

Installation Instructions

Procon

IP-50M

IP-100M

Procon IP-xxM Overview

The Procon IP-xxM units provide an interface between Mitsubishi City-Multi G50A controllers and a Modbus RTU serial data link.

**NOTE:- The software version for the G50A must be 2.10 or higher.
To access OC and BC errors it should be 2.60 or higher.**

Units are available in 50M and 100M format. The 50M unit interfaces to a single G50A controller, using the Ethernet 1, Com1A and Com1B connectors. The 100M interface is effectively two 50M units with the second unit using the Ethernet 2, Com2A and Com2B connectors.

The 100M unit has separate MAC addresses for each Ethernet connector. In each case the two serial ports (A and B) operate identically. They can operate on either RS232C or RS485.

Unit Operation

The units communicate with the G50A via its Ethernet port. Normally this would be connected to a hub or switching hub, allowing other pieces of equipment to be connected at the same time. These could include a router and a computer running the G50A configuration programme.

Each section of the IP-xxM unit is equipped with 6 LEDs which provide status information as below

L	Ethernet Link Active
R	Ethernet Receive
X	Ethernet Transmit
M	Modbus Link Transmit
G	Good Response from G50A
F	Fault Response from G50A

(The Fault response does not indicate a communications failure. It indicates that the G50A does not recognize the Group or Mnet number requested.)

At start up the IP-xxM unit will delay for about 15 seconds before starting to access the G50A. After this time the 'X' Led will blink periodically as the unit establishes a connection. When the connection is established the 'G' or 'F' Leds will flash in response to the 'X' Led activity. If a modbus link is connected and active then the 'M' Led should flash in synchronism with the Modbus messages.

Note that if the dialogue is interrupted it could take up to five minutes for the connection to be re-established, depending on the conditions under which the dialogue stopped.

If an invalid number of indoor units is entered in Slave 17 Offset 26 then the 'G' and 'F' LEDs will be on continuously and the unit will not scan.

