Satchwell ✺

MN MI

WIRING AND COMMISSIONING INFORMATION FOR

I/A SERIES® MICRONET INTERFACE

APPLICATION

Order Type:
MNN-MI-100   MicroNet NCP Interface

The I/A Series MicroNet Interface (MI) provides network-level supervision functions for a network of MicroNet controllers and displays. An RS232 port on the MI furnishes a single connection to a PC running the MicroNet Tech Tool, the MicroSat Tool or MicroNet View software or a Wide Area Network (WAN) for remote access. The MN MI features password protection. It can supervise up to 61 devices on a LonWorks network or 20 x 95 devices on a NCP network and 95 devices on an ARCNET network. An MI features a built-in real-time clock with battery-backup that can be used for network synchronization.

The MI connects a PC running the MicroNet View or MicroNet Tech Tool software or MicroSat Tool to a communications network that is LonWorks® FTT-10 Free Topology, NCP or ARCNET. When connected to a modem, the MI can allow modem access from MicroNet View.

SPECIFICATION

Order Type	Description	Communications
MNN-MI-100	MicroNet NCP Interface	NCP [a] [b]

 [a]   ARCNET communications protocol available for this model with optional plug-in card, MNA-C.
 [b]   LonWorks communications protocol available for this model with optional plug-in card, MNL-C-ENM.

C E ®

INSTALLATION

INSPECTION

Inspect carton for damage. If damaged, notify carrier immediately. Inspect MI for damage. Return damaged products.

REQUIREMENTS

(These items not provided)

- Installer must be an experienced technician
- Job wiring diagrams
- Tools:
  - Drill and bits
  - Digital Volt-Ω meter (DVM)
  - Static protection wrist strap
- EN 60742 power transformer supplying a nominal 24Vac (20.4 to 30Vac) with a minimum rating of 10VA, 50/60Hz per MI.
- Three No. 10 self-starting screws or 35mm DIN rail for mounting
- Terminators (If MicroNet LONWORKS or ARCNET network is used):
  - One LON-TERM1 terminator required for free topologies
  - Two LON-TERM2 terminators required for bus topologies
  - Two 120Ω terminators required for ARCNET bus topology
- Null modem cable for RS232 connection to PC, Satchwell part number CBL-002.
- Cable for RS232 connection to modem, Satchwell part number CBL-003.

PRECAUTIONS

Warning: Electrical shock hazard!
Disconnect power before installing or removing the cover.

GENERAL

- Follow Static precautions when installing this equipment.
- Use copper conductors that are suitable for 75°C (167°F).
- Make all connections according to electrical wiring diagram, national and local electrical codes.

STATIC PRECAUTIONS

Static charges damage electronic components. The microprocessor and associated circuitry are extremely sensitive to static discharge. Use the following precautions when installing, servicing, or operating the system:

- Work in a static-free area.
- Discharge static electricity by touching a known, securely grounded object.
- Use a wrist strap connected to earth ground when handling the MI's printed circuit board.

EUROPEAN COMMUNITY DIRECTIVES

This equipment meets all requirements of European Community Directives for Low Voltage (72/23/EEC), General Safety (92/59/EEC), and Electromagnetic Compatibility (89/336/EEC).

FEDERAL COMMUNICATIONS COMMISSION (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CANADIAN DEPARTMENT OF COMMUNICATIONS (DOC)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

GENERAL WIRING PRECAUTION

When using RS232 communication connections, remove and discard conduit plate.

MICRONET NETWORK WIRING PRECAUTIONS

- Do not mix network wiring with other types of wiring.
- Communication wire pairs must be dedicated to MicroNet network communications. They cannot be part of an active, bundled telephone trunk.
- Shielded cable is not required for LonWorks wiring, but is required for NCP and ARCNET wiring.
- Terminals accept 1.5mm^2 (No.16 to 24 AWG) wire.
- If the cable is installed in areas of high RFI/EMI, the cable must be in conduit.

RS232 COMMUNICATION WIRING PRECAUTIONS

- Use Null modem cable for RS232 connection to PC, Satchwell part number CBL-002.
- 9 pin to 25 pin cable for RS232 connection to modem.
- Do not exceed 15m (50 feet) total length.

