Satchwell

MODEM INTERFACE UNIT

Specification No. 585-4-252

WIDE AREA NETWORK (WAN) OPERATION

The Modem Interface Unit (MIU) provides the necessary link between a modem and Satchwell Networking controllers on a remote site, when using Satchnet Pro Networking Software. An RS232 input is provided for connection to a modem on a Wide Area Network (WAN). The MIU is then able to be connected (via its RS422/485 link) to upto 31 Networking controllers.

The MIU will autodial the central computer in the event of one of the controllers on the remote site having an alarm. The MIU is capable of storing two phone numbers thus allowing it to dial the central computer on a second backup phone number in the event of getting no reply on the main number (two modems required at the central computer to use this facility). See DS 5.00A for a full list of modems.

The MIU can be password protected to stop unauthorised computers from interrogating remote sites (the password is set from the main computer).

REPEATER (LAN) MODE

It may alternatively be used as a repeater to allow a further 32 Networking controllers to be used, making a maximum of 63 controllers on a single RS422/485 Network.
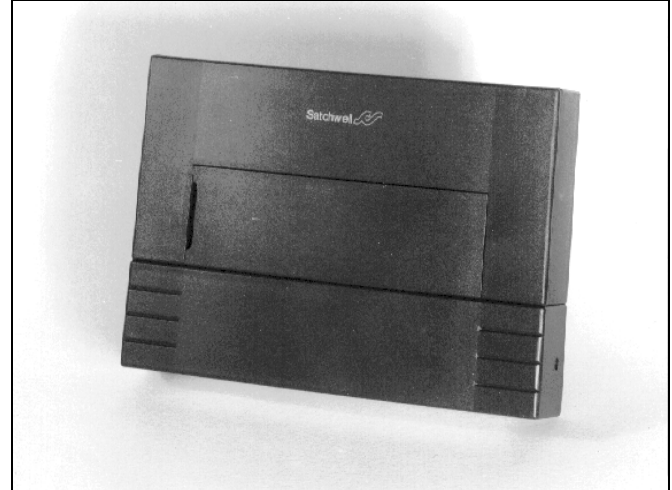
RS232 TO RS485 CONVERTER MODE

The unit provides Opto-isolation of the serial link on a Local Area Network (LAN), and can be used on sites where the earth potential varies from panel to panel giving Galvanic isolation of the earths from each other and protection of the controllers on the LAN.

The MIU can be used as an RS232 to RS485 converter for use with a computer.

See DS 5.00A for Networking system configurations.

FEATURES

- **For use with Satchnet Pro Networking Software - Version 6.3 or later**
- **RS232 and RS422/485 ports**
- **Autoanswer operation on modem sites**
- **Autodial in the event of an alarm on modem sites**
- **Password protection**
- **Stores up to two phone numbers**
- **The MIU retains telephone numbers and passwords in E^{2}PROM during a power failure**
- **Autodials in the event of a controller going off line**
- **Galvanic isolation of LAN earths**
- **Opto-isolation on the RS422/485 LAN connections**
- **Acts as a repeater to increase possible LAN wiring distances (1000m from each MIU)**
- **Optional battery backed up Real Time Clock (RTC) Board**

- **Allows a further 32 Networking controllers to be connected, making a maximum of 63 on a single LAN**
- **Industry standard connector used for modem connection**
- **LED Status display**
- **Simple to install**

EXTRA FUNCTIONS WITH OPTIONAL REAL TIME CLOCK BOARD (841-2-201)

- **Clock set from a computer running Satchnet Networking Software Version 6.3 or later**
- **Stores a minimum of 3000 logs**
- **Continues running the RTC during a power failure**
- **Supports the MIU RAM thus preserving any current MIU logs and alarms**

