



**Provides the FMT-400 with an Ethernet
Fieldbus connection**
**Allows FMT-400 to act as a remote node
in a SCADA system over a Ethernet
network**

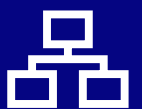
Introduction

The 400-ETHERNET module provides the FMT-400 system with means to communicate with remote equipment over a Ethernet network. For instance the FMT-400 could be a remote node in a SCADA network communicating over a Ethernet network. A maximum of one 400-ETHERNET module is supported by the 400-CPU-B, and a maximum of four 400-ETHERNET modules are supported by the 400-CPU-C. The 400-ETHERNET module must be used in the main rack of the FMT-400 system.

General Specifications

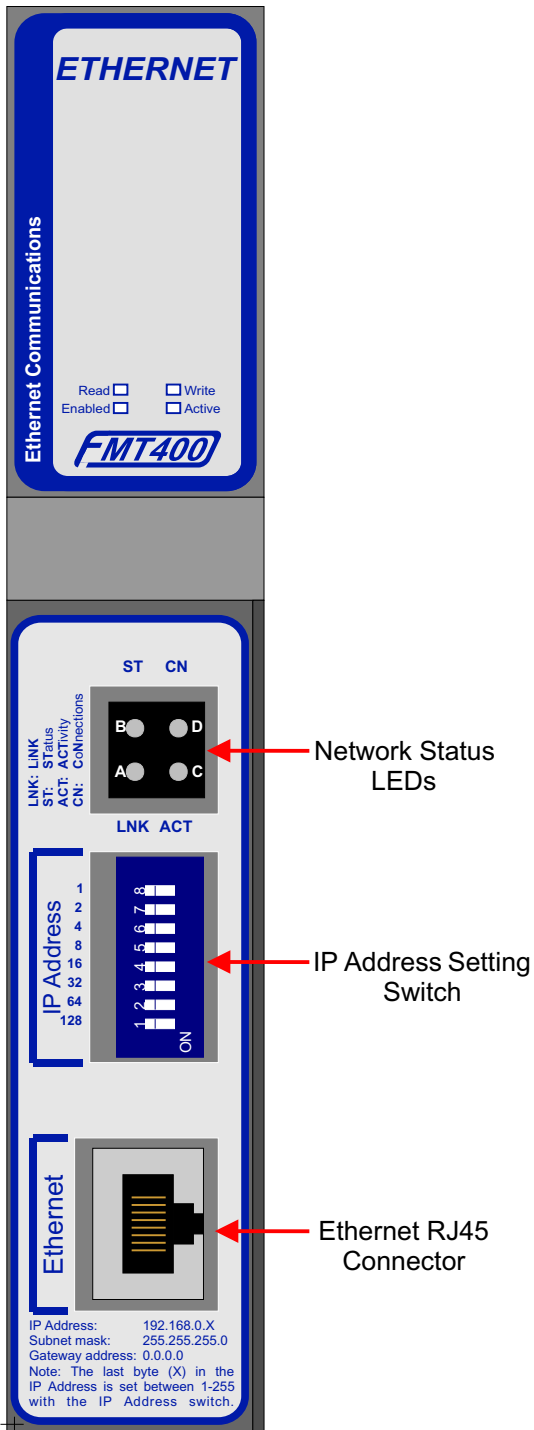
Storage temperature	-20 to +70 °C
Operating temperature	0 to 55 °C
Humidity	10-90% non condensing
Weight	500g approx
Dimensions	Standard FMT-400 size single width module
Current consumed from rack	TBAmA from rack power supply





Connection Details

Connections should be made to the 400-ETHERNET connectors as shown in the following diagrams.
The Ethernet connector is a standard RJ45 connector.



More details can be found on the following pages

Ethernet (Modbus / TCP) Overview

The Ethernet module implements Modbus/TCP over an Ethernet network and can be set up in several different ways by using the 'Fieldbus' page within Flex32. There are two main options within the 'Fieldbus' page of Flex32, these being 'Normal Fieldbus Operation' and 'Communications Port Emulation for Ethernet'.

