EtherNet/IP™

AC20 Series

Ethernet/IP– Communication Option

Technical Manual

DOC-0017-08-EN-B
04.04.2023

Parker

ENGINEERING YOUR SUCCESS.

1 Safety

IMPORTANT: Please read this information BEFORE installing the equipment.

1.1 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, 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)***	

1.2 Application Area

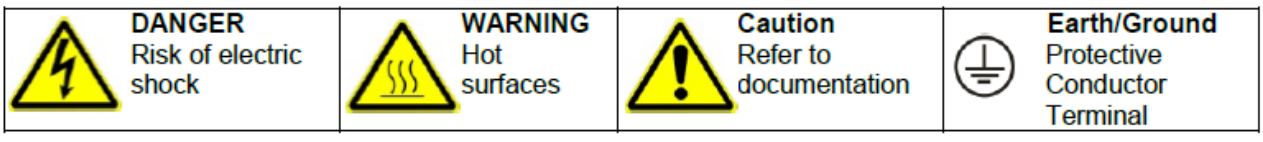
The equipment described is intended for industrial motor speed control utilizing AC induction motors or AC permanent magnet synchronous machines.

1.3 Personnel

Installation, operation, and maintenance of the equipment should be carried out by competent personnel. A competent person is someone that 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.

1.4 Product Warnings

Special attention must be paid to the information presented in warning, caution, and information notices when they appear in this manual. Definitions of caution, warning and information notices are shown below:



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

1.5 Safety Information

Risk of Electric Shock

DANGER!

Ignoring the following may result in injury:

- This equipment can endanger life by exposure to rotating machinery and high voltages.
- The equipment must be permanently earthed due to the high earth leakage current, and the inverter motor must be connected to an appropriate safety earth.
- Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the inverter.
- 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.
- 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.
- Allow at least 5 minutes for the inverter'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.
- Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the inverter must be returned. Refer to "Routine Maintenance and Repair".

Safety & EMC Requirements

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

WARNING!

Ignoring the following may result in injury or damage to equipment:

- Never perform high voltage resistance checks on the wiring without first disconnecting the inverter 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 an inverter in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.
- When replacing an inverter 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.

WARNING!

Ignoring the following may result in injury or damage to equipment:

- 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 for. Permission of the supply authority shall be obtained before connection to the public low voltage supply.

2 Manufacturing Location

Germany
Parker Hannifin Manufacturing Germany GmbH & Co. KG
Electric Motion & Pneumatic Division (EMPD)
Robert-Bosch-Strasse 22
77656 Offenburg (Germany)
Tel.: + 49 (0781) 509-0
Website: **www.parker.com/eme**

Certified according to ISO 9001:2015

3 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 should be taken for central disposal as secondary raw material.

4 Table of Contents

5 Introduction

5.1 Product Features

- Real-time Ethernet
- Up to 1448 bytes of process data in each direction.
- Up to 1500 bytes of explicit messaging.
- Quick Connect supported.
- Beacon Based DLR (Device Level Ring) and linear network topology supported
- 2 x RJ-45 ETHERNET IP ports available simultaneously
- 10/100 Mbit/s, full/half duplex operation
- Galvanically isolated 2-port Ethernet interface
- IIoT (Industrial Internet of Things) ready: Includes Email Client, Web server with customizable content, FTP server.
- EDS file provided.
- LEDs to indicate network status (NS), Module status (MS) and Link activity (L/A).

6 Installation

DANGER!

RISK OF ELECTRIC SHOCK

Terminal covers, main covers, and cover fixings must remain in place while the drive is energized.
These should only be removed once the supply to the unit and/or system has been disconnected, and the residual energy in the DC link capacitors has been discharged.

CAUTION!

ESD SENSITIVE EQUIPMENT

Take ESD precautions when handling the Communication Interface Option Cards to avoid any risk of damaging the equipment.

- All activities covered in this chapter should be carried out when there is no power to the inverter.
- If the drive has been powered up, ensure enough time has elapsed that the inverter has discharged its residual energy.
- Always check that the voltages on the user terminals are at a safe level (<50V) before carrying out any of these activities.

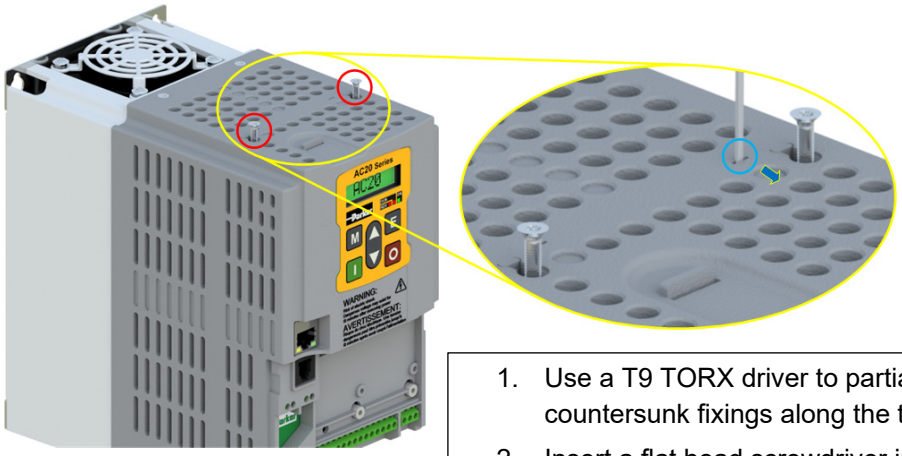
6.1 Order Codes

Order Code	Description
2003-CB-00	CANopen communication interface option card
2003-EC-00	EtherCAT communication interface option card
2003-IP-00	Ethernet IP communication interface option card
2003-PB-00	Profibus DP-V1 communication interface option card
2003-PN-00	PROFINET IO communication interface option card
2003-RS-00	RS485 Modbus RTU communication interface option card

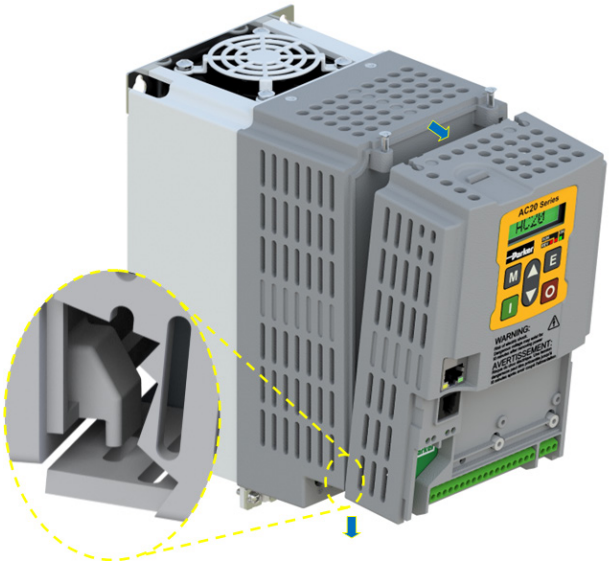
6.2 Fitting the Option

Frames 2 – 5

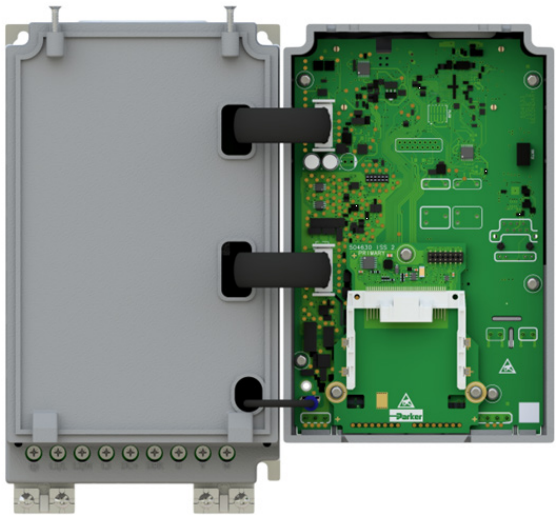
The Communication Interface Option Cards are intended to be customer installed.
The control module housing cover will need to be removed prior to option card installation.



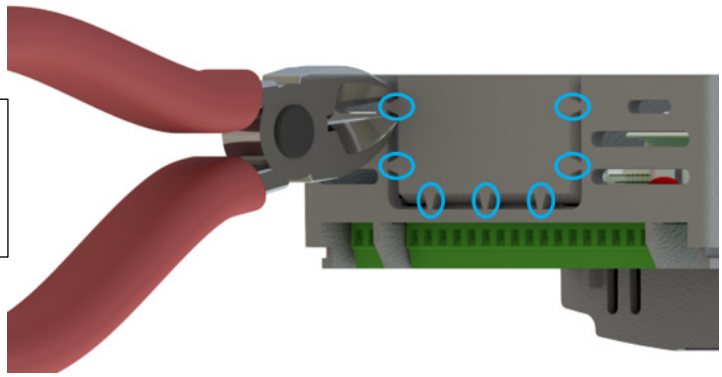
1. Use a T9 TORX driver to partially unscrew the two 3x12 countersunk fixings along the top of the product.
2. Insert a flat head screwdriver into the moulding features and lever the control module housing away from the power

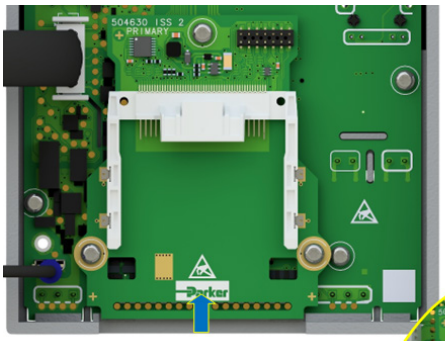


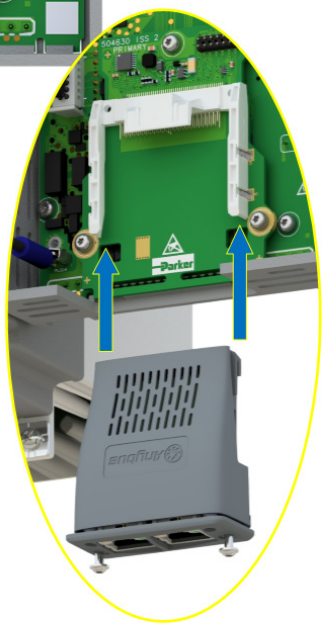
3. Unhook the bottom of the control module housing from the power stack.
4. Gently turn the control module upside down so it rests to the right of the power stack, with the interface cables still connected.



5. Remove and discard the Comms Option break-out feature in the control module housing by cutting the 7x bridges using suitable small side cutters.

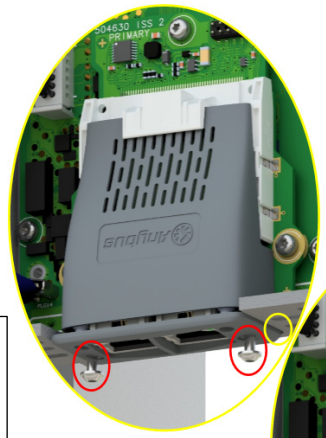






6. Remove the Comms Interface Option card from its packaging.
7. Slide the Comms Card along the PCB using the connector features for alignment.

Note: The front facia of the Option should be loose at this point.

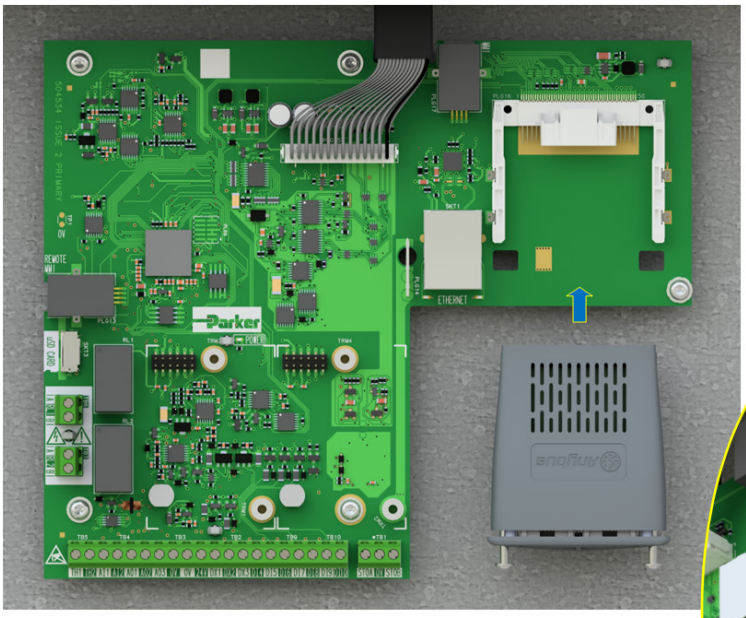


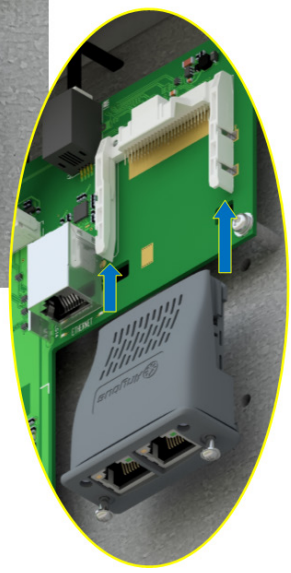
9. Now fully tighten the two T8 screws on the front facia of the Communication Interface Option Card.
10. Check that the Option Card is secure and that it cannot slide out.
11. Reassemble the product by performing the reverse process of steps 1 – 4.

In the event that the Communication Interface Option Card needs to be removed, follow the installation process, but perform steps 7 and 8 in reverse.

Frame 6 – 10

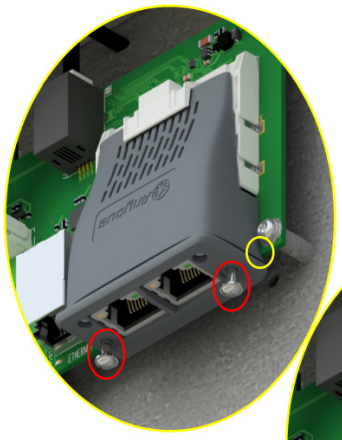
On Frames 6 – 10, the lower terminal cover will need to be removed prior to option card installation.





1. Remove the Comms Interface Option card from its packaging.
2. Slide the Comms Card along the PCB using the connector features for alignment.

