YASKAWA

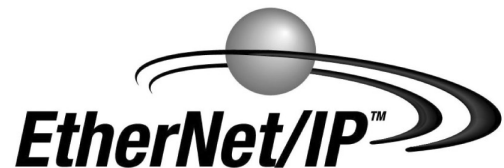# V7 EtherNet/IP™ Option CM093
Technical Manual

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EtherNet√IP™
conformance tested

EtherNet/IP™

Warnings and Cautions

⚠ WARNING

YASKAWA manufactures component parts that can be used in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user. YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and to fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to that part's safe use and operation. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the YASKAWA manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products..

⚠ WARNING

■ Read and understand this manual before installing, operating, or servicing this drive. All warnings, cautions, and instructions must be followed. All activity must be performed by qualified personnel. The drive must be installed according to this manual and local codes.

■ Do not connect or disconnect wiring while the power is on. Do not remove covers or touch circuit boards while the power is on. Do not remove or insert the digital operator while power is on.

■ Before servicing, disconnect all power to the equipment. The internal capacitor remains charged even after the power supply is turned off. Status indicator LEDs and Digital Operator display will be extinguished when the DC bus voltage is below 50VDC. To prevent electric shock, wait at least 5 minutes after all indicators are OFF and measure the DC bus voltage level to confirm that it is at a safe level.

■ Do not perform a withstand voltage test on any part of the unit. This equipment uses sensitive devices and may be damaged by high voltage.

■ The drive is not suitable for circuits capable of delivering more than the specified RMS symmetrical amperes. Install adequate branch short circuit protection per applicable codes. Refer to the specification. Failure to do so may result in equipment damage and/or personal injury.

■ Do not connect unapproved LC or RC interference suppression filters, capacitors, or over voltage protection devices to the output of the drive. Capacitors may generate peak currents that exceed drive specifications.

■ To avoid unnecessary fault displays, caused by contactors or output switches placed between drive and motor, auxiliary contacts must be properly integrated into the control logic circuit.

■ YASKAWA is not responsible for any modification of the product made by the user, doing so will void the warranty. This product must not be modified.

■ Verify that the rated voltage of the drive matches the voltage of the incoming power supply before applying power.

■ To meet CE directives, proper line filters and proper installation are required.

■ Some drawings in this manual may be shown with protective covers or shields removed, to describe details. These must be replaced before operation.

■ Observe Electrostatic Discharge Procedures when handling the drive and drive components to prevent ESD damage.

■ The attached equipment may start unexpectedly upon application of power to the drive. Clear all personnel from the drive, motor and machine area prior to applying power. Secure covers, couplings, shaft keys, machine beds and all safety equipment before energizing the drive.

⚠ CAUTION

■ When using this kit, it is strongly recommended that no connections be made to the V7 Drive's DC Bus terminals (+1 and -) on models CIMR-V7AMxxxx, where xxxx is 25P5, 27P5, 45P5, or 47P5. A (+1 to +2) connection for a DC reactor is allowed.

Introduction

This manual explains the specifications and handling of the Yaskawa *V7 EtherNet/IP Option Kit* for the Yaskawa V7 drives with software ID 8340 or 8350 only. The *V7 EtherNet/IP Option Kit* connects the drive to an *EtherNet/IP* network and facilitates the exchange of data. In this document, the word "inverter", "AC drive" and "drive" may be used interchangeably.

To ensure proper operation of this product, read and understand this manual. For details on installation and operation of the drive, refer to the appropriate drive technical manual. For details on specific parameters, refer to the appropriate drive user and/or programming manual. All technical manuals and EDS and support files can be found on the CD that came with the drive, CD.AFD7.01. They are also available for download at www.Yaskawa.com. Refer to the web site for the most recent information.

For information on EtherNet/IP contact the Open DeviceNet Vendors Organization at www.odva.org.

- **DriveWizard version 6.1 or later** with a custom database is required for DriveWizard to operate with this option. Install DriveWizard with the "Custom" install option checked and the appropriate databases selected.

V7 and V74X Drive User Manual document reference **TM.V7.01**
V7 EtherNet/IP Option Kit document reference **IG.V7.26**
Application Note - Using the Yaskawa AC Drive "EtherNet/IP" Option with Controllogix / Compactlogix Programmable Controllers document reference **AN.AFD.09**
Application Note - Commissioning the Yaskawa AC Drive "EtherNet/IP" Option with the Rockwell BOOTP/DHCP Server document reference **AN.AFD.010**

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Table of Contents

Chapter 1 Installation

This section describes how to install and set up the V7 EtherNet/IP Option Kit.

Installation Check Sheet

The following is a quick reference check list to install and configure the *V7 EtherNet/IP Option Kit*. Make a copy of this page and check-off ☑ each item as it is completed. For detailed information please refer to the detailed sections that follow.

1. ☐ **Unpack the *V7 EtherNet/IP Option Kit* and verify that all components are present and undamaged.**

2. ☐ **Connect power to the drive and verify that it runs normally.**
   Refer to the V7 Technical Manual for information on how to set-up a drive.

4. ☐ **Install the *V7 EtherNet/IP Option Kit* on the drive.**

5. ☐ **Connect the *V7 EtherNet/IP Option Kit* to the EtherNet/IP communication network.**

6. ☐ **Apply power to the drive and check diagnostic and normal operation LED status.**

> ⚠ **WARNING!**
> Dangerous voltages in excess of 400VDC (230V drives) or 800VDC (460V drives) are present at the DC bus terminals of the drive.

7. ☐ **Configure the PC for a network connection.**

8. ☐ **Configure the *EtherNet/IP Option Kit.***

9. ☐ **Finish the *V7 EtherNet/IP Option Kit* Installation:**

   Refer to the documentation included with the EtherNet/IP configuration utility supplied with the EtherNet/IP Master controller. Verify that the drive appears on the EtherNet/IP network at the correct IP address, Subnet Mask, gateway and server.

⚠ **CAUTION**

When using this kit, it is strongly recommended that no connections be made to the V7 Drive's DC Bus terminals (+1 and -) on models CIMR-V7AMxxxx, where xxxx is 25P5, 27P5, 45P5, or 47P5. A (+1 to +2) connection for a DC reactor is allowed.

Note: It is strongly recommended that shielded CAT-5 cable be used. Verify that the shield is continuous to the drive and that it is grounded only at the drive end.

Unpack and Inspect

Prior to unpacking, check the package label and verify that the product received matches the product ordered. Unpack the option and verify that the following items are included in the product package and are undamaged.
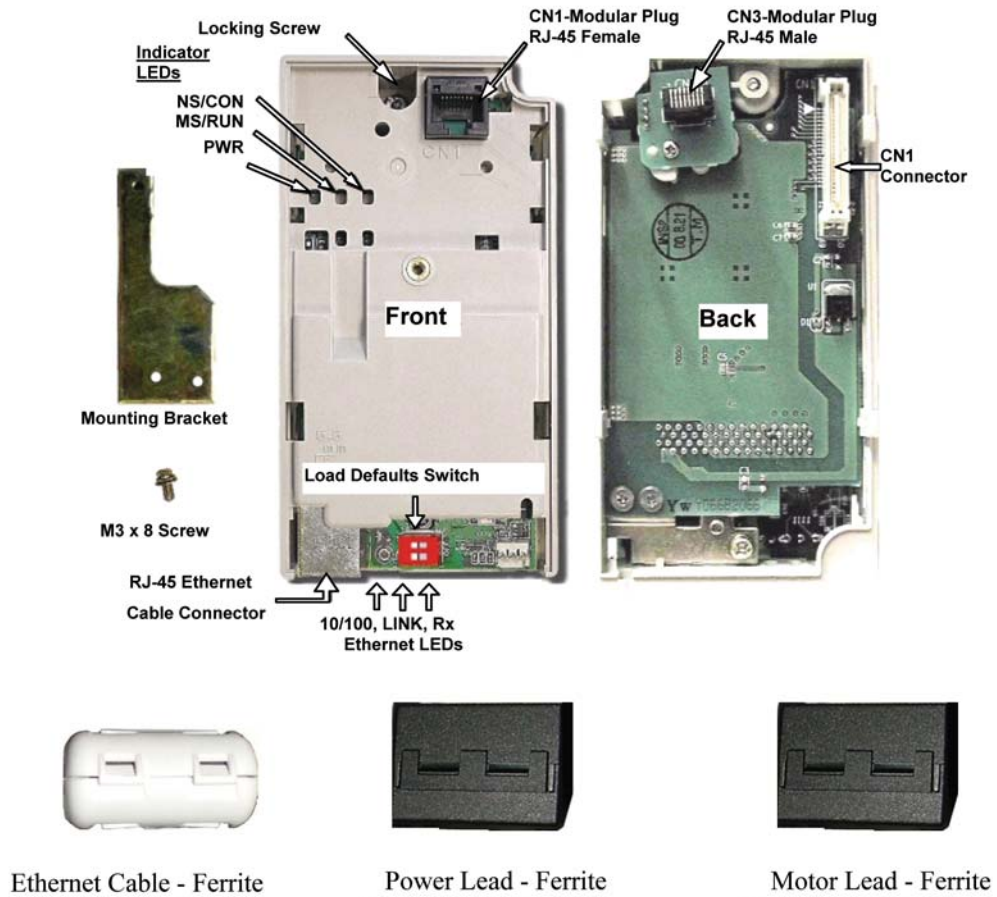
Fig 1.1 – *V7 Ethernet/IP Option Kit CM093*

Table 1.1 – V7 EtherNet/IP Option CM093 Parts	
CM093 Kit Parts	Qty.
V7 EtherNet/IP Option CM093 Ring Kit	1
Option Mounting Bracket	1
Mounting Bracket Screw	1
Ferrite (Power & Motor Leads)	2
Ferrite (Ethernet Cable)	1
Cable Ties	3
Installation Guide (IG.V7.26)	1

Installation and Wiring

◆ Verify Drive Operation

1. Connect power to the drive and verify that the drive functions properly. This includes running the drive from the operator keypad. Refer to the *V7 Drive Technical Manual*, **TM.V7.01**, for information on connecting and operating the drive.

2. Remove power from the drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.

> ⚠ **WARNING!**
> Dangerous voltages in excess of 400VDC (230V drives) or 800VDC (460V drives) are present at the DC bus terminals of the drive.

◆ Prepare the V7 Drive

1. Remove the operator keypad and V7 Drive cover.

2. Remove the terminal cover

3. Remove the CN2 cover from the V7 Drive housing. Carefully snip the 3 tabs connecting the CN2 cover to the V7 housing and remove the cover.

4. Attach the Mounting Bracket. Align the mounting bracket as shown in the figure to the right. Secure the mounting bracket to the V7 Drive housing using the M3 x 8 screw provided.
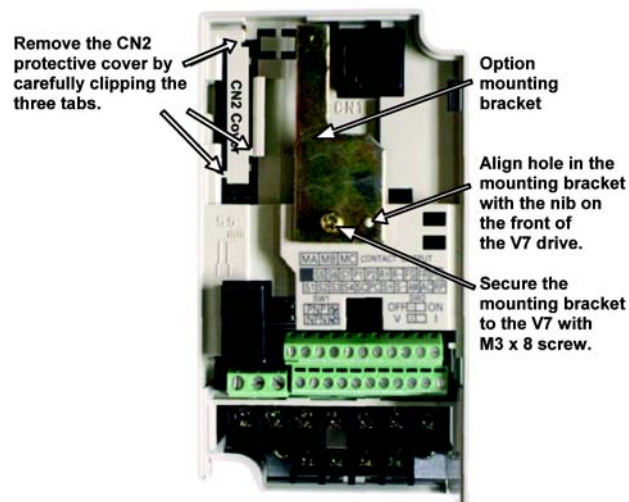
Fig 1.2 – Prepare the V7 Drive

◆ Install the *V7 EtherNet/IP Option Kit*

1. Wire the V7 Drive I/O terminals prior to mounting the *V7 EtherNet/IP Option Kit*, as the option will obscure the terminals when mounted.
2. Mount the *V7* EtherNet*/IP Option Kit* on the V7 Drive.

    2.1 **Do NOT connect a ground wire to the screw on the back of the option kit.**

    2.2 Align the CN1 connector on the back of the option with its mating CN2 connector on the front of the V7 Drive.

    2.3 Simultaneously align connector CN3 (male RJ-45) on the back of the option with connector CN1 (female RJ-45) on the front of the V7 Drive.

    2.4 Align the tabs on the option with their corresponding slots on the front of the V7 Drive.

    2.5 Press the option and the V7 Drive together until the tabs lock into their associated slots.

    2.6 Secure the option to the V7 Drive by tightening the locking screw at the top-center of the option.

    2.7 Reinstall the operator keypad and all V7 Drive covers.
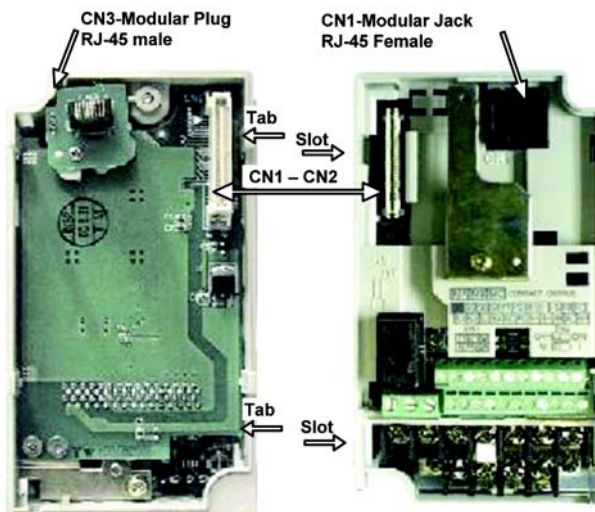
Fig 1.3 – Install the *V7 EtherNet/IP Option Kit*

◆ Diagnostic LED Power-up Sequence

A power-up test is performed each time the AC drive is powered-up after the initial boot-up sequence. The initial boot-up sequence may take several seconds. When this sequence is complete, the LEDs will assume their normal conditions.

