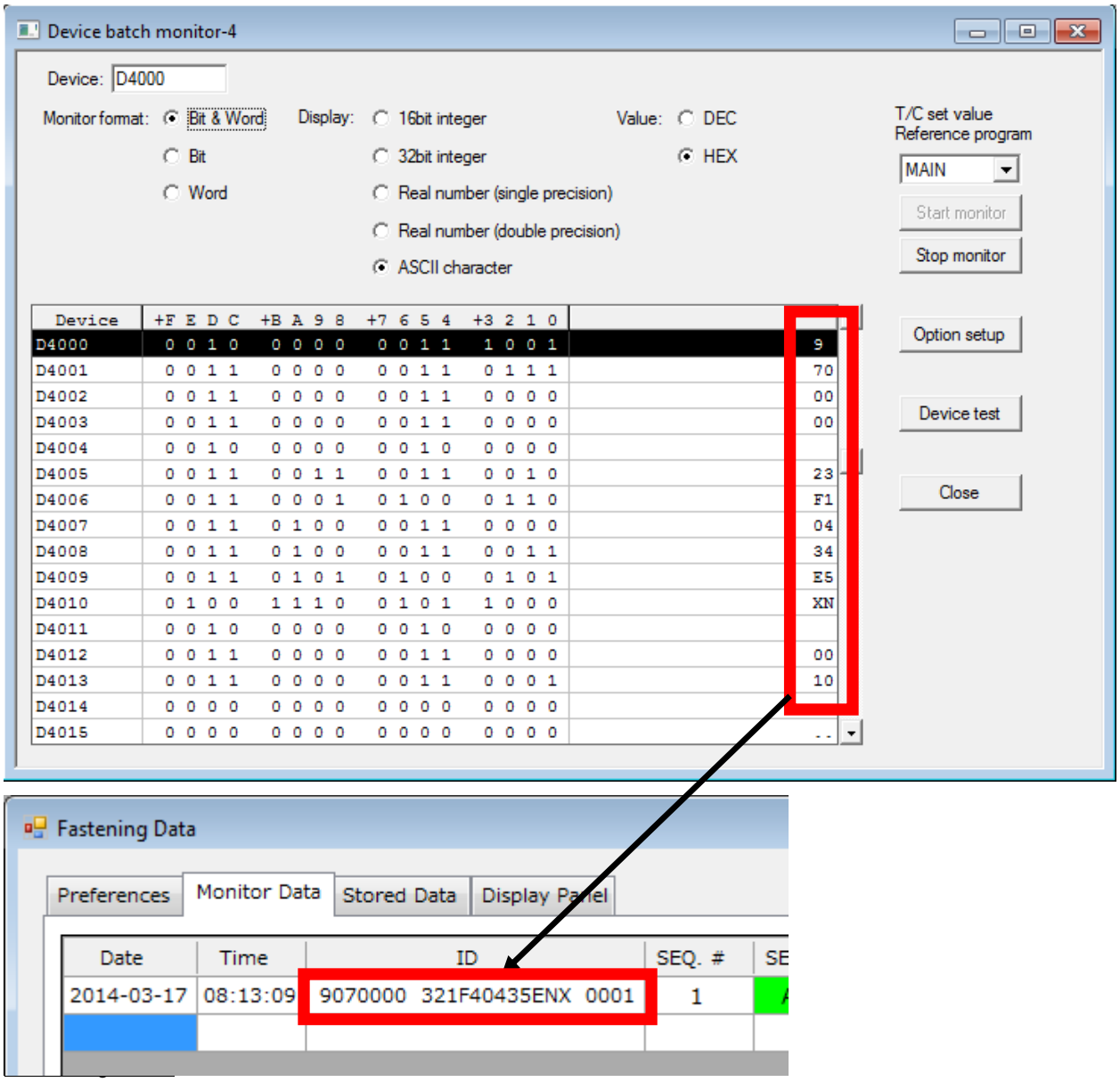
1. Contents of Sent Data: ASCII Data
   Refer to 3. below regarding the actual sent results.

2. Max. message length: 16 words/32 bytes
   (As configured in the DSP3000 Software)

3. Input Example
   Select ASCII letters to send message information from the PLC to the MASTER Spindle for PC communication and I/O (PLC) control. (Only ASCII Data can be recognized by FEC Master)
   The message information sent from the PLC to the MASTER Spindle for PC communication and I/O (PLC) control is reflected in the fieldbus communication, the DSP3000 User Console, the Unit RS232C, and the expansion RS232C.