POWER SUPPLY WIRING PRECAUTIONS

- This product contains a non-isolated half-wave rectifier power supply and must not be powered by transformers used to power other devices containing non-isolated full-wave rectifier power supplies. Refer to *DS 10.250, Guidelines for Powering Multiple Full-Wave and Half-Wave Rectifier Devices from a Common Transformer* for detailed information.
- Do not mix power wiring with network, AO, UI or DI wiring.
- Use EN 60742 power transformer supplying a nominal 24Vac (20.4 to 30Vac) with a minimum rating of 10VA at 50/60Hz. The supply to transformer must have a breaker or disconnect.
- The transformer frame must be grounded.

LOCATION

Suitable for indoor use only (IP40). When selecting a mounting location make certain the following conditions are met:

- Do not install where excessive moisture, corrosive fumes, vibration, or explosive vapours are present.
- Do not install near large contactors, electrical machinery or welding equipment.
- Allow 150mm (6 inch) clearance from contactors, switches and associated cabling.
- Locate where ambient temperatures do not exceed 50°C (120°F) or fall below 0°C (32°F) and relative humidity does not exceed 95% or fall below 0%, non-condensing.

PANEL OR DIN RAIL MOUNTING

1. Select mounting location. Allow minimum 50mm (2 inch) clearance around MI.

2. Do the following to mount MI on a panel:

    a. Loosen two screws securing terminal cover and remove cover.

    b. Press wall mounting bracket clip onto back of controller.

    c. Lift wall mounting bracket clip.

    d. Using a self-starting screw, install top screw.

    e. Level controller.

    f. Using two self-starting screws, install bottom screws.

    g. Re-install terminal cover. (May be left off until wiring is completed.)

3. Do the following to mount MI on a DIN rail:

    a. While pulling down on DIN rail locking bracket, snap MI base on a 35mm DIN mounting rail.

    b. Release DIN rail locking bracket.

MOUNTING METHODS

Wall Mounting   **DIN Rail Mounting**
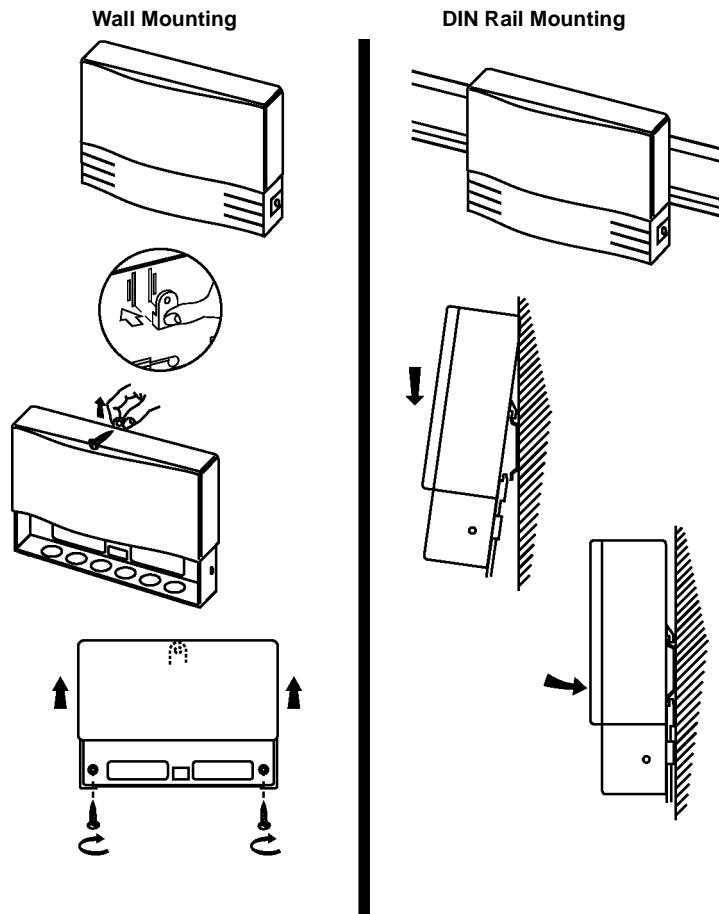
WIRING

Note:
When using RS232 communications connection, remove and discard conduit plate before making other connections.