CE

An Invensys company

SPECIFICATION

Type:	**MIU 4252** – Modem Interface Unit Specification No. 585-4-252
Power Supply:	24Vac (+/– 15%), 47 to 63 Hz Supplied by a transformer conforming to EN 60742 - DS 25.00
Consumption:	1.5 VA
Fuse:	2A
Number and Type of Communications Ports:	1 – RS232 2 – RS422/485 (opto-isolated)
Maximum Cable Length:	RS232 – 15m RS422/485 – 1000m
RS232 Communication Speed:	1200, 2400, 4800 or 9600 BPS
RS422/485 Communication Speed:	1200, 2400, 4800 or 9600 BPS
Communications Protection:	RS422/485 (opto-isolated)
RAM:	32k bytes Stores approximately 3000 logs minimum (Real Time Clock option must be fitted)
EPROM:	64k bytes
Power Failure Reserve:	E^2PROM preserves configuration data such as password, telephone numbers, baud rate (if LK 5 is not used) etc.
Ambient Temperature Limits:	Operating: 0 to 50°C Storage & Transit: –10 to 70°C
Max. Ambient Humidity:	95% rh (non-condensing)

Optional Real time Clock Board can be fitted (Specification Number 841-2-201):

Power Failure Reserve:
The Lithium battery is not rechargeable. The Lithium battery continues to run the clock and supports the MIU RAM thus preserving current logs and alarms in the MIU for typically 350 days assuming the battery is fully charged. Battery life, if unused, is typically 10 Years. When fitting the Real Time Clock board the jumper link must be removed from the MIU RTC connector.

CONSTRUCTION

Case:	Moulded Polycarbonate plastic case. Fire resistant to UL94 V-0.
Protection Class:	IP 41 IP 00 if the RS232 connector is used. If the RS232 connector is used, the MIU must be mounted in a panel.
Mounting:	DIN rail or surface mounting only. (DIN rail to DIN 46277 Part 3 - EN 50022/BS 5584).
Terminals:	Accept one 1.5mm^2 wire. Plug in screw terminal blocks (low Voltage only).
RS232 Connector:	25 way D type connector.

5 LEDs to indicate the status of the MIU:

LED Marked	Description
RUN (Ready)	Constantly lit when the MIU is fully configured.
MODEM	Constantly lit when modem connected and on-line. Flashing once per second when the MIU is dialling out. Flashing five times per second when the MIU is initialising the modem.
DUMB	Constantly lit when the MIU is in its dumb repeater mode.
MASTER RX	Lit when the modem or master LAN is active.
LAN RX	Lit when the LAN is active.

ACCESSORIES

Hayes compatible autodial/autoanswer modem up to 9600 BPS - see DS 5.00A for a list of suitable modems. UK specification only, refer to your local Satchwell agent.

MODEM INTERFACE MODES

When used in this mode the MIU operates as an interface between an RS232 modem and the RS485 LAN on a remote site. The MIU can operate at Baud rates of up to 9600 BPS. The MIU can be set to interface to a Hayes or a non Hayes compatible modem.

The main operations the MIU carries out are as follows:

- Monitor the modem for incoming calls from the Satchnet computer and provide a transparent link to the controllers on the LAN.
- Monitor the LAN controllers for alarms as programmed from Satchnet and on detecting an alarm autodial the Satchnet computer to allow the controller to be interrogated. This will also occur if a controller goes off line for any reason. The MIU can store 2 phone numbers for the Satchnet computer.
- Real time Clock only - Log parameters that have been set to be logged in Satchnet. Stores a minimum of 3000 logs. The MIU can be set to dial the Satchnet computer if the log storage becomes full or will overwrite the oldest entry in the log store.

RS485 TO RS485 REPEATER MODES

When used as an addressable repeater the MIU is connected to any point in the RS485 LAN and is given an address as if it is a normal controller. The LAN Baud rate can be set from Satchnet (LK5 must be removed). It is possible to set the MIU as a dumb repeater but then the LAN Baud rate must be set with a jumper on LK5.

The main operations the MIU carries out are as follows:

- The MIU monitors data communications on the LAN. On receiving data the signal is re transmitted at full power thus enabling the LAN length to be extended by 1000 metres for every MIU.
- When areas of a site have different ground potentials due to poor Earthing conditions an earth loop (current loop) is set up, which flows along the earth and back through the transmission lines (LAN). Under certain conditions this current can become excessive and damage the transceivers in the controllers. To prevent this you need to avoid having a contiguous transmission line. This is achieved by breaking the transmission lines with MIU's (usually between panels) and because the MIU has Galvanic isolation between its RS485 ports the earth loops are reduced to an acceptable level.

