Option Modules

EtherNet IP Option

HA501842U001 Issue 2
Technical Manual

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
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ENGINEERING YOUR SUCCESS

AC30 EtherNet IP Option

Technical Manual
HA501842U001 Issue 2

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Safety Information

Requirements

IMPORTANT: *Please read this information BEFORE installing the equipment.*

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

Complete the following table for future reference detailing how the unit is to be installed and used.

INSTALLATION DETAILS	
Model Number *(see product label)*	
Where installed *(for your own information)*	

Application Area

The equipment described is intended for industrial motor speed control utilising AC induction or AC synchronous machines.

Personnel

Installation, operation and maintenance of the equipment should be carried out by competent personnel. A competent person is someone who is technically qualified and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Product Warnings

DANGER Risk of electric shock	**WARNING** Hot surfaces	**Caution** Refer to documentation	**Earth/Ground** Protective Conductor Terminal

CAUTION!

APPLICATION RISK

- The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We cannot guarantee the suitability of the equipment described in this Manual for individual applications.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended. In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The motor's direction of rotation might not be controlled
- The motor speed might not be controlled
- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition. Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

Safety Information

DANGER! - Ignoring the following may result in injury

1. This equipment can endanger life by exposure to rotating machinery and high voltages.
2. The equipment must be permanently earthed due to the high earth leakage current, and the drive motor must be connected to an appropriate safety earth.
3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the drive.
4. There may still be dangerous voltages present at power terminals (motor output, supply input phases, DC bus and the brake, where fitted) when the motor is at standstill or is stopped.
5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range.
   CAT I and CAT II meters must not be used on this product.
6. Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50V). Use the specified meter capable of measuring up to 1000V dc & ac rms to confirm that less than 50V is present between all power terminals and between power terminals and earth.
7. Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the drive must be returned. Refer to "Routine Maintenance and Repair".

WARNING! - Ignoring the following may result in injury or damage to equipment

SAFETY

Where there is conflict between EMC and Safety requirements, personnel safety shall always take precedence.

- Never perform high voltage resistance checks on the wiring without first disconnecting the drive from the circuit being tested.
- Whilst ensuring ventilation is sufficient, provide guarding and /or additional safety systems to prevent injury or damage to equipment.
- When replacing a drive in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.
- All control and signal terminals are SELV, i.e. protected by double insulation. Ensure all external wiring is rated for the highest system voltage.
- Thermal sensors contained within the motor must have at least basic insulation.
- All exposed metalwork in the Inverter is protected by basic insulation and bonded to a safety earth.
- RCDs are not recommended for use with this product but, where their use is mandatory, only Type B RCDs should be used.

EMC

- In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.
- This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.
- This is a product of the restricted sales distribution class according to IEC 61800-3. It is designated as “professional equipment” as defined in EN61000-3-2. Permission of the supply authority shall be obtained before connection to the low voltage supply.

Disposal

Waste Electrical and Electronic Equipment (WEEE)

Waste Electrical and Electronic Equipment - must not be disposed of with domestic waste.

It must be separately collected according to local legislation and applicable laws.

Parker Hannifin Company, together with local distributors and in accordance with EU directive 2002/96/EC, undertakes to withdraw and dispose of its products, fully respecting environmental considerations.

For more information about how to recycle your Parker supplied waste equipment, please contact your local Parker Service Centre.

Packaging

During transport our products are protected by suitable packaging. This is entirely environmentally compatible and should be taken for central disposal as secondary raw material.

Contents **Page No.**

AC30 ETHERNET IP OPTION

Introduction

Features

- EtherNet IP
- 10/100Mbit, full/half duplex
- Galvanically isolated 2-port Ethernet interface
- Device Level Ring (DLR) and linear network topology supported
- Network Status and Module Status LEDs
- Up to 256 bytes of consumed data and 256 bytes of produced data
- CIP Parameter Object support
- Explicit messaging
- Web server
- FTP server
- EDS file provided

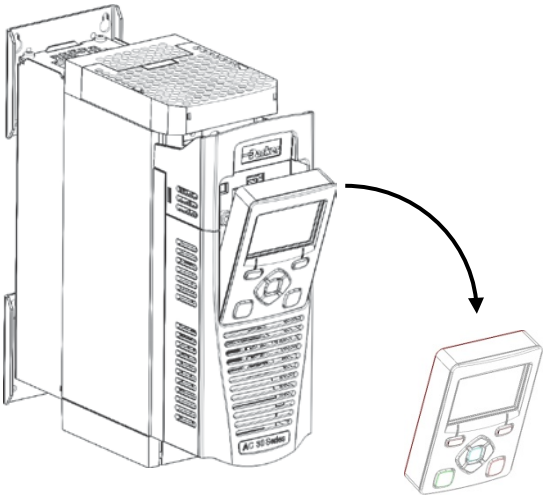
Product Code

The product code for the EtherNet IP Option is:

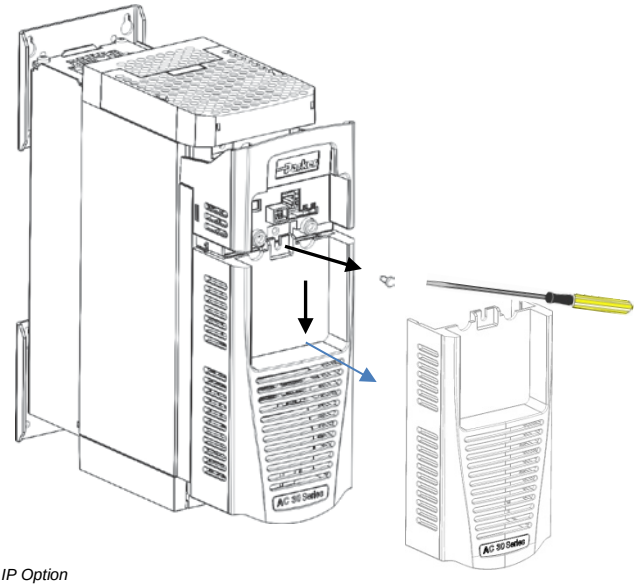
7003-IP-00

Installation

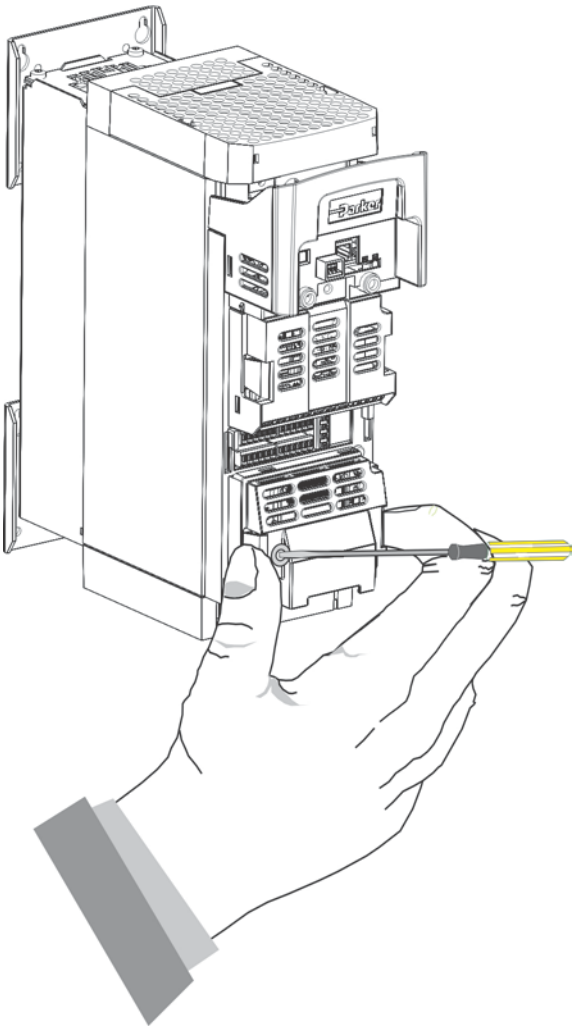
1. Remove the Graphical Keypad (GKP) by pulling from the top down, and remove.



2. After removing the screw slide the control module lower cover down slightly and then remove.

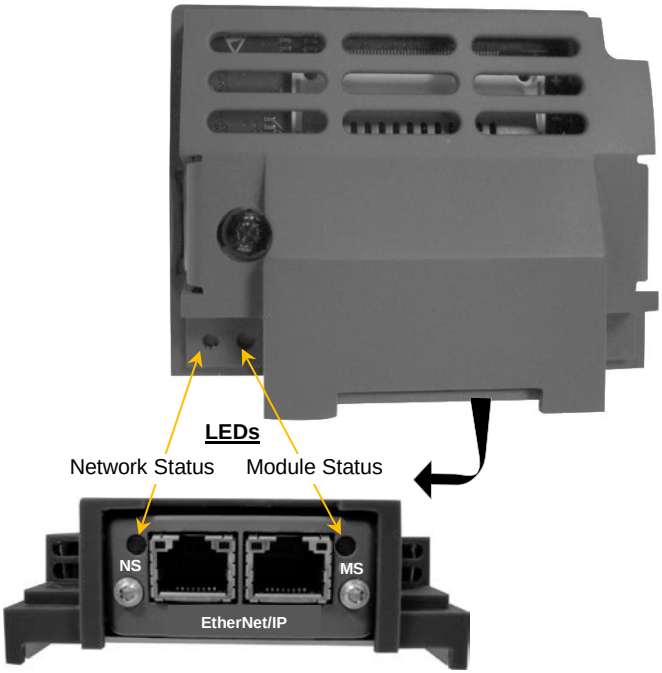


3. Click the Option into place and tighten the retaining screw, as shown.



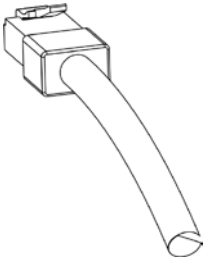
4. Slide and click back the control module lower cover, tighten the retaining screw and slot back the GKP

Connecting to the EtherNet IP Network



Two RJ45 Ethernet sockets are provided. Either or both sockets may be used. Having 2 ports reduces the need for additional Ethernet switches.

The socket shields are connected to protective earth via a filter.



Cable Type

CAT5E or CAT6 cable up to 100m between nodes with both RJ45 plugs wired in the same TIA/EIA-468A or B scheme.

LEDs

Network Status (NS) LED

State	Indication
Off	Not online / No power
Green	On-line, one or more connections are established (CIP Class 1 or 3)
Green, flashing	On-line, no connections established
Red	Duplicate IP address or fatal error
Red, flashing	One or more connections timed-out (CIP Class 1 or 3)

Module Status (MS) LED

State	Indication
Off	No power
Green	Controlled by a Scanner in Run state
Green, flashing	Not configured, or Scanner in Idle state
Red	Major fault (exception or fatal error)
Red, flashing	Recoverable Fault(s)

Configuration

The option requires configuration of the device address and mapping of the process data to the master. The Producer Assembly instance number and Consumer Assembly instance number may be changed from the defaults if required. Note that some communication parameters only become active after the AC30 leaves the configuration state.