Caution

- **The standard set value for the ID input data is 32 bytes (16 words). Be careful because even when a value beyond this is set, only the 32 bytes from the start are saved in the pressing result retention of the Unit.**
- **Do not use the following characters.**
  "\": backslash (yen mark), "/": slash,
  ":": colon, "*": asterisk, "?": question mark,
  "": double quotation, "<" ">": inequality signs, "|": pipe sign

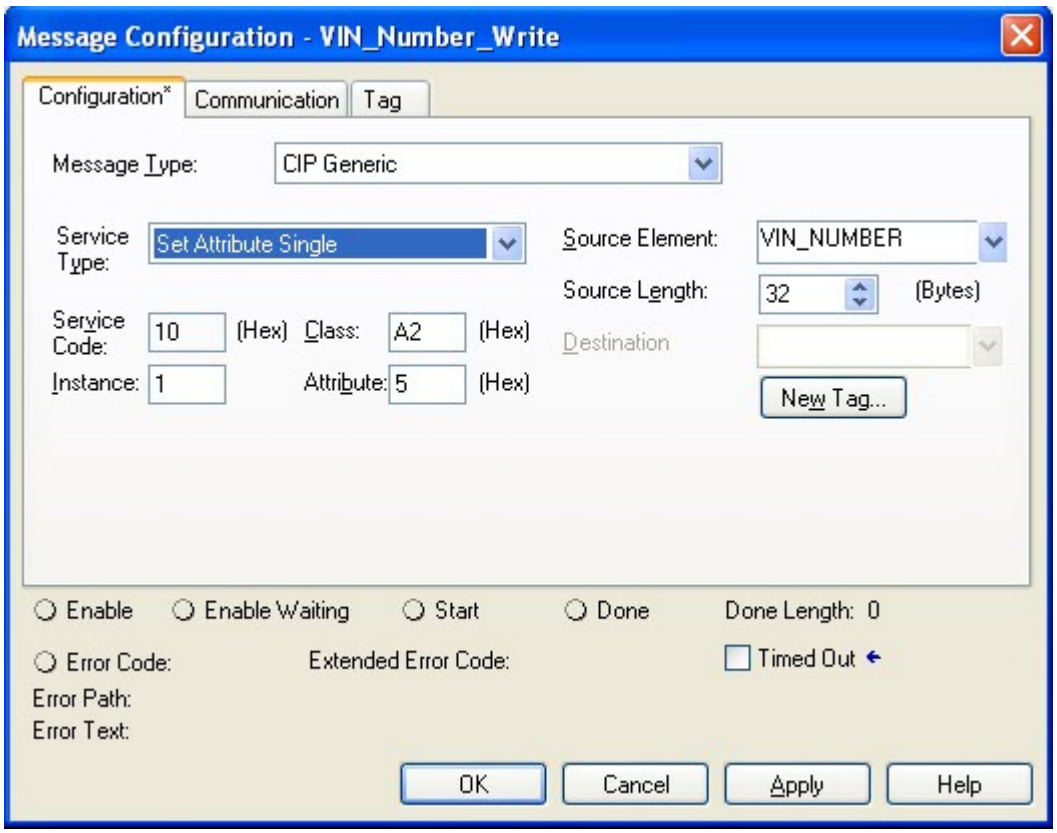


PLC CONFIGURATION – DATA WRITE

A ‘Write_Tag’ needs to be added to the ‘Controller Tags’ for data to be sent from the PLC to the FEC Master Controller. (Such as part ID Data) This data when received by the FEC Master controller will be ‘Married” with the pressing result data so that the pressing data would now contain the part ID number providing a ‘birth history’ for the part being pressed.
The “Write_Tag” contains the configuration of the message transfer. A MSG command (Message command in the PLC logic) must be used in conjunction with a ‘Write_Tag’ to send data. In the case below, ‘VIN_Number_Write’ tag has been setup and configured (following pages)