RS232 TO RS485 CONVERTER MODE

When used in this mode the MIU acts as an RS232 to RS485 converter connecting a computer to the LAN. The MIU operation is completely transparent to all communications to and from the computer and controllers.

WIRING PRECAUTIONS

The 24Vac supply transformer must conform to EN 60742 - see DS 25.00.

The power supply should have a verified good earth. The power supply 0V connection (GND) to the MIU must remain connected even if the 24V supply is turned off. RS232 and RS422/485 wiring must be screened with the screen only earthed at the MIU terminals provided. The RS232 and RS422/485 wiring should be routed away from 24V and mains Voltage wiring (min 75mm).

The MIU must be located as far as possible from relays, contactors and their associated wiring (min 75mm).

The RS422/485 cable(s) should be twisted pair screened 24 AWG, 25 SWG (0.21mm^2) or larger conductor, solid or stranded copper wire. Maximum dc core resistance 10 ohms per 100 metres, maximum capacitance between wires 60 pico Farads per metre.

Supply Looping – Do not loop the **SUPPLY and GND** together.

INSTALLATION

LOCATION

Select a position which is reasonably clean and free from damp and condensation.

If the MIU is to be mounted in an enclosure ensure that the heat generated can be dissipated without raising the ambient temperature of the space above the maximum limits allowed.

Mount the MIU on the panel back plate, DIN rail or wall.

REAL TIME CLOCK INSTALLATION

CAUTION
A wrist strap must be worn when fitting the RTC board.

1. Remove power from the MIU.
2. Remove the MIU terminal cover by undoing the screws and then remove the MIU cover.
3. Remove the MIU PCB.
4. Find connector PL5 in the top right of the MIU PCB and remove the jumper.
5. Fit the battery to the RTC board and plug the RTC board in to the MIU PCB making sure the locating pin fits in the locating hole in the MIU PCB.
6. Use the cable tie to fix the two PCB's together by passing the cable tie through the two holes in the MIU PCB and fastening the tie directly above the battery. Note the tie must be fastened above the battery so that it does not foul the MIU cover.
7. Refit the MIU PCB.
8. Refit the MIU covers.

WARNING -
DO NOT SWITCH ON THE POWER UNTIL THE COMMISSIONING PROCEDURES HAVE BEEN CARRIED OUT.

BIT SWITCH QUICK REFERENCE TABLE

This table is to be used a s a quick reference only, for detailed information on each mode see the appropriate section in COMMISSIONING.

OPERATING MODE	BIT SWITCH NUMBER							
	1	2	3	4	5	6	7	8
Modem Interface (Hayes)	0	–	–	–	–	0	0	1
Modem Interface (Not Hayes)	1	–	–	–	–	0	0	1
Dumb Repeater RS485 to RS485	–	–	–	–	–	–	1	0
Addressable Repeater RS485 to RS485	A	A	A	A	A	A	0	0
RS232 to RS485 Converter	–	–	–	–	–	–	1	1

KEY

– = Don't Care what setting is used
A = Bit Switch used to set Address
1 = ON/OPEN
0 = OFF

COMMISSIONING

MIU SWITCH OPTIONS WHEN IN MODEM MODE

SW1 SWITCH (Increment No.)	POSITION	
	On (open)	Off
1	No Hayes Modem	Hayes Modem
2	–	–
3	–	–
4	–	–
5	–	–
6	Reset	No Reset
7	–	Set to OFF
8	Set to ON	–

MIU COMMISSIONING (MODEM INTERFACE MODE)

1. Disconnect the power supply.
2. Remove gland plate and using a 25 way ribbon cable connect the MIU to a modem.
3. Select mode of operation from bit switches seven and eight.
   Bit switch 7 OFF.
   Bit switch 8 ON (modem operation).
4. Select modem type using bit switch 1.
   ON - Disable modem initialisation.
   OFF - Enable modem initialisation, Hayes command set initialisation string sent to the modem is "ATV0E1M0S0=1Q0".
   If ON is selected the modem must be manually configured before connection to the MIU.
5. Bit switches 2 to 5 can be in any position and are ignored.
6. Select the communication speed for both the modem (PC LAN) and LAN by using the jumpers (LK 6 and LK 5 respectively, see Fig.1). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer

running Satchnet Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed.