The following electrical connections can be made to MI:

- MicroNet LonWorks connection to other LonWorks equipped controllers
- MicroNet NCP connection to other NCP type MicroNet controllers.
- MicroNet ARCNET connection (MNN-MI-100 with MNA-C fitted) to other ARCNET equipped controllers.
- 24Vac nominal EN 60742 power source and earth ground power connection
- RS232 communication connection to a personal computer (PC)
- RS232 communication connection to a modem.

COMMUNICATIONS WIRING

Review Precautions section before connecting or installing any communications wiring. Communications wiring includes a connection between the MI and a MicroNet controller network.

Depending on the specific interface model, one of three network types can be used:

- FTT LonWorks Networks (MNN-MI-100 with MNL-C-ENM fitted)
- NCP Networks (MNN-MI-100)
- ARCNET Networks (MNN-MI-100 with MNA-C fitted).

MICRONET NETWORK WIRING

Review Precautions section. For complete details on designing and wiring MicroNet networks (including approved cable models) refer to the *I/A Series MicroNet System Engineering Guide*.
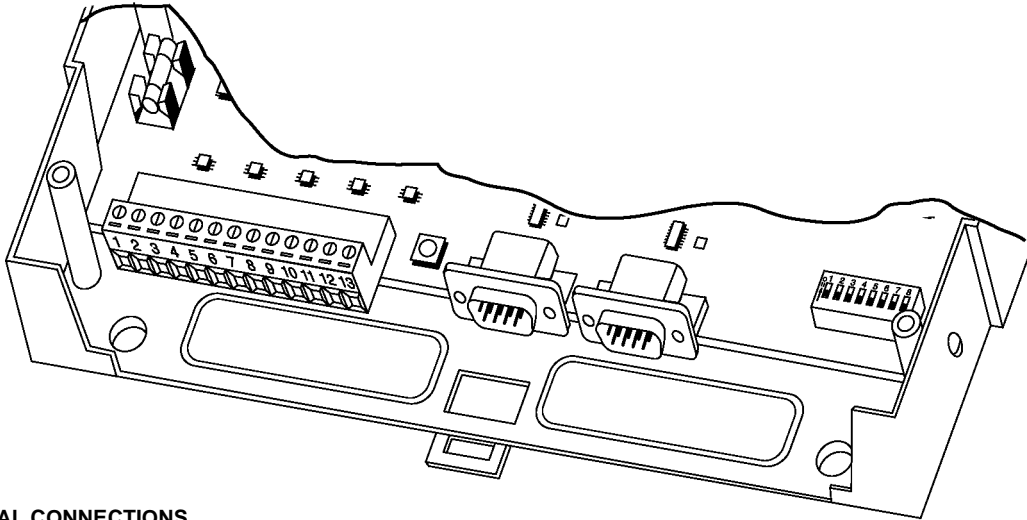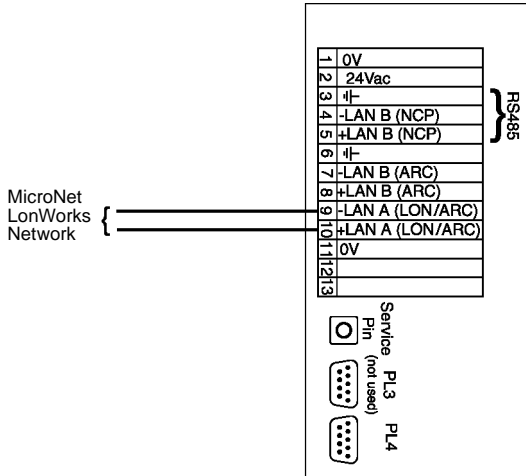