Note: The front facia of the Option should be loose at this point.



3. When the Comms Interface Option Card is fully engaged in the connector and its housing has hocked onto the edge of the PCB, fully tighten the two T8 screws on the front facia.
4. Check that the Option Card is secure and that it cannot slide out.

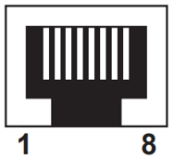
In the event that the Communication Interface Option Card needs to be removed, perform steps 2 & 3 in reverse.

7 Network

7.1 Network Connector and Cable Specification

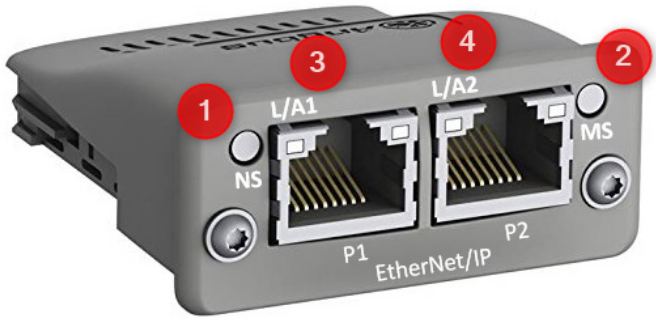
Two RJ45 Ethernet sockets are provided. Either or both sockets may be used. Having 2 ports reduces the need for additional Ethernet switches.

Pin	Signal
4,5,7,8	Connected to chassis ground over serial RC circuit
6	RD-
3	RD+
2	TD-
1	TD+
Housing	Cable Shield



Only use cables terminated with RJ45 plugs.

7.2 LED Indications



LED	Description
1	Network Status
2	Module Status
3	Link/Activity (Port 1)
4	Link/Activity (Port 2)

Network Status (NS) LED

LED Status	Description
OFF	No power or no IP address
GREEN	Online, one or more connections established (CIP Class 1 or 3)
GREEN, Flashing	Online, no connections established
RED	Duplicate IP address, FATAL error
RED, Flashing	One or more connections timed out (CIP Class 1 or 3)

Module Status (MS) LED

LED Status	Description
Off	No power
Green	Controlled by a scanner in Run state and, if CIP Sync is enabled, time is synchronized to Grandmaster clock
Green, flashing	Not configured, Scanner in Idle state, or, if CIP Sync is enabled, time is synchronized Grandmaster clock
Red	Major fault (EXCEPTION-state, FATAL error etc.)
Red, flashing	Recoverable fault(s). Module is configured, but stored parameters differ from currently used parameters

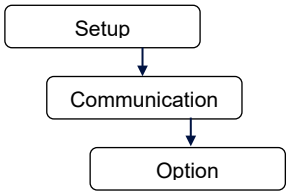
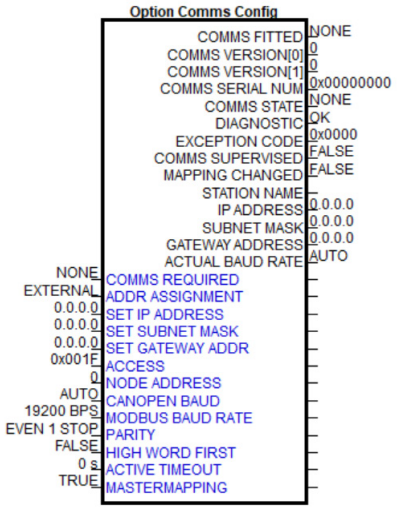
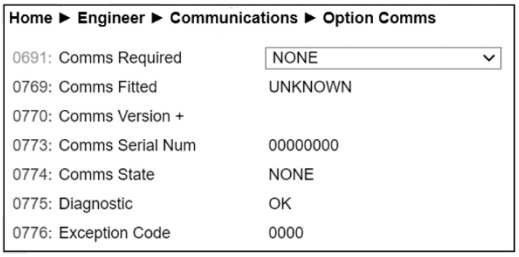
Link/Activity (L/A) LED

LED Status	Description
Off	No Link, no activity
Green	Link (100 Mbit/s) established
Green, Flickering	Activity (100 Mbit/s)
Yellow	Link (10 Mbit/s) established
Yellow, Flickering	Activity (10 Mbit/s)

8 Configuration

The option comms configuration is accessible through the keypad under the menu **Option Comms**, through DSE Lite function block **Option Comms Config** or through the webserver following the path **Home > Engineer > Communications > Option Comms**.
The AC20 Ethernet IP option requires configuration of both communication parameters and process data mapping.

8.1 Communication parameters

Keypad Menu Path	DSE-Lite Function Block	Webserver
		

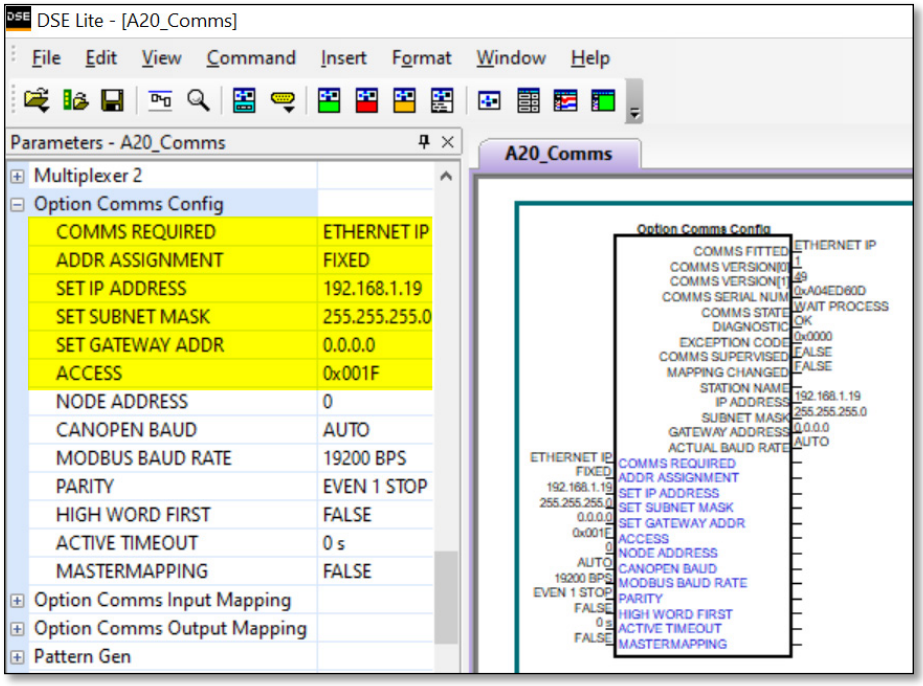
The network parameters of the slave must be set to establish communication with master**.**

- The parameter **0691 COMMS REQUIRED** must be set to **Ethernet IP.**
- The parameter **0758 ADDRESS ASSIGNMENT** slects the slave IP Addressing method.
- 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 by an Ethernet IP master, or the address is set by a DHCP server.
- If the IP address is set by the slave (**Address Assignment = FIXED**) then three further parameters must be set:
  0759 SET IP ADDRESS
  0760 SET SUBNET MASK
  0761 SET GATEWAY ADDRESS
- The parameter **0762 ACCESS** may be set to enable web features of the AC20 option comms (IP Config Enable, Web Enable, Web Parameters Enable, FTP Enable, FTP Admin Mode).

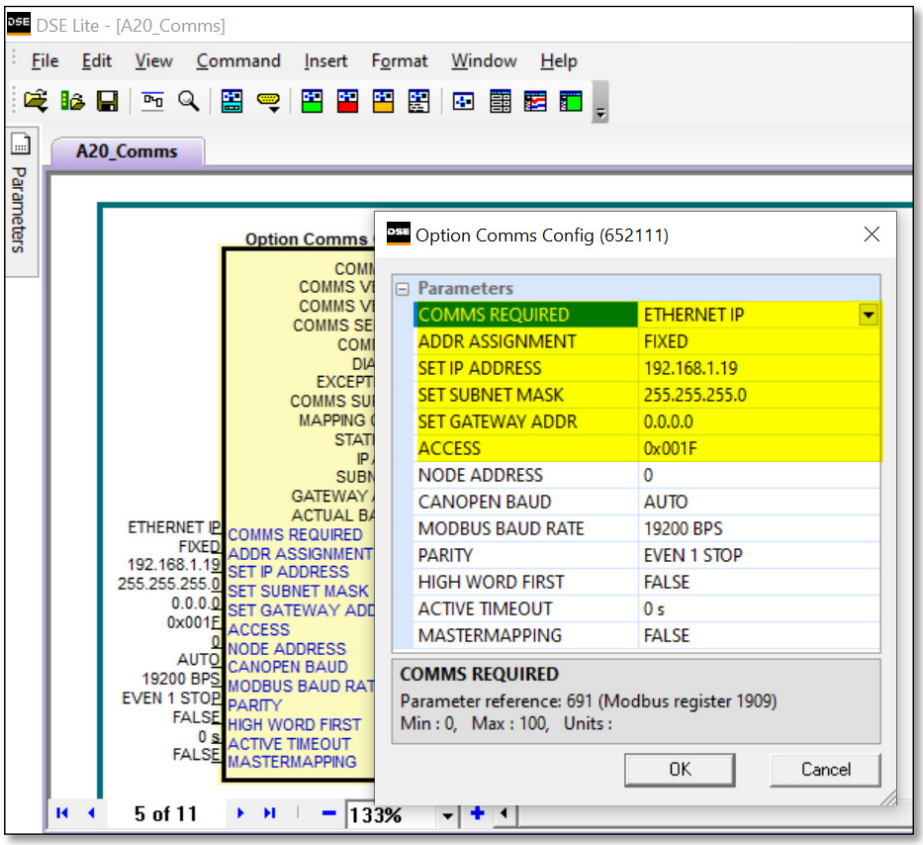
Configuration with DSE Lite

When performing an online configuration, the fitted option card will automatically be selected.

In offline mode, display your configuration page in DSE Lite and click the plus sign [+] at the left of function block **Option Comms Config** to see set communication parameters.

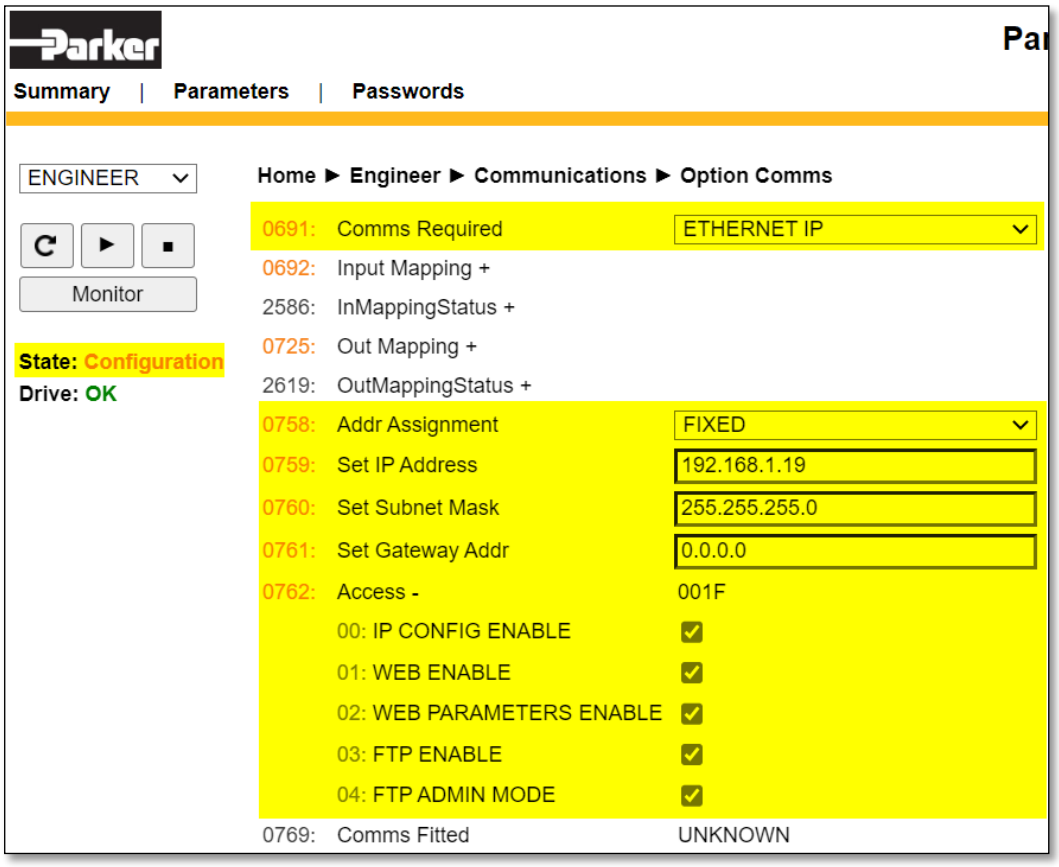


Alternatively. perform the steps described above by double clicking on the function block **Option comms config** to open parameters tab in the configuration interface.



Configuration with the webserver

Access the AC20 webserver by typing the IP-Address of the drive into the web browser.
The drive must be in configuration state. Set the Ethernet IP Option comms parameters as shown below.



8.2 Process Data

AC20 parameters implementation

The AC20 Ethernet/IP option requires configuration of **process data mapping**.

Config Mapping

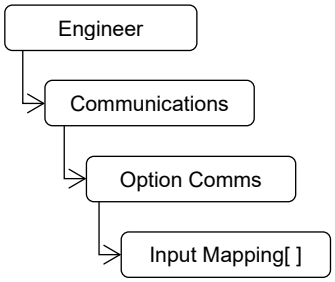
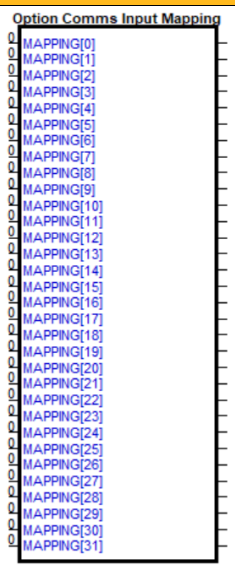
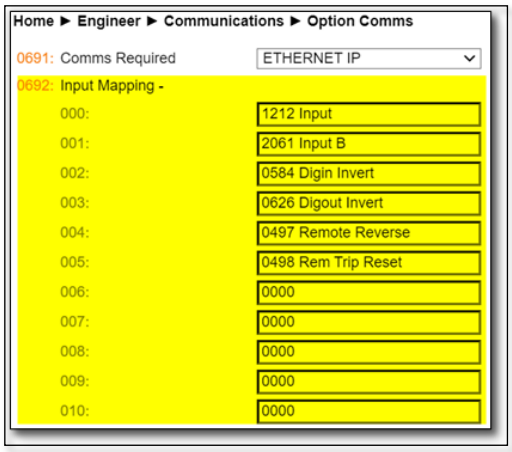
The AC20 Ethernet IP option requires configuration of process data mapping. Parameters mapped as Process Data can be exchanged cyclically as Process Data Objects (PDOs) on the bus.