7. Switch bit switch 6 to the ON position. This will ensure that all variables in memory are reset to default values. Switch on the power.
8. The MIU checks the bit switch settings and if the modem is to be initialised the MODEM LED on the MIU will flash at five times per second whilst the modem is being initialised. Once initialisation is complete the MODEM LED will stay ON and the RUN LED will be constantly ON.
9. If the start up sequence does not follow the description in instruction 8 then turn the power off and check that the MIU and controllers have been correctly wired, that there are no short circuits in the communication wiring and that the 25 way connection lead is correctly connected. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
10. Set bit switch 6 to OFF so that if there is a power failure the MIU will not be reset.
11. The MIU is now ready to accept data via the modem. By default the address of the MIU in modem mode will be 0, this cannot be changed.
12. At this stage the autodial telephone numbers, site mnemonic and new poll data may be programmed into the MIU memory. This is achieved by calling up the MIU using the auto answer facility from the Satchnet PC and selecting the MIU.
13. The MIU is now fully operational.

MIU/MODEM

If bad communications are experienced it may be necessary to utilise 'low loss' telephone lines as supplied by the telephone company on certain applications.

MIU SWITCH OPTIONS WHEN IN REPEATER MODE

SWITCH (Increment No.)	POSITION		
	On (open)	Off	
1	1	0	
2	2	0	
3	4	0	Address Setting
4	8	0	Only used if bit
5	16	0	switch 7 is OFF
6	32	0	
7	Dumb Repeater	Addressable Repeater	
8	–	Set to OFF	

MIU COMMISSIONING (REPEATER MODE)

1. Disconnect power supply.
2. Select mode of operation using bit switch eight.
   i. OFF for repeater.
3. Select the communication speed for both the PC LAN and LAN by using the jumpers (LK 6 and LK 5 respectively, see Fig.1). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer running Satchnet Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed.
4. Set bit switch 7 to ON if the MIU is to operate as a transparent (Dumb) repeater.
   Set bit switch 7 to OFF if the MIU is to act as an addressable repeater.
5. If bit switch 7 is set to ON then bit switches 1 to 6 are ignored and can be left in any position.
   If bit switch 7 is set to OFF then bit switches 1 to 6 are used to set the MIU address (see table).
6. Switch on the power.
7. The RUN, MODEM and DUMB LEDs should light simultaneously. The MODEM LED will then go OFF. If bit switch 7 is set to ON then the DUMB LED will also stay ON.
8. If the start up sequence does not follow the description in instruction 7 then turn the power off and check that the MIU and controllers have been correctly wired and that there are no short circuits in the communication wiring. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
9. The MIU is now fully operational.

MIU COMMISSIONING (RS232 TO RS485 CONVERTER MODE)

1. Disconnect power supply.

2. Remove the gland plate and using a 25 way null modem cable connect the MIU to the computer. Note the computer connector may be a 9 way D type connector, either use a 9 to 25 way adapter or a 9 to 25 way ribbon cable.

3. Select the mode of operation from bit switches 7 and 8.
   Bit switch 7 ON (transparent operation).
   Bit switch 8 ON (RS232 operation).

4. Select the communication speed for both the PC and LAN by using the jumpers (LK 6 and LK 5 respectively, see Fig.1). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer running Satchnet Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed.

5. The RUN, MODEM and DUMB LED's should light simultaneously. The MODEM LED will then go OFF.

6. If the start up sequence does not follow the description in instruction 5 then turn the power off and check that the MIU and controllers have been correctly wired and that there are no short circuits in the communication wiring. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
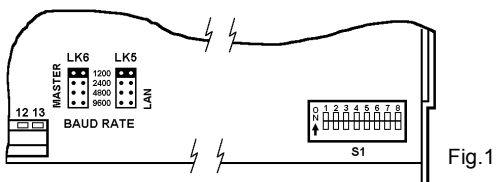
7. The MIU is now fully operational.