MN MI TERMINAL CONNECTIONS
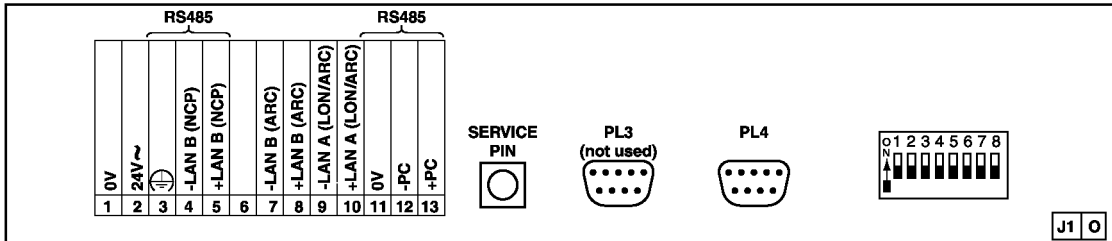
LONWORKS NETWORK ATTACHMENT (MNN-62-100 WITH MNL-C-ENM FITTED)
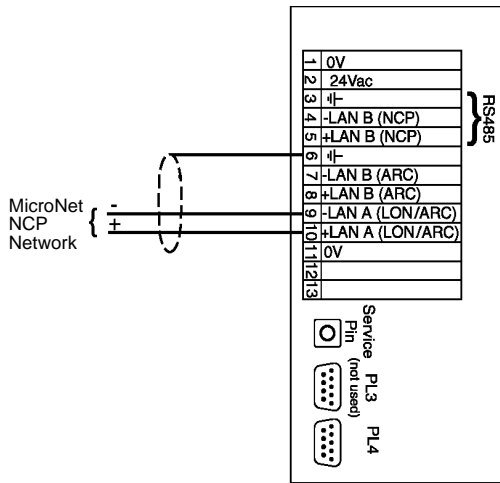
Note:
Unshielded cable is recommended.

1. Review Precautions section.

2. Connect two twisted wires of the FTT network cable to terminals 9 and 10 of MI. Polarity makes no difference.

3. Depending on topology chosen for the FTT segment, attach other controllers freely using multiple wiring tees and stars (Free topology), or daisy-chain connect controllers only in a device-to-device fashion (Bus Topology).

4. If shielded cable is used, connect one end only to earth ground by a 470KΩ 1/4 watt resistor. Keep the shield wire continuous throughout the wiring segment.
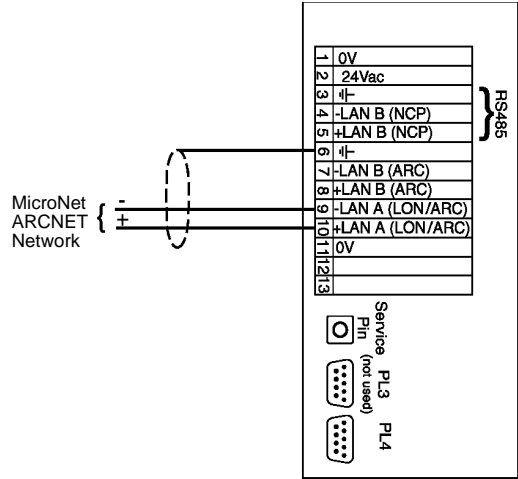
5. Attach terminators as required.

NCP NETWORK ATTACHMENT (MNN-MI)

Note:
Recommended cable is Belden 8762 or equivalent twisted pair overall screened cable.

1. Review Precautions section.

2. Connect positive wire to terminal 5 and negative wire to terminal 4.

3. Connect NCP wiring shield to terminal 3. Keep shield continuous between all NCP devices on LAN.

4. Using daisy-chain method, connect MI with other NCP devices in a device-to-device fashion. Do not use wiring tees or stubs.

ARCNET NETWORK ATTACHMENT (MNA-MI)

Note:
Recommended cable is Belden 8762 or equivalent twisted pair overall screened cable.

1. Review Precautions section.

2. Connect positive wire to terminal 9 and negative wire to terminal 10.

3. Connect ARCNET wiring shield to terminal 6. Keep shield continuous between ARCNET devices and LAN.

4. Using daisy-chain method, connect MI with other MNA equipped devices on network. Do not use wiring tees or stubs.

5. Fit bias links to LK1 and LK2 on ARCNET daughter board. (In controller at approximate mid-network position only).

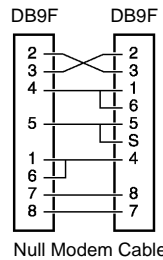6. Attach 120Ω terminators to each end of LAN.

RS232 COMMUNICATION WIRING TO A PERSONAL COMPUTER (PC)
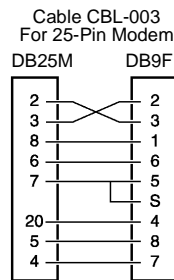
1. Review Precautions section.

Note:
Connector PL3 on MI is not used.