Set process data using AC20 input and output mapping tables

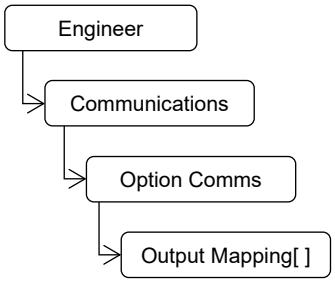
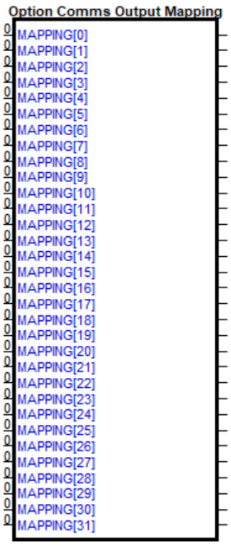
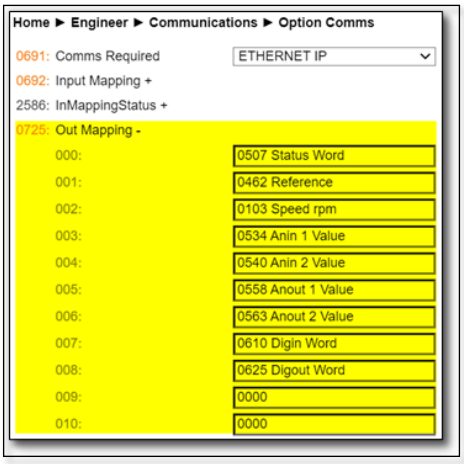
These tables are two parameter arrays in which AC20 parameter numbers may be added.

Read Mapping:

The read process data represents cyclic data sent from the PLC to the AC20, this is mapped into the table **Option Comms Input Mapping**. Only writable AC20 parameters that are not configuration parameters may be added to the read process data.

Keypad Menu Path	DSE Lite Function Block	Webserver
		

Write Mapping:
The write process data represents cyclic data sent from the AC20 to the PLC, this is mapped into the table **Option Comms Output Mapping.**

Keypad Menu Path	DSE Lite Function Block	Webserver
		

Note: String-type parameters cannot be mapped.

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

Assembly mapping object instance

The process data is represented as dedicated instances in the assembly object (CIP), the Assembly object uses static assemblies and holds the Process Data sent/received by the master. It allows data to and from each object to be sent or received over a single connection.
Process data “Input” will produce data on the network and process data output will consume data from the network.

Assembly Mapping Object	Instance Value	Ethernet IP master
Option comms Output mapping	100	Producing Instance Number
Option comms Input mapping	150	Consuming Instance Number

Cyclic Data Exchange

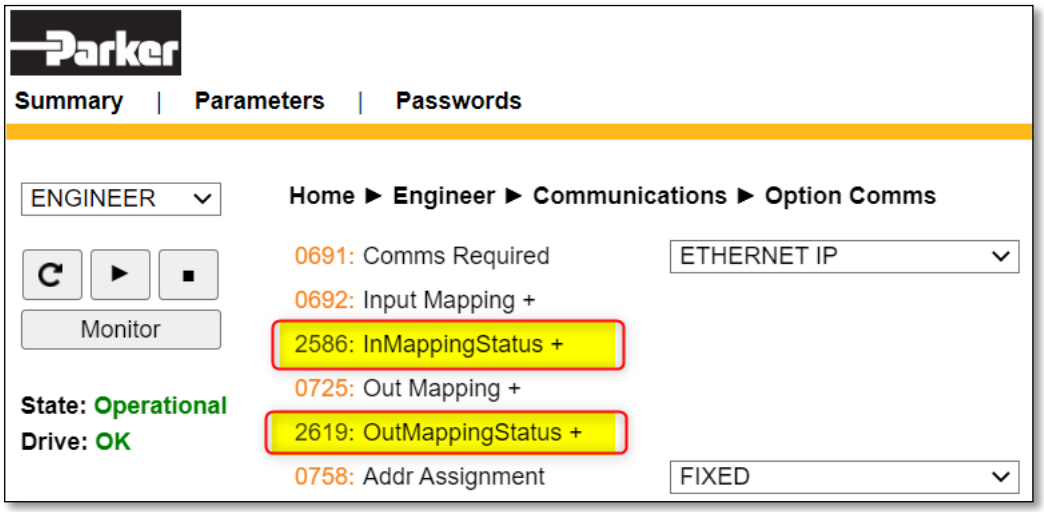
Cyclic data exchange will occur when a Class 1 connection is established (active or idle). However, the read process data will only update the mapped parameters when in the PROCESS ACTIVE state.
On a transition into the PROCESS ACTIVE state all read process mapped parameters will be updated. When in the PROCESS ACTIVE state, the read process mapped parameters will all update only when a change in the read process data occurs.

Mapping status

The process data mapping status can be accessed from AC20 via the following parameters:

- Parameter **2586 InMappingStatus**: shows the status of the currently active cyclic data input mapping table (32 entries), value is the Tag ID of the parameter to be cyclic read In.
- Parameters **2619 OutMappingStatus**: Shows the status of the currently active cyclic data output mapping table (32 entries), value is the Tag ID of the parameter to be cyclic sent out.

The parameters **2586 InMappingStatus** and **2619 OutMappingStatus** are visible from the webserver and are valid if **Parameter 0774 Comms State** = PROCESS ACTIVE.



8.3 Acyclic Data Exchange

Acyclic access of the AC20 parameters may be achieved using explicit messaging via EtherNet/IP **Get** and **Set** attribute requests to the CIP object **A2h**. The instance number of this object corresponds directly to the AC20 parameter number. The supported services are **Get Attribute Single** and **Set Attribute Single**.

The instance attributes are summarized as follow:

#	Attribute Name	Access / Type	Description
1	Name	Get / SHORT_STRING	Parameter Name
2	Data Type**	Get / USINT	Data Type Code
3	N°. of elements	Get / USINT	N°. 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 parameter	Maximum allowed parameter value
7	Min Value		Minimum allowed parameter value
8	Default Value		Not supported

The class attributes are summarized as follows:

#	Attribute Name	Access / Type	Description
1	Revision	Get / UINT	Object revision(0001h)
2	Max Instance	Get / UINT	Highest parameter number
8	N°. of instances	Get / UINT	Number of instances

(See Appendix A for data type detail)

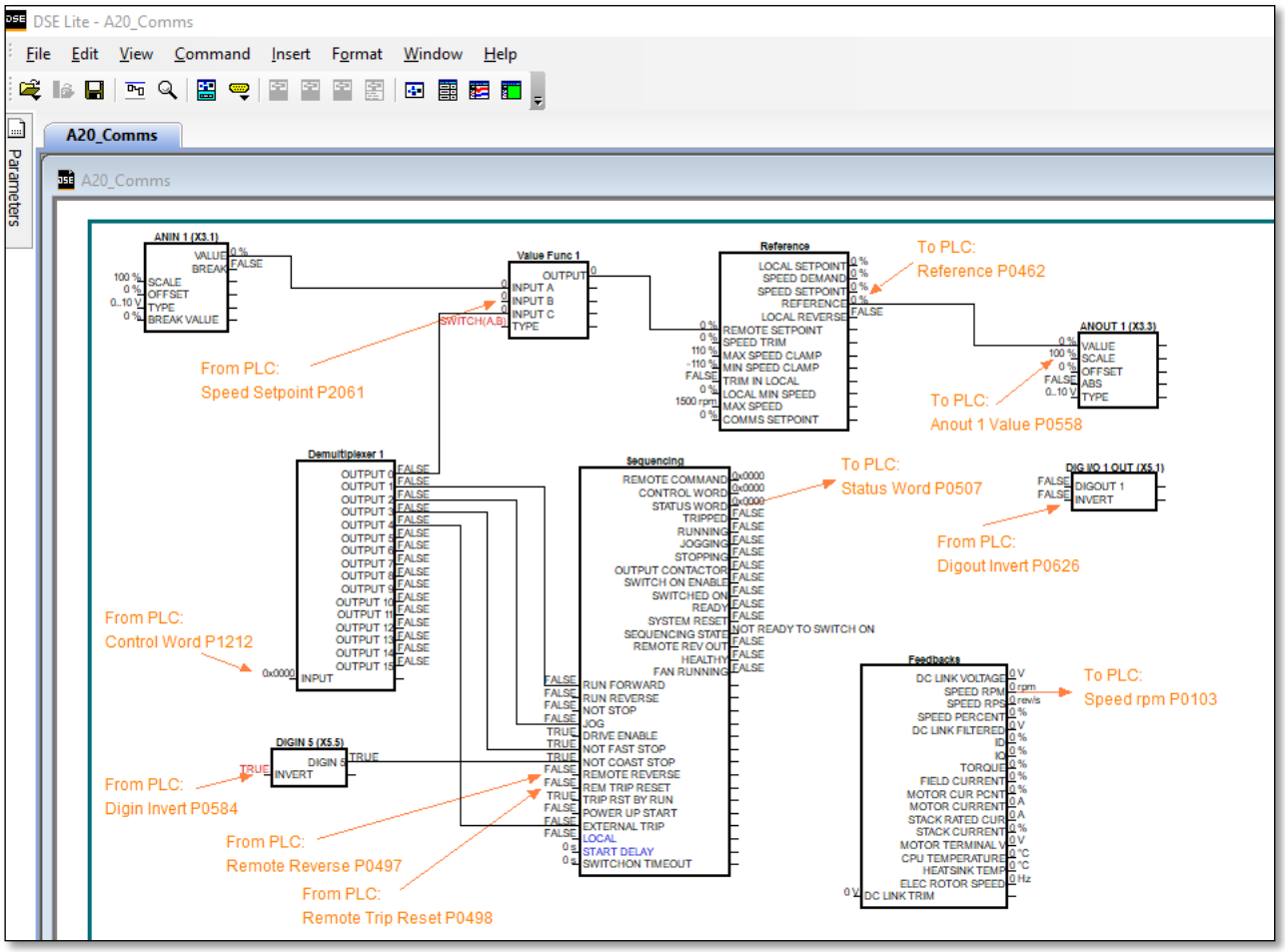
8.4 EDS File

The EDS device description file holds a description of the device and its functions. Must important the file describes the parameters implementation in the module. EDS file for the AC20 Ethernet IP option may be downloaded from www.parker.com.

9 Example Configuration and Programming

9.1 AC20 Motor Control Application

Use DSE Lite to create, parameterize and configure user defined applications or parameterize and connect fixed motor control blocks in the application. Download the application into the drive then connect to the PLC to read/write the value of the parameters.
In the example below the PLC is used to set motor speed and control, then to read the speed feedback, status of the control and speed reference.



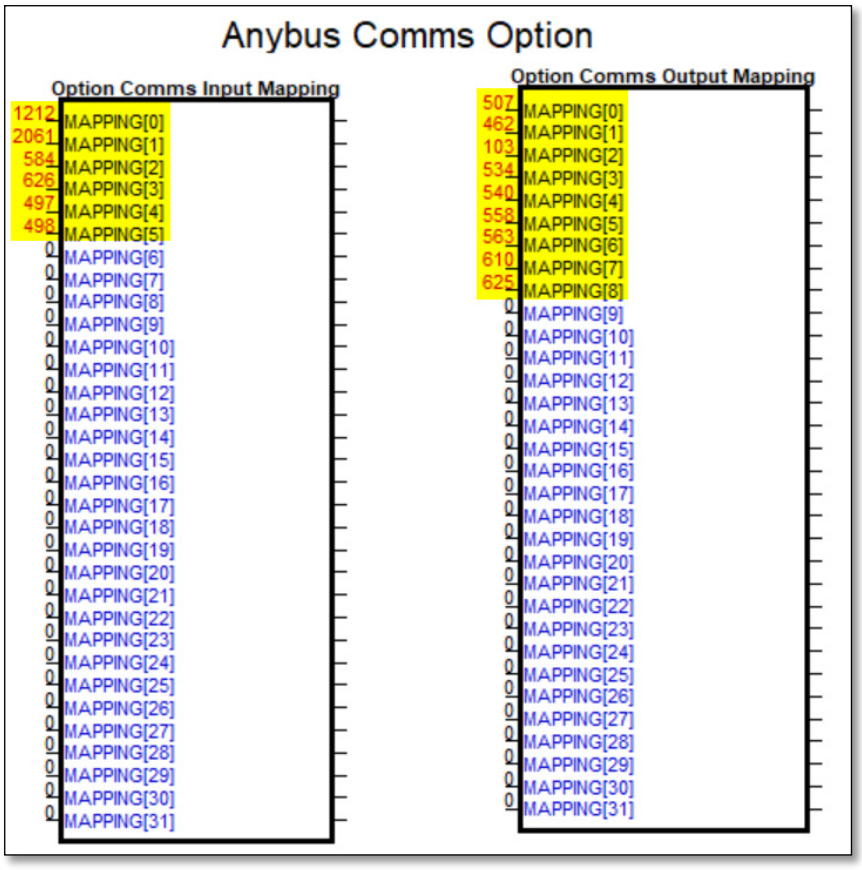
The data highlighted will be mapped into the AC20 process data mapping table in the example below.