Table 1.2 - LED Power-up Sequence			
Seq	MS/RUN	NS/CON	Time
1	GREEN	OFF	250ms
2	RED	OFF	250ms
3	GREEN	OFF	250ms
4	GREEN	GREEN	250ms
5	GREEN	RED	250ms
6	GREEN	OFF	

The *EtherNet/IP Option Kit* is successfully initialized after the LEDs have completed the above sequence.

◆ Successful Initialization

The *EtherNet/IP Option Kit* hardware is installed and operating correctly with the LEDs in the states shown in **bold text** in the "LED Descriptions" table on page 1-7. The LINK LED represents the status of the physical connection to the network and is not indicative of any card state.
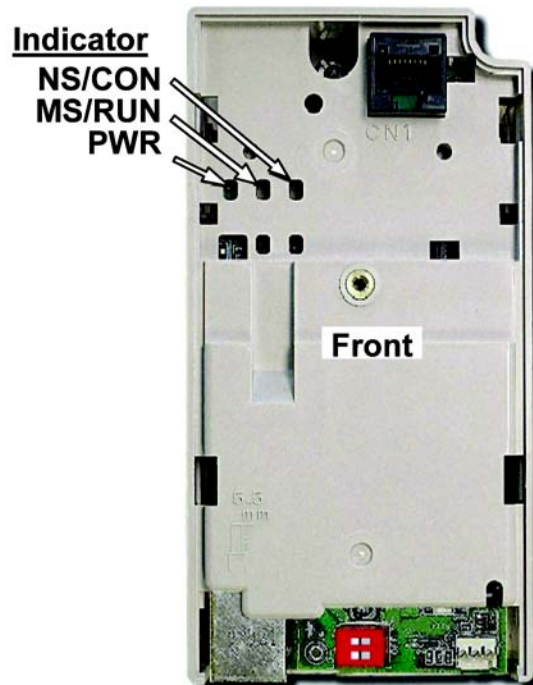
Fig 1.4 LED State Description

◆ LED Sequence

Table 1.3 - LED States		
LED	**Label**	**Description**
D1	MS/RUN	**GREEN - Card Functioning Normally** GREEN BLINK - Standby/Initializing (500ms cycle) RED BLINK - Minor Fault (500ms cycle) RED - Major Fault GREEN/RED BLINK - Module Test (500ms cycle)
D2	NS/CON	**GREEN - Connected** **GREEN BLINK - Waiting for Connections (500ms cycle)** RED BLINK - Connection Timeout (500ms cycle) RED - Duplicate IP Address GREEN/RED BLINK - Network Test (500ms cycle)
D3	10/100	GREEN - 100Mbs Connection Speed
D4	LINK	**GREEN - Link Established**
D5	Rx	GREEN - Message Being Received
D8	PWR	**GREEN - Appropriate Power Supplied to Card**

◆ LED Reference

	Table 1.4 - Option LED States		
LED	**Indicator**	**Behavior**	**Description**
MS/RUN	Steady OFF	No Power	No power is applied to the option card the LED remains OFF.
	Green Steady	Normal Operation	The option card is operating correctly with all initialization checks complete.
	Green Flash	Standby / Initializing	The option card is in process of configuring or waiting for configuration information.
	Red Flash	Minor Fault	The option card has detected a recoverable minor fault, such as incomplete configuration. Faults that are typically corrected by cycling power to the drive.
	Red Steady	Major Fault	The option card has detected a non-recoverable major fault, (Ram Error, corrupt storage, non - unique MAC address). All major faults will require more intervention than a power cycle to correct.
	Green/Red Flash	Option Card Test	Power-up sequence and tests.
NS/CON	OFF Steady	No Power or IP Address	The option card is powered OFF, or is not configured with an IP address and therefore cannot communicate on the network.
	Green Steady	Connected	The option card currently has one or more connections established to it.
	Green Flash	No Connections	The option card currently has no valid connections, but is correctly configured. The state is "waiting" for communication to assume.
	Red Flash	Connection Timeout	One or more of the established connections has timed out. The state will remain until all time-out connections have been re-established or a reset occurs. Recoverable minor fault
	Red Steady	Duplicate IP	A duplicate IP address has been discovered on the network or non-recoverable major network fault has occurred.
	Green/Red Flash	Network Test	Power-up sequence and tests.
10/100	OFF	10 Mbps Connection	The network is operating at 10 Mbps.
	Green	100 Mbps Connection	The network is operating at 100 Mbps.
Link	OFF	No Network Connection	The option card is not physically connected to the network. Check cable connections.
	Green	Network Connection	The option card is connected to a network.
Rx	OFF	No Message Received	No message to the option card is being received.
	Green	Message Received	A message to the option card is being received.
PWR	OFF	No Power	The drive is not powered or the option card is not securely connected to the drive.
	Green	Power Supplied	The option card has the appropriate power supplied.

Network and Web Access Configuration

◆ Configure the EtherNet/IP Network

1. The default configuration option for the *EtherNet/IP Option Kit* is DHCP (Dynamic Host Configuration Protocol). Thus there must be a DHCP Server connected to the network in order to set the IP address of the *EtherNet/IP Option Kit*. For detailed information on how to setup the Rockwell BOOTP/DHCP Server on a PC refer to the appropriate Rockwell document or Yaskawa's Application Note AN.AFD.10.

2. If the network configuration requires that devices have a static IP address, the *EtherNet/IP Option Kit's* configuration can be changed to USER and the appropriate static IP address can be entered via the *EtherNet/IP Option Kit's* web pages as shown below.

Note that the *EtherNet/IP Option Kit* must first have been assigned an IP address via DHCP before its configuration can be changed.

◆ Connect to the *V7 EtherNet/IP Option Kit*

1. **Direct connection:** To connect directly to the *V7 EtherNet/IP Option Kit* plug one end of a shielded CAT-5 (or better) EtherNet/IP **cross-over cable** into the RJ-45 socket on V7 Drive. Connect the other end to the RJ-45 Ethernet socket on the configuration device, typically a controller, laptop or other PC.

2. **Connection through hub or switch:** To connect through a switch, hub or router, connect a standard shielded CAT-5 (or better) **patch cable** to the RJ-45 socket on the V7 Drive. Connect the other end to the switch, hub or router.

3. **Attach the provided ferrite** to a looped Ethernet cable as close to the connection on the V7 drive as possible. Secure the ferrite in place with the provided cable tie.

4. **Attach the provided ferrites** to the V7 motor leads and to the V7 power leads as close to the V7 motor and power terminals as possible (typically within 1 foot). Secure the ferrites to the motor and power leads with the provided cable ties.
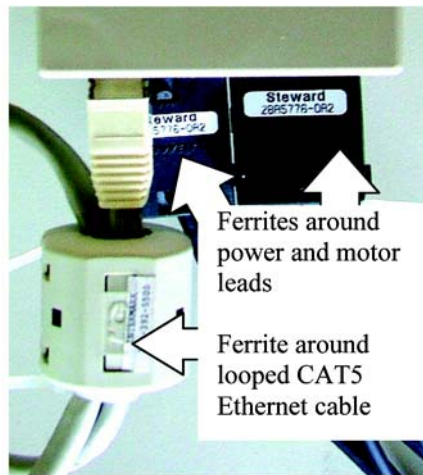
Fig 1.5 – Install Ferrites

◆ Accessing the *EtherNet/IP Option Kit* Web Pages

The browser interface to the *EtherNet/IP Option Kit* can be used for configuring the card or for network and drive information and diagnostics. To access the web pages:

1. Obtain the IP address of the desired drive and enter that IP address in the browser address bar. Hit Enter. The IP address of the desired drive is 192.168.1.20 in this example.
2. The main web page should be displayed.
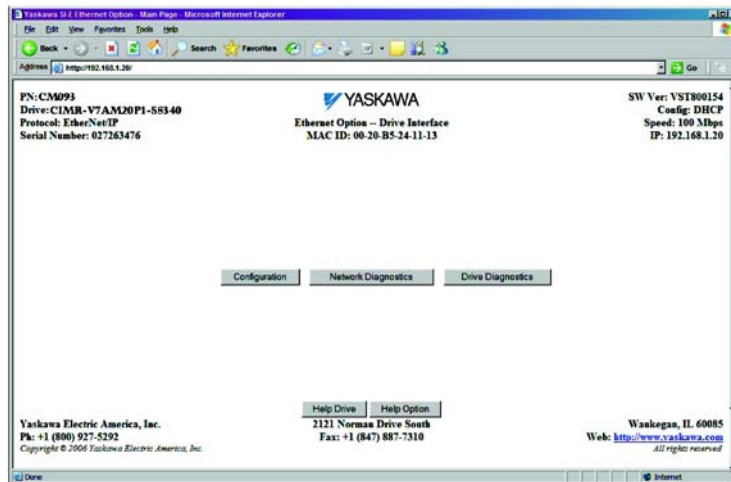
Fig 1.6 – EtherNet/IP Option Kit Main Web Page

◆ Configuring a PC with a Static IP Address

1. Select an existing connection or create a new network connection for communication with the *EtherNet/IP Option Kit*.

    1.1   Select **Start** ==> **Settings** ==> **Network Connections** from the task bar in the Windows OS.

    1.2   Select the network connection to be used.

2. Right click on the network connection and select **Properties** from the drop down menu.

3. Select **Internet Protocol (TCP/IP)** from the components displayed.

    Note: If a TCP/IP selection is not available, it may be installed by selecting Install. Administrator access to the PC and the OS operating system installation CD-ROMs may also be required.

    3.1   Select Properties.

    Note: If the PC is on a building or office network, disconnect it from that network before proceeding. Record the existing network settings. If the network connection already has an IP address assigned on the EtherNet/IP Local network, ignore the following instructions and just click on Cancel.

    3.2   Select the **Use the following IP address** radio button.

    3.3   Enter the IP address of a vacant IP address on the EtherNet/IP Local Network (192.168.1.19 in this example).

    3.4   Enter the subnet mask for the EtherNet/IP Local Network (255.255.255.0 in this example).

    3.5   Check the system network schematic or with your network administrator to ensure that the IP address does not already exist on the network.

    3.6   Once the IP address and Subnet mask are entered, select OK.

Note: It may be necessary to reboot the PC in order for the changes to take affect.
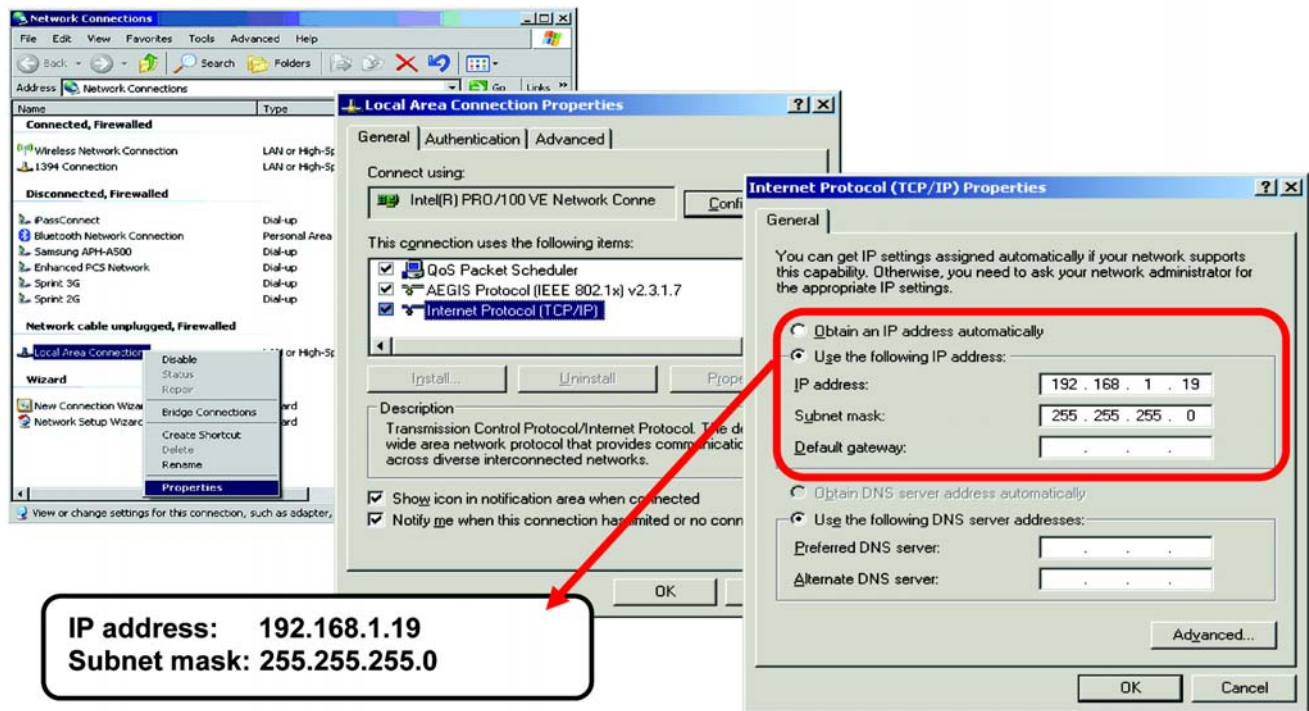
Fig 1.7 – PC Static IP Network Settings