2. Remove and discard conduit plate.

3. Connect 9-pin female RS232 (Siebe part number CBL-002) connector to PL4 on MI.

4. Connect other end of cable to computer. (Do not exceed 15m (50 feet) in length.)
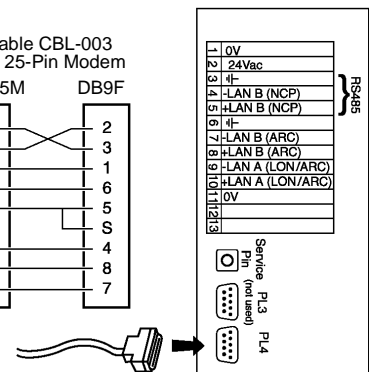

RS232 COMMUNICATION WIRING TO A MODEM

1. Review Precautions section.

Note:
Connector PL3 on MI is not used.

2. Remove and discard conduit plate.

3. Connect 9-pin female RS232 connector to PL4 on MI.

4. Connect other end of cable to modem. (Do not exceed 15m (50 feet) in length.)

POWER SUPPLY WIRING

Note:

- This product contains a non-isolated half-wave rectifier power supply and must not be powered by transformers used to power other devices containing non-isolated full-wave rectifier power supplies. Refer to *DS 10.250, Guidelines for Powering Multiple Full-Wave and Half-Wave Rectifier Devices from a Common Transformer* for detailed information.

- Twisted or untwisted cable can be used for power wiring.

POWER WIRING

1. Review Precautions section.
2. Ensure that the controller 0V terminal is connected to Earth **before** connecting the power wiring to the controller.
3. Connect power ground wiring to terminal 1 (0V 24G).
4. Connect power 24Vac wiring to terminal 2 (24H).
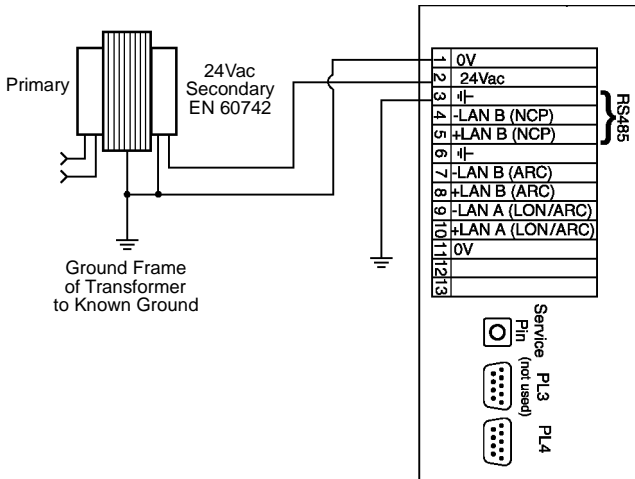
BATTERY SETUP

The unit is shipped with the battery disabled to preserve battery life. To enable battery, do the following:

1. Remove cover.
2. Remove battery.
3. Remove protective strip from battery.
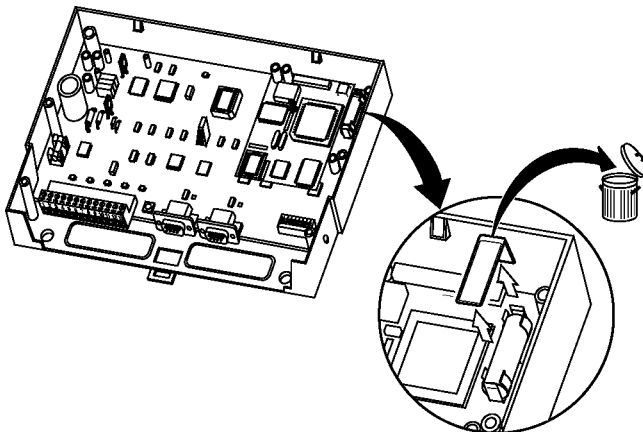
1. Re-install battery. (Make certain polarity is correct.)
2. Make certain battery is fully seated in battery holder.
3. Re-install cover.

CHECKOUT

MECHANICAL HARDWARE CHECKOUT

1. Verify network wiring between MI and other devices is installed according to job wiring diagram and national and local electrical codes.
2. Verify 24Vac power is provided from an EN 60742 power transformer and wiring is installed according to job wiring diagrams and with national and local electrical codes.
3. Verify RS232 communication is wired according to job wiring diagram and with national and local electrical codes.

COLD START PROCEDURE

Caution:

The cold start procedure clears *all* configuration data from the non-volatile EEPROM of the MI.