Normal Fieldbus Operation: If this option is selected then the Ethernet module will work in the same fashion as the other Fieldbus modules (400-FBM) that are available for the FMT - 400 system. You should set:

- The start number of registers to read in from the Fieldbus (note that this is the start number of registers within the FMT-400 system that will contain the contents of the registers been read in from the Ethernet network).
- The number of registers to read in from the Ethernet network.
- The start number of registers to write out to the Ethernet network (note that this is the start number of registers within the FMT-400 system that will be written out to the Ethernet network).
- The number of registers within the FMT-400 system that will be written out to the Ethernet network.
- The update interval (this is the time between reads and writes to the Ethernet network by the FMT-400 system).

Modbus/TCP: In 'Normal Fieldbus Operation' mode the module allows the FMT-400 system to work as a Modbus / TCP slave (via the 400-Ethernet module) according to the Modbus / TCP specification 1.0. It is possible to use up to eight Modbus / TCP connections simultaneously.

The module supports all the Modbus commands according to class 0 and class 1 and some of the commands in class 2.

The Modbus commands supported by the module in 'Normal Fieldbus Operation' mode are:

Function Code	Function Name	Class
1	Read coils	1
2	Read input discretes	1
3	Read multiple registers	0
4	Read input registers	1
5	Write coil	1
6	Write single register	1
7	Read exception status	1
15	Force multiple coils	2
16	Write multiple registers	0
22	Mask write register	2
23	Read / Write registers	2

For more information regarding the Modbus / TCP specification, please visit the website: www.modicon.com/openmbus/.

Notes:

1. The input registers of the 400-Ethernet module are from address 0 to 1023 (Decimal), here any 'input data' that is sent to the 400-Ethernet module is contained (e.g. write single register, write coil).
2. The output registers of the 400-Ethernet module are from address 1024 to 2047 (decimal), here any 'output data' that is sent from the 400-Ethernet module is contained (e.g. read coils, read multiple registers).

In notes 1 and 2 above the registers referred to are registers within the 400-Ethernet module, NOT within the 400-CPU module.

Example 1: If you set the 'Start of registers to read in from Fieldbus' to R100 and the number of registers to read in from Fieldbus to 100 then this will store data in registers R100 to R200 in the 400-CPU module this corresponds to registers 0 to 99 within the 400-Ethernet module.





Ethernet (Modbus / TCP) Overview (continued)

Example 2: If you set the 'Start of registers to write out to Fieldbus to R200 and the 'Number of registers to write out to Fieldbus' to 150 then data will be written from registers R200 to R350 within the 400-CPU module to registers 1024 to 1174 within the 400-Ethernet module.

Communications Port Emulation for Ethernet: If this option is selected then you have the options to implement various communication protocols over a TCP/IP Ethernet network. The options presently available are: 'Modbus RTU Slave' and 'Modbus (Flag map I/O)'.

'Modbus RTU Slave': This option implements a Modbus RTU slave over a TCP/IP Ethernet network. Standard Modbus RTU slave commands are directly implemented e.g. sending the command to force coil 1 on will result in output Q1 in the FMT-400 system being forced on, sending the command to write a register (see note 1) will result in that register being written to within the 400-CPU. You should set:

- The Modbus station number.
- Spare 0, set this to the start number of registers within the FMT-400 CPU that can be read or written to via Modbus by a remote system (see note 1).
- Spare 1, set this to the end number of registers within the FMT-400 CPU that can be read or written to via Modbus by a remote system (see note 1).

Note 1: You can limit the access to registers that the remote system can read from and write to via Modbus over Ethernet. For example if 'Spare 0' is set to 400 and 'Spare 1' is set to 680 then the remote system can only read from and write to registers r400 to r680 within the FMT-400 system, the remote system will not be able to access anything else. If 'Spare 0' is set to 0 and 'Spare 1' is set to 0 then the remote system will have full access to all Modbus command set.