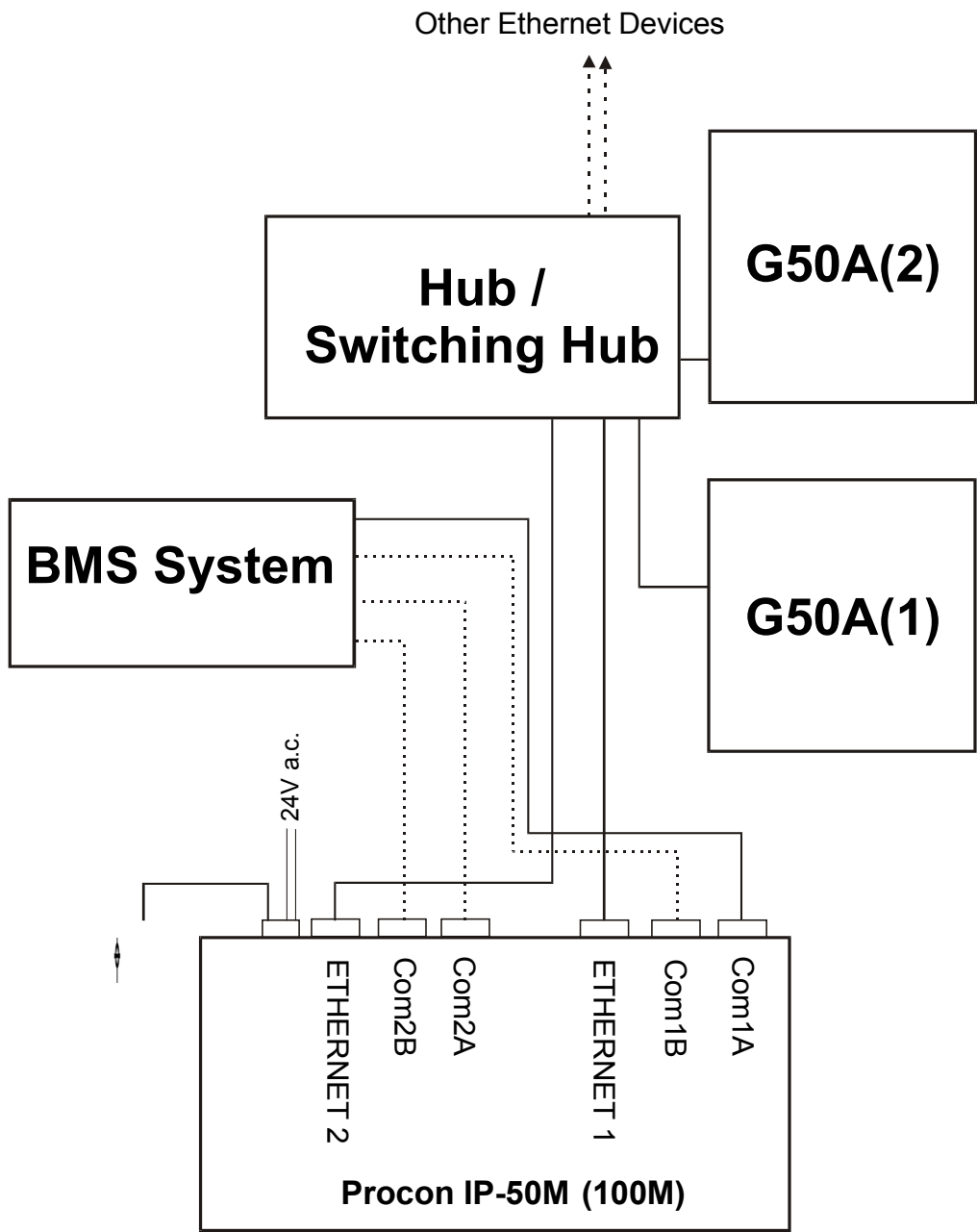


Fig 2 – Connection via Network

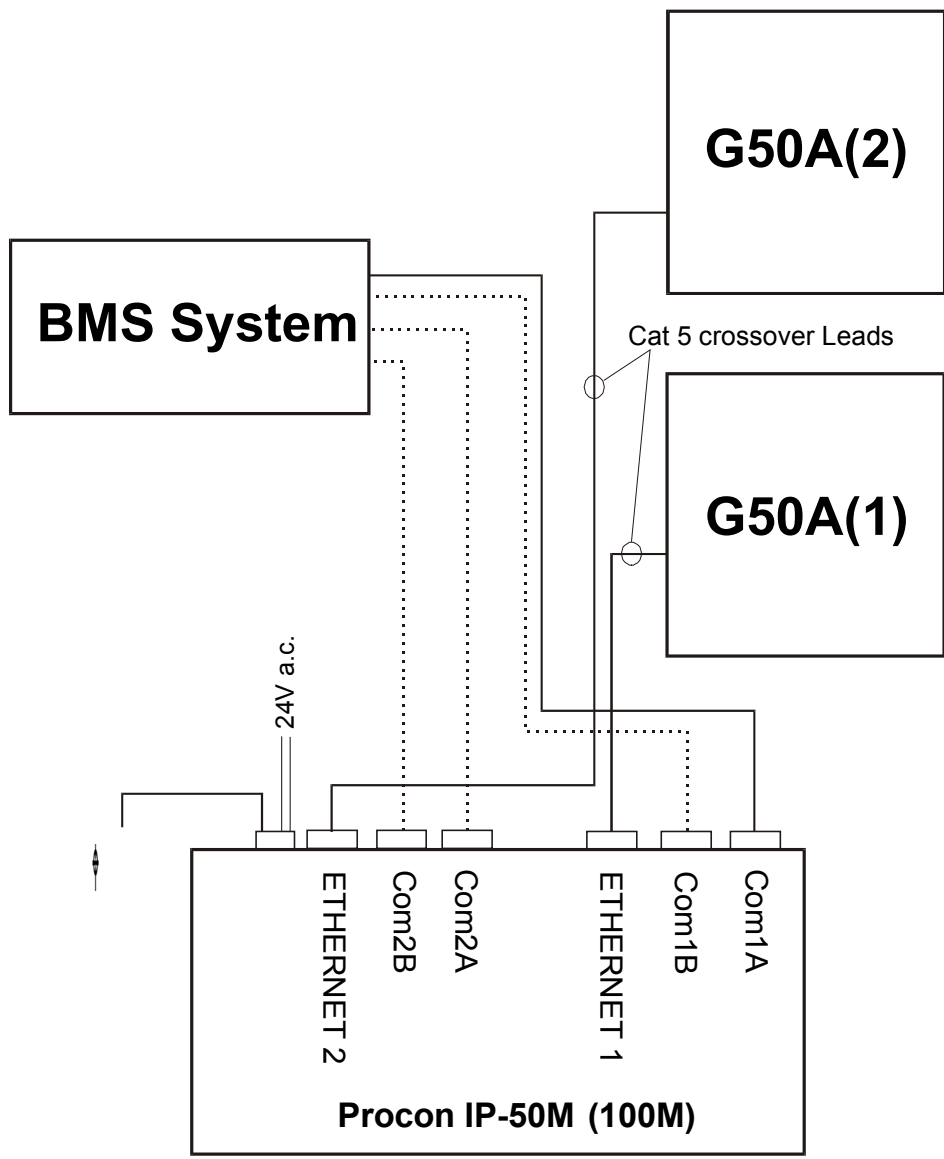


Fig 2a – Direct Connection

Wiring Connections: Refer to Fig 2 or 2a

All electrical work should be carried out by a competent person and wiring must be in accordance with the national electrical installation regulations

1) Supply.

The units are powered from 24v a.c. which should be supplied from a suitable SELV source to the supply connector where marked. Current consumption is less than 0.5A The internal fuse is T500mA

THIS EQUIPMENT MUST BE EARTHED

2) Ethernet link

NOTE:- The software version for the G50A must be 2.10 or higher.
To access OC and BC errors it should be 2.60 or higher.

The Ethernet link (1 and 2) should be connected via a CAT 5 cable to the G50A. Normally the connection would be via a network and the non-crossover cable is likely to be correct for the system.

If the unit is connected directly to the G50A alone then the crossover cable will be needed.

3) BMS (Modbus) Serial link

The BMS serial link is provided on Com1A and Com1B (Com2A/Com2B). The connection may use either RS232 or 2-wire RS485.(See Appendix A). The serial cables should be shielded with the shield connected to ground.

System Organisation

The Procon IP-xxM maps the data from the air conditioner units into Modbus registers. These are accessed by two Modbus parameters 'Slave No.' and 'Offset'.

The Procon IP-xxM behaves as 20 slaves (1 to 20) each with 30 registers (Offset = 0 to 29).

The first 16 slaves each represent 3 indoor units (addresses 1 to 48) with 10 registers and 2 coils being assigned to each unit. (see Appendix B). Slave 17 represents the last two indoor units 49 and 50 together with a special 'indoor unit' (51) which is used to hold configuration data as follows:-

The **Mode Set** register (offset 26) sets the number of scanned indoor units.
The **Return Air** register (offset 20) returns the software number.
The **Error** register (offset 21) returns the Software Version