The **0044 Comms Required** parameter must be set to **ETHERNET IP**.

Address

There are three methods to set the IP address, subnet mask and gateway address of the device: the slave sets its own address, the address is set externally, say be a PLC, or the address is set by a DHCP server. The parameter **0199 Address Assignment** is used to choose the method.

If the IP address is set by the slave (**Address Assignment = FIXED**) then three further parameters must be set. These are:

0200 Fixed IP Address

0201 Fixed Subnet Mask

0202 Fixed Gateway Address

Producing / Consuming Instance Numbers

The Producing Instance Number may be changed from its default of 0064h if required using the parameter **0226 ENET Producing Inst**

The Consuming Instance Number may be changed from its default of 0096h if required using the parameter **0227 ENET Consuming Inst**

The Configuration Instance Number is fixed as 0005h.

Process Data

The cyclic I/O data is configured by using the read and write process data mapping tables in the AC30. These tables are two parameter arrays in which AC30 parameter numbers may be added.

At least one AC30 parameter must be mapped to the process data. String-type parameters may not be mapped.

Read Mapping

The read process data represents cyclic data sent from the PLC to the AC30. Only writable AC30 parameters, that are not configuration parameters, may be added to the read process data.

Write Mapping

The write process data represents cyclic data sent from the AC30 to the PLC.

Mapping Arrays

Parameter arrays may be added into the process data, however this could lead to large amounts of data being passed across the communications. An alternative is to only reference the element(s) of the array required. This is possible as each element of a parameter array has its own parameter number. See the Appendix A – Array Parameter Numbers.

Default Mapping

The process data mapping will contain a factory default mapping. The default mapping may be overwritten if required.

Cyclic Data Exchange

Cyclic data exchange will occur when a Class 1 connection is established (active or idle). However, the read process data will only update the mapped parameters when in the PROCESS ACTIVE state.

On a transition into the PROCESS ACTIVE state all read process mapped parameters will be updated.

When in the PROCESS ACTIVE state the read process mapped parameters will all update only when a change in the read process data occurs.

EtherNet IP Supported CIP Objects

The following CIP objects are supported:

- Identity Object (01h)
- Message Router (02h)
- Assembly Object (04h)
- Connection Manager (06h)
- Parameter Object (0Fh)
- DLR Object (47h)
- QoS Object (48h)
- Vendor Specific Object (A2h)
- Port Object (F4h)
- TCP/IP Interface Object (F5h)
- Ethernet Link Object (F6h)

Example Configuration

Configuration Summary

Communications Settings
IP Address, Subnet Mask, Gateway Address

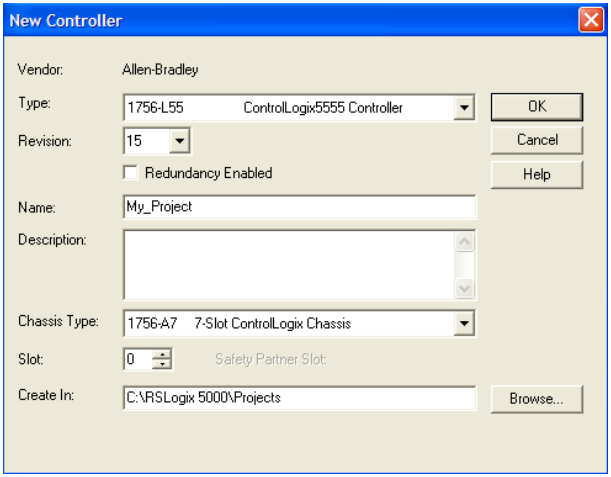
Read Process Mapping Table		Data Type	Bytes
000	**0627 Comms Control Word**	WORD	2
001	**0681 Comms Reference**	REAL	4
002	000		
003	000		

Write Process Mapping Table		Data Type	Bytes
000	**0661 Status Word**	WORD	2
001	**0395 Actual Speed Percent**	REAL	4
002	000		
003	000		

Example Using Allen Bradley RSLogix 5000

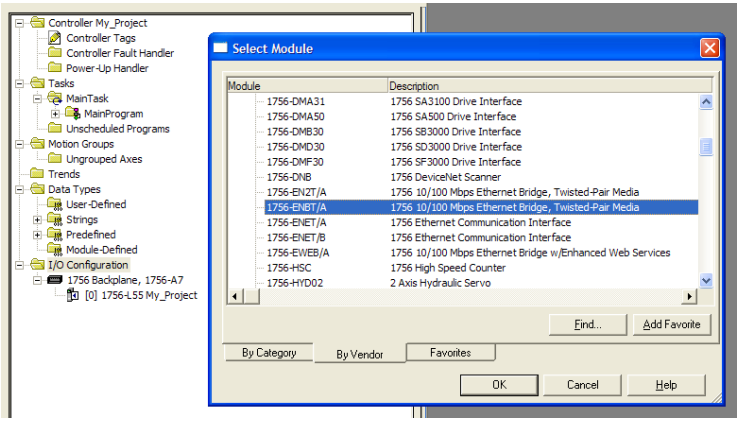
Prior knowledge of the Allen Bradley RSLogix 5000 software is assumed. The following is an example of configuring the PLC.