A cold start is normally performed only once when MI is first installed. The cold start is performed using DIP switch S1. Status LED location is shown on page 7.

To perform a cold start:

1. Energize MI and verify RUN LED flashes at about once per second.
2. Place DIP switch 1 in ON position.
3. Place DIP switch 8 in ON position and then return to OFF position. Verify the following:
   - RUN, MODEM and WINK LEDs light steady for about one second, then:
   - RUN LED flashes at about once per second.
4. Place DIP switch 1 in OFF position.

Note:
Cold start procedure does *not* clear assigned node address (LON only).

DIP SWITCH S1 LOCATION
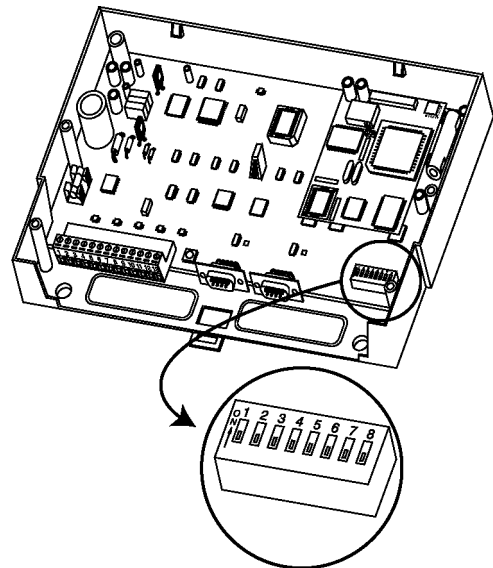
SETTING THE ADDRESS

LONWORKS EQUIPPED MI

The LonWorks network address is fixed in firmware as node 62, Subnet 1. The service pin switch is not used. Address other network devices using an online function of MicroNet Tech Tool. See *I/A Series MicroNet Tech Tool Engineering Guide* for other LON addressing details.

ARCNET AND NCP EQUIPPED MI

The ARCNET and NCP network address is fixed as Subnet 0 node 1. Bit 8 should then be toggled ON then OFF.

Note:
In the initial release, when connecting to MicroSat, set Bits 1 to 4 ON, then toggle Bit 8 ON then OFF. The address will then be set to Subnet 0, node 1.

GENERAL OPERATION CHECKOUT

There are five LEDs on the MI. Three of the LEDs (Status LEDs) are under processor control. These LEDs are:

- RUN - Green LED
- MODEM - Yellow LED
- WINK - Red LED

Two of the LEDs are hard wired to the receive data lines. These two LEDs indicate activity on the communication ports and are:

- MASTER RX - Yellow LED
- LAN RX - Yellow LED

1. Turn ON power to MI.
2. Observe LEDs during normal operation RUN LED flashes at about once per second.
3. Compare other LED indications to Status LED Indications.

STATUS LED INDICATIONS

Indicator	Context	Action	Status	Corrective Action
RUN (green), MODEM (yellow), WINK (red)	Power-up	All three Status LEDs steady on for about 1.5 seconds	Indicates defaults have been loaded.	None required.
	Anytime	All three Status LEDs blink rapidly	Unit has a problem.	Reload defaults.
RUN LED – Green	Anytime	Blinks at 50% on, 50% off rate "heartbeat"	MI is operating properly, and has good communication.	None required.
		Blinks at 25% on, 75% off rate.	Indicates no or bad communications.	Check communications wiring.
		Off	Unit has a problem.	Make certain MI power is on. If power is on and LED remains off, replace MI.
MODEM LED – Yellow	Anytime	Off	No modems detected.	None required.
		Steady on	Modem is on-line	
		Blinks every 2 seconds	Modem detected and currently idle.	
		Blinks rapidly	Indicates initializing or searching for modem.	
WINK LED – Red	Anytime	Off	Nothing to report.	None required.
		Blinks rapidly for 10 seconds.	Indicates LonTalk "wink" function.	