9.2 List of process data

Read / Write Process Data mapping list for master/PLC

AC20 Input Mapping	Data Type	Byte	Comments	PLC Module
1212 Input Demultiplexer 1	WORD	2	Control Word	Output
2061 Input B Value Func 1	REAL	4	Speed Setpoint	
0584 Digin Invert	WORD	2	Invert digital input	
0626 Digout Invert	WORD	2	Invert digital Output	
0497 Remote reverse	BOOL	1	Invert motor Rotation	
0498 Rem Trip Reset	BOOL	1	Trip Reset	
Total Byte Size		12		

AC20 Output Mapping	Data Type	Byte	Comments	PLC Module
0507 Status Word	WORD	2	Status Word	Output
0462 Reference	REAL	4	Speed Reference	
0103 Speed rpm	REAL	4	Speed Feedback	
0534 Anin1 Value	REAL	4	Analog In1 Value	
0540 Anin2 Value	REAL	4	Analog In2 Value	
0558 Anout1 Value	REAL	4	Analog Out1 Value	
0563 Anout2 Value	REAL	4	Analog Out2 Value	
0610 Digin Word	WORD	2	Digital Input state	
0625 Digout Word	WORD	2	Digital Output state	
Total Byte Size		30		

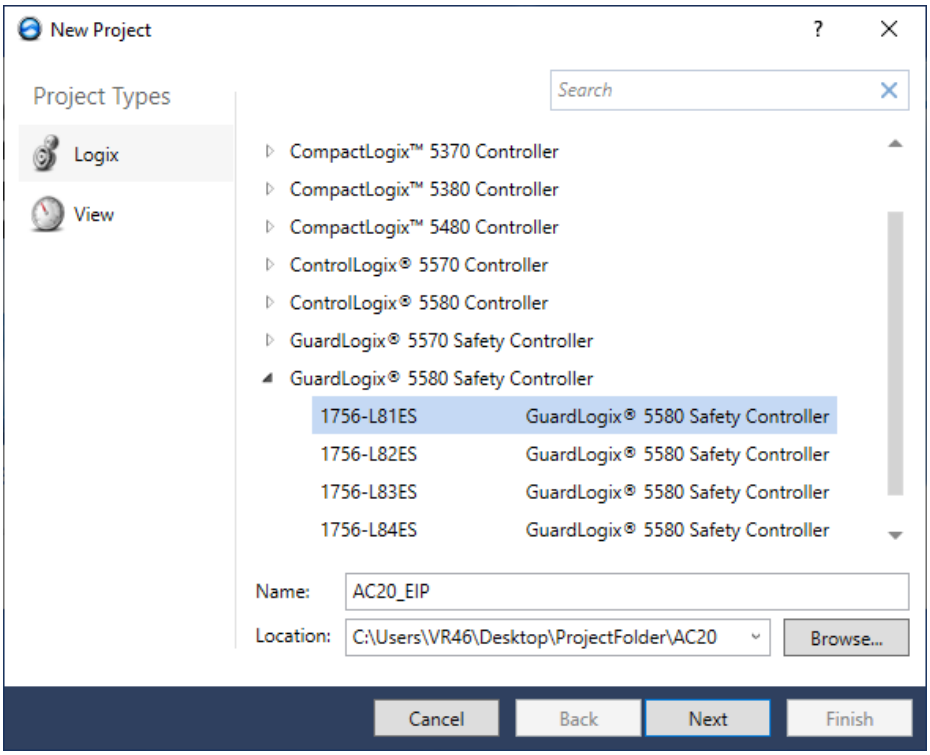


9.3 Programming with Allen Bradley PLC

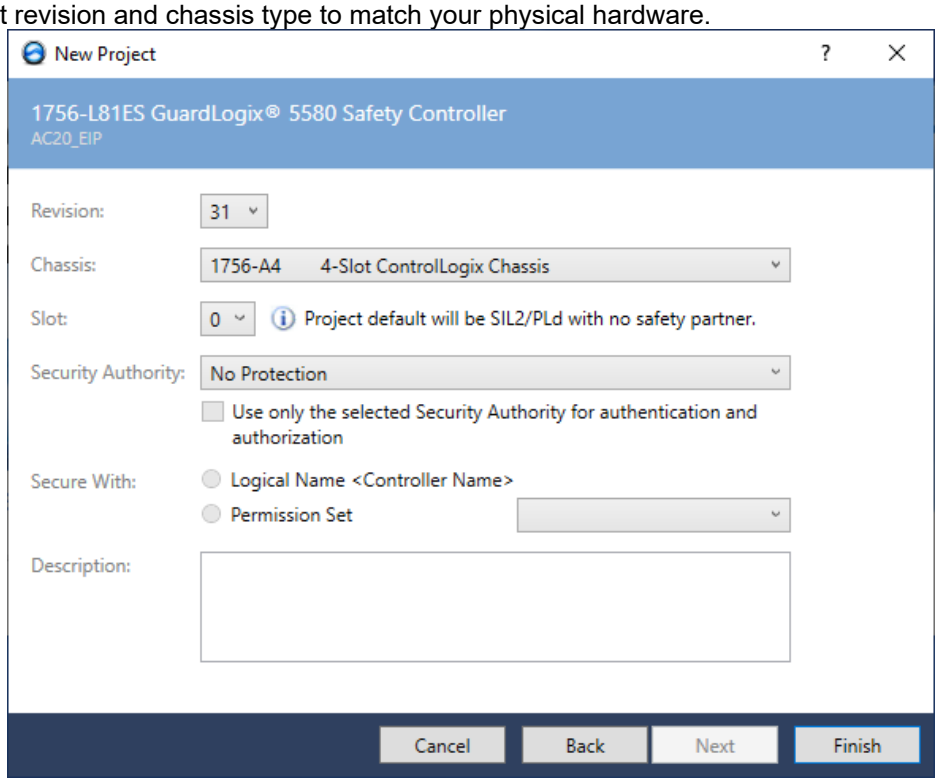
The example uses Allen Bradley - Rockwell **1756-L81ES Guardlogix 5580** as controller PLC and **Studio 5000 – Logix Designer** as programming Environment.
Prior knowledge of Allen Bradley Studio 5000 software is assumed

Create a project

- Launch “Studio 5000” software from desktop, start a new project, select the required PLC processor and define project properties.

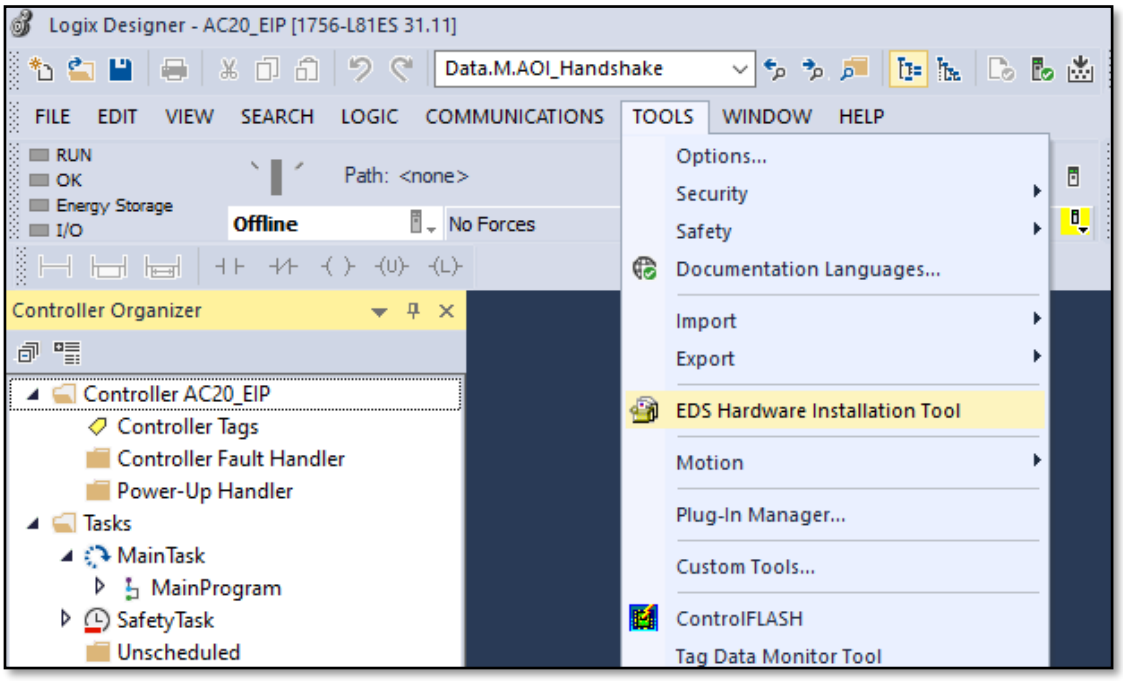


- Select revision and chassis type to match your physical hardware.

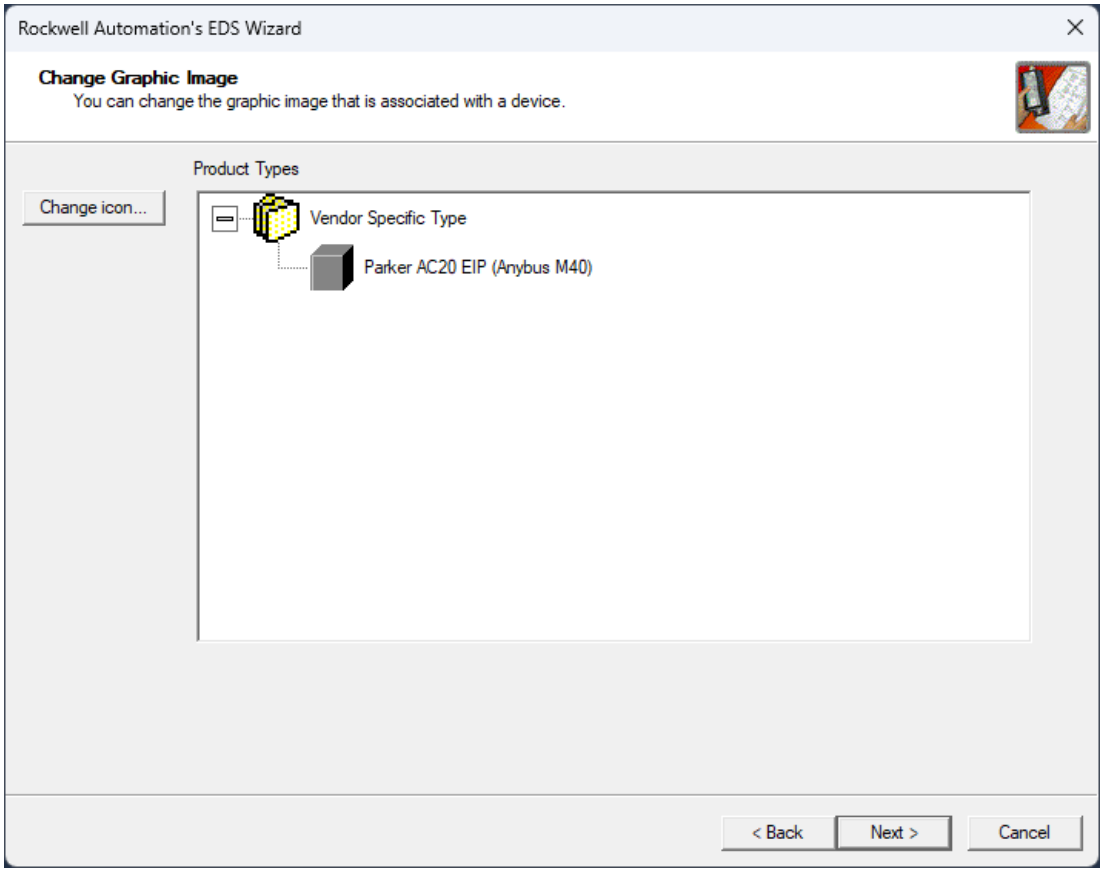


EDS File Installation

- From Studio 5000 Logix Designer menu bar click on **Tools > EDS Hardware Installation Tool** to open the tab.

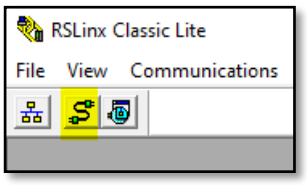


- In the **Rockwell Automation's EDS Wizard** select the path of your EDS file, follow the instruction to install the AC20 Ethernet IP option device into the Catalogue.

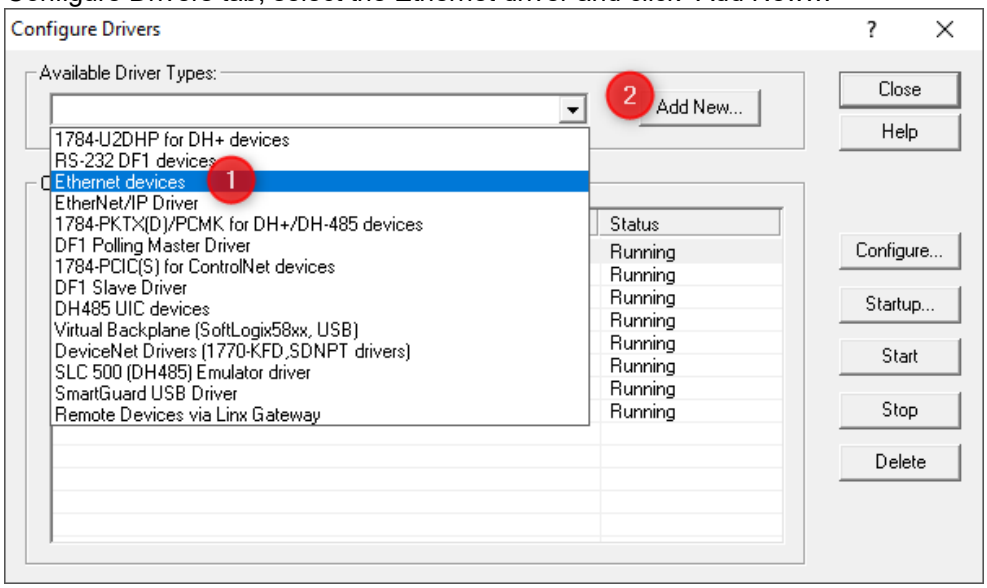


Create the connection path to project

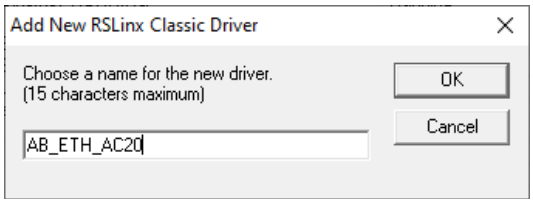
- Start **RSLinx Classic** and click on **Configure drivers**