◆ Configuring the EtherNet/IP Option Kit

1. Select **Configuration** from the main web page.
2. After the **Configuration** page has been displayed, select the method in which the *EtherNet/IP Option Kit* will obtain its IP address.
   - 2.1 **User:** The *EtherNet/IP Option Kit* will use the network address as entered in the IP, Subnet and Gateway fields. Check with the system schematic or network administrator to insure that the IP address is valid and unique and that the subnet mask and gateway are correct.
     - 2.1.1 The **USER** radio button is used in this example.
     - 2.1.2 Enter the new IP address, 192.168.1.20 in this example.
   - 2.2 **DHCP:** The *EtherNet/IP Option Kit* will use the network address assigned to it by the DHCP server.
   - 2.3 **BOOTP:** The *EtherNet/IP Option Kit* will use the network address assigned to it by the BOOTP server.
3. Select the **Gateway Usage**. Connectivity to the *EtherNet/IP Option Kit* may be limited or nonfunctional if the gateway usage setting and gateway address do not match the network infrastructure in which it is installed.
   - 3.1 **Do not use default gateway in system**. Select this radio button to disable the gateway when there is no external gateway in the system.
   - 3.2 **Use default gateway in system**. Select this radio button to enable the gateway when there is an external gateway in the system. Verify and/or update the gateway address as necessary, so that it matches the address of the system gateway.
   - 3.3 In all cases the **Gateway** field must contain a valid IP address and must not be blank.
4. When the new configuration, IP address and subnet mask have been entered, click the **Submit** button.
5. Verify that the information is correct on the **Submit Results** page.
6. Power cycle the drive in order to store the new information on the *EtherNet/IP Option Kit*.

Note: The IP address in the browser address bar will have to be changed to the drive's new IP address and the web page refreshed in order to continue to communicate with the *EtherNet/IP Option Kit* web pages.
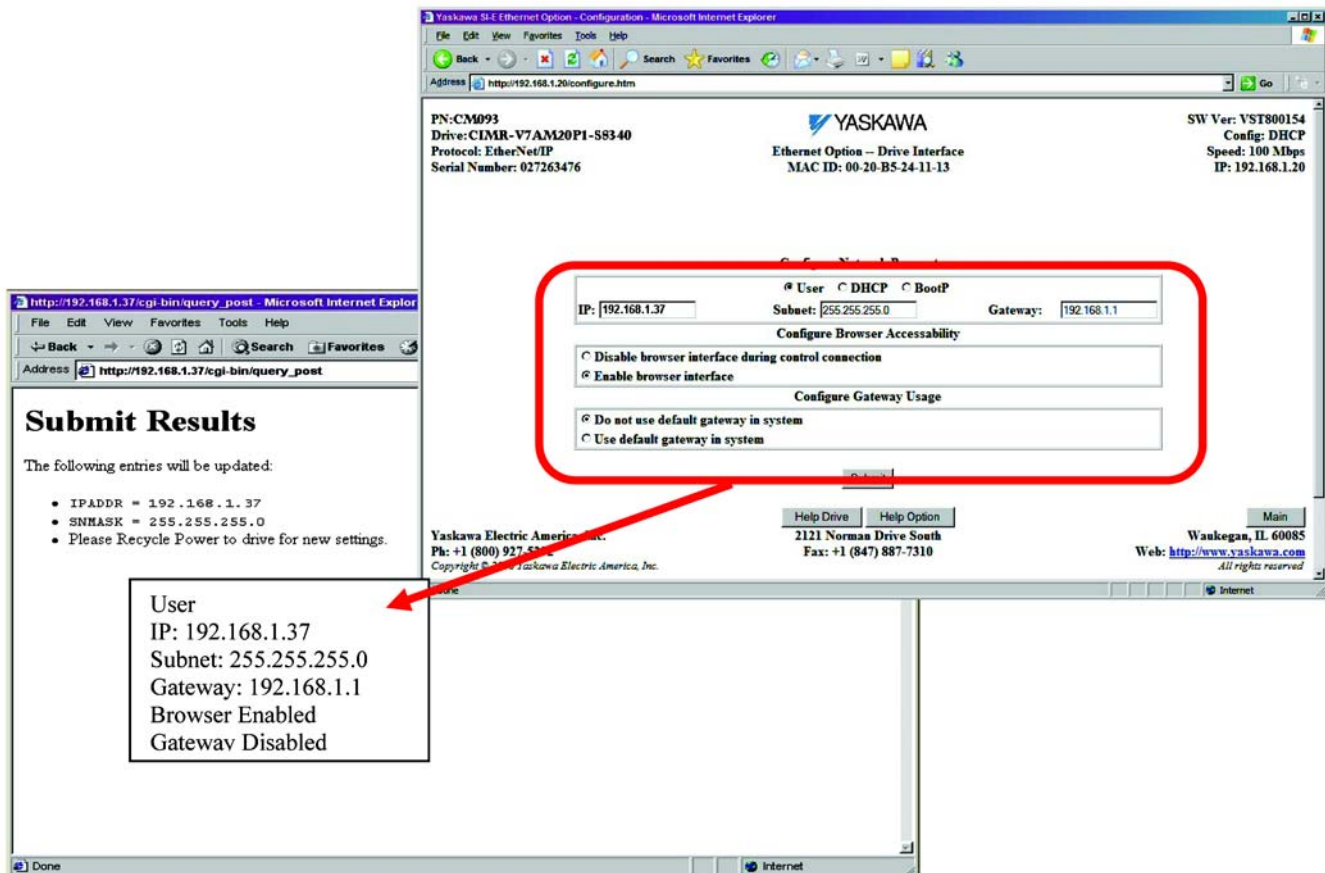
Fig 1.8 – Configuring an *EtherNet/IP Option Kit*

◆ Finish the V7 EtherNet/IP Option Kit Installation

1. Remove power from the AC drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the AC drive DC bus voltage and verify that it is at a safe level.

> ⚠ **WARNING!**
> Dangerous voltages in excess of 400VDC (230V drives) or 800VDC (460V drives) are present at the DC bus terminals of the drive.

2. Reinstall all drive covers and the operator keypad. Apply power to the drive.
3. Set parameters n003 and n004 to their appropriate values.
4. Refer to the table below for available n003 and n004 values.

Addr	Drive Param	Function	Data	Description	Default Setting
103h	n003	Operation Method Selection	0	Operator keypad	1
			1	Terminal	
			2	Serial Communication[1]	
			3	**Option kit** *(V7 EtherNet/IP Option CM093)*	
104h	n004	Reference Selection	0	Operator keypad potentiometer	2
			1	Operator keypad	
			2	Voltage Reference (0-10VDC)	
			3	Current Reference (4-20mA)	
			4	Current Reference (0-20mA)	
			5	Pulse Train Reference	
			6	Serial Communication[1]	
			7	Multi-Function Analog Input (0-10VDC)	
			8	Multi-Function Analog Input (4-20mA)	
			9	**Option kit** *(V7 EtherNet/IP Option CM093)*	
198h	n152	Display Scaling	0	0.01 Hz	0
			1	0.1 %	
			2-39	RPM (Enter motor poles)	
			40-3999	User Setting	

Table 1.5 Reference and Operation Source Selection

Note: [1] RS485 communications is disabled with the *V7 EtherNet/IP Option Kit* installed.

Important Notes

1. It is strongly recommended that **shielded** CAT-5 cable be used for all network cables.
2. Switches implementing IGMP snooping are strongly recommended. When IGMP snooping is used, devices will only receive the multicast packets in which they are interested.
3. The maximum number of simultaneous connections is: 1 for I/O, 4 for Explicit, 2 for Drive Wizard.
4. To simplify the drive configuration, EDS files can be obtained at www.yaskawa.com. From the Yaskawa web site, select **Downloads ==> By Inverter Drives ==> By Product ==> Network Comms-Ethernet**. Then select the appropriate EDS file based on the drive series and the latest version of those listed. EDS files for individual drive models are compressed into a single Zip file and need to be un-zipped into a temporary directory in order to be installed. For example: The current file containing all of the V7AM EDS files is named **EDS_V7AM_UTC000190_V1_02.zip**. To extract the EDS file for drive model 20P4, extract the EDS file named *V7AM20P4_UTC000190_V1_0*.eds*.

Refer to the V7 technical or parameter access manual for a complete list of drive parameters and registers available. A list of applicable manuals is available at the beginning of this document.

Resetting V7 EtherNet/IP Option Kit to its Default
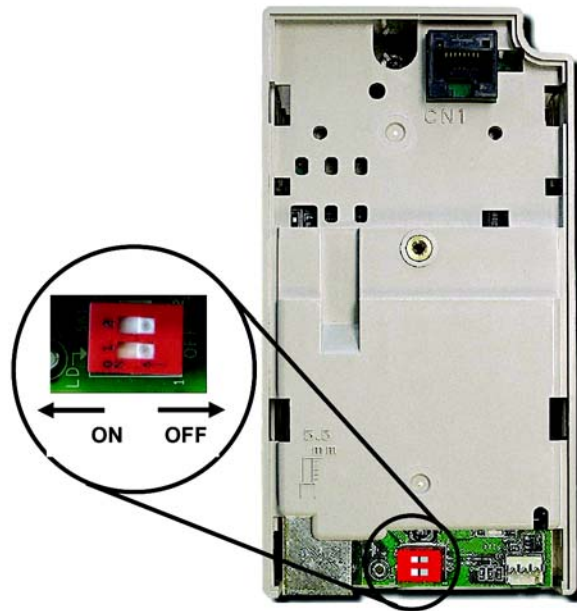
Fig 1.9 – EtherNet/IP Option Kit Reset Switch

The factory default settings:

> Configure Network Parameters: DHCP
> IP Address:192.168.1.20
> Subnet: 255.255.255.0
> Gateway: 192.168.1.1
> Gateway Usage: Disabled

Symptom: The *V7 EtherNet/IP Option Kit* main web page does not display on the PC web browser screen.

Corrective Action: Check that the PC is setup, properly connected and that an IP address has been assigned to both the node and DHCP server and that they are both on the same local network.

If the web page is still not visible after confirming PC setup, then reset the IP configuration of the *V7 EtherNet/IP Option Kit* to its factory default as follows:

1. Remove power from the V7 drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the V7 to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.

> ⚠️ **WARNING!**
> Dangerous voltages in excess of 400VDC (230V drives) or 800VDC (460V drives) are present at the DC bus terminals of the drive.

2. Slide the bottom Load Defaults (LD) switch (SW1) to the **ON** position.
3. Reapply power to the V7 and wait approximately 10 seconds for the power-up cycle to complete.
4. Note: Additional wait time (approximately 2 minutes) may be required if utilizing the DHCP feature of this card, and the DHCP server is not available, or it did not respond to the request for an IP address. The *V7 EtherNet/IP Option Kit* will indicate that the load defaults process is complete when the MS/RUN LED is displaying a steady GREEN status indication after the wait time.
5. Remove power from the V7 and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the V7 to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level. See the warning above.
6. Slide the bottom Load Defaults (LD) switch (SW1) to the **OFF** position.
7. Reapply power to the V7 and wait approximately 10 seconds for the power-up cycle to complete.

Drive Fault Messages

◆ EtherNet/IP Drive Fault Messages

The table of *EtherNet/IP* fault codes returned by the drive is shown below.
Refer to the appropriate drive user and/or programming manual(s) for drive specific information on the fault returned.

Table 1.6 – Fault Code Conversions					
Drive Fault Code	*EtherNet/IP* Fault Code [hex]	Description	Drive Fault Code	*EtherNet/IP* Fault Code [hex]	Description
0h	0000h	None	13h	9000h	External Fault 5 (EF5)
2h	3220h	DC Bus Undervoltage (UV1)	14h	9000h	External Fault 6 (EF6)
3h	5110h	CTL PS Undervoltage (UV2)	15h	9000h	External Fault 7 (EF7)
7h	2300h	Overcurrent (OC)	1Eh	5300h	Operator Disconnected (OPR)
8h	3210h	DC Bus Overvoltage (OV)	1Eh	5300h	OPE Faults
9h	4200h	Heatsink Over-temperature (OH)	21h	7500h	*EtherNet/IP* Communication Error (BUS)
0Ah	4210h	Heatsink Maximum Temperature (OH1)	22h	7500h	*EtherNet/IP* Communication Error
0Bh	2220h	Motor Overload (OL1)	23h	7500h	Reserved
0Ch	2200h	Inverter Overload (OL2)	24h	7500h	Reserved
0Dh	2221h	Overtorque Detection 1 (OL3)	27h	9000h	External Fault 0 (EF0)
11h	9000h	External Fault 3 (EF3)	29h	8321h	Undertorque Detection 1 (UL3)
12h	9000h	External Fault 4 (EF4)	2Ch	4300h	Motor Overheat 1 (OH3)

◆ Operator Keypad Fault Messages

The following is a table of faults that could be caused by the *V7 EtherNet/IP Option Kit* that will be displayed on the Operator Keypad only. For any fault displayed on the operator that is not listed in the following table, please see TM.V7.01, V7 Drive technical manual.