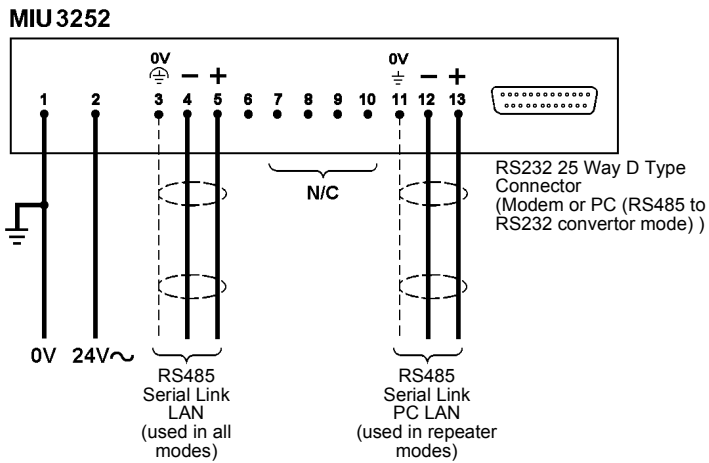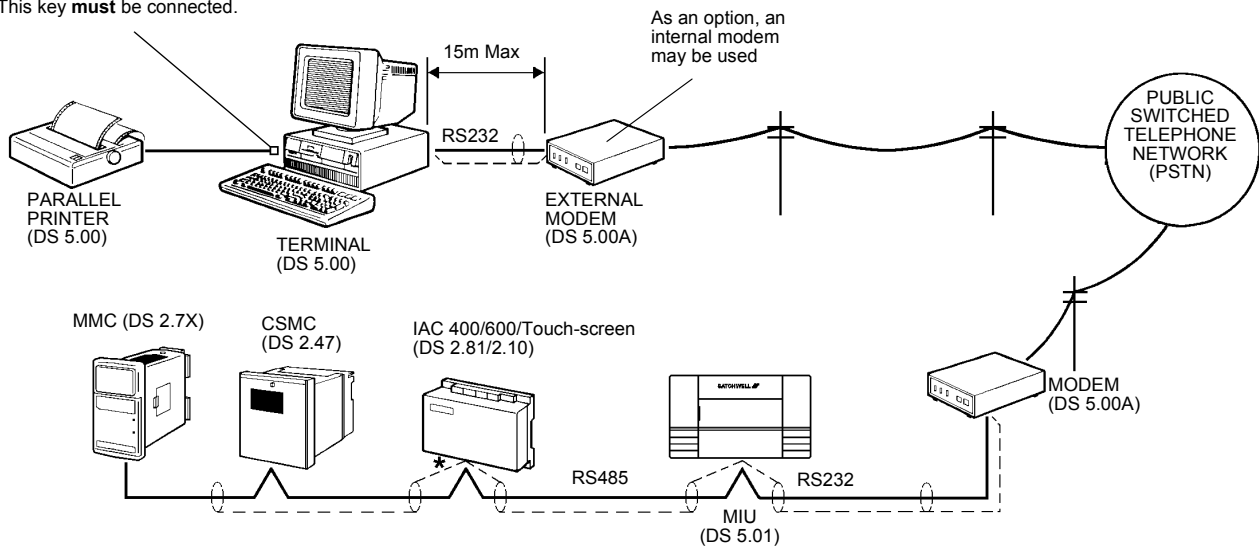

Fig.1

CONNECTION DIAGRAMS

BASIC DIAGRAM

MIU 3252

RS232 25 Way D Type Connector
(Modem or PC (RS485 to RS232 convertor mode))

0V 24V~

RS485 Serial Link LAN (used in all modes)

RS485 Serial Link PC LAN (used in repeater modes)

Fig.2

MODEM TO LAN CONNECTION

Software protection key (dongle) plugs into parallel printer port. This key **must** be connected.