1. Start a new project and select the required PLC processor and chassis type.

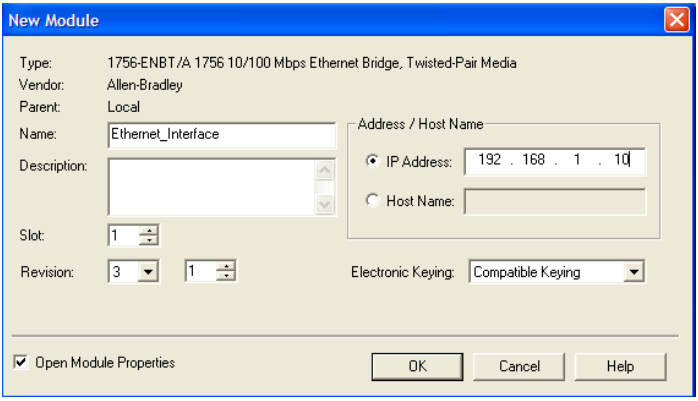


In this example, a 1756-L55 processor and 1756-A7 rack is chosen.

2. Insert the Ethernet interface.

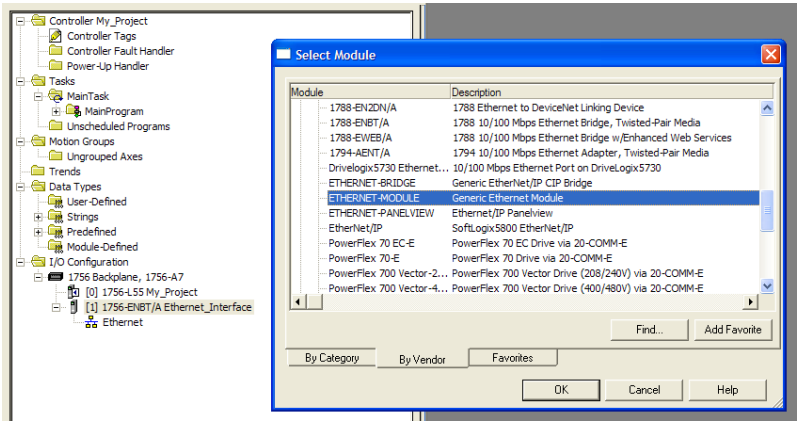


Right-click on the **I/O Configuration** and select **New Module**. In this example, a 1756-ENBT/A is used.

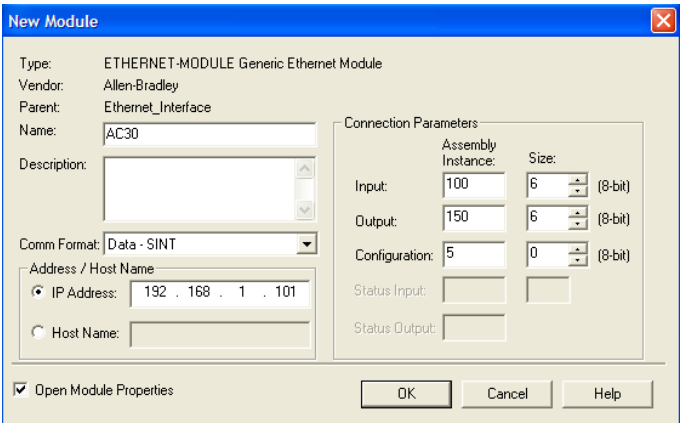


Enter the name and IP address of the Ethernet interface.

3. Insert the device.



Right-click on the Ethernet Interface module and select **New Module**. Select the Generic Ethernet Module.



Enter the required name and IP address. The Input Assembly Instance is 100 (64h), the Output Assembly Instance is 150 (96h) and the Configuration Assembly Instance is 5.

The data size is 6 bytes in either direction to match the configuration of the AC30 in this example.

4. Save and Download.

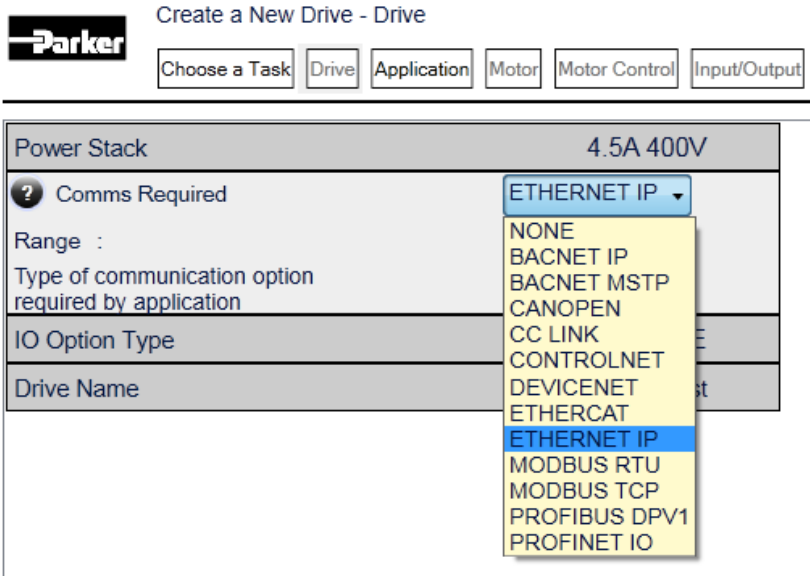
When completed with the setup, the project may be saved and downloaded to the PLC. For testing, the data can be accessed via the Controller Tags.