<table>
<tr><th colspan="4">Table 1.7– Drive Faults (Displayed on the Drive Keypad)</th></tr>
<tr><th>Fault</th><th>Content</th><th>Cause</th><th>Solution</th></tr>
<tr>
<td>BUS</td>
<td>*V7 EtherNet/IP Option Kit* communications error</td>
<td>Communication is not established between EtherNet/IP Master and the drive.</td>
<td>• Check *V7 EtherNet/IP Option Kit* communication LED display.</td>
</tr>
<tr>
<td>EF0</td>
<td>*V7 EtherNet/IP Option Kit* external fault</td>
<td>Drive received an external fault command from the *V7 EtherNet/IP Option Kit*</td>
<td>• Check multi-function input settings
• Check PLC or controller program
• Eliminate cause of fault (machine device in fault state)</td>
</tr>
<tr>
<td>OPE05</td>
<td>Command selection fault</td>
<td>Parameter n003 is set to *V7 EtherNet/IP Option Kit* and no card is detected</td>
<td>• Install *V7 EtherNet/IP Option Kit*
• Reprogram n003
• Replace the *V7 EtherNet/IP Option Kit*</td>
</tr>
<tr>
<td>OPE06</td>
<td>Reference selection fault</td>
<td>Parameter n004 is set to *V7 EtherNet/IP Option Kit* and no card is detected</td>
<td>• Install *V7 EtherNet/IP Option Kit*
• Reprogram n004
• Replace the *V7 EtherNet/IP Option Kit*</td>
</tr>
<tr>
<td>CPF20</td>
<td>*V7 EtherNet/IP Option Kit* fault</td>
<td>Faulty J1/2CN connection</td>
<td>• Power cycle the drive
• Reseat the *V7 EtherNet/IP Option Kit*
• Replace the *V7 EtherNet/IP Option Kit*
• Replace the inverter</td>
</tr>
<tr>
<td>CPF21</td>
<td>*V7 EtherNet/IP Option Kit* self-diagnostics fault</td>
<td rowspan="3">Faulty *V7 EtherNet/IP Option Kit*</td>
<td rowspan="3">• Replace the *V7 EtherNet/IP Option Kit*</td>
</tr>
<tr>
<td>CPF22</td>
<td>*V7 EtherNet/IP Option Kit* ID code fault</td>
</tr>
<tr>
<td>CPF23</td>
<td>Watch dog timer fault</td>
</tr>
</table>

Notes

Chapter 2 Browser Interface

This section describes the web server or browser interface to the V7 EtherNet/IP Option Kit.

Main Web Page

The main page is the first web page displayed. It displays the standard page header and footer along with links to the other web pages.
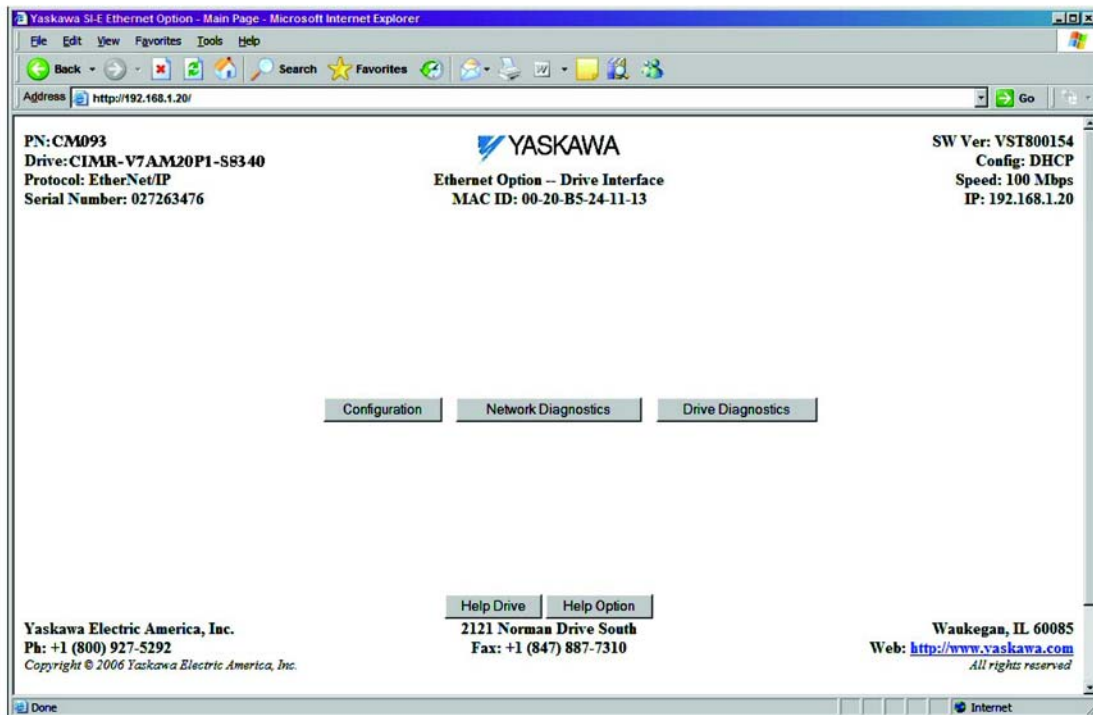
Fig 2.1 – *V7 EtherNet/IP Option Kit* Main Web Page

◆ Standard Header

The standard heading displays information specific to the installed *V7 EtherNet/IP Option Kit*.

1. **PN:** Part Number: Indicates the part number for the *V7 EtherNet/IP Option Kit*.
2. **Drive Model and Software:** Indicates the drive family and model along with the dive control card software version. The software control card software version is represented by the last 4 digits preceded by '-S".
3. **Protocol Name:** Indicates the current protocol supported - EtherNet/IP.
4. **Serial Number:** Indicates the serial number of this particular *V7 EtherNet/IP Option Kit*. Each card has a unique serial number.
5. **MAC ID:** The MAC ID is unique to each *V7 EtherNet/IP Option Kit*.
6. Option Software Version/Revision: The first five (5) digits following "VST" represent the main *V7 EtherNet/IP Option Kit* software version. The last digit represents the current revision level.
7. **Config:** Server Configuration: Determines how and where the IP address is generated.
8. **Speed:** Connection Speed: Current connection speed. Either 10 or 100 will be displayed.
9. **IP Address:** The IP address of the current *V7 EtherNet/IP Option Kit*.

◆ Standard Footer

The standard footer contains information on how to contact Yaskawa for technical support.

Configuration Web Page

The configuration page contains the standard header and footer along with a method of configuring the EtherNet/IP server and web server interfaces of the *V7 EtherNet/IP Option Kit*.
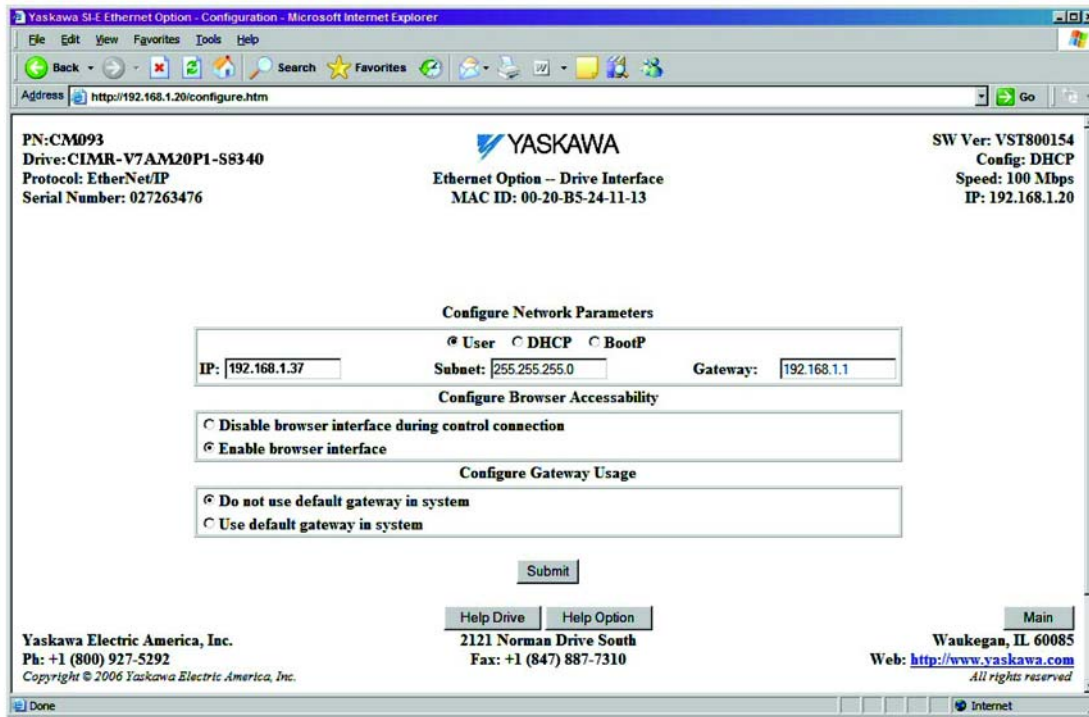
Fig 2.2 – Local Network Setup

◆ Web Server Configuration

The web server configuration allows for the setting of the IP Address, Subnet Mask, Gateway and EtherNet/IP server type. All octets must contain valid numbers between 0 and 255. The **Submit** button must be pressed, the accepted page displayed and the drive power cycled before any changes are effective.

1. Configure Network Parameters.

2. **IP:** A series of four (4) octets separated by **"."** that determines the current *V7 EtherNet/IP Option Kit* address.

3. **SubNet:** A series of four (4) octets separated by **"."** that determines the *V7 EtherNet/IP Option Kit* local area network.

4. **Gateway:** A series of four (4) octets separated by **"."** that determines the IP Address of the gateway server. If a gateway server is not used, select *Do not use default gateway in system*. The gateway must contain a valid IP address whether it is used or not and must not be blank.

5. Address Configuration Mode:
    5.1   **USER:** The user enters The IP address via the web interface.
    5.2   **DHCP:** The IP Address is set by a DHCP server and not by the user via the web interface.
    5.3   **BootP:** The IP Address is set by a BootP server and not by the user via the web interface.
         Note: Verify that a DHCP or BootP server determines the network address before selecting either.

6. Browser Access Configuration: In order to use the web pages for diagnostics, *Enable browser interface* must be selected.

Submit Page

After any of the configuration parameters shown above have been changed, the submit button must be pressed to store the changed data. The V7 Drive must then be power cycled for the new data to take affect. Verify that the data on the submit page is correct.
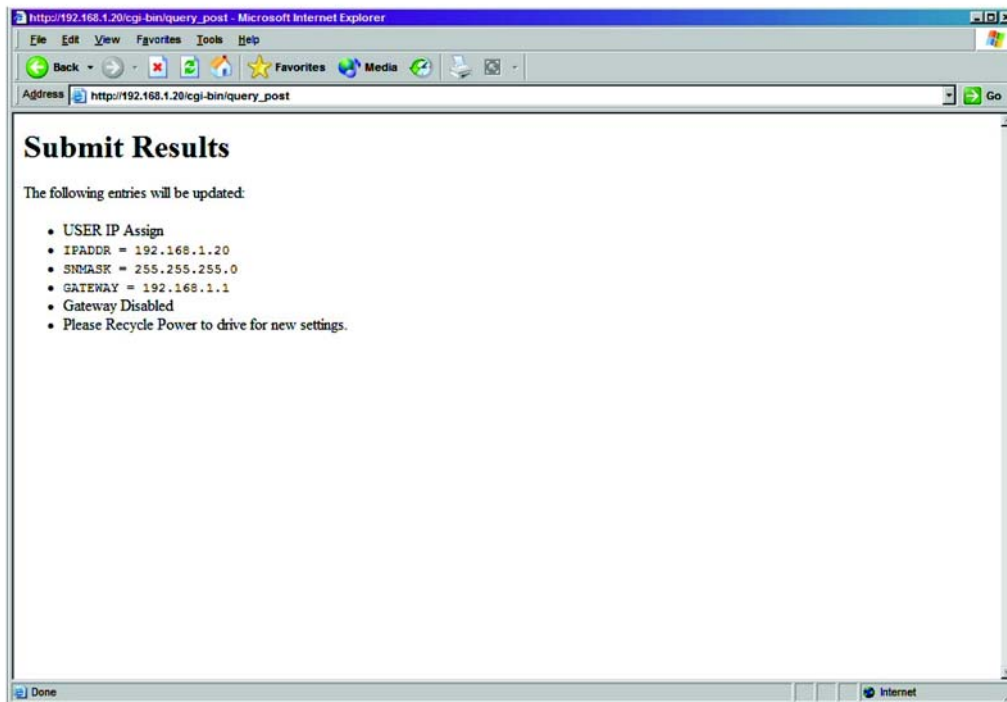
Fig 2.3 – Submit Results page

After the data on the submit page has been verified and the drive power cycled, make sure to reset your network parameters and browser address accordingly.