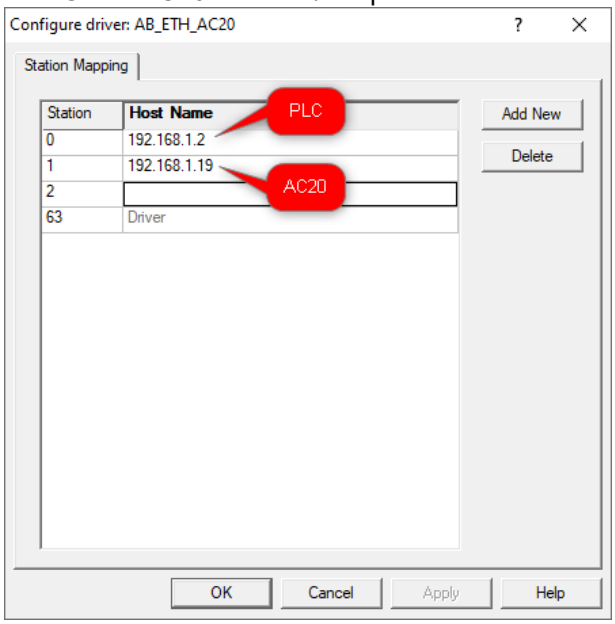
- In the Configure Drivers tab, select the Ethernet driver and click “Add New…”



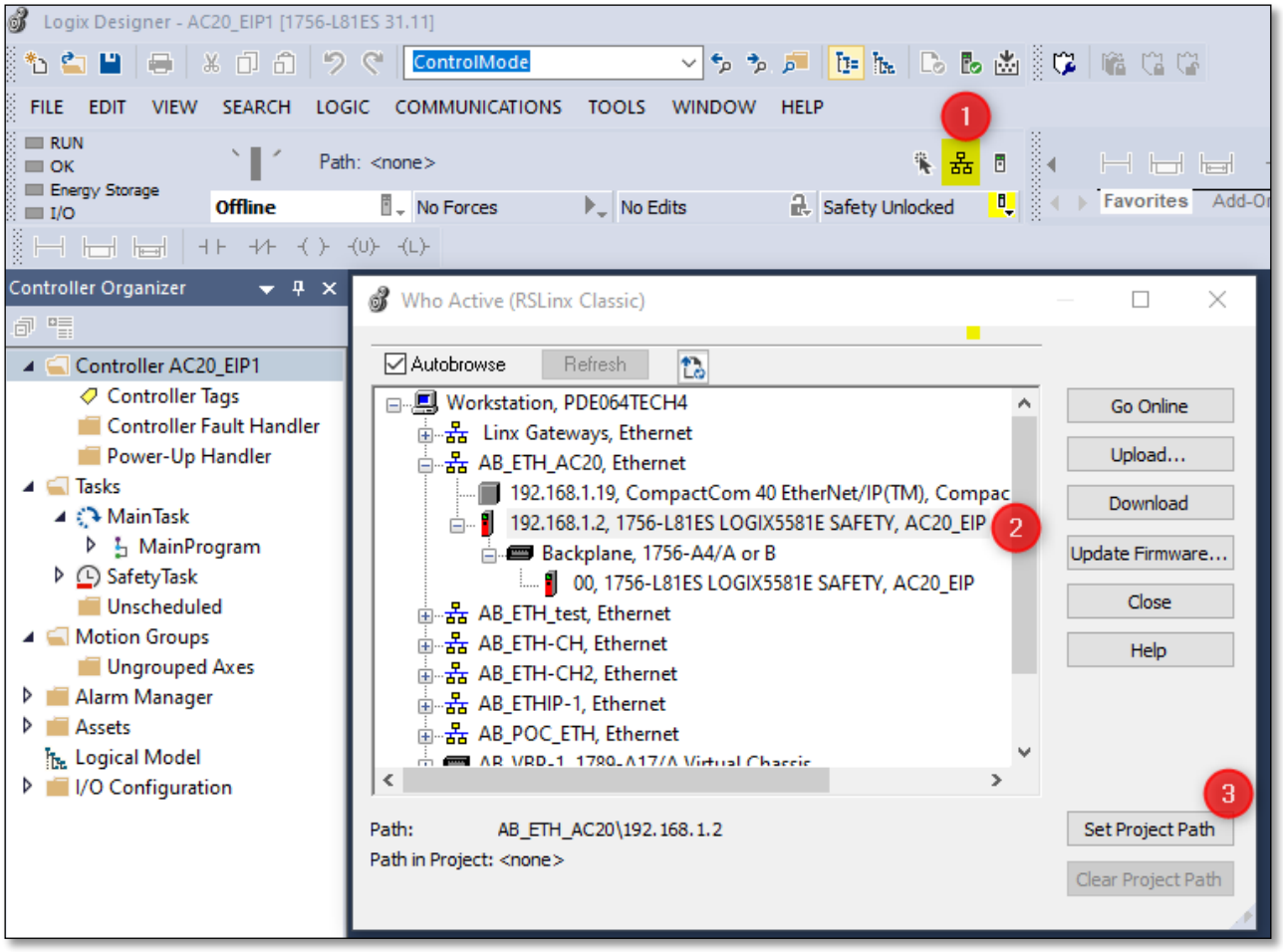
- Choose a name for the new driver then click **OK** to add hostname.



- Insert IP address of the PLC and AC20 Ethernet/IP option.

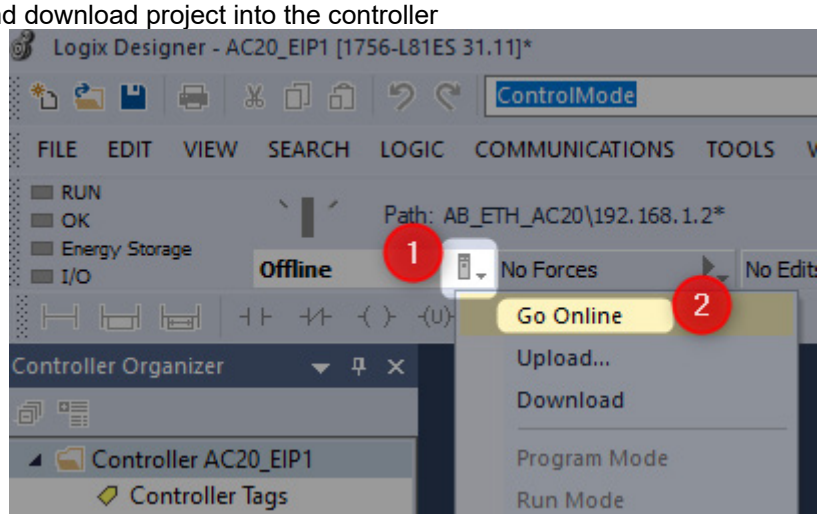


- From the Studio 5000 Logix Designer environment add the just created drive into the project, click on **Who active** and select the drive inserted in the previous step.

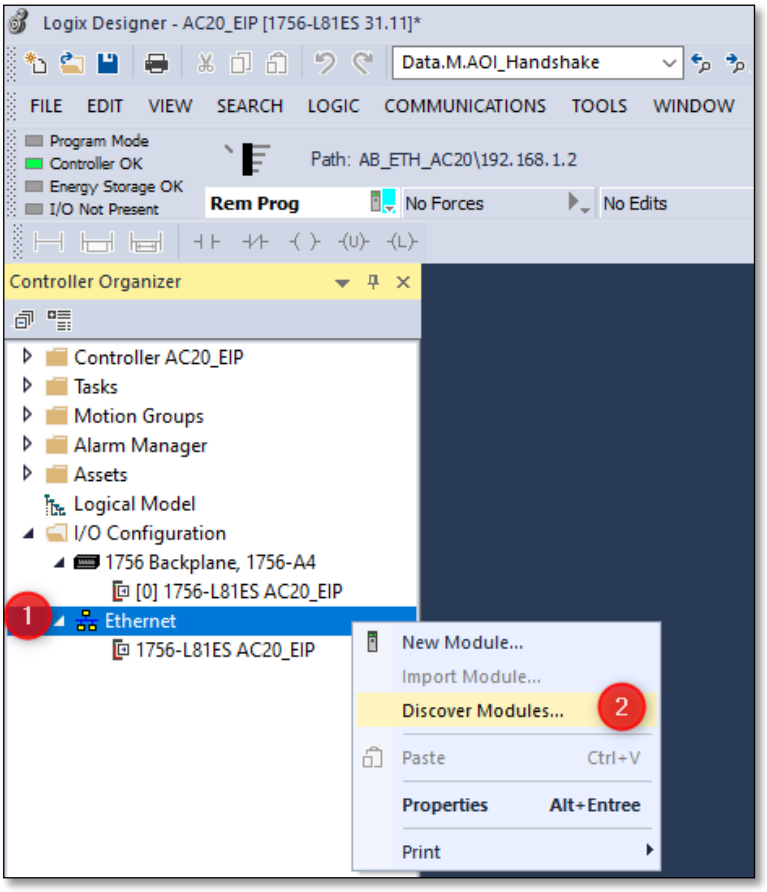


Add AC20 Ethernet IP option – Module Scanning Method

- Go online and download project into the controller



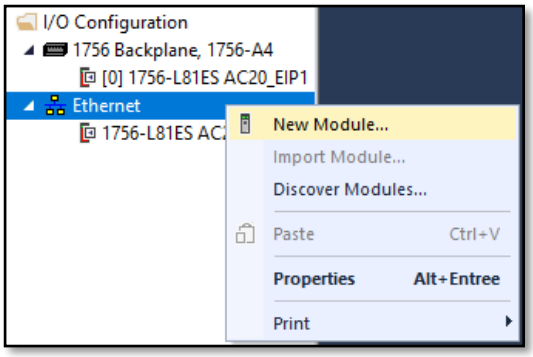
- In the I/O configuration tree, right-click Ethernet and select “Discover Modules.



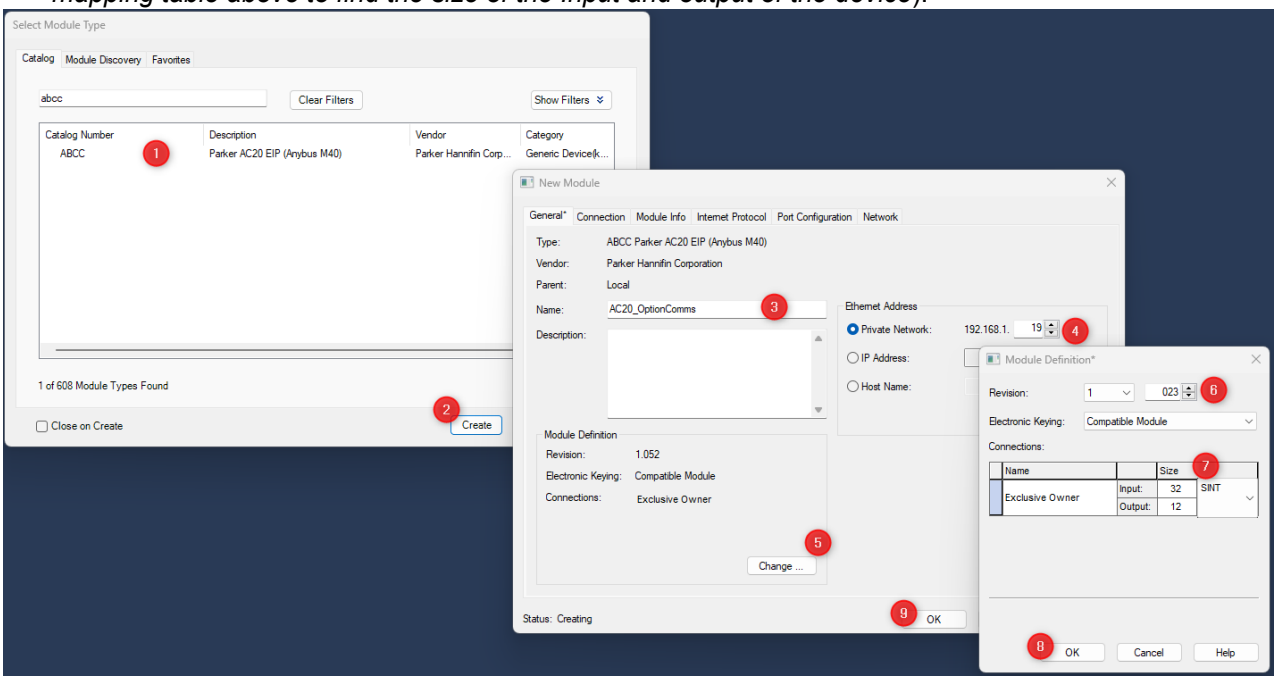
- Select the found device and click on create, assign a module name then click on **Change** to define module revision and the size of the data to exchange (*see the mapping table above to find the size of the Input and outputs of the device*).

Add AC20 Ethernet IP option – Manual Addition Method

- In the I/O configuration tree, right-click Ethernet and click “New Module”.

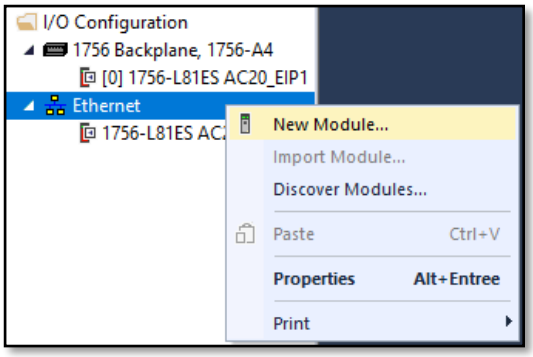


- Select the module from the catalogue and click on **create**: Assign a module name and IP address then click on **Change** to define module revision and the size of the data to exchange (*see the mapping table above to find the size of the Input and output of the device*).