STATUS LED LOCATION
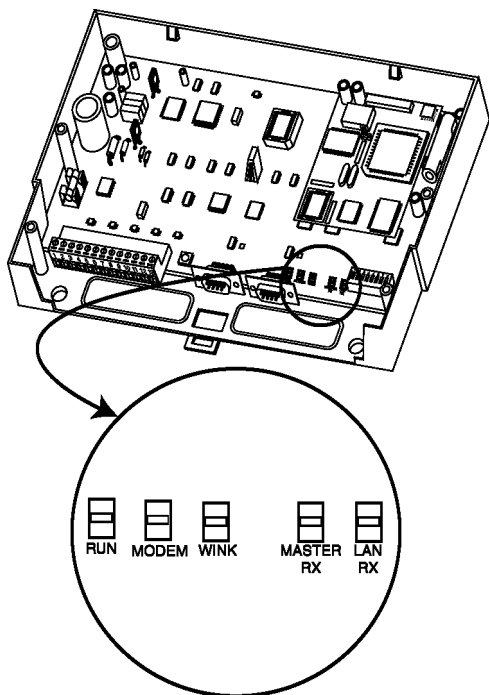
COMMUNICATIONS CHECKOUT

LONWORKS EQUIPPED MNN-MI-100

1. Ensure MI is powered and connected to LonWorks network.
2. If cover is attached, remove cover.
3. Observe yellow "Heartbeat" LED on LonTalk Daughter Board and do the following:
   a. If yellow "Heartbeat" LED is blinking, go to Step 4.
   b. If yellow "Heartbeat" LED is off, check power.

Note:

The LonWorks MI addresses itself when power is turned on. Service LED should be off if MI has addressed itself correctly.

4. Verify red service LED is off.

Note:

See *I/A Series MicroNet Tech Tool Engineering Guide* for details on addressing other devices on a LONWORKS network and downloading applications.

LOCATION OF LONTALK DAUGHTER BOARDS LEDs

Red "Service"

Yellow "Heartbeat"
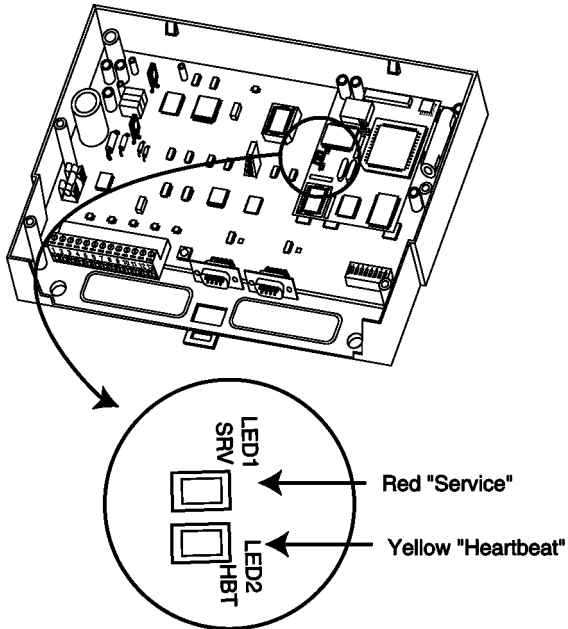
5. Compare other LED indications to Table 2.
6. Re-install cover.

LONTALK DAUGHTER BOARD (LDB) LED INDICATION

| Indicator	Context	Action	Status	Corrective Action
"Heartbeat" LED – Yellow	Anytime	Blinks at 50% duty-cycle rate	MI is operating properly.	None required.
		Off	May remain off for extended amount of time during power up and reset.	Make certain MI power is on. If power is on and LED remains off, replace MI.
	Flash Clear	Blinks at 80% on, 20% off	Indicates flash clear jumper is installed.	Contact factory service representative for procedure to restore MI to normal operating status. See LDB Flash Clear section.
Service LED – Red	Power-up	LED blinks several times	If a valid application is loaded, indicates successful power-up.	None required.
	Power-up	On	Indicates that the neuron application is not running. Neuron applications are not field replaceable.	Replace the MI.
	After Flash Clear Procedure	Blinks once per second	Indicates that the neuron application is loaded, but the neuron's communication parameters are not loaded, are being reloaded, or have been corrupted. Communication parameters cannot be configured by field personnel.	If ENM does not automatically reconfigure the neuron after several seconds, replace MI.
	Power-up	Off	Indicates that the neuron application is loaded	None required

LDB FLASH CLEAR

Caution:

This function clears the Lontalk Daughter Board (LDB) and ENM of all information. Perform this procedure only when instructed by a factory service representative.

If the LDB is flash cleared, all devices on the LDBs network must be re-installed. If a device is not re-installed and still connected, the LDB may assign another device to the same address.