Network Diagnostics Web Page

The network diagnostics page displays the standard header and footer along with information relative to network and *V7 EtherNet/IP Option Kit* performance.
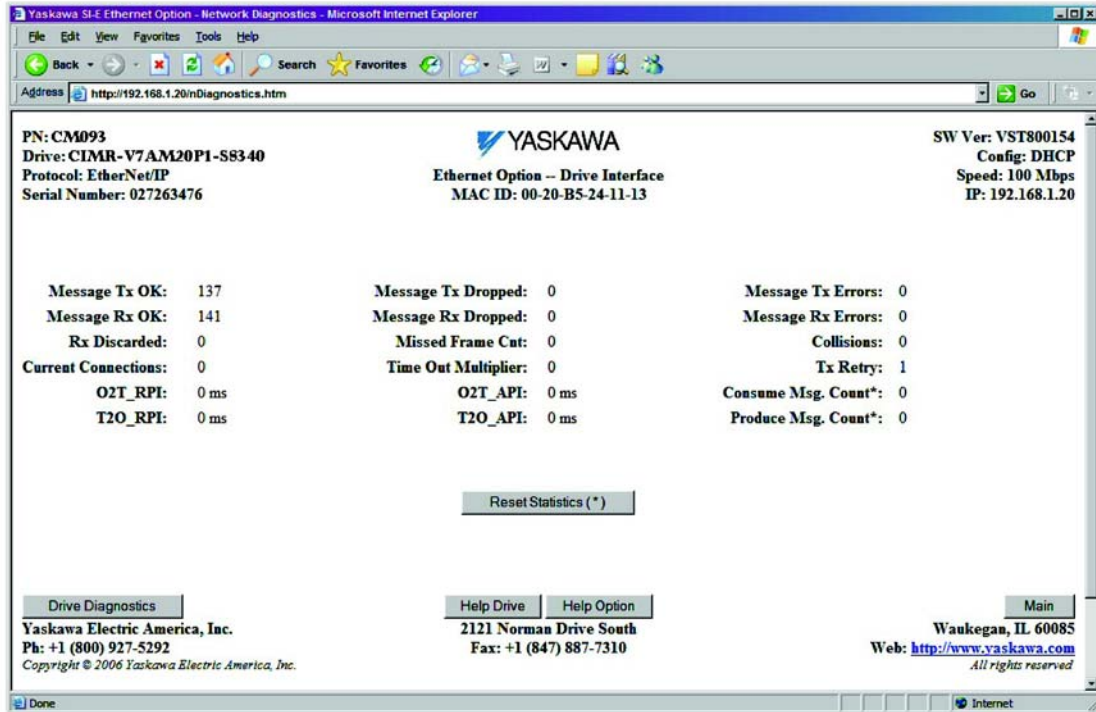
Fig 2.4 – Network Diagnostics Web Page

1. Message Tx OK: Transmit Message Count: The number of messages sent from the *V7 EtherNet/IP Option Kit*.
2. Message Rx OK: Receive Message Count: The number of messages received by the *V7 EtherNet/IP Option Kit*.
3. Rx Discarded: Received Messages Discarded: The number of received messages discarded by the *V7 EtherNet/IP Option Kit*.
4. Current Connections: The number of established connections used on the *V7 EtherNet/IP Option Kit*. This is the total of explicit, implicit and DriveWizard™ connections.
5. O2T RPI: The time interval for Master to Slave messaging during I/O connection (ms).
6. T2O RPI: The time interval for Slave to Master messaging during I/O connection (ms).
7. Message Tx Dropped: Dropped Transmit Messages: The number of dropped transmit messages sensed on the *V7 EtherNet/IP Option Kit*.
8. Message Rx Dropped: Dropped Receive Messages: The number of dropped receive messages sensed on the *V7 EtherNet/IP Option Kit*.
9. Missed Frame Cnt: The number of missed frame errors sensed on the *V7 EtherNet/IP Option Kit*.
10. Time Out Multiplier: The current timeout multiplier for I/O messages received from the master controller, during the I/O connection.
11. O2T API: The time interval for Master to slave setup messaging during I/O connection (ms).
12. T2O API: The time interval for Slave to Master setup messaging during I/O connection (ms).
13. Message Tx Errors: Transmit Message Errors: The number of error messages sent from the *V7 EtherNet/IP Option Kit* due to not processing or incorrect processing.
14. Message Rx Errors: Receive Message Errors: The number of error messages received on the *V7 EtherNet/IP Option Kit* due to not processing or incorrect processing.
15. Collisions: The number of collisions sensed on the *V7 EtherNet/IP Option Kit*.
16. Tx Retry: Transmit Retries: The number of transmit retries on the *V7 EtherNet/IP Option Kit* due to media collisions or non granted access to the media.
17. Consumed Msg Cnt: The number of consumed messages.
18. Produced Msg Cnt: The number of produced messages.
19. Reset Statistics (*): Button to reset all counters.

Drive Diagnostics Web Page

The drive diagnostics page contains the standard header and footer along with diagnostic information specific to the current drive.
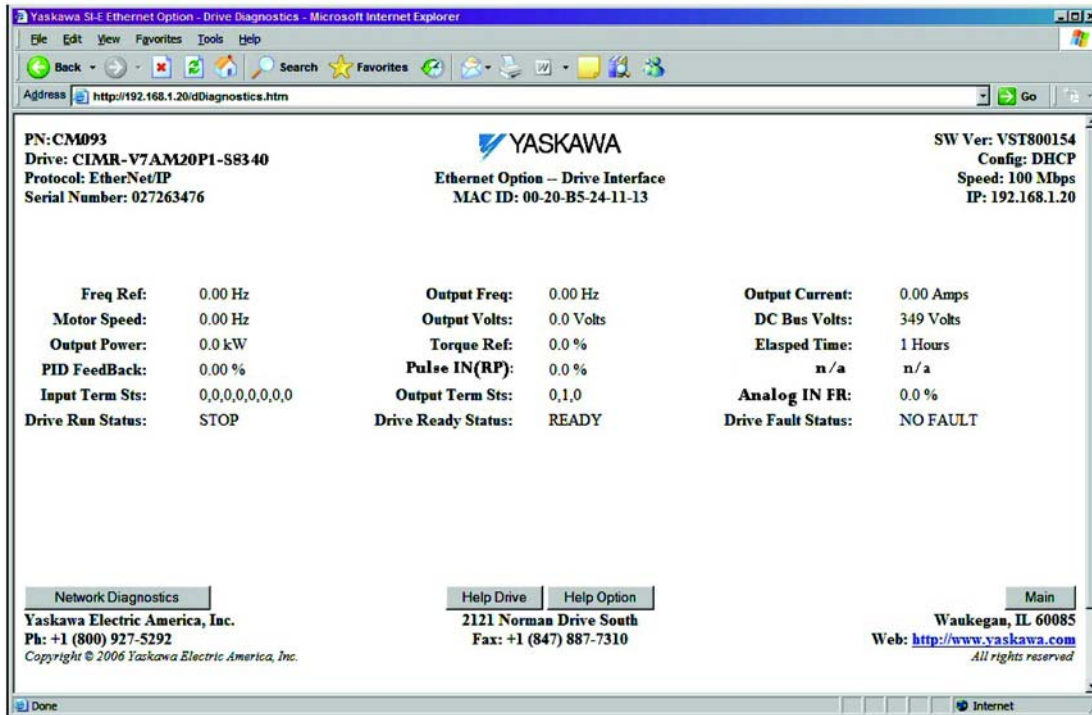
Fig 2.5 – Drive Diagnostics Web Page

1. Freq Ref: Frequency Reference – Monitor Parameter U-01.
2. Motor Speed: Motor Speed – Monitor Parameter U-02.
3. Output Power: Output Power – Monitor Parameter U-11.
4. PID Feedback: PID Feedback in %. U-16.
5. Input Term Sts: The Digital Input status as bit field – Monitor Parameter U-06.
6. Drive Run Status: Indicates RUN/STOP state of the drive.
7. Output Freq: Output Frequency – Monitor Parameter U-02.
8. Output Volts: Output Voltage – Monitor Parameter U-04.
9. Torque Ref: Torque Reference in % of rated torque – Monitor Parameter U-08.
10. Pulse In (RP):   Pulse Input (terminals RP to FC).
11. Output Term Sts: Digital Output status as bit field – Monitor Parameter U-07.
12. Drive Ready Status: Indicates the drive READY status.
13. Output Current: Output Current – Monitor Parameter U-03.
14. DC Bus Volts: DC bus Voltage – Monitor Parameter U-05.
15. Elapsed Time: Elapsed Time.
16. N/A:
17. Analog In FR: Analog input (terminals FR to FC).
18. Drive Fault Status: Indicates drive FAULT status.

Chapter 3 EtherNet/IP Objects

This section describes the V7 EtherNet/IP Option Kit supported objects.

Supported Output Instances

◆ Basic Speed Control Output Instance 20 (14h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Fault Reset	-	Run Forward
20 (14h)	1	-							
	2	Speed Reference (Low Byte) [n035 Scaled]							
	3	Speed Reference (High Byte) [n035 Scaled]							

Run Forward: Forward RUN Command

Fault Reset: Fault Reset Command

Speed reference: RPM when $n035 = (2 \sim 39)$

◆ Extended Speed Control Output Instance 21 (15h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Net Reference	Net Control	-	-	Fault Reset	Run Reverse	Run Forward
21 (15h)	1	-							
	2	Speed Reference (Low Byte) [n035 Scaled]							
	3	Speed Reference (High Byte) [n035 Scaled]							

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Fault Reset: Fault Reset Command

Net Control: Parameter n003

                      0 - 1 transition sets n003 = 3

                      1 - 0 transition sets n003 to previous value

Net Reference: Parameter n004

                      0 - 1 transition sets n004 = 9

                      1 - 0 transition sets n004 to previous value

Speed Reference: RPM when $n035 = (2 \sim 39)$

◆ Speed and Torque Control Output Instance 22 (16h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Fault Reset	-	Run Forward
22 (16h)	1	-							
	2	Speed Reference[1] (Low Byte) [n035 Scaled]							
	3	Speed Reference[1] (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							

Note: [1] Speed reference is torque limit in OLV mode (n002 = 1)

Run Forward: Forward RUN Command

Fault Reset: Fault Reset Command

Speed reference: RPM when n035 = (2 ~ 39)

◆ Extended Speed and Torque Control Output Instance 23 (17h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Net Reference	Net Control	-	-	Fault Reset	Run Reverse	Run Forward
23 (17h)	1	-							
	2	Speed Reference[1] (Low Byte) [n035 Scaled]							
	3	Speed Reference[1] (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							

Note: [1] Speed reference is torque limit in OLV mode (n002 = 1)

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Fault Reset: Fault Reset Command

Net Control: Parameter n003

                      0 - 1 transition sets n003 = 3

                      1 - 0 transition sets n003 to previous value

Net Reference: Parameter n004

                      0 - 1 transition sets n004 = 9

                      1 - 0 transition sets n004 to previous value

Speed Reference: RPM when n035 = (2 ~ 39)

Yaskawa Output Instances

◆ Yaskawa Standard Speed/Torque Control Output Instance 101 (65h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run Reverse	Run Forward
	1	Terminal P2-PC	Terminal P1 - PC	Terminal MA/MB - MC	-	-	-	Fault Reset	External Fault
101 (65h)	2	Speed Reference[1] (Low Byte) [n035 Scaled]							
	3	Speed Reference[1] (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							
	6	Reserved							
	7	Reserved							

Note: [1] Speed reference is torque limit in OLV mode (n002 = 1)

Run Forward:	Forward RUN Command
Run Reverse:	Reverse RUN Command
Terminal S3:	Multi-function Digital Input 1 (n052)
Terminal S4:	Multi-function Digital Input 2 (n053)
Terminal S5:	Multi-function Digital Input 3 (n054)
Terminal S6:	Multi-function Digital Input 4 (n055)
Terminal S7:	Multi-function Digital Input 5 (n056)
External Fault:	External Fault (Setting of n052 ~ n056)
Fault Reset:	Fault Reset Command
Terminal MA/MB-MC:	Multi-function Digital Output 1 (n057)
Terminal P1-PC:	Multi-function Digital Output 2 (n058)
Terminal P2-PC:	Multi-function Digital Output 3 (n059)
Speed Reference:	RPM when n035 = (2 ~ 39)

◆ Yaskawa Extended Speed/Torque Control Output Instance 115 (73h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run Reverse	Run Forward
	1	Terminal P2-PC	Terminal P1 - PC	Terminal MA/MB - MC	-	-	-	Fault Reset	External Fault
115 (73h)	2	Speed Reference[1] (Low Byte) [n035 Scaled]							
	3	Speed Reference[1] (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							
	6	Reserved							
	7	Reserved							
	8	Reserved							
	9	Reserved							
	Ah	Reserved							
	Bh	Reserved							
	Ch	Reserved							
	Dh	Reserved							
	Eh	Reserved							
	Fh	Reserved							
	10h	Digital Outputs (Low Byte)							
	11h	Digital Outputs (High Byte)							
	12h	Reserved							
	13h	Reserved							
	14h	Net Control							
	15h	Net Control							
	16h	Reserved							
	…	Reserved							
	27h	Reserved							

Note: [1] Speed reference is torque limit in OLV mode (n002 = 1)

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Terminal S3:   Multi-function Digital Input 1 (n052)

Terminal S4:   Multi-function Digital Input 2 (n053)

Terminal S5:   Multi-function Digital Input 3 (n054)

Terminal S6:   Multi-function Digital Input 4 (n055)

Terminal S7:   Multi-function Digital Input 5 (n056)

External Fault: External Fault (Setting of n052 ~ n056)

Fault Reset: Fault Reset Command

Terminal MA/MB-MC: Multi-function Digital Output 1 (n057)