Note that if other tools, such as RSNetworx, are used to configure the PLC then, rather than using a generic device, an EDS file is available and may be downloaded from www.parker.com/ssd

Configuring the AC30

AC30 Parker Drive Quicktool (PDQ)

When performing an online configuration, the fitted option card will automatically be selected. In offline mode, parameter **0044 Comms required** must be set to Ethernet IP



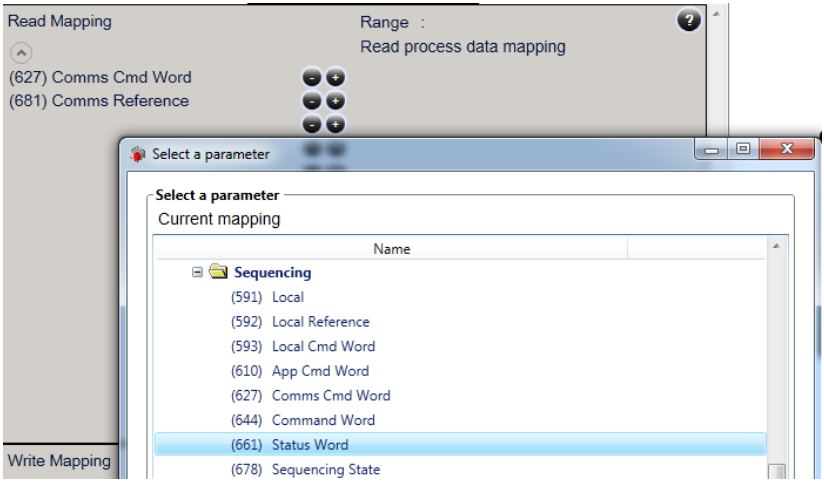
In the Application tab, the following settings are available in the Communications block.

Select the method to set the IP address, subnet mask and gateway address using the **0199 Address Assignment** parameter:

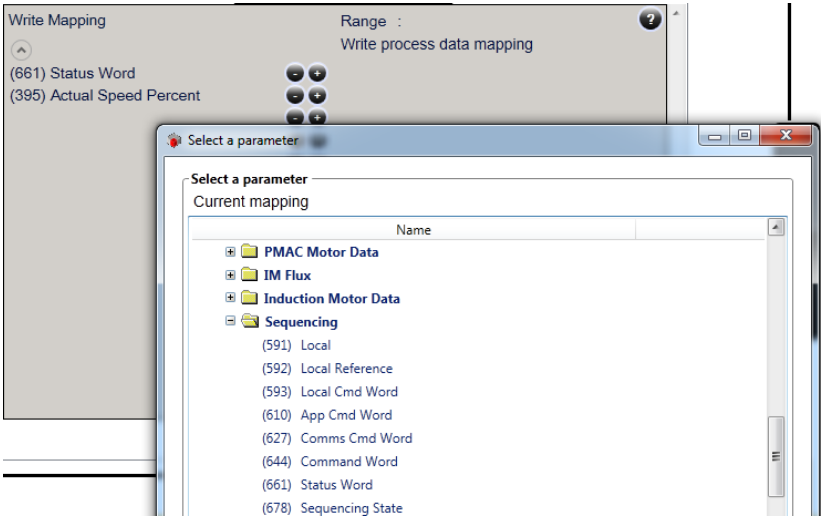
If this parameter is set to FIXED then the parameters **0200 Fixed IP Address, 0201 Fixed Subnet Mask, 0202 Fixed Gateway Address** must be set:

Fixed IP Address	192 . 168 . 1 . 0
Range : Required IP Address	
Fixed Subnet Mask	0
Fixed Gateway Address	0

Add the required parameters to the Read Process Mapping table (parameter **0055 Read Mapping)** by selecting them from the popup window:



Add the required parameters to the Write Process Mapping table (parameter **0120 Write Mapping**) by selecting them from the popup window:



Note the Process Data mapping ends on the first empty entry.

Acyclic Data Exchange

AC30 parameters may be accessed acyclically using explicit messaging via vendor specific object **A2h**.

Overview

The instance number of this object corresponds directly to the AC30 parameter number. The supported services are **Get Attribute Single** and **Set Attribute Single**. The instance attributes are summarized as:

#	Attribute Name	Access / Type	Description
1	Name	Get / SHORT_STRING	Parameter name
2	Data Type**	Get / USINT	Data Type Code
3	No. of elements	Get / USINT	No. of elements of the parameter
4	Descriptor	Get / USINT	Bit 0 =Get Access Bit 1 = Set Access
5	Value	Get/Set / Depends on parameter	Parameter value
6	Max Value	Get / Depends on	Maximum allowed parameter value

7	Min Value	parameter	Minimum allowed parameter value
8	Default Value		Not supported

** The Data Type Code can be found Appendix B – Data Types

The class attributes are summarized as:

#	Attribute Name	Access / Type	Description
1	Revision	Get / UINT	Object revision (0001h)
2	Max Instance	Get / UINT	Highest parameter number
3	No. of instances	Get / UINT	Number of instances

Arrays

Parameter arrays may be accessed either as a whole or as a single element.

Using the parameter number (instance number) that represents the whole parameter with attribute 5 will return / modify the contents of all elements.

Using the parameter number that represents a single element will allow access only to that element.

See Appendix A – Array Parameter Numbers.

Strings

String parameters may be accessed via its parameter number. This is in the format of a SHORT_STRING. See Appendix B – Data Types.

String arrays may not be accessed as a whole array, but may be accessed via each element. Each element has its own parameter number. See the AC30 Product Manual HA501717U001 for more information.

Lost Communications Trip

Supervised Parameter

The **0047 Comms Supervised** parameter indicates that the EtherNet IP network participation is supervised by another EtherNet IP device.