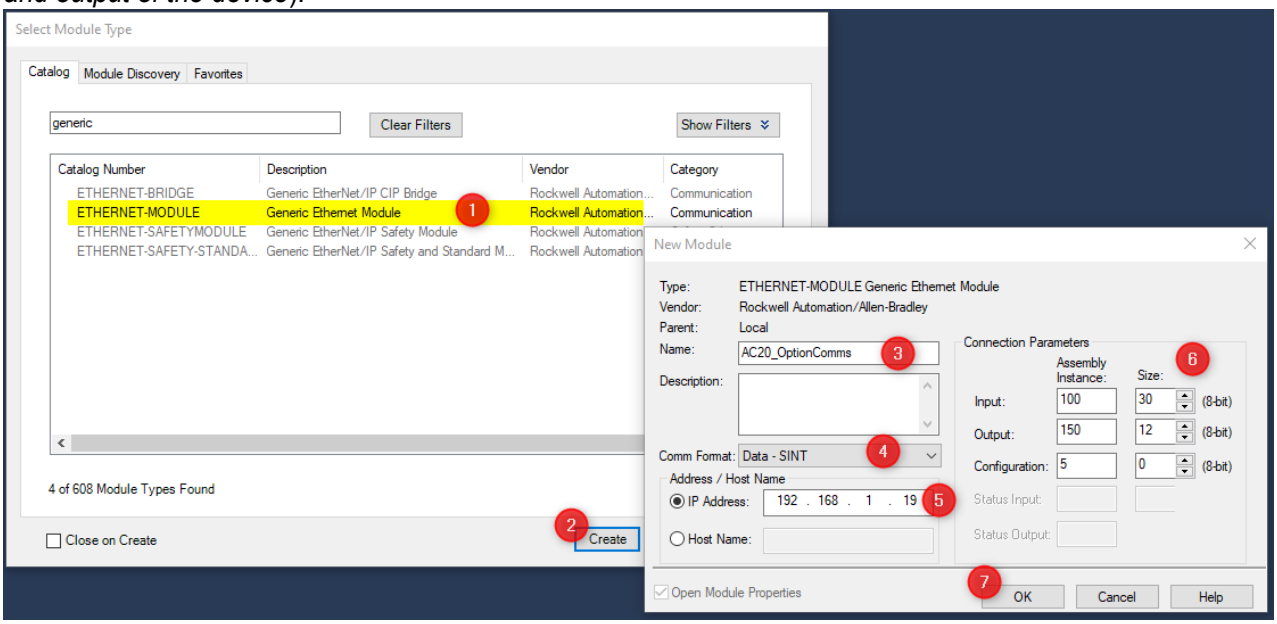


Add AC20 Ethernet IP option – Generic Ethernet Module Method

- In I/O configuration tree, right-click Ethernet and click “New Module”.

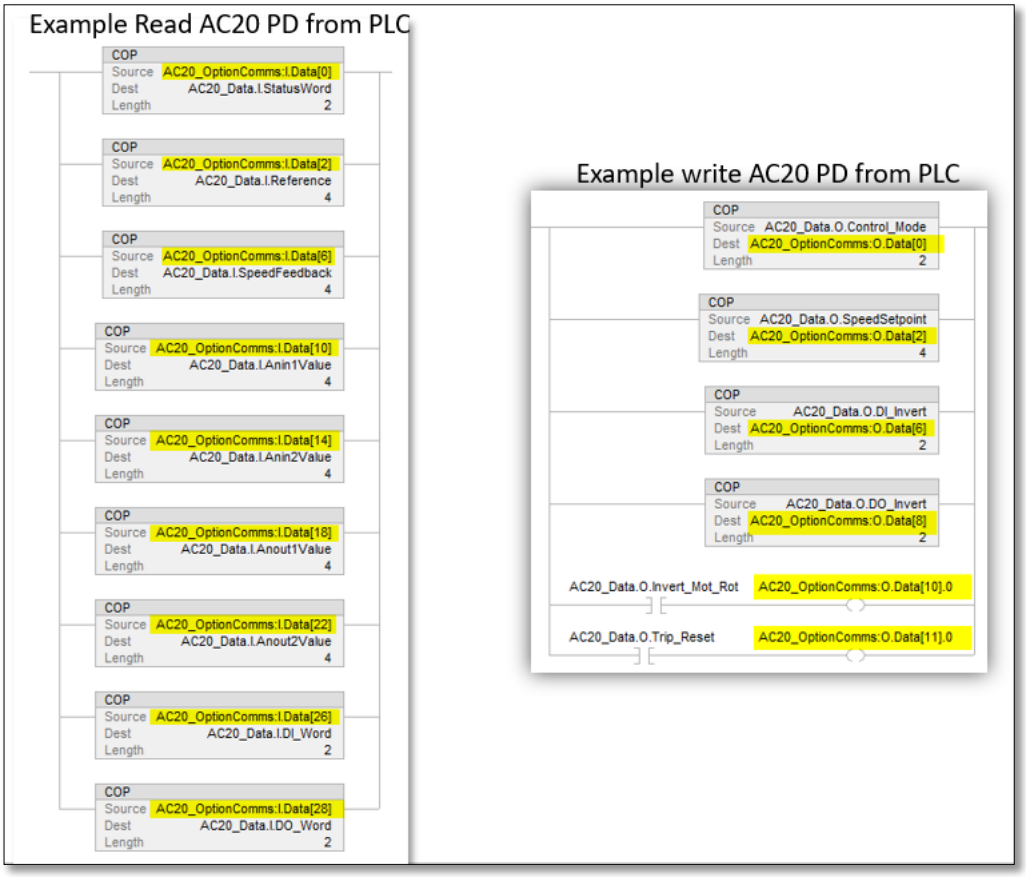


- Select the generic module from Catalogue, click on create: Assign a module name, define module revision and the size of the data to exchange (*see the mapping table above to find the size of the Input and output of the device*).



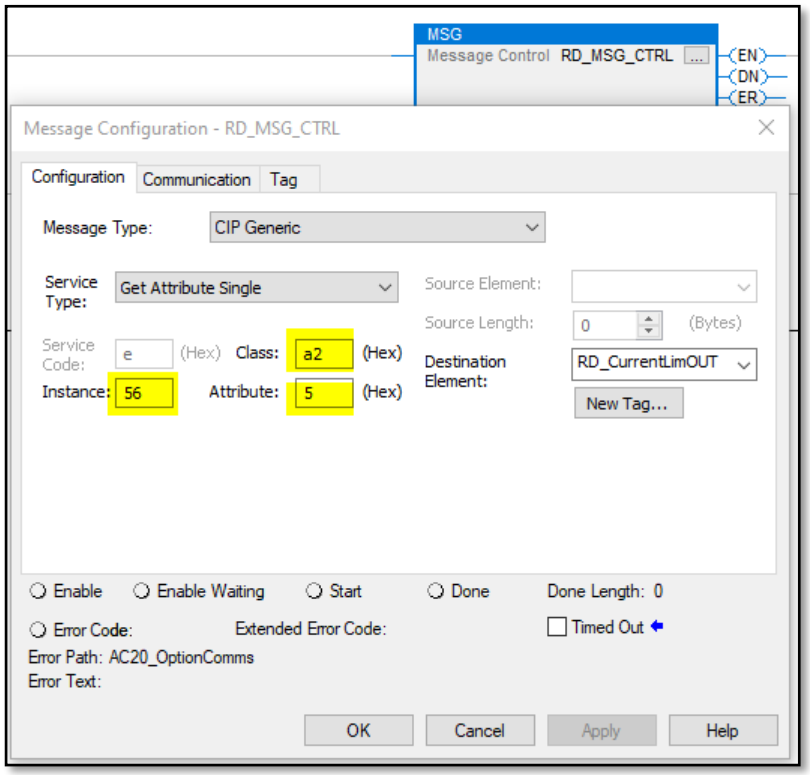
Create a program to transfer data

In the example ladder code below, in Network 1 the data is read from drive to PLC and in Network 2 the PLC writes data to the drive.

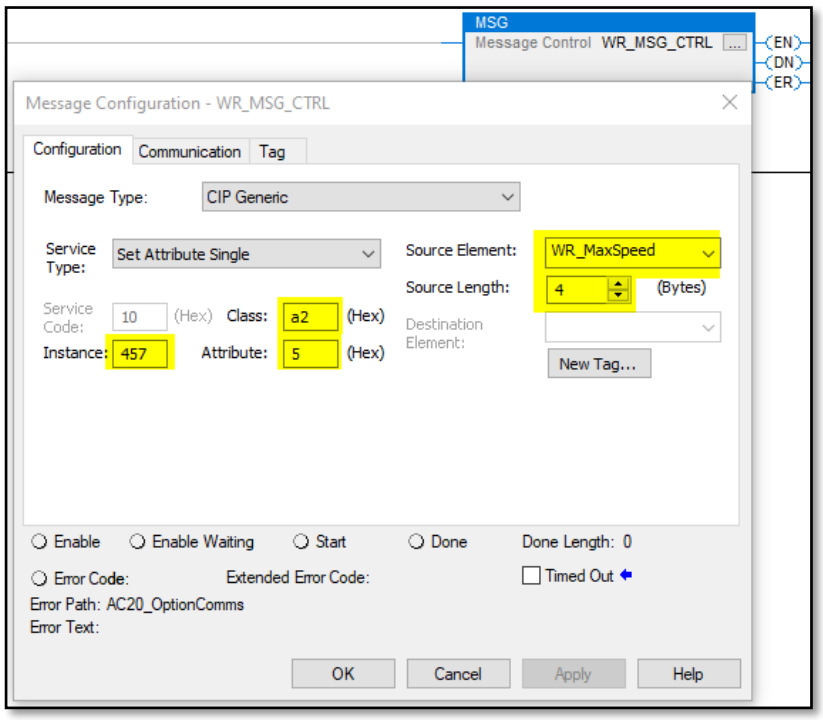


Read / Write parameters Acyclically

- Example: Read parameter **0056 Current Limit Out** (2038h).
- The "**Get Attribute Single**" message is used to send acyclic read requests to the AC20, as well as receive the requested response.



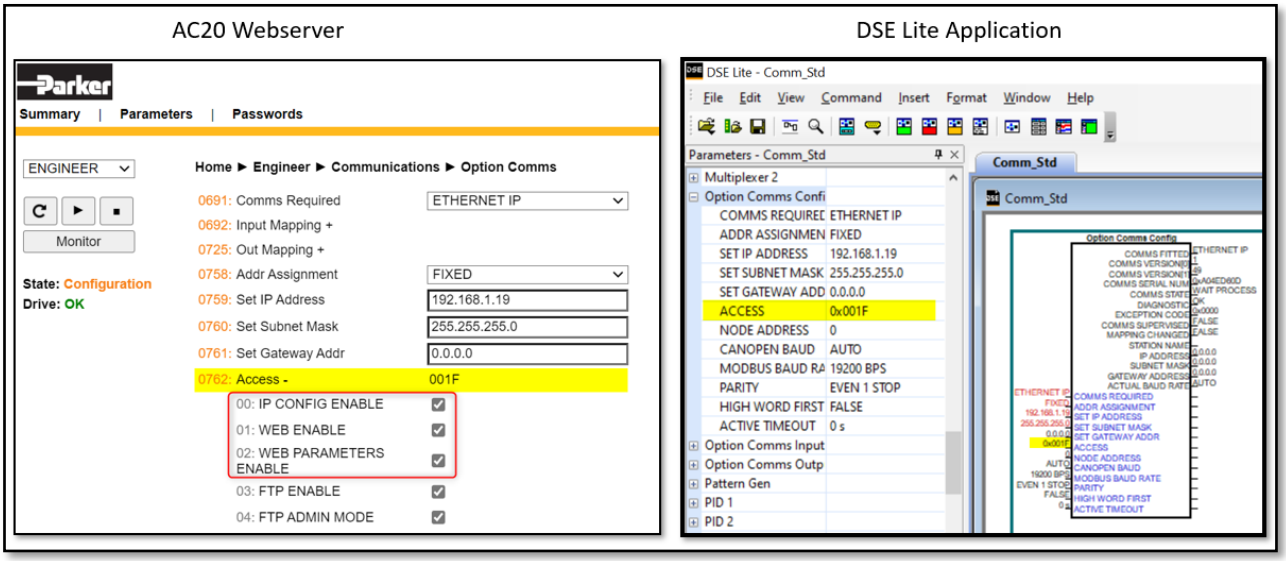
- Example: Write parameter **0457 Motor Max Speed** (21C9h).
- The "Set Attribute Single" message is used to send acyclic write request to the AC20, as well as receive the requested response.



10 Option Module Webserver

The option comms module built-in webserver provides a flexible environment for end-user interaction configuration purposes, parameters setting and diagnostics.

- The parameter **0762 "ACCESS"** BIT0 "**IP CONFIG ENABLE**", BIT1 "**WEB ENABLE**" and BIT2 "**WEB PARAMETERS ENABLE**" must be set to **TRUE** via the AC20 webserver or DSE Lite.

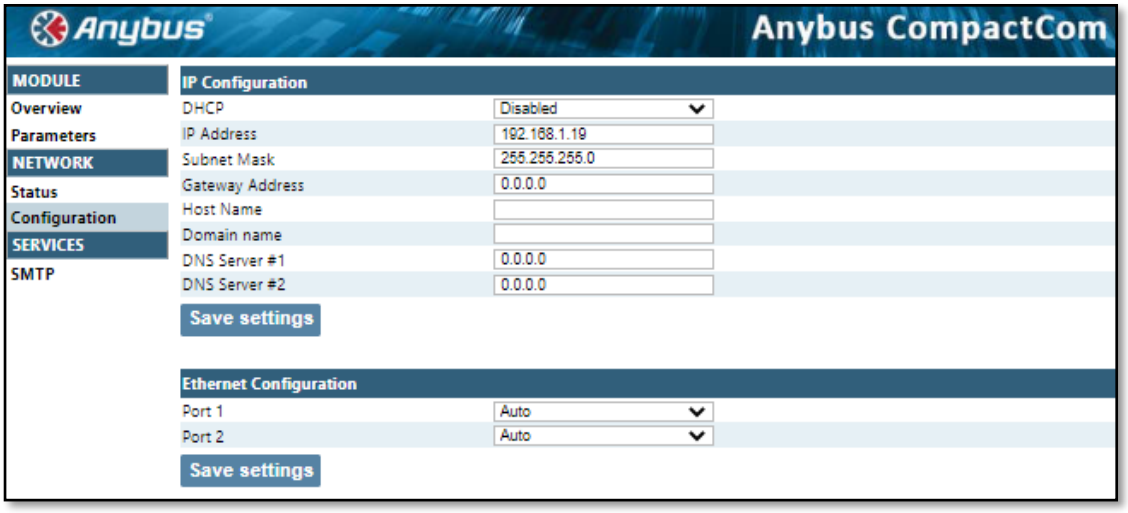


- The web pages may be accessed by a web browser by entering the IP address of the AC20 Ethernet/IP option comms module. The main index page provides access to network configuration parameters, network status information and access to the AC20 Parameters.