The **Setpoint** register (offset 22) returns the Software Date

Slaves 18 and 19 may be used to access error information from other Mnet addressed devices (e.g. OC and BC units)

Note : Access to OC and BC errors requires that the G50A software be version 2.60 or higher.

Slave 20 carries the IP addressing data.

Addressing the Equipment

The IP addresses of both the G50A and the IP-xxM unit must be entered into the IP-xxM unit. This is achieved by writing the addresses into modbus slave 20 locations as described in appendix C. Each half of an IP-100M requires its own unique IP address. Where units are connected on a network no two units may have the same IP address.

Available Indoor unit Information

For each indoor unit it is possible to access: **Error Code**

For each control group it is possible to access: **Return Air Temperature**

- and to access and alter: **On/Off**
Setpoint
Mode
Fan Speed

If controllers have been grouped then all parameters except error codes will only relate to the first indoor unit of any group. All the units in the group will respond to the information – but it must be sent and accessed via the first unit in the group.

The IP-xxM identifies two internal error conditions:

6999 Indicates that communications with the G50A has been interrupted.

6998 indicates that the G50A does not recognize the Mnet or group address.

Mode values:

0 : Draft , **1** : Cool , **2** : Heat , **3** : Dry , **4** : Auto , **5** :(Not Used)

6 : Auto Cool - (Not applicable for setting)

7 : Auto Heat - (Not applicable for setting)

Fan Speed Values

0 : Low

1 : Low Medium (Not available on 2-speed units)

2 : High Medium (Not available on 2-speed units)

3 : High

Outdoor and BC Card (and other Mnet) Error Data.

It is possible to access error values from other Mnet equipment (e.g. OC and BC units) using slaves 18 and 19.

In these two slaves register offsets 0 to 14 accept a list of the Mnet (OC and BC etc.) addresses. These may be written using function 6.