The Supervised parameter value is set to TRUE when one or more Class 1 or Class 3 connections have been opened towards the device.

Comms Break Trip

The Comms Break trip will generate a trip if a break in communications is detected. A trip event will be generated when a transition from TRUE to FALSE of the parameter **0047 Comms Supervised** occurs.

To enable the Comms Break trip, the parameter **0048 Comms Trip Enable** must be set to TRUE *and* the **COMMS BREAK** bit set in the parameter **0697 Enable 1-32**.

For more information on enabling trips see Chapter 10 Trips & Fault Finding in the AC30 Product Manual HA501718U001.

Diagnostic Event

A single diagnostic event may be created. The severity is fixed as Minor Recoverable.

This is represented on the network through the CIP Identity Object:

Identity Object (01h)

Instance #1

Attribute #5 (Status)

Bit #8 (Minor Recoverable Faults)

Three AC30 parameters are associated with the diagnostic event:

0187 Comms Event Set

A rising edge signal from FALSE to TRUE will create a diagnostic event. The **Comms Event Clear** parameter must be set FALSE.

0188 Comms Event Clear

A rising edge signal from FALSE to TRUE will remove a diagnostic event. The **Comms Event Set** parameter must be set to FALSE.

0186 Comms Event Active

This parameter indicates if a diagnostic event is active or not.

Note: The rising edge signals for Comms Event Set and Comms Event Clear must be held for at least 10ms in FALSE and at least 10ms in TRUE to take effect.

When a diagnostic event is active the Module Status LED will flash red.

Ethernet

Web Server

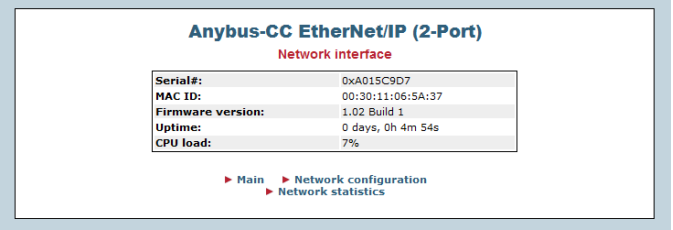
The option has a built-in web server enabling some configuration and diagnostics for the option.

To enable the web server the parameter **0203 Option Web Enable** must be set to TRUE. The web pages may be accessed by a web browser by entering the IP address of the option.

A number of built-in pages are available. The main index page provides a link to the Network Interface pages and the Parameter Data pages.

Network Interface Pages

The Network Interface page provides basic information about the option.

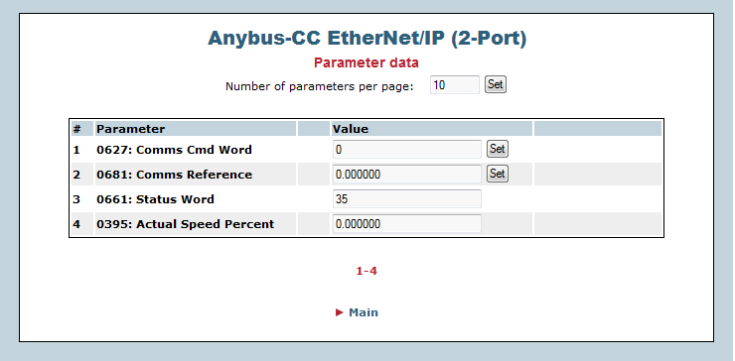


The Network Configuration page allows TCP/IP settings to be changed. The Host name can also be set here. This will be used if DHCP is enabled.

The Network Statics page provides information about the Ethernet ports and communications statistics.

Parameter Data Pages

The Parameter Data pages allow access to some AC30 parameters. To enable access to this page the parameter **0204 Web Parameters Enable** must be set to TRUE.



The parameter page lists the mapped process data parameters and any soft parameters that have been defined. The Parameter column contains the parameter number followed by its name.

Authorization

Directories can be protected from web access by placing a file called 'web_accs.cfg' in the directory to protect (see the FTP Server section). All the built-in web files are virtual files and are located in the root directory.

The file shall contain a list of users that are allowed to access the directory and it subdirectories.

File format:

```
Username1:Password1
Username2:Password2
…
UsernameN:PasswordN

[AutName]
(message goes here)
```

→ List of approved users

→ Optional login message

FTP Server

The option has a built-in FTP server enabling access to the FLASH-based file system which hosts 2MByte of non-volatile storage.

To enable the FTP server the parameter **0205 Option FTP Enable** must be set to TRUE. To access the file system an FTP client is required such as Windows Explorer. Enter the IP address in to the address bar, for example ftp://192.168.1.57

By default no files are stored on the file system (the built-in web files are virtual files).

User Accounts

User accounts are stored in the configuration file '\ftp.cfg'. This file holds the usernames, passwords and home directory for all users. Usernames and password must not exceed 15 characters in length. Users are not able to access files outside of their home directory.

File format:

```
Username1:Password1:Homedir1
Username2:Password2:Homedir2
…
UsernameN:PasswordN:HomedirN
```

If there is no \ftp.cfg' file or if the parameter **0206 Option FTP Admin Mode** parameter is set to TRUE then there will be unrestricted access to the file system.

Parameters

Configuration Parameters

0044 Comms Required		Range	RW	Saved	Config
Type	USINT (enumerated)	(1) NONE (2) BACNET IP (3) BACNET MSTP (4) CANOPEN (5) CC LINK (6) CONTROLNET (7) DEVICENET (8) ETHERCAT (9) ETHERNET IP (10) MODBUS RTU (11) MODBUS TCP (12) PROFIBUS DPV1 (13) PROFINET IO	✓	✓	✓
Default	NONE				
Communications option parameter. Sets the required communications option.					