Terminal P1-PC: Multi-function Digital Output 2 (n058)

Terminal P2-PC: Multi-function Digital Output 3 (n059)

Speed Reference: RPM when n035 = (2 ~ 39)

Supported Input Instances

◆ Basic Speed Control Input Instance 70 (46h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Running 1 (FWD)	-	Faulted
70 (46h)	1	-							
	2	Speed Actual (Low Byte) [n035 Scaled]							
	3	Speed Actual (High Byte) [n035 Scaled]							

Faulted: Drive Fault

Running1 (Forward):   Running in forward direction

Speed Actual: RPM if n035 = (2 ~ 39)

◆ Extended Speed Control Input Instance 71 (47h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	At Speed	Reference from Net	Control from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
71 (47h)	1	-							
	2	Speed Actual (Low Byte) [n035 Scaled]							
	3	Speed Actual (High Byte) [n035 Scaled]							

Faulted: Drive Fault

Warning: Drive Alarm

Running1 (FWD):   Running in forward direction

Running1 (REV):   Running in reverse direction

Ready: Drive Ready

Control from Net: 0 = Non-network control

                               1 = Control from network

Reference from Net: 0 = Reference not from network

                               1 = Reference from network

At Speed: Speed Agree

peed Actual: RPM if n035 = (2 ~ 39)

◆ Speed and Torque Control Input Instance 72 (48h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Running 1 (FWD)	-	Faulted
72 (48h)	1	-							
	2	Speed Actual (Low Byte) [n035 Scaled]							
	3	Speed Actual (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							

Faulted: Drive Fault

Running1 (Forward):   Running in forward direction

Speed Actual: RPM if n035 = (2 ~ 39)

◆ Extended Speed and Torque Control Input Instance 73 (49h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	At Speed	Reference from Net	Control from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
73 (49h)	1	-							
	2	Speed Actual (Low Byte) [n035 Scaled]							
	3	Speed Actual (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							

Faulted: Drive Fault

Warning: Drive Alarm

Running1 (FWD):   Running in forward direction

Running1 (REV):   Running in reverse direction

Ready: Drive Ready

Control from Net: 0 = Non-network control

                     1 = Control from network

Reference from Net: 0 = Reference not from network

                     1 = Reference from network

At Speed: Speed Agree

Speed Actual: RPM if n035 = (2 ~ 39)

Yaskawa Input Instances

◆ Yaskawa Standard Speed/Torque Input Instance 151 (97h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	FAULT	ALARM	READY	Speed Agree	Reset	Running REV	-	Running FWD
	1	-	-	Terminal P2-PC	Terminal P1-PC	Terminal MA/MB - MC	Local/ Remote	UV	OPE
151 (97h)	2	Output Frequency (Low Byte) [n035 Scaled]							
	3	Output Frequency (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							
	6	Output Current (Low Byte) [0.1A]							
	7	Output Current (High Byte) [0.1A]							

Running Forward:	Running in the forward direction
Running Reverse:	Running in the reverse direction
Reset:	Fault reset
Speed Agree:	@ commanded speed
Ready:	Drive Ready
Alarm:	Drive Alarm
Fault:	Drive Fault
OPE:	Drive OPE Fault
UV:	Drive Undervoltage Fault
Local/Remote:	0 = Drive is in Local Control
	1 = Drive is in Remote Control
Terminal MA/MB-MC:	Multi-function Digital Output 1 (n057)
Terminal P1-PC:	Multi-function Digital Output 2 (n058)
Terminal P2-PC:	Multi-function Digital Output 3 (n059)
Output Frequency:	Output frequency of the drive

◆ Yaskawa Extended Speed/Torque Input Instance 155 (9Bh)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	FAULT	ALARM	READY	Speed Agree	Reset	Running REV	-	Running FWD
	1	-	-	Terminal P2-PC	Terminal P1-PC	Terminal MA/MB-MC	Local/ Remote	UV	OPE
155 (9Bh)	2	Output Frequency (Low Byte) [n035 Scaled]							
	3	Output Frequency (High Byte) [n035 Scaled]							
	4	Reserved							
	5	Reserved							
	6	Reserved							
	7	Reserved							
	8	Frequency Command (Low Byte)							
	9	Frequency Command (High Byte)							
	Ah	Output Frequency (Low Byte)							
	Bh	Output Frequency (High Byte)							
	Ch	Output Current (Low Byte)							
	Dh	Output Current (High Byte)							
	Eh	Reserved							
	Fh	Reserved							
	10h	Main Circuit DC Voltage (Low Byte)							
	11h	Main Circuit DC Voltage (High Byte)							
	12h	Error Alarm 1 (Low Byte) [See page 3-11 for a list of fault codes]							
	13h	Error Alarm 1 (High Byte) [See page 3-11 for a list of fault codes]							
	14h	Error Alarm 2 (Low Byte) [See page 3-11 for a list of fault codes]							
	15h	Error Alarm 2 (High Byte) [See page 3-11 for a list of fault codes]							
	16h	Error Alarm 3 (Low Byte) [See page 3-11 for a list of fault codes]							
	17h	Error Alarm 3 (High Byte) [See page 3-11 for a list of fault codes]							
	18h	Reserved							
	19h	Reserved							
	1Ah	Input Terminals (Low Byte)							
	1Bh	Input Terminals (High Byte)							
	1Ch	Reserved							
	1Dh	Reserved							
	1Eh	Reserved							
	1Fh	Reserved							
	…	Reserved							
	27h	Reserved							

Running Forward: Running in the forward direction

Running Reverse: Running in the reverse direction

Reset: Fault reset

Speed Agree: @ commanded speed

Ready: Drive Ready

Alarm: Drive Alarm

Fault: Drive Fault

OPE: Drive OPE Fault

UV: Drive Undervoltage Fault

Local/Remote:	0 = Drive is in Local Control
	1 = Drive is in Remote Control
Terminal MA/MB-MC:	Multi-function Digital Output 1 (n057)
Terminal P1-PC:	Multi-function Digital Output 2 (n058)
Terminal P2-PC:	Multi-function Digital Output 3 (n059)
Output Frequency:	Output frequency of the drive

◆ Yaskawa Extended Speed/Torque Input Instance 155 (9Bh)

(Details for bytes 10 through 23, Error Alarm Signals 1, 2, and 3)

Bytes 12 (Low) and 13 (High) - Error Alarm Signal 1		Bytes 14 (Low) and 15 (High) - Error Alarm Signal 2		Bytes 16 (Low) and 17 (High) - Error Alarm Signal 3	
Bit	Fault	Bit	Fault	Bit	Fault
0h	PUF DC Bus Fuse Open	0h	EF3 External Fault - Terminal S3	0h	CE Modbus Communication Error
1h	UV1 DC Bus Undervoltage	1h	EF4 External Fault - Terminal S4	1h	BUS Bus Fault
2h	UV2 Control Circuit Undervoltage	2h	EF5 External Fault - Terminal S5	2h	Not Used
3h	UV3 Main Circuit Contactor Answerback Fault	3h	EF6 External Fault - Terminal S6	3h	Not Used
4h	Not Used	4h	EF7 External Fault - Terminal S7	4h	CF Out of Control Fault No Determination of Motor Speed
5h	GF Ground Fault	5h	EF8 External Fault - Terminal S8 (F7U/G7U Only)	5h	SVE Zero Servo Fault (F7U, G7U and G5M in Closed-loop flux vector mode (FVC) only)
6h	OC Overcurrent Fault	6h	FAN Drive Cooling Fan Fault (models with internal cooling fans only)	6h	EF0 External Communications Fault
7h	OV Overvoltage Fault	7h	OS Overspeed Fault	7h	Not Used
8h	OH Heatsink Over temperature Fault	8h	DEV Speed Deviation Fault	8h	Not Used
9h	OH1 Drive Overheat Fault	9h	PGO PG Open, Encoder (Pulse Generator open circuit)	9h	Not Used
Ah	OL1 Motor Overload Fault	Ah	PF Input Phase Loss Fault	Ah	Not Used
Bh	OL2 Drive Overload Fault	Bh	LF Output Phase Loss	Bh	EF9 External Fault - Terminal S9 (G7U)
Ch	OL3 Overtorque Fault 1 (L6-02)	Ch	Not Used	Ch	EF10 External Fault - Terminal S10 (G7U)
Dh	OL4 Overtorque Fault 2 (L6-05)	Dh	OPR Operator Disconnected	Dh	EF11 External Fault - Terminal S11 (G7U)
Eh	RR Dynamic Braking Transistor Failure	Eh	ERR Eprom R/W Error	Eh	EF12 External Fault - Terminal S12 (G7U)
Fh	RH Dynamic Braking Resistor Overheat	Fh	Not Used	Fh	CPF Control Circuit Fault/Peripheral Fault

CIP Supported Objects

◆ Class 01h – Identity Object

Service Code No. (hex)	Service Name
01	Get Attribute All
05	RESET
0E	Get Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X		Word	1
	2	Maximum Instances	X		Word	1
1	1	Vendor ID	X		Word	44 (YASKAWA)
	2	Device Type	X		Word	2 (AC drives)
	3	Product Code	X		Word	Product/Model Dependant Code- *For factory use.* Refer to **Attribute 7-Product Name,** for drive family and model.
	4	Revision	X		Word	Software Dependent
	5	Status	X		Word	0
	6	Serial Number	X		Word	Each product's serial number is unique Range is 0x8200000 ~0x82FFFFF
	7	Product Name	X		String (14 Bytes)	Product Dependent*

* The product name is CIMR-[Drive Family][Drive Model]. A Product Name example would be CIMR-V7AM20P4. For a V7 drive, AM-spec, 200V class, 0.4 kW drive.

◆ Class 06h – Connection Manager Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X	-	Word	1

◆ Class 02h – Message Router Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X	-	Word	

◆ Class 04h – Assembly Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X	-	Word	1
20 (14h)	3	Data	X	-	Array 4 Bytes	00 00 00 00
21 (15h)	3	Data	X	-	Array 4 Bytes	00 00 00 00
22 (16h)	3	Data	X	-	Array 6 Bytes	00 00 00 00 00 00
23 (17h)	3	Data	X	-	Array 6 Bytes	00 00 00 00 00 00
70 (46h)	3	Data	X	-	Array 4 Bytes	00 00 00 00
71 (47h)	3	Data	X	-	Array 4 Bytes	00 00 00 00
72 (48h)	3	Data	X	-	Array 6 Bytes	00 00 00 00 00 00
73 (49h)	3	Data	X	-	Array 6 Bytes	00 00 00 00 00 00
101 (65h)	3	Data	X	-	Array 8 Bytes	00 00 00 00 00 00 00 00
115 (73h)	3	Data	X	-	Array 40 Bytes	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
151 (97h)	3	Data	X	-	Array 8 Bytes	00 00 00 00 00 00 00 00
155 (9Bh)	3	Data	X	-	Array 40 Bytes	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

◆ Class F5h – TCP/IP Object

Service Code No. (hex)	Service Name
01	Get Attribute All
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X		Word	1
	2	Maximum Instance	X	-	Word	1
1	1	Status	X		Long	Bit 0: Not configured Bit 1: Configured Bit 2~31: Reserved
	2	Configuration Capability	X		Long	Bit 0: BootP Client Bit 1: DHCP Client Bit 2: DNS Client Bit 3: DHCP-DNS update Bit 4: Configuration Settable Bit 5~31: Reserved
	3	Configuration Control	X	X	Long	Bit 0~3: Start up Configuration Bit 4: DNS Enable Bit 5~31: Reserved
	4	Physical Link	X	-	Struct	Path (Word): EPATH
	5	Interface Configuration	X	X	Struct	IP Address (Long) Subnet Mask (Long) Gateway (Long) Name Server 1 (Long) Name Server 2 (Long) Domain Name (String)

◆ Class F6h - Ethernet Link Object

Service Code No. (hex)	Service Name
01	Get Attribute All
0E	Get Attribute Single
10	Set Attribute Single
4C	Get and Clear

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X	-	Word	1
	2	Maximum Instance	X		Word	1
1	1	Interface Speed	X		Long	10
	2	Interface Flags	X		Long	Bit 0: Link Status Bit 1: 0: Half Duplex 1: Full Duplex Bit 2 ~ 31: Reserved
	3	Physical Address (MAC ID)	X		Array 6 Words	Unique per assembly
	6	Interface Control	X	X	Struct	Control Bits: Word Forced Int Speed: Word

◆ Class 29h – Control Supervisor Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single
05	RESET

Attributes

Instance ID	Attribute	Description	Get	Set	Size	V7 Data
0	1	Object Software Revision	X	-	Word	1
1	3h	Run 1 (Forward Run)	X	X	Byte	Forward Run Command
	4h	Run 2 (Reverse Run)	X	X	Byte	Reverse Run Command
	5h	Net Control	X	X	Byte	Net Control Command - Parameter n003 Set: 0 = previous n003 value 1 = n003 = 3
	6h	State	X	-	Byte	Inverter Status
	7h	Running 1 (Forward)	X	-	Byte	Forward Running
	8h	Running 2 (Reverse)	X	-	Byte	Reverse Running
	9h	Ready	X	-	Byte	Inverter Ready
	10 (0Ah)	Faulted	X	-	Byte	Inverter Fault
	11 (0Bh)	Warning	X	-	Byte	Inverter Alarm
	12 (0Ch)	Fault Reset	X	X	Byte	Fault Reset
	13 (0Dh)	Fault Code	X	-	Word	Current Fault[1]
	14 (0Eh)	Warn Code	X	-	Word	Current Warning
	15 (0Fh)	Control from Net	X	-	Byte	Net Control Status - Parameter n003
	16 (10h)	CIP Fault Mode	X	-	Byte	Always "2"
	17 (11h)	Force Fault	X	X	Byte	External Fault - EF0
	18 (12h)	Force Status	X	-	Byte	External Fault Status - EF0

Note: [1] See Fault Code Conversions at the end of this section.