Network Configuration parameters

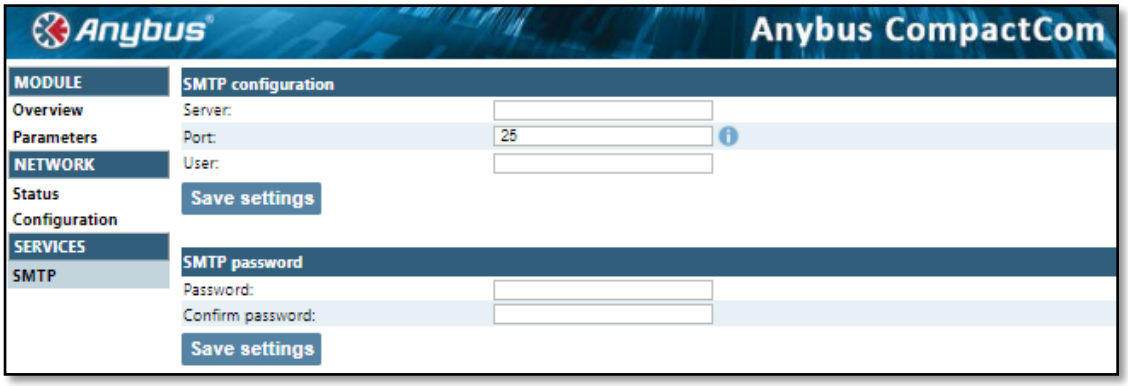
The network configuration page provides interfaces for changing TCP/IP and SMTP settings.
The module needs a reset for the changes to take effect.

TCP/IP settings



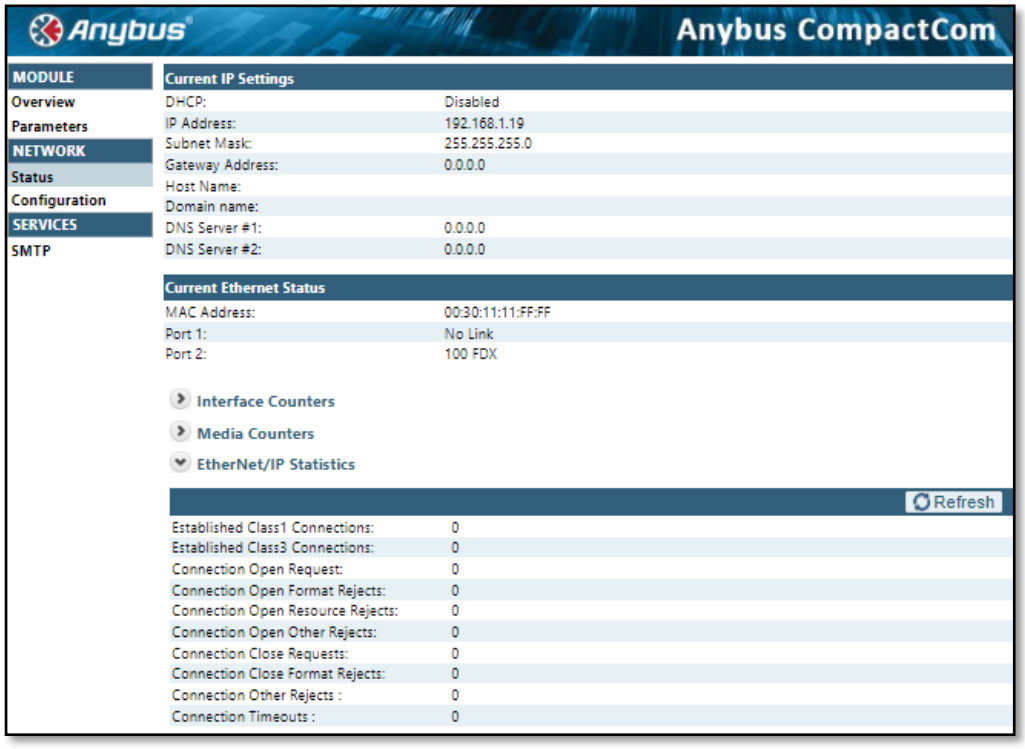
SMTP (Simple Mail Transfer Protocol) settings

The built-in email client can send predefined email messages based on trigger-events in the dual port memory (DPRAM). The module needs a valid SMTP server configuration in order to be able to send email messages.



Network status information

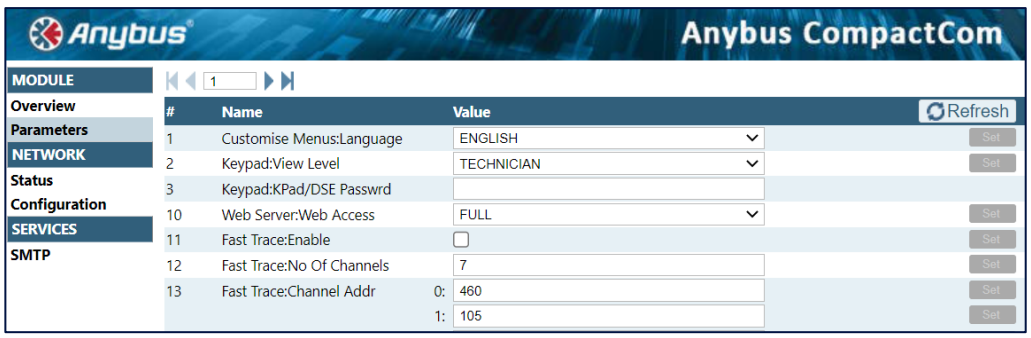
The Network Statics page provides information about the Ethernet ports and communications statistics.



AC20 Parameters Data

The Parameter Data pages allow access to AC20 parameters. To enable access to this page the parameter **0762 “ACCESS”** BIT2 **Web Parameters Enable** must be set to TRUE.

During the setting, the value of the parameter is written into the column value, the button “set” change from gray to blue, this button should be pressed to apply the parameter change.

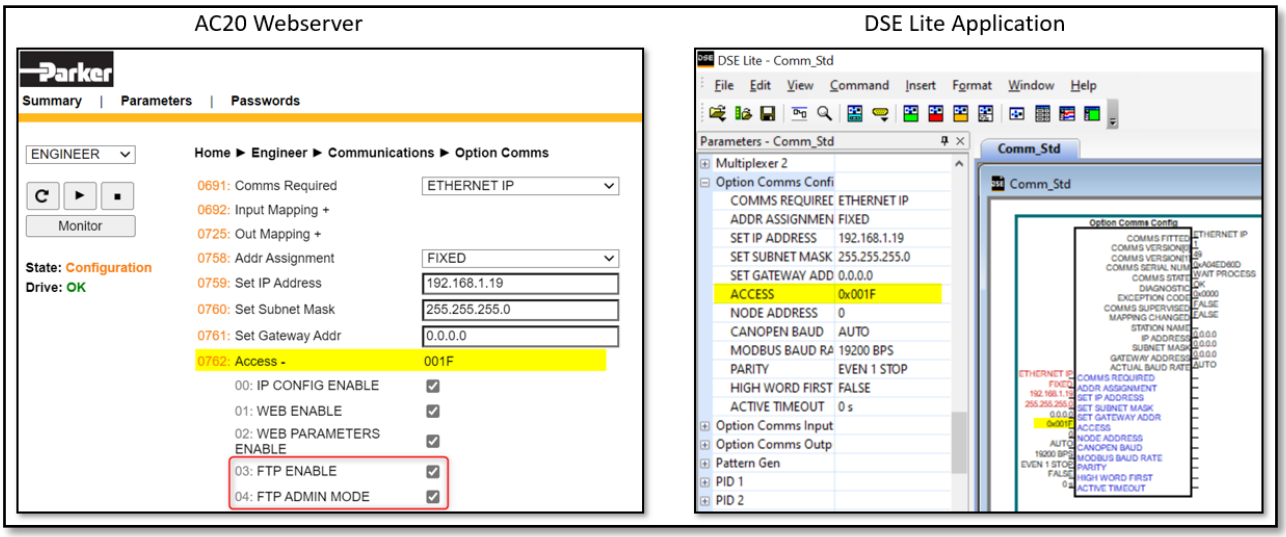


11 FTP Server

FTP (File Transfer Protocol) Server

The option has a built-in FTP server enabling access to the FLASH based file system.

The FTP server must be enabling by setting parameter **0762 "ACCESS"** BIT3 "**FTP ENABLE**" and BIT4 "**FTP ADMIN MODE**" to TRUE.



To access the file system an FTP client is required such as Windows Explorer. Enter the IP address into the address bar, for example ftp://192.168.1.19 By default no files are stored on the file system (the built-in web files are virtual files).

12 Lost Communication Trip

Supervised Parameter:
The **0777 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 drive will trip when there is a loss of communications between the master and the drive.
A COMMS BREAK trip will occur if the **0777 Comms Supervised** parameter transitions from TRUE to FALSE and the drive is in the operational state.
The trip may be disabled by clearing the respective bit in the parameter **0870 Enable Trips Lo**. The parameter Enable Trip Lo is a 32-bit word, the bit number 27 is used to disable or to enable the trip.

Comms state
The parameter **0774 Comms State** indicates 'PROCESS_ACTIVE' when the Ethernet IP communication is active. The table below describes how the comms state relates to the Ethernet IP network:

Comms State	Comments
NW_INIT	Initialization, all write assemblies will be remapped to the write process data area
WAIT_PROCESS	Waiting open connection
ERROR	Duplicate IP address detected, or communication lost
PROCESS_ACTIVE	Connection active
IDLE	Connection Idle
EXCEPTION	Unexpected error, e.g. Watchdog timeout, MS Led turns red and NS LED is off

13 Diagnostic Event

Configuration problems can often be identified by looking at the Run and Error LEDs and from the Comms Diagnostic **0775 parameters.** Under normal operating conditions the Comms diagnostic parameter should indicate **OK**. 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
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 read-only parameter to the read process data.

Other Diagnostics

Diagnostic = EXCEPTION :
Module has gone into an unrecoverable exception state

Diagnostic = UNSUPPORTED OPTION:
The fitted option is not supported by the drive

Diagnostic = NOT RESPONDING:
no initial response from the option

APPENDIX A: Data types

The relationship between AC20 parameter and Ethernet IP data type is given in the table below.

AC20 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.

Arrays

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 **VHZ_USER FREQ** has 11 elements.

Parameter Number	Parameter - VHZ_USER FREQ
0145	whole array
0146	index 0
0147	index 1
…	…
0157	index 10

If the parameter number of the whole array is 0145, then the parameter number of the element index 0 of the array will be 0134, the parameter number of the element index 01 will be 0147, etc.

String

A string parameter may be accessed via its parameter number. This is in the format of a SHORT_STRING. String arrays may not be accessed as a whole array but may be accessed via each element. Each element has its own parameter number.

APPENDIX B: Parameters

Function Block Inputs

Parameter Name	No.	Default Value	Range	Units	Type	Writable
COMMS REQUIRED	691	1: None	0: Unknown 1: None 2: CANopen 3: EtherCAT 4: Ethernet IP 5: Modbus RTU 6: Profibus 7: Profinet		ENUM	CONFIG
Communications option required.						
ADDR ASSIGNMENT	758	0: External	0: External 1: Fixed 2: DHCP		ENUM	CONFIG
Method for assigning the IP address.						
SET IP ADDRESS	759	0			ADDR	CONFIG
Ethernet option IP address						
SET SUBNET MASK	760	0			ADDR	CONFIG
Ethernet option subnet mask.						
SET GATEWAY ADDR	761	0			ADDR	CONFIG
Ethernet option gateway address.						
ACCESS	762	31: 31	0: IP Config Enable 1: Web Enable 2: Web Parameters Enable 3: FTP Enable 4: FTP Admin Mode		WORD	CONFIG
Ethernet access using comms option (bitwise)						
NODE ADDRESS	763	0			USINT	CONFIG
Communications node address.						
CANOPEN BAUD	764	9: Auto	0: 10 kbps 1: 20 kbps 2: 50 kbps 3: 100 kbps 4: 125 kbps 5: 250 kbps 6: 500 kbps 7: 800 kbps 8: 1000 kbps 9: Auto 10: Lss		ENUM	CONFIG
Required baud Rate for CANopen.						
MODBUS BAUD RATE	765	4: 19200 BPS	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 76800 bps 8: 115200 bps		ENUM	CONFIG
Required baud Rate for Modbus RTU						
PARITY	766	0: Even 1 Stop	0: Even 1 Stop 1: Odd 1 Stop 2: None 2 Stop 3: None 1 Stop		ENUM	CONFIG
Modbus parity and stop bits						
HIGH WORD FIRST	767	FALSE			BOOL	CONFIG
For 32-bit values high word comes first if set to TRUE.						
ACTIVE TIMEOUT	768	0	0 to 65		TIME	CONFIG
Process active timeout period.						

Parameter Name	No.	Default Value	Range	Units	Type	Writable
MASTERMAPPING	2566	TRUE			BOOL	CONFIG
Switch to choose how the PROFInet, EtherCAT, PROFIbus and CanOpen PDO mapping is defined: If TRUE the bus master sets/configures the PDO mapping. The drive mapping parameters 692...757 are cleared (set to zero) and made invisible (GKP and website) as this the required condition. If FALSE the mapping parameters 692...757 are visible (Keypad and webserver) can be used to define the PDO mapping from drive side (which the bus master then can upload). The switch is considered during drive startup (stopped -> operational transition).						