0199 Address Assignment		Range	RW	Saved	Config
Type	USINT (enumerated)	(0) SLAVE SETS ADDRESS (1) EXTERNAL (2) DHCP	✓	✓	✓
Default	SLAVE SETS ADDRESS				
Communications option parameter. Sets the method for setting the IP address, subnet mask and gateway address.					

0200 Fixed IP Address		Range	RW	Saved	Config
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255	✓	✓	✓
Default	0.0.0.0				
Communications option parameter. IP address to be set by the slave. The parameter **Address Assignment** must be set to SLAVE SETS ADDRESS for this parameter to take effect.					

0201 Fixed Subnet Mask		Range	RW	Saved	Config
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255	✓	✓	✓
Default	0.0.0.0				
Communications option parameter. Subnet mask to be set by the slave. The parameter **Address Assignment** must be set to SLAVE SETS ADDRESS for this parameter to take effect.					

0202 Fixed Gateway Address		Range	RW	Saved	Config
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255	✓	✓	✓
Default	0.0.0.0				
Communications option parameter. Gateway address to be set by the slave. The parameter **Address Assignment** must be set to SLAVE SETS ADDRESS for this parameter to take effect.					

0203 Option Web Enable		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	✓
Default	TRUE				
Communications option parameter. Enable access to the option's web server.					

0204 Web Parameters Enable		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	✓
Default	TRUE				
Communications option parameter. Allows access to the parameter page via the option's web server.					

0205 Option FTP Enable		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	✓
Default	TRUE				
Communications option parameter. Allows access to the option's FTP server.					

0206 Option FTP Admin Mode		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	✓
Default	TRUE				
Communications option parameter. Allows unrestricted access to the option's FTP server. The parameter **Option FTP Enable** must be set to TRUE to access the server.					

0207 IPConfig Enable		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	✓
Default	TRUE				
Communications option parameter. Enables the option to be accessed via the IPConfig PC utility.					

0055 Read Mapping		Range	RW	Saved	Config
Type	Array of UINT	0 … Last parameter number	✓	✓	✓
Default	-				
Communications option parameter. Sets the required read process data mapping. Each entry in the table represents the required parameter number.					

0120 Write Mapping		Range	RW	Saved	Config
Type	Array of UINT	0 … Last parameter number	✓	✓	✓
Default	-				
Communications option parameter. Sets the required write process data mapping. Each entry in the table represents the required parameter number.					

0048 Comms Trip Enable		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	✓	×
Default	TRUE				
Communications option parameter. Enables the communications trip.					

0226 ENet Producing Inst		Range	RW	Saved	Config
Type	WORD	0x0000 0xFFFF	✓	✓	✓
Default	0064				
EtherNet IP communications option parameter. Sets the Producing Instance Number for EtherNet IP.					

0227 ENet Consuming Inst		Range	RW	Saved	Config
Type	WORD	0x0000 0xFFFF	✓	✓	✓
Default	0096				
EtherNet IP communications option parameter. Sets the Consuming Instance Number for EtherNet IP.					

Runtime Parameters

0187 Comms Event Set		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	×	×
Default	FALSE				
Communications option parameter. A rising edge (FALSE to TRUE) will create a diagnostic event.					

0188 Comms Event Clear		Range	RW	Saved	Config
Type	BOOL	FALSE TRUE	✓	×	×
Default	FALSE				
Communications option parameter. A rising edge (FALSE to TRUE) will remove a diagnostic event.					

Diagnostic Parameters

0045 Comms Fitted		Range
Type	USINT (enumerated)	(0) UNKNOWN (1) NONE (2) BACNET IP (3) BACNET MSTP (4) CANOPEN (5) CC LINK (6) CONTROLNET (7) DEVICENET (8) ETHERCAT (9) ETHERNET IP (10) MODBUS RTU (11) MODBUS TCP (12) PROFIBUS DPV1 (13) PROFINET IO
Communications option parameter. Indicates the communications option fitted.		

0046 Comms State		Range
Type	USINT (enumerated)	(0) SETUP – setup in progress (1) NW INIT – network-related initialisation tasks are being performed (2) WAIT PROCESS – the module will stay in this state until a Class 1 connection is opened (3) IDLE – Class 1 connection idle (4) PROCESS ACTIVE – Error free Class 1 connection (5) ERROR – Class 1 connection error, or duplicate IP address detected (6) RESERVED (7) EXCEPTION – major fault (8) NONE – option not fitted
Communications option parameter. Indicates the state of the communications option fitted.		

0225 EtherNet IP State		Range
Type	USINT (enumerated)	(0) SETUP – setup in progress (1) NW INIT – network-related initialisation tasks are being performed (2) WAITING TO CONNECT – the module will stay in this state until a Class 1 connection is opened (3) CONNECTION IDLE – Class 1 connection idle (4) CONNECTION ACTIVE – Error free Class 1 connection (5) ERROR – Class 1 connection error, or duplicate IP address detected (6) RESERVED (7) EXCEPTION – major fault (8) NONE – option not fitted
Ethernet IP communications option parameter. Indicates the state of the communications option fitted as the parameter **0046 Comms State**, but using specific enumerated strings for EtherNet IP.		

0189 Option MAC Address		Range
Type	STRING	Null terminated string.
Communications option parameter. Indicates the Ethernet MAC address of the option.		