◆ Class 2Ah – AC Drive Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	V7 Data
0	1	Object Software Revision	X	-	Word	1
1	3h	At Reference	X	-	Byte	**Speed Agree**
	4h	Net Reference	X	X	Byte	**Net Reference Command - Parameter n004** **SET: 0 = previous n004 value** **1 = n004 = 9**
	6h	Drive Mode	X	X	Byte	**Control Method - Parameter n002**
	7h	Speed Actual	X	-	Word	**Output frequency – Monitor Parameter U-02**
	8h	Speed Reference	X	X	Word	**Speed Command – Monitor Parameter U-01**
	9h	Current Actual	X	-	Word	**Output Current – Monitor Parameter U-03**
	10 (0Ah)	Current Limit	X	X	Word	**Motor FLA - n036**
	11 (0Bh)	Torque Actual[1]	X		Word	
	12 (0Ch)	Torque Ref[1,2]	X	X	Word	
	15 (0Fh)	Power Actual	X	-	Word	**Actual Power - Monitor Parameter U-11** Power Actual = [U-11] * 100
	16 (10h)	Input Voltage	X	-	Word	**Input Voltage**
	17 (11h)	Output Voltage	X	-	Word	**Output Voltage - Monitor Parameter U-04** Output Voltage = [U-04] /10
	18 (12h)	Accel Time	X	X	Word	**Accel Time 1 - Parameter n019** The unit must be converted to parameter n018 setting.
	19 (13h)	Decel Time	X	X	Word	**Decel Time 1 - Parameter n020** The unit must be converted to parameter n018 setting.
	20 (14h)	Low Speed Limit	X	X	Word	**Reference Lower Limit - Parameter n034** The unit must be converted if n035 = "2" to "39",
	21 (15h)	High Speed Limit	X	X	Word	**Reference Upper Limit - Parameter n033** The unit must be converted if n035 is "2" to "39",
	22 (16h)					
	23 (17h)	Speed Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	24 (18h)	Current Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	25 (19h)	Torque Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	26 (1Ah)	Power Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	27 (1Bh)	Voltage Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	28 (1Ch)	Time Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the *V7 EtherNet/IP Option Kit*
	29 (1Dh)	Reference from the Net (Status)	X	-	Byte	**NetRef Status – Parameter n004**

Note: [1] Torque values are valid in OLV mode only (n002 = 1)

[2] Torque limit in speed mode (n002 = 0) and torque reference in OLV mode (n002 = 1)

◆ Class 28h – Motor Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	V7 Data
0	1	Object Software Revision	X		Word	1
1	3	Motor 1 Type	X		Byte	7 (0 ~ 10)

Yaskawa Supported Objects

◆ Class 64h – Yaskawa Command Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
0	1	Object Software Revision	X		Word	1
1	1h	Operation Command	X	X	Word	0
	2h	Frequency Reference (0.01Hz)	X	X	Word	0
	3h	Reserved				
	4h	Reserved				
	5h	Reserved				
	6h	Analog Output 1 (Terminal AM-AC)	X	X	Word	0
	7h	Reserved				
	8h	Digital Output	X	X	Word	0
	254 (FEh)	Accept Command	X	X	Word	0
	255 (FFh)	Enter Command	X	X	Word	0

Yaskawa Command Object – Class 64h, Instance 1, Attribute 1 – Operation Command	
Bit	**Definition**
0h	Forward RUN (1) /Stop (0) Bits 1 and 2 may not be set simultaneously
1h	Reverse RUN (1) /Stop (0) Bits 1 and 2 may not be set simultaneously
2h	Terminal S3 – Multi-function Digital Input 1 – Parameter n052 setting
3h	Terminal S4 – Multi-function Digital Input 2 – Parameter n053 setting
4h	Terminal S5 – Multi-function Digital Input 3 – Parameter n054 setting
5h	Terminal S6 – Multi-function Digital Input 4 – Parameter n055 setting
6h	Terminal S7 – Multi-function Digital Input 5 – Parameter n056 setting
7h	Reserved
8h	External Fault
9h	Fault Reset
10 (0Ah)	Reserved
11 (0Bh)	Reserved
12 (0Ch)	Reserved
13 (0Dh)	Reserved
14 (0Eh)	Reserved
15 (0Fh)	Reserved

Yaskawa Command Object – Class 64h, Instance 1, Attribute 8 – Digital Output	
Bit	**Definition**
0	Contact Output – Multi-function Digital Output 1 – Parameter n057 setting
1	PHC 1 – Multi-function Digital Output 2 – Parameter n058 setting
2	PHC 2 – Multi-function Digital Output 3 – Parameter n059 setting
3	Reserved
4	Reserved
5	Reserved
6	Fault Contact Enable
7	Fault Contact – Bit 6 must be set to 1 in order to enable the function of bit 7

◆ Class 65h - Yaskawa Status Object

Service Code No. (hex)	**Service Name**
0E	Get Attribute Single
10	Set Attribute Single

Attributes

Instance ID	**Attribute**	**Description**	**Get**	**Set**	**Size**	**Default Value**
0	1	Object software Revision	X		Word	1
1	1h	Drive Status	X		Word	0
	2h	Speed Feedback (n035 scaled)	X		Word	0
	3h	Reserved				
	4h	Reserved				
	5h	Speed Reference (n035 scaled)	X		Word	0
	6h	Output Frequency (n035 scaled)	X		Word	0
	7h	Output Current	X		Word	0
	8h	Reserved				
	9h	DC Bus Voltage (1V)	X		Word	0
	10 (0Ah)	Fault Code 1	X		Word	0
	11 (0Bh)	Fault Code 2	X		Word	0
	12 (0Ch)	Reserved				
	13 (0Dh)	Reserved				
	14 (0Eh)	Digital Input Status	X		Word	0
	15 (0Fh)	Analog Input Channel 1	X		Word	0
	16 (10h)	Reserved	X		Word	0

◆ Class 65, Instance 1, Attribute 1, Drive Status

Attribute 1 - Drive Status Word	
Bit	**Status**
0	Drive Running
1	Reserved
2	Reverse Running
3	Reset Command Received
4	Speed Agree
5	Inverter Ready
6	Alarm Condition
7	Fault Condition
8	Not Used
9	Momentary Power Loss Ride Thru
A	Local / Remote
B	Digital Output 1
C	Digital Output 2
D	Digital Output 3
E	Reserved
F	Reserved

◆ Class 65, Instance 1, Attributes 10, 11 and 12, Fault Code Words

Bit	Attribute 10 - Fault Code Word 1 Fault	Bit	Attribute 11 - Fault Code Word 1 Fault	Bit	Attribute 12 - Fault Code Word 1 Fault
1h	UV1 Main Circuit Undervoltage	0h	EF3　External Fault - Terminal S3	0h	CE Communication Error
2h	UV2 Control Power Undervoltage	1h	EF4 External Fault - Terminal S4	1h	BUS Option Card Error
4h	Reserved	2h	EF5 External Fault - Terminal S5	2h	Reserved
6h	OC Overcurrent	3h	EF6 External Fault - Terminal S6	3h	Reserved
7h	OV Overvoltage	4h	EF7 External Fault - Terminal S7	6h	EF0 Option External Error
8h	OH Drive Overheat	5h	Not Used	8h	UL3 Undertorque Detect 1
9h	OH1 Motor Overheat Alarm	6h	FAN Drive Cooling Fan Fault (models with internal cooling fans only)	Bh	Reserved
Ah	OL1 Motor Overload	Ch	OH3 Motor Overheat Disconnect	Ch	Reserved
Bh	OL2 Motor Overload	Dh	OPR Operator Disconnect	Dh	Reserved
Ch	OL3 Overtorque 1	-	-	Eh	Reserved
-	-	-	-	Fh	CPF Hardware Fault

Fault Code Conversions

EtherNet/IP Fault Code [hex]	Drive Fault Code	Description	EtherNet/IP Fault Code [hex]	Drive Fault Code	Description
Table 1.7 – Drive Fault Messages (by EtherNet/IP Communication)						
0000h	0	None	5300h	1Eh	OPE Errors
2200h	0Ch	Inverter Overload (OL2)	7500h	21h	EtherNet/IP Communication Error (BUS)
2220h	0Bh	Motor Overload (OL1)	7500h	22h	EtherNet/IP Communication Error
2221h	0Dh	Overtorque Detection 1 (OL3)	7500h	23h	Reserved
2300h	7	Overcurrent (OC)	7500h	24h	Reserved
3210h	8	DC Bus Overvoltage (OV)	8321h	29h	Undertorque Detection 1 (UL3)
3220h	2	DC Bus Undervoltage (UV1)	9000h	11h	External Fault 3 (EF3)
4200h	9	Heatsink Over-temperature (OH)	9000h	12h	External Fault 4 (EF4)
4210h	0Ah	Heatsink Maximum Temperature (OH1)	9000h	13h	External Fault 5 (EF5)
4300h	2Ch	Motor Overheat 1 (OH3)	9000h	14h	External Fault 6 (EF6)
5110h	3	CTL PS Undervoltage (UV2)	9000h	15h	External Fault 7 (EF7)
5300h	1Eh	Operator Disconnected (OPR)	9000h	27h	External Fault 0 (EF0)

Notes

Chapter 4 Product Specification

This appendix describes the specification for the V7 EtherNet/IP Option Kit.

Product Specification

<table>
<tr><td colspan="2" align="center">Table 4.1 – Environmental Specifications</td></tr>
<tr><td>Condition</td><td>Limits</td></tr>
<tr><td>Operating Temperature:</td><td>0 to 55°C</td></tr>
<tr><td>Storage Temperature:</td><td>-20 to 70°C</td></tr>
<tr><td>Humidity:</td><td>90% Relative Humidity (no condensing)</td></tr>
<tr><td>Vibration:</td><td>1G at less than 20Hz, up to 0.2G at 20 to 50Hz</td></tr>
<tr><td>Altitude:</td><td>3300 ft or less</td></tr>
</table>

Firmware Description

◆ Status Support

The following Status Assembly information is available in the EtherNet/IP interface, which is implemented as the normal heartbeat information in CIP. The following states of the device along with the additional flags provide for monitoring the EtherNet/IP enabled Yaskawa drives.

<table>
<tr><td colspan="3" align="center">Table 4.2 – Status Support</td></tr>
<tr><td>Value</td><td colspan="2" align="center">State</td></tr>
<tr><td>0</td><td colspan="2">Non-Existant</td></tr>
<tr><td>1</td><td colspan="2">Device Self-test</td></tr>
<tr><td>2</td><td colspan="2">Standby</td></tr>
<tr><td>3</td><td colspan="2">Operational</td></tr>
<tr><td>4</td><td colspan="2">Major Fault -Recoverable</td></tr>
<tr><td>5</td><td colspan="2">Major Fault -Unrecoverable</td></tr>
<tr><td>EV_</td><td>Event Flag</td><td>An Event has Occurred</td></tr>
<tr><td>SF_</td><td>System Fault</td><td>Connection or BUS Fault</td></tr>
<tr><td>UF_</td><td>User Fault</td><td>User Interaction Inhibited Operation</td></tr>
<tr><td>DF_</td><td>Device Fault</td><td>Drive or Hardware Fault</td></tr>
</table>

◆ Protocols

Standard TCP/IP and UDP/IP are implemented with the support of SNMP for network diagnostic features support. ARP, ICMP, and IGMP are supported for interoperable operation in IP networks.

◆ Ports

EtherNet/IP: Port 0xAF12 for encapsulation packets, services and CPF-session management
              Port 0x08AE for I/O connections supported with timeout configurations.
Web: Port 80 (Http)
Telnet: Port 23(Telnet)

◆ Connections

The maximum number of simultaneous connections is: 1 for I/O, 4 for Explicit, 2 for Drive Wizard™.

◆ Cable Loss and Timeout

Timeout is calculated based on RPI configuration parameter on startup. It is specified in seconds. A setting of "0" disables the timeout. The default cable loss timeout is RPI* 4.

◆ ENTER and ACCEPT

The ENTER and ACCEPT commands are translated internally. ENTER and ACCEPT usage is determined by the identity of the drive.

Notes

Chapter 5 Parameter Tables

Class/Instance/Attribute Tables

The following tables list all the drive monitors and parameters that are supported by the *V7 EtherNet/IP Option Kit*.
Instance ID 0 of each of the following tables is the Object Software Revision, Service GET, Data Type Word, 2 Bytes and Default Value 1.
Unless otherwise shown, all default values are 0. Table cells that do not contain a value either do not exist or are not available.
All parameters all share the same service (GET/SET), data type (Word) and number of bytes (2).

◆ Class 78h, Instance 1 - Monitor Parameters 1

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2).