The list must start at offset 0 and should be terminated with a zero if less than 15 registers are used.

The errors associated with the specified Mnet addresses will be returned in offsets 15 to 29. The error values may be read using function 3.

The error for the unit whose address is in register offset 0 will be returned in register offset 15.

The error for the unit whose address is in register offset 1 will be returned in register offset 16.

... etc. up to and including ...

The error for the unit whose address is in register offset 14 which will be returned in register offset 29.

Slaves 18 and 19 operate identically allowing up to 30 OC, BC or other Mnet devices to be monitored.

Invalid requests will return the 6998 error code.

The 6999 ethernet communications error is not shown in slaves 18 & 19.

Appendix A Wiring Detail

1) IP leads (Supplied)

A standard non-crossover and a crossover Cat 5 interconnect are supplied.
(2 of each with IP-100M units)

Note: if the unit is to be connected directly to the G50A ONLY then the crossover leads should be used

2) BMS serial link (To be supplied by BMS integrator)

Communication Standard:

Modbus RTU; 9600 Baud, 8 bit, No Parity, 1 Stop Bit

Pin designations

2	RS232 Tx
3	RS232 Rx
5	Common
7	RS485+
8	RS485-

Cable should be shielded with the shield connected to ground.

Appendix B Modbus Variables Table

Indoor unit Number	Slave	Register Base	Coil Base
1	1	0	0
2	1	10	2
3	1	20	4
4	2	0	0
5	2	10	2
6	2	20	4
7	3	0	0
8	3	10	2
9	3	20	4
10	4	0	0
11	4	10	2
12	4	20	4
13	5	0	0
14	5	10	2
15	5	20	4
16	6	0	0
17	6	10	2
18	6	20	4
19	7	0	0
20	7	10	2
21	7	20	4
22	8	0	0
23	8	10	2
24	8	20	4
25	9	0	0
26	9	10	2
27	9	20	4
28	10	0	0
29	10	10	2
30	10	20	4
31	11	0	0
32	11	10	2
33	11	20	4
34	12	0	0
35	12	10	2
36	12	20	4
37	13	0	0
38	13	10	2
39	13	20	4
40	14	0	0
41	14	10	2
42	14	20	4
43	15	0	0
44	15	10	2
45	15	20	4
46	16	0	0
47	16	10	2
48	16	20	4
49	17	0	0
50	17	10	2

Modbus Variables Table Cont.

Parameter	Offset	Modbus Function
Return Air temperature	Register Base	3
Error	Register Base + 1	3
Setpoint (Read)	Register Base + 2	3
Mode (Read)	Register Base + 3	3
Fan Speed (Read)	Register Base + 4	3
Setpoint (Write)	Register Base + 5	6
Mode (Write)	Register Base + 6	6
Fan Speed (Write)	Register Base + 7	6

Parameter	Offset	Modbus Function
On/Off (Read)	Coil Base	1
On/Off (Read)	Register Base + 8	3
On/Off (Write)	Coil Base + 1	5
On/Off (Write)	Register Base + 9	6

Note that ON and OFF may be controlled and read as either Coils or Registers.

When using registers the numbers will be either 0 (off) or 1 (on).

Coil Base and (Register Base + 8) will read the same values.

The write parameters of (CoilBase+1) and (Register Base +9) will individually reflect the last value written to each of them.

Slaves 18 & 19 Mnet Error Code Access

Parameter	Offset	Modbus Function
Mnet Address (Write)	0 to 14 (n)	6
Associated Mnet Error	15 to 29 (n+15)	3

Appendix C Configuration Data

Setting Function	Slave	Offset	
Number of Indoor units	17	26	6
Software Number	17	20	3
Software Version	17	21	3
Software Date	17	22	3
Procon IP Number HI (1)	20	20	6
Procon IP Number (2)	20	21	6
Procon IP Number (3)	20	22	6
Procon IP Number LO (4)	20	23	6
G50A IP Number HI (1)	20	24	6
G50A IP Number (2)	20	25	6
G50A IP Number (3)	20	26	6
G50A IP Number LO (4)	20	27	6

By convention the IP addresses of G50A units are 192 . 168 . 1 . x
And those of Procon IP-M units are 192 . 168 . 1 . y

- where x and y are numbers in the range 1 to 255.

Reading slave 20 offsets 28 and 29 will return the unit serial number
These registers are read only