0195 Option IP Address		Range
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255
Communications option parameter. Indicates the current IP address of the slave.		

0196 Option Subnet Mask		Range
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255
Communications option parameter. Indicates the current subnet mask of the slave.		

0197 Option Gateway		Range
Type	DWORD (IP address)	0.0.0.0 … 255.255.255.255
Communications option parameter. Indicates the gateway address of the slave		

0198 Option DHCP Enabled		Range
Type	BOOL	FALSE TRUE
Communications option parameter. Indicates if the DHCP client of the option is enabled.		

0047 Comms Supervised		Range
Type	BOOL	FALSE TRUE
Communications option parameter. Indicates that the EtherNet IP network participation is supervised by another EtherNet IP device.		

0049 Comms Module Version		Range
Type	DWORD	0x00000000 … 0xFFFFFFFF
Communications option parameter. Firmware version of the option communications module.		The most significant byte is the major version number, followed by the minor version number. The least significant byte is the build number.

0050 Comms Module Serial		Range
Type	DWORD	0x00000000 … 0xFFFFFFFF
Communications option parameter. Serial number of the option communications module.		

0051 Comms Diagnostic		Range
Type	USINT (enumerated)	(0) NONE (1) HARDWARE MISMATCH – required communications option does not match that fitted, or no option fitted but one is required. (2) INVALID CONFIGURATION – the configuration of the option is not valid. (3) MAPPING FAILED – the process data mapping is not permitted, e.g. adding read-only parameters to the read process data mapping. (4) EXCEPTION – configuration error (5) UNSUPPORTED OPTION – the fitted option is not currently supported
Communications option parameter. Indicates the state of the communications option fitted.		

0052 Comms Diagnostic Code		Range
Type	DWORD	0x00000000 … 0xFFFFFFFF
Communications option parameter. Diagnostic code associated with the Diagnostic parameter.		

0053 Comms Exception		Range
Type	BYTE	0x00 … 0xFF
Communications option parameter. Exception code associated with the Diagnostic parameter being in EXCEPTION		

0054 Comms Net Exception		Range
Type	BYTE	0x00 … 0xFF
Communications option parameter. Network specific exception code associated with the Diagnostic parameter being in EXCEPTION		

0186 Comms Event Active		Range
Type	BOOL	FALSE TRUE
Communications option parameter. Indicates a diagnostic event is active.		

Troubleshooting

Configuration problems can often be identified by looking at the Network Status and Module Status LEDs and from the **EtherNet IP State** and **Comms Diagnostic** parameters. Under normal operating conditions the Diagnostic parameter should indicate NONE. Other values are summarized in the Diagnostic Parameters section.

Hardware Mismatch

Diagnostic = HARDWARE MISMATCH

- The required option does not match the actual fitted option.
- No option is fitted but one is required.

Invalid Configuration

Diagnostic = INVALID CONFIGURATION

- Invalid read or write process data mapping
- No read or write process data mapped
- Invalid communication settings

Diagnostic = MAPPING FAILED

- Attempting to map a parameter that does not exist.
- Attempting to map a configuration parameter.
- Attempting to map a string parameter.
- Attempting to map a read-only parameter to the read process data.

PLC Connection Timeout

If the PLC reports a fault in the module ‘connection timeout error’ (16#0203) update to the latest version of the firmware in the PLC/scanner and update the PLC software accordingly.

Appendix A – Array Parameter Numbers

Some parameters have multiple elements and are classified as parameter arrays. A parameter array has a parameter number that accesses the *whole* of the array. It also has parameter numbers that represent each *element* of the array.

Array Example

A parameter array called **My Array** has 4 elements.

Parameter Number	Parameter - My Array
0152	Whole array
0153	index 0
0154	index 1
0155	index 2
0156	index 3

If the parameter number of the whole array is 0152, then the parameter number of the element index 0 of the array will be 0153, the parameter number of the element index 01 will be 0154, etc.

Note that *string* array parameters access their elements via parameter numbers that are calculated in a different way. See the AC30 Product Manual HA501718U001 for more details.

Appendix B – Data Types

The relationship between AC30 parameter and CIP data type is given in the table below.

AC30 Parameter		CIP	
Data Type	**Description**	**Data Type**	**Bytes**
BOOL	Boolean	BOOL	1
SINT	Short integer	SINT	1
INT	Integer	INT	2
DINT	Double integer	DINT	4
USINT	Unsigned short integer	USINT	1
UINT	Unsigned integer	UINT	2
UDINT	Unsigned double integer	UDINT	4
REAL	Floating point	FLOAT	4
TIME	Duration	UDINT	4
DATE	Date	UDINT	4
TIME_OF_DAY	Time of day	UDINT	4
DATE_AND_TIME	Date and time of day	UDINT	4
STRING	String	SHORT_STRING**	*n*
BYTE	Bit string length 8	USINT	1
WORD	Bit string length 16	UINT	2
DWORD	Bit string length 32	UDINT	4

** SHORT_STRING consists of a single-byte length field followed by the actual character data.

The Data Type Code returned using explicit messaging via vendor specific object A2h, attribute 2 is given in the table below.

AC30 Data Type	Data Type Code
BOOL	0
SINT	1
INT	2
DINT	3
USINT	4
UINT	5
UDINT	6
REAL	18
TIME	6
DATE	6
TIME_OF_DAY	6
DATE_AND_TIME	6
STRING	7
BYTE	4
WORD	5
DWORD	6
USINT (enumerated)	8

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