Name	Data Type	Description	External Access	Constant	Sty
IL_CS15QPLC_TC1AD014	DINT[20]		Read/Write	☐	De
IL_CS15QPLC_TC1AD014_FEC	FEC_DataFromQuality_v1[4]		Read/Write	☐	
IL_TC1AD014_CS15QPLC	DINT[20]	Interlock Data To Pre-Final QPLC	Read/Write	☐	De
IL_TC1AD014_CS15QPLC_FEC	FEC_DataToQuality_v1[2]	Interlock Tool Data To Pre-Final QPLC	Read/Write	☐	
AFC3000_MESSAGE_DATA	SINT[150]		Read/Write	☐	De
VIN_NUMBER	SINT[32]		Read/Write	☐	De
VIN_Number_Write	MESSAGE		Read/Write	☐	
RH_Message_Read	MESSAGE		Read/Write	☐	
				☐	

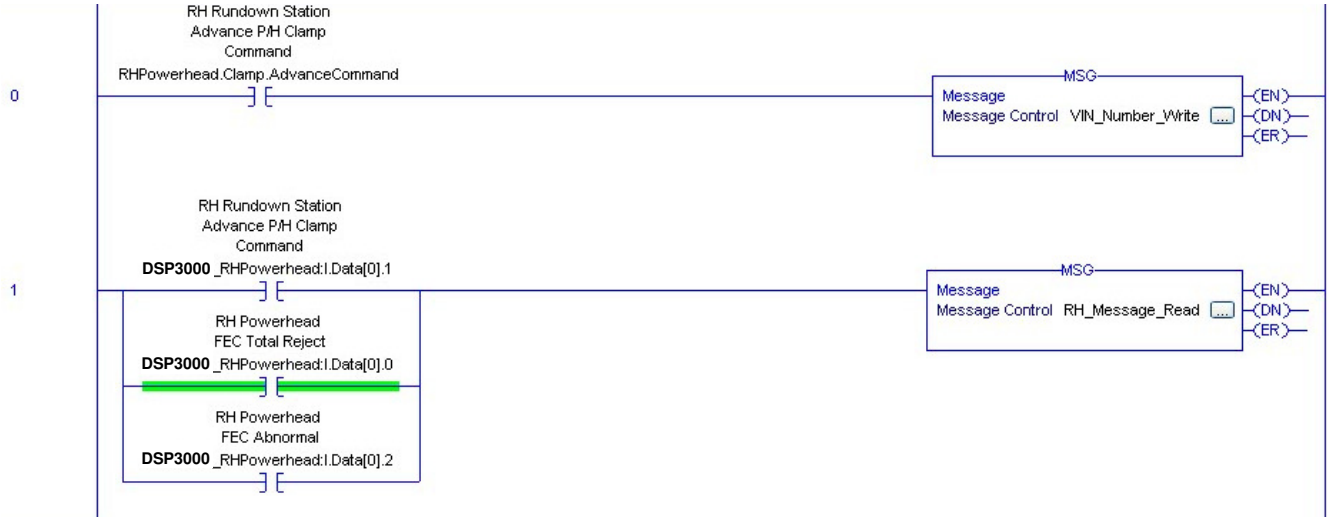
Below are the properties which must be set up for the Message Configuration of the Write_Tag. (Right Click in MSG command)



Message Type	CIP Generic
Service Type	Get Attribute Single
Service Code	10
Class	A2
Instance	1
Attribute	5
Destination	The controller tag “VIN_Number” or whatever Write Tag you setup should be selected

Note: The FEC Master controller will only take a maximum of 32 Bytes for the Write_Tag (Part ID data) configurable (between 0-32 bytes) in the DSP3000 software for the Fieldbus Message Setup. So an instance of “1” is all that is required in the above setup for WRITING data using the Message Command.

PLC Logic Example: Sending Message data to FEC Master Controller



The MSG message command initiates the message data to be sent or received. The ‘Write” tag sends the data to the device connected, and the ‘Read’ tag retrieves the data from the connected device.
In the example above, the Write MSG command takes place at or near the start of the machine cycle before the FEC controller has been issued a START command. (The FEC Master Controller, can receive the Write Data any time before the end of the pressing cycle. Once received, the data is buffered and will be used until new message data is received or the “ID DATA CLEAR” Input signal is enabled (See Input signals). (The ID data received by the FEC Master Controller will be married with the pressing data and will continue to use the same message data it receives until new data is sent or the ID Data Clear signal is turned on. Care must be taken so data is not recorded with the same ID data in that case)
The “Read” Tag in the example above is shown happening AFTER the FEC pressing is completed. Once pressing is completed, the MSG Read command can be performed and the pressing result data will be read into the PLC.