Table 5.1 – Monitor Attribute		
Monitor	**Name**	**Attribute**
		V7
-	Inverter Status	1
-	Fault Monitor	2
U-01	Frequency Reference Hz	3
U-02	Output Frequency Hz	4
U-03	Output Current A	5
U-04	Output Voltage	6
U-06	Input Terminal Status	7
U-07	Output Terminal Status	8
U-05	DC Bus Voltage	9
U-08	Torque Monitor	10 (0Ah)
U-11	Output Power	11 (0Bh)
U-16	PID Feedback	12 (0Ch)
U-17	PID Input	13 (0Dh)
U-18	PID Output	14 (0Eh)
U-15	Transmission Error	15 (0Fh)
U-09	Fault History 1	16 (10h)
U-09	Fault History 2	17 (11h)
U-10	Software Number	18 (12h)

◆ Class 79h, Instance 1 - Initialize/User Object

Instance ID 0 of each of the following tables is the Object Software Revision, Service GET, Data Type Word, 2 Bytes and Default Value 1. Unless otherwise shown, all default values are 0. Table cells that do not contain a value either do not exist or are not available.

All parameters share the same service (GET/SET), data type (Word) and number of bytes (2).

Table 5.2 – Parameter Attribute		
Parameter	**Description**	**Attribute**
n001	Initialization/Access Level	1
n002	Control Mode Select	2
n003	Run Command Select	3
n004	Frequency Reference	4
n005	Stopping Method	5
n006	Rev Run Prohibit	6
n007	Stop Key Select	7
n008	Local Frequency Select	8
n009	Frequency Ref Method	9
n010	Digital Oper Detect	10 (0Ah)
n011	Max Frequency	11 (0Bh)
n012	Max Voltage	12 (0Ch)
n013	Base Frequency	13 (0Dh)
n014	Mid Frequency	14 (0Eh)
n015	Mid Voltage	15 (0Fh)
n016	Min Frequency	16 (10h)
n017	Min Voltage	17 (11h)
n018	Accel/ Decel Units	18 (12h)
n019	Accel Time 1	19 (13h)
n020	Decel Time 1	20 (14h)
n021	Accel Time 2	21 (15h)
n022	Decel Time 2	22 (16h)
n023	S- Curve Sel	23 (17h)
n024	Frequency Reference 1	24 (18h)
n025	Frequency Reference 2	25 (19h)
n026	Frequency Reference 3	26 (1Ah)
n027	Frequency Reference 4	27 (1Bh)
n028	Frequency Reference 5	28 (1Ch)
n029	Frequency Reference 6	29 (1Dh)
n030	Frequency Reference 7	30 (1Eh)
n031	Frequency Reference	31 (1Fvh)
n032	Jog Reference	32 (20h)
n033	Freq Upper Limit	33 (21h)
n034	Freq Lower Limit	34 (22h)
n035	Display Mode	35 (23h)
n036	Motor Rated Current	36 (24h)
n037	Thermal Overload Sel	37 (25h)
n038	Thermal OL Time Const	38 (26h)
n039	Cooling Fan Sel	39 (27h)
n040	Motor Rotation	40 (28h)
n041	Accel Time 3	41 (29h)

Table 5.2 – Parameter Attribute		
Parameter	**Description**	**Attribute**
n042	Decel Time 3	42 (2Ah)
n043	Accel Time 4	43 (2Bh)
n044	Decel Time 4	44 (2Ch)
-	Not Used	45 (2Dh)
-	Not Used	46 (2Eh)
-	Not Used	47 (2Fh)
-	Not Used	48 (30h)
-	Not Used	49 (31h)
n050	Terminal S1 Func Select	50 (32h)
n051	Terminal S2 Func Select	51 (33h)
n052	Terminal S3 Func Select	52 (34h)
n053	Terminal S4 Func Select	53 (35h)
n054	Terminal S5 Func Select	54 (36h)
n055	Terminal S6 Func Select	55 (37h)
n056	Terminal S7 Func Select	56 (38h)
n057	Terminal MA Func Sel	57 (39h)
n058	Terminal P1 Func Sel	58 (3Ah)
n059	Terminal P2 Func Sel	59 (3Bh)
n060	Frequency Reference Gain	60 (3Ch)
n061	Frequency Reference Bias	61 (3Dh)
n062	Analog Time Constant	62 (3Eh)
-	Not Used	63 (3Fh)
n064	Freq Ref Loss Detection	64 (40h)
n065	Monitor Output Config	65 (41h)
n066	Monitor Func Sel	66 (42h)
n067	Monitor Output Gain	67 (43h)
n068	Analog Frequency vGain	68 (44h)
n069	Analog Frequency vBias	69 (45h)
n070	Analog Frequency Time	70 (46h)
n071	Analog Frequency cGain	71 (47h)
n072	Analog Frequency cBias	72 (48h)
n073	Analog Frequency Time	73 (49h)
n074	Pulse Train Gain	74 (4Ah)
n075	Pulse Train Bias	75 (4Bh)
n076	Pulse Train Time	76 (4Ch)
n077	CN2 Select	77 (4Dh)
n078	CN2 Signal Select	78 (4Eh)
n079	Frequency Reference Bias	79 (4Fh)
n080	Carrier Freq Select	80 (50h)
n081	Power Loss Opr	81 (51h)
n082	# of Auto Retries	82 (52h)
n083	Jump Frequency 1	83 (53h)
n084	Jump Frequency 2	84 (54h)
n085	Jump Frequency 3	85 (55h)
n086	Jump Frequency Width	86 (56h)
-	Not Used	87 (57h)
-	Not Used	88 (58h)
n089	DC Injection Current	89 (58h)

	Table 5.2 – Parameter Attribute		
Parameter	**Description**	**Attribute**
n090	DC Injection Time @ Stop	90 (5Ah)
n091	DC Injection Time @ Start	91 (5Bh)
n092	Stall Prev During Decel Sel	92 (5Ch)
n093	Stall Prev Accel Level	93 (5Dh)
n094	Stall Prev Run Level	94 (5Eh)
n095	Freq Detection Lvl	95 (5Fh)
n096	Overtorque Detection	96 (60h)
n097	Overtorque Det Sel	97 (61h)
n098	Overtorque Del Lvl	98 (62h)
n099	Overtorque Det Time	99 (63h)
n100	Freq Ref Retention	100 (64h)
n101	Speed Search DEC Time	101 (65h)
n102	Speed Search Level	102 (66h)
n103	Torque Comp Gain	103 (67h)
n104	Torque Comp Time	104 (68h)
n105	Motor Iron Loss	105 (69h)
n106	Motor Rated Slip	106 (6Ah)
n107	Motor Term Resistance	107 (6Bh)
n108	Motor Leak Inductance	108 (6Ch)
n109	Torque Comp Limit	109 (6Dh)
n110	Motor No-Load Current	110 (6Eh)
n111	Slip Comp Gain	111 (6Fh)
n112	Slip Comp Time	112 (70h)
n113	Regen Slip Comp	113 (71h)
-	Not Used	114 (72h)
n115	Stall Prevention Sel	115 (73h)
n116	Stall Prev Time	116 (74h)
n117	Under-Torque Selection	117 (75h)
n118	Under-Torque Detection Level	118 (76h)
n119	Under-Torque Detection Time	119 (77h)
n120	Frequency Reference 9	120 (78h)
n121	Frequency Reference 10	121 (79h)
n122	Frequency Reference 11	122 (7Ah)
n123	Frequency Reference 12	123 (7Bh)
n124	Frequency Reference 13	124 (7Ch)
n125	Frequency Reference 14	125 (7Dh)
n126	Frequency Reference 15	126 (7Eh)
n127	Frequency Reference 16	127 (7Fh)
n128	PID Control Select	128 (80h)
n129	Feedback Gain	129 (81h)
n130	PID Proportional Gain	130 (82h)
n131	PID Integral Time	131 (83h)
n132	PID Derivative Time	132 (84h)
n133	PID Offset	133 (85h)
n134	PID Integral Limit	134 (86h)
n135	PID Lag Time	135 (87h)
n136	Feedback Loss Detect	136 (88h)
n137	FBL Detection Level	137 (89h)

Table 5.2 – Parameter Attribute		
Parameter	**Description**	**Attribute**
n138	FBL Delay Time	138 (8Ah)
n139	Energy Saving Select	139 (8Bh)
n140	Energy Savings Gain	140 (8Ch)
n141	V Lower Limit@60Hz	141 (8Dh)
n142	V Lower Limit @ 6Hz	142 (8Eh)
n143	Time of Avg kW	143 (8Fh)
n144	Tuning Voltage Limit	144 (90h)
n145	Tuning Step V@100%	145 (91h)
n146	Tuning Step V@5%	146 (92h)
n147	Motor Rated Volts	147 (93h)
-	Not Used	148 (94h)
n149	Pulse Train Scale	149 (95h)
n150	Pulse Monitor Sel	150 (96h)
n151	Modbus TimeOut	151 (97h)
n152	Modbus Ref Units	152 (98h)
n153	Modbus Address	153 (99h)
n154	Modbus Baud Rate	154 (9Ah)
n155	Modbus Parity	155 (9Bh)
n156	Transmission Wait Time	156 (9Ch)
n157	RTS Control	157 (9Dh)
n158	Motor Code	158 (9Eh)
n159	Energy Sav @ 60 Hz	159 (9Fh)
n160	Energy Sav @ 6Hz	160 (A0h)
n161	Power Detection Width	161 (A1h)
n162	Power Det Filter	162 (A2h)
n163	PID Output Gain	163 (A3h)
n164	PID Feedback Select	164 (A4h)
n165	OverHeat Protection Select for Resistor Unit Mount	165 (A5h)
n166	Input Phase Loss Detection Level	166 (A6h)
n167	Input Phase Loss Detection Time	167 (A7h)
n168	Output Phase Loss Detection Level	168 (A8h)
n169	Output Phase Loss Detection Time	169 (A9h)
-	Not Used	170 (AAh)
-	Not Used	171 (ABh)
-	Not Used	172 (ACh)
n173	DC Injection P Gain	173 (ADh)
n174	DC Injection I Time	174 (AEh)
n175	Carrier Freq Decel Sel	175 (AFh)
-	Not Used	176 (B0h)
-	Not Used	177 (B1h)
-	Not Used	178 (B2h)
n179	Software ID	179 (B3h)

Hexadecimal/Decimal Conversion

Table B.1 – Hexadecimal/Decimal Conversions									
Hex	**Decimal**	**Hex**	**Decimal**	**Hex**	**Decimal**	**Hex**	**Decimal**	**Hex**	**Decimal**
0	0	34	52	68	104	9C	156	D0	208
1	1	35	53	69	105	9D	157	D1	209
2	2	36	54	6A	106	9E	158	D2	210
3	3	37	55	6B	107	9F	159	D3	211
4	4	38	56	6C	108	A0	160	D4	212
5	5	39	57	6D	109	A1	161	D5	213
6	6	3A	58	6E	110	A2	162	D6	214
7	7	3B	59	6F	111	A3	163	D7	215
8	8	3C	60	70	112	A4	164	D8	216
9	9	3D	61	71	113	A5	165	D9	217
A	10	3E	62	72	114	A6	166	DA	218
B	11	3F	63	73	115	A7	167	DB	219
C	12	40	64	74	116	A8	168	DC	220
D	13	41	65	75	117	A9	169	DD	221
E	14	42	66	76	118	AA	170	DE	222
F	15	43	67	77	119	AB	171	DF	223
10	16	44	68	78	120	AC	172	E0	224
11	17	45	69	79	121	AD	173	E1	225
12	18	46	70	7A	122	AE	174	E2	226
13	19	47	71	7B	123	AF	175	E3	227
14	20	48	72	7C	124	B0	176	E4	228
15	21	49	73	7D	125	B1	177	E5	229
16	22	4A	74	7E	126	B2	178	E6	230
17	23	4B	75	7F	127	B3	179	E7	231
18	24	4C	76	80	128	B4	180	E8	232
19	25	4D	77	81	129	B5	181	E9	233
1A	26	4E	78	82	130	B6	182	EA	234
1B	27	4F	79	83	131	B7	183	EB	235
1C	28	50	80	84	132	B8	184	EC	236
1D	29	51	81	85	133	B9	185	ED	237
1E	30	52	82	86	134	BA	186	EE	238
1F	31	53	83	87	135	BB	187	EF	239
20	32	54	84	88	136	BC	188	F0	240
21	33	55	85	89	137	BD	189	F1	241
22	34	56	86	8A	138	BE	190	F2	242
23	35	57	87	8B	139	BF	191	F3	243
24	36	58	88	8C	140	C0	192	F4	244
25	37	59	89	8D	141	C1	193	F5	245
26	38	5A	90	8E	142	C2	194	F6	246
27	39	5B	91	8F	143	C3	195	F7	247
28	40	5C	92	90	144	C4	196	F8	248
29	41	5D	93	91	145	C5	197	F9	249
2A	42	5E	94	92	146	C6	198	FA	250
2B	43	5F	95	93	147	C7	199	FB	251
2C	44	60	96	94	148	C8	200	FC	252
2D	45	61	97	95	149	C9	201	FD	253

Table B.1 – Hexadecimal/Decimal Conversions														
Hex	**Decimal**		**Hex**	**Decimal**		**Hex**	**Decimal**		**Hex**	**Decimal**		**Hex**	**Decimal**
2E	46		62	98		96	150		CA	202		FE	254
2F	47		63	99		97	151		CB	203		FF	255
30	48		64	100		98	152		CC	204		100	256
31	49		65	101		99	153		CD	205			
32	50		66	102		9A	154		CE	206			
33	51		67	103		9B	155		CF	207			

EtherNet√IP Option CM093 — YASKAWA

conformance tested

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