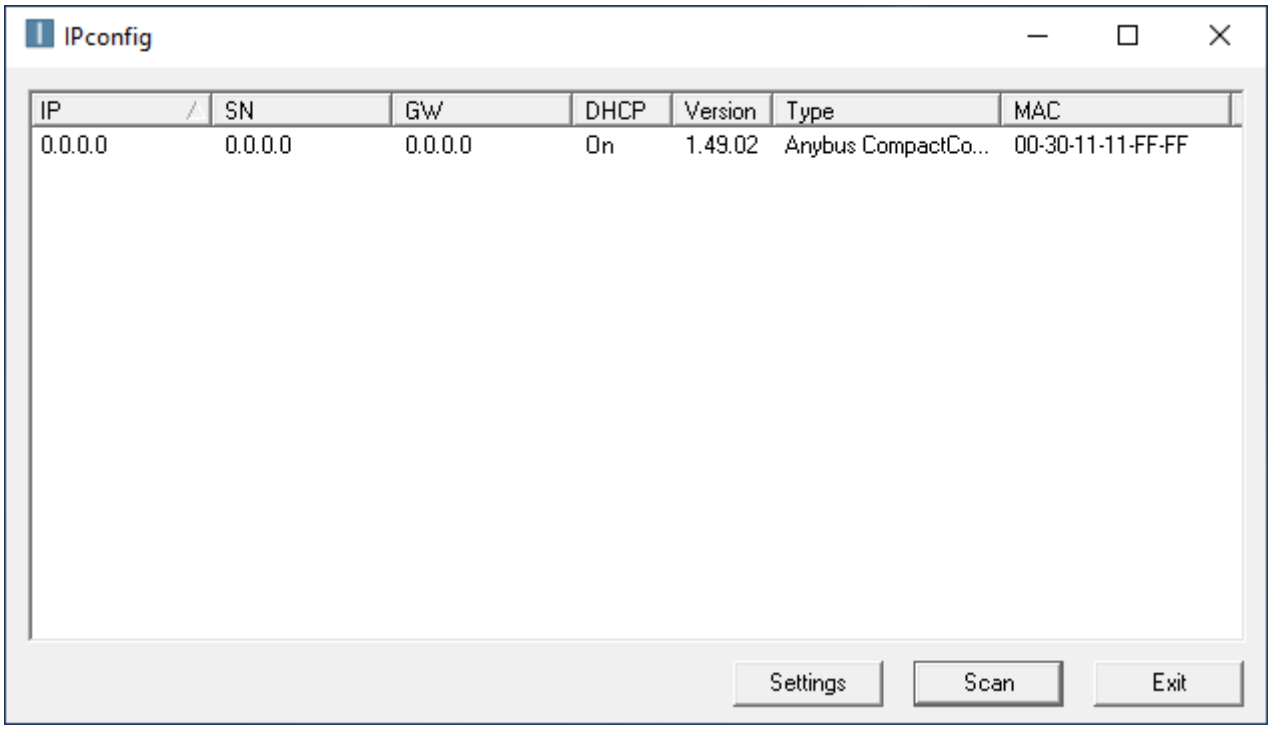
Function Block Outputs

Parameter Name	No.	Default Value	Range	Units	Type	Writable
COMMS FITTED	769	0: Unknown	0: Unknown 1: None 2: CANopen 3: EtherCAT 4: Ethernet IP 5: Modbus RTU 6: Profibus 7: Profinet		ENUM	NOT
Communications option fitted.						
COMMS VERSION[0]	770	0			USINT	NOT
Firmware version of the comms module.						
COMMS VERSION[1]	770	0			USINT	NOT
Firmware version of the comms module.						
COMMS SERIAL NUM	773	0			DWORD	NOT
Serial number of the comms module.						
COMMS STATE	774	8: None	0: Setup 1: NW Init 2: Wait Process 3: Idle 4: Process Active 5: Error 6: Reserved 7: Exception 8: None		ENUM	NOT
State of the option comms.						
DIAGNOSTIC	775	0: Ok	0: Ok 1: Hardware Mismatch 2: Invalid Configuration 3: Mapping Failed 4: Exception 5: Unsupported Option 6: Not Responding		ENUM	NOT
Diagnostic for the comms option.						
EXCEPTION CODE	776	0			WORD	NOT
Diagnostic code on option entering exception state. The MSB is the exception code and the LSB is the exception info.						
COMMS SUPERVISED	777	FALSE			BOOL	NOT
Indicates a master has made a connection to the device.						
MAPPING CHANGED	778	FALSE			BOOL	NOT
The PLC has changed the process data mapping from that set by the drive.						
STATION NAME	779				STRING	NOT
Current PROFINET station name.						
IP ADDRESS	787	0			ADDR	NOT
Current Ethernet option IP address.						
SUBNET MASK	788	0			ADDR	NOT
Current Ethernet option subnet mask.						
GATEWAY ADDRESS	789	0			ADDR	NOT
Current Ethernet option gateway address.						

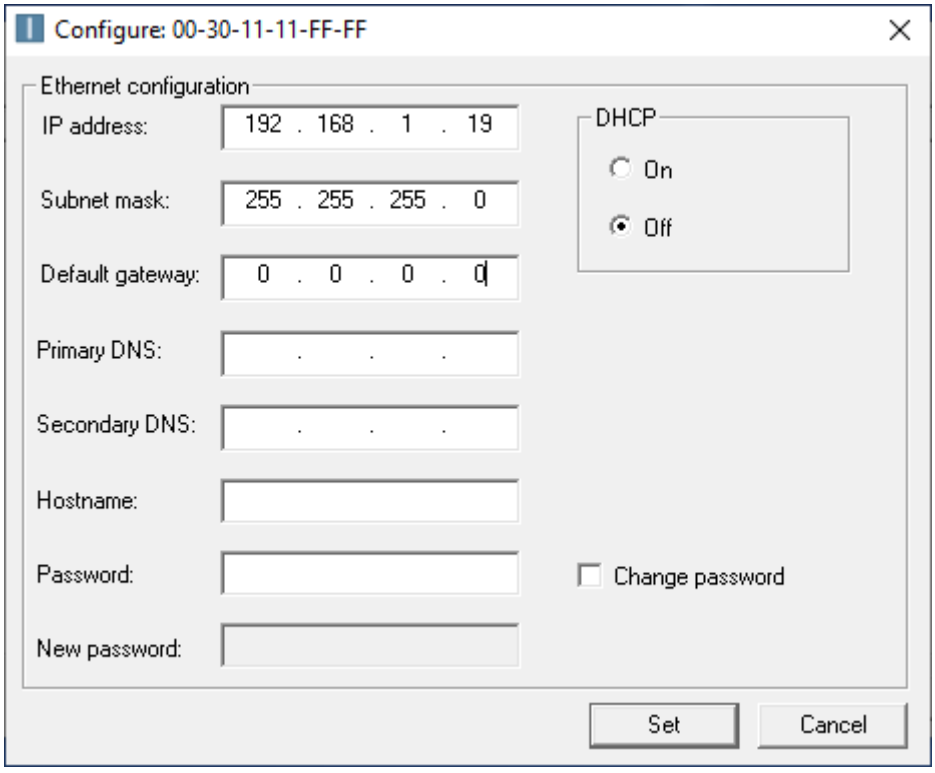
Parameter Name	No.	Default Value	Range	Units	Type	Writable
ACTUAL BAUD RATE	790	0: 10 kbps	0: 10 kbps 1: 20 kbps 2: 50 kbps 3: 100 kbps 4: 125 kbps 5: 250 kbps 6: 500 kbps 7: 800 kbps 8: 1000 kbps 9: Auto 10: Iss		ENUM	NOT
Actual CANopen baud rate.						

APPENDIX C: Setting IP-Address via Anybus IPCONFIG

Use the IPCONFIG tool from HMS to search and set slave IP Addresses. The Anybus IPCONFIG utility can be downloaded free of charge from the HMS website. This utility may be used to configure the network settings of any Anybus product connected to the network.
On starting the program, the network is scanned for Anybus products. The network can be rescanned at any time by clicking ‘Scan’.

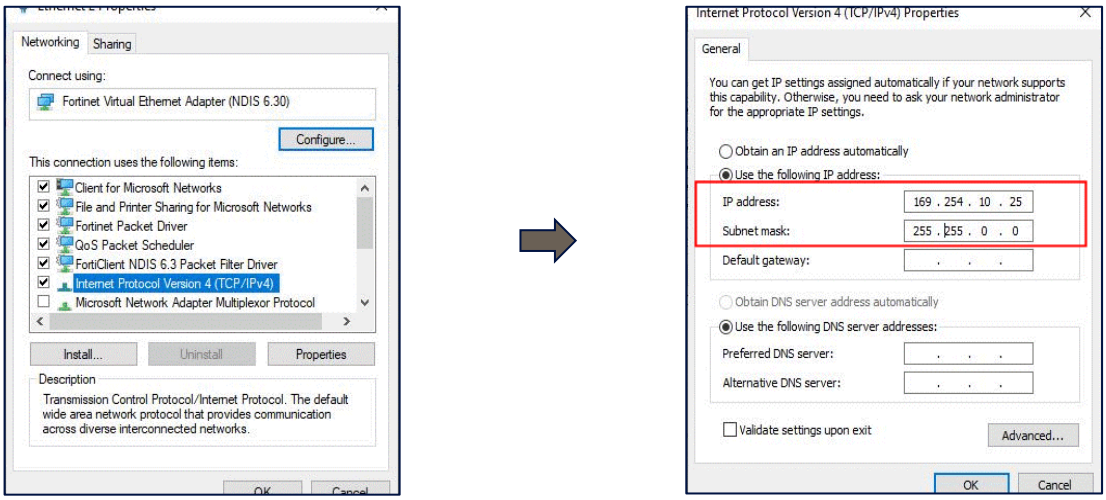


In the list of detected devices, double-click on the entry in the list. A window will appear, containing the IP configuration and password settings. Validate the new settings by clicking ‘Set’, or click ‘Cancel’ to abort



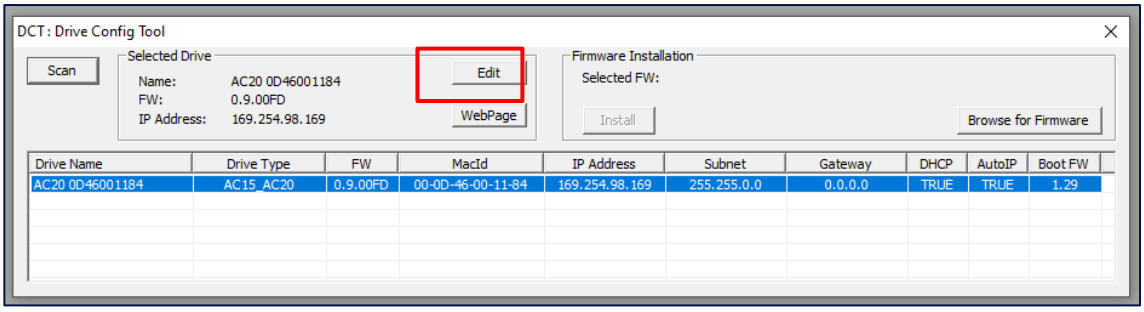
APPENDIX D: DSE Lite Quick Start Guide

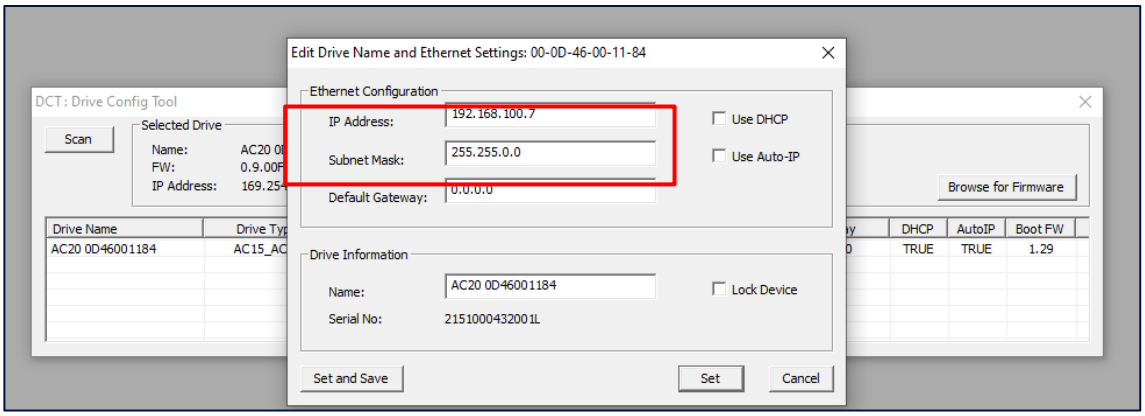
Follow the steps below to configure the AC20 via DSE Lite PC-Tool.
The block diagram of the AC20 may be accessed through the onboard webserver or DSE Lite.
DSE Lite is recommended.
The IP address of the AC20 is in the range 169.254.xx.xx by default. Therefore, the user's PC network adapter must be configured to this range as shown below (IPv4 is used for communication).



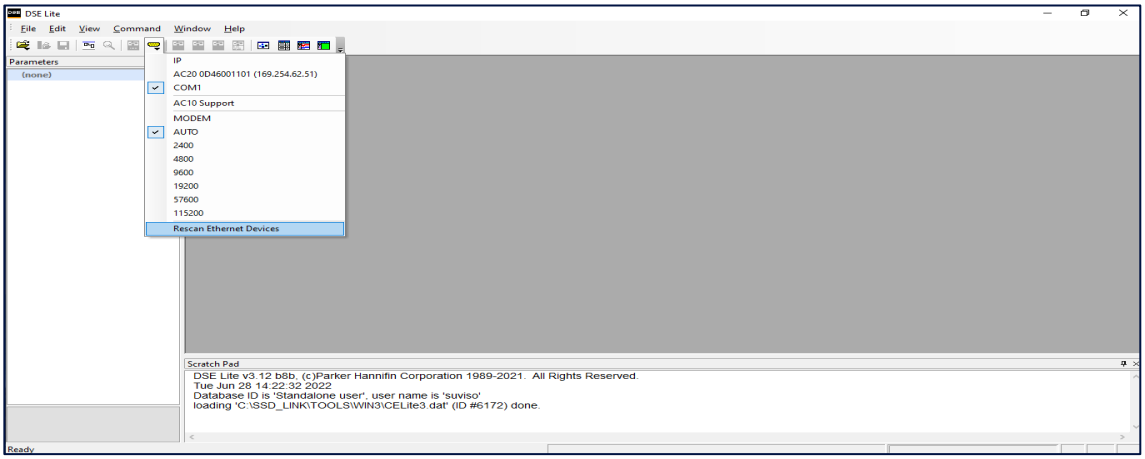
Alternatively, the IP address of the drive may be changed to suit the settings of the PC network adapter. The IP address of the drive can be configured using the DCT function, accessible from within DSE Lite by selecting Command -> Install AC15/AC20 Firmware.

Once the network scan is completed, then the drive settings can be edited.





If the drive is not found by DSE lite, or a new drive is connected to the Ethernet port, a network scan must be performed again, as blow.



Once the network scan has been performed, any AC20 connected to the network will appear and DSE lite can connect to the drive.

When connected to a drive, this is shown in the scratch pad.