'Modbus (Flag Map I/O)': This option is the same as the Modbus RTU Slave above, but the physical I/O is mapped in flags within the FMT-400 system. You can have upto 1024 flags mapped as inputs and 1024 flags mapped as outputs. This is of use if, for example, you are interfacing a PLC with a large I/O count, via the FMT-400, to the Ethernet network. The FMT-400 can read and write I/O on the PLC via Modbus RTU on one of it's comms ports and the PLC's I/O is effectively mapped as virtual I/O within the FMT-400's flags. You should set:

- The Modbus station number.
- The starting point of the flags to be used as 'virtual' inputs.
- The starting point of the flags to be used as 'virtual' outputs.

IP Address Setting

To configure the module for intranet use, use the DIP switch to configure the IP address.

The settings below are used:

IP address:	192.168.0.X
Subnet mask:	255.255.255.0
Gateway address:	0.0.0.0

The last byte 'X' in the IP address is set between 1 - 255 using the address setting DIP switch on the module. The MSB is switch number 1 (the left most switch).

Example: If switches 8,6 and 3 were set to the 'ON' position then the byte 'X' would be set to a value of 37. The IP address for the module will therefore be: 192.168.0.37.

Alternatively: Set the address switch to 0 and you may configure the full required IP address within Flex32 the setting may be adjusted by clicking on the 'Adjust' button on the Flex32 toolbar.

Note: If the address switch is set to any setting other than 0 then it will override the settings in Flex32

Connection Cable

The cable that should be used to connect the 400-ETHERNET module to the Ethernet network is normal CAT5 twisted pair Ethernet cable with RJ45 connectors.

LED Descriptions

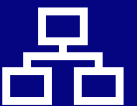
Label	Colour	Description	
Read	Green	Flashes when data is being read from the 400-ETHERNET module by the 400-CPU module (at high data rate this LED may appear to be constantly illuminated).	
Write	Red	Flashes when data is being written to the 400-ETHERNET module by the 400-CPU module (at high data rate this LED may appear to be constantly illuminated).	
Enabled	Yellow	When illuminated shows that the module has been correctly set up within your project in Flex32 and that the CPU module has initialised the module. If not illuminated then the module may not have been set up in your project configuration.	
Active	Yellow	Indicates activity within the module, this will normally flicker or appear to be constantly illuminated, activity occurs when the 400-CPU module is sending data to or receiving data from the 400-ETHERNET module.	
<u>LED</u>	<u>Colour</u>	<u>Function</u>	<u>Description</u>
ST	Green/ Red	Status	Flashing green 1Hz - Indicates that used IP address has not been set by the value on the DIP switches. Flashing red 1Hz - The Ethernet MAC address is not correct. The module will not be able to initialise. Flashing red 2hz - The module failed to load Ethernet configuration from its flash RAM.
CN	Green	Connections	Indicates the number of Modbus / TCP connections that are established to the module. The number of flashes indicates the number of connections. The LED turns off for a short period then repeats the number of flashes. (only in 'Normal Fieldbus Register Exchange Operation' mode)
LNK	Green	Link	When ON - Module connected to an Ethernet.
ACT	Green	Activity	Steady green - No activity. Flashes from green to off - The LED flashes from green to off when a packet of data is received or transmitted.



Notes:

FMT-400

400-ETHERNET Ethernet Module



**Colter
Group**

Notes:

FMT-400

400-ETHERNET Ethernet Module



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Order Codes

Part Number
400-ETHERNET

COLTER GROUP
COLTER PRODUCTS LIMITED

UNIT 7, ZONE C
CHELMSFORD ROAD INDUSTRIAL ESTATE
DUNMOW
ESSEX
CM6 1HD

Telephone: + 44 (0)1371 876887
Fax: + 44 (0)1371 875638

E-Mail: sales@coltergroup.co.uk
Web Site: www.coltergroup.co.uk

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