As an option, an internal modem may be used

15m Max

RS232

PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

PARALLEL PRINTER (DS 5.00)

TERMINAL (DS 5.00)

EXTERNAL MODEM (DS 5.00A)

MMC (DS 2.7X)

CSMC (DS 2.47)

IAC 400/600/Touch-screen (DS 2.81/2.10)

MODEM (DS 5.00A)

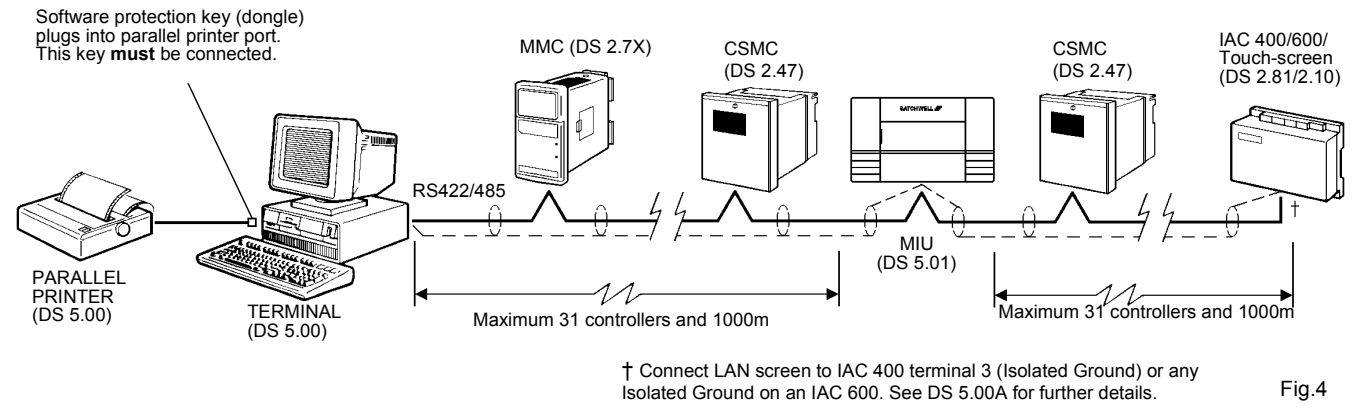RS485   RS232

MIU (DS 5.01)

* Connect LAN screen to IAC 400 terminal 3 (Isolated Ground) or any Isolated Ground on an IAC 600. See DS 5.00A for further details.

Fig.3

CONNECTION DIAGRAMS(Continued)

LAN REPEATER/ISOLATOR

Software protection key (dongle) plugs into parallel printer port. This key **must** be connected.

MMC (DS 2.7X)   CSMC (DS 2.47)   CSMC (DS 2.47)   IAC 400/600/ Touch-screen (DS 2.81/2.10)

RS422/485

PARALLEL PRINTER (DS 5.00)

TERMINAL (DS 5.00)

MIU (DS 5.01)

Maximum 31 controllers and 1000m   Maximum 31 controllers and 1000m

† Connect LAN screen to IAC 400 terminal 3 (Isolated Ground) or any Isolated Ground on an IAC 600. See DS 5.00A for further details.
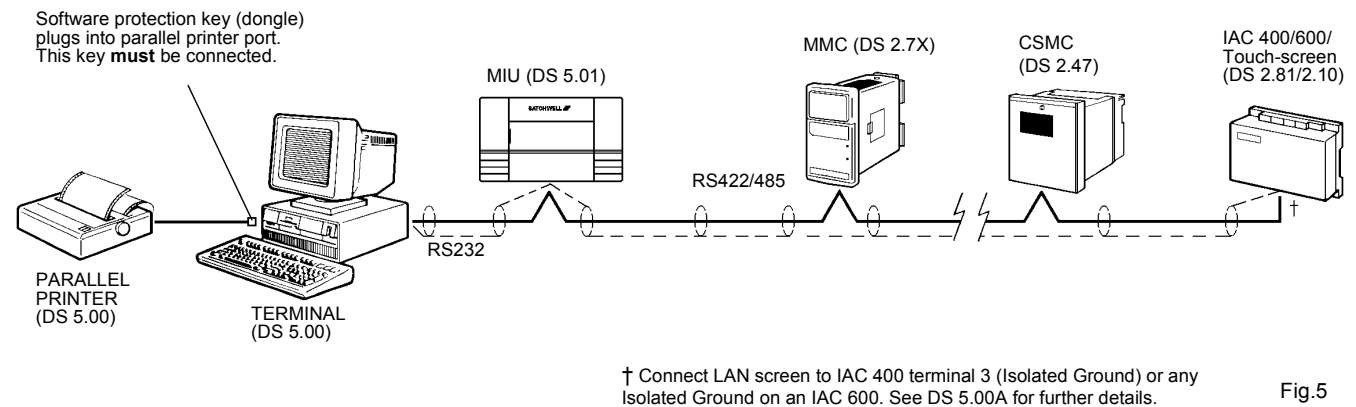
Fig.4

RS232 TO RS485 CONVERTER

Software protection key (dongle) plugs into parallel printer port. This key **must** be connected.

MIU (DS 5.01)   MMC (DS 2.7X)   CSMC (DS 2.47)   IAC 400/600/ Touch-screen (DS 2.81/2.10)

RS422/485

PARALLEL PRINTER (DS 5.00)

TERMINAL (DS 5.00)

RS232

† Connect LAN screen to IAC 400 terminal 3 (Isolated Ground) or any Isolated Ground on an IAC 600. See DS 5.00A for further details.

Fig.5

MMC, CSMC LAN CONNECTIONS AND SCREENING

LAN   LAN
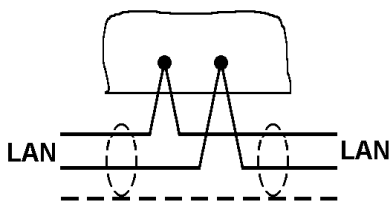
Fig.6

IAC, TOUCH-SCREEN LAN CONNECTIONS AND SCREENING

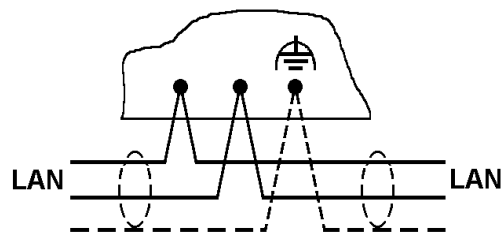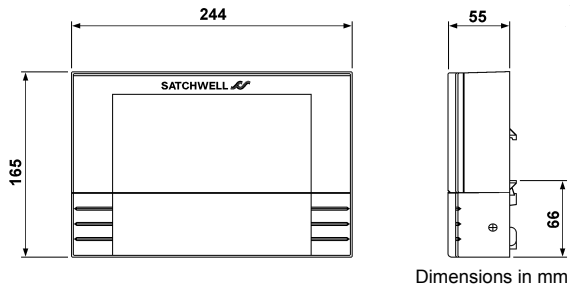LAN   LAN

Fig.7

DIMENSION DRAWINGS

Dimensions in mm

Satchwell 〰〰

Satchwell Control Systems Limited
Farnham Road
Slough
Berkshire SL1 4UH
United Kingdom

Telephone   +44 (0)1753 550550
Facsimile   +44 (0)1753 824078
www.satchwell.com

An Invensys company

WARNINGS -

THE REAL TIME CLOCK CONTAINS A LITHIUM CHLORIDE BATTERY WHICH IS COMPLETELY SAFE WHILST IN NORMAL OPERATION. BATTERIES MUST BE DISPOSED OF IN AN AUTHORISED LANDFILL SITE.

Cautions

- **This is a low Voltage (24Vac) device and should only be used with the appropriate Satchwell controllers.**
- **24Vac devices must be supplied by a transformer that conforms to EN 60742 - see DS 25.00.**
- **Observe wiring precautions – see Page 2.**
- **Observe installation instructions – see Page 2, Page 3 and Page 4.**
- **Do not switch on power supply until commissioning checks have been completed – see Page 3 and Page 4.**
- **Observe maximum ambient temperature.**
- **Interference with those parts under sealed covers renders the guarantee void.**
- **Design and performance of Satchwell equipment are subject to continual improvement and therefore liable to alteration without notice**
- **Information is given for guidance only and Satchwell do not accept responsibility for the selection or installation of its products unless information has been given by the Company in writing relating to a specific application.**
- **A periodic system and tuning check of the control system is recommended. Please contact your local Satchwell service office for details.**