1. Verify all devices connected to MI are in a manually controlled safe state.
2. Turn OFF power to MI.
3. If cover is attached, remove cover.
4. Place jumper in Flash Clear position (jumper pin 2 and 3).

Flash Clear Position

Jumper Shown in the Normal Position
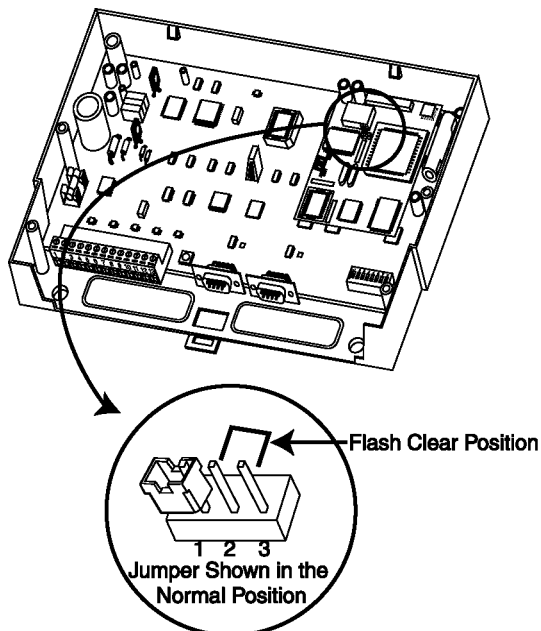
5. Turn ON power to MI.
6. Wait about 15 seconds and verify red Service LED and yellow Heartbeat LED blink rapidly.
7. Turn OFF power to MI.

Caution:

When restoring Flash Clear jumper to normal operating position, place jumper on Pin 1 only. Placing jumper on Pin 1 and 2 will initiate a factory test operation.

8. Remove jumper from Flash Clear position and place jumper on Pin 1 only (Normal Operation position).
9. Re-install cover.
10. Turn ON power to MI.

SERVICE

Components within MI can not be field repaired. If there is a problem with a MI, follow the steps below before contacting your local Satchwell Controls office.

1. Make sure MI is connected and communicating to desired devices.
2. If MI is operating, make sure the LonWorks application is loaded by using MicroNet Tech Tool and the NCP and ARCNET applications are loaded using MicroSat Tool. For more information, see *I/A Series MicroNet Tech Tool Engineering Guide, and MicroSat Engineering Guide.*
3. Record precise hardware setup indicating the following:
   - Version numbers of applications software.
   - MI firmware version number.
   - Information regarding the MicroNet Tech Tool or MicroSat Tool.
   - A complete description of difficulties encountered.

FUSE REPLACEMENT

A fuse (2A, fast blow) provides overcurrent protection for the MI. Do the following to check and replace fuse:

1. Turn OFF power to MI.
2. Remove cover.
3. Remove fuse.
4. Check continuity across fuse.
5. If fuse is faulty, replace fuse with same type and rating.
6. Re-install cover.
7. Turn ON power to MI

FUSE LOCATION
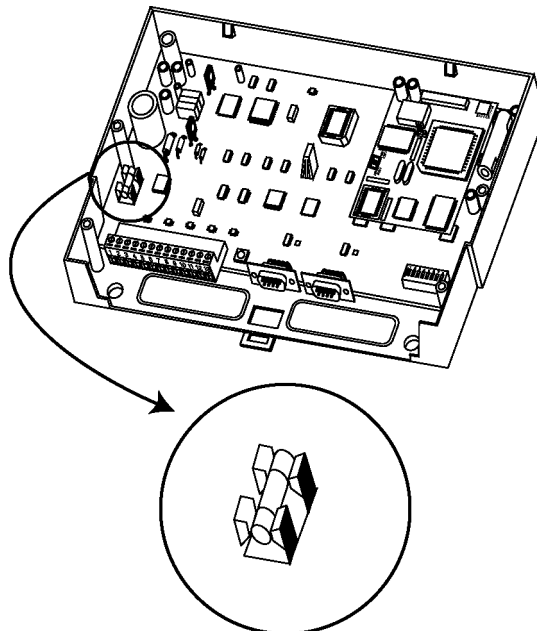
BATTERY REPLACEMENT

Should there be a power failure, the clock and RAM are protected with a battery-backup. Do the following to check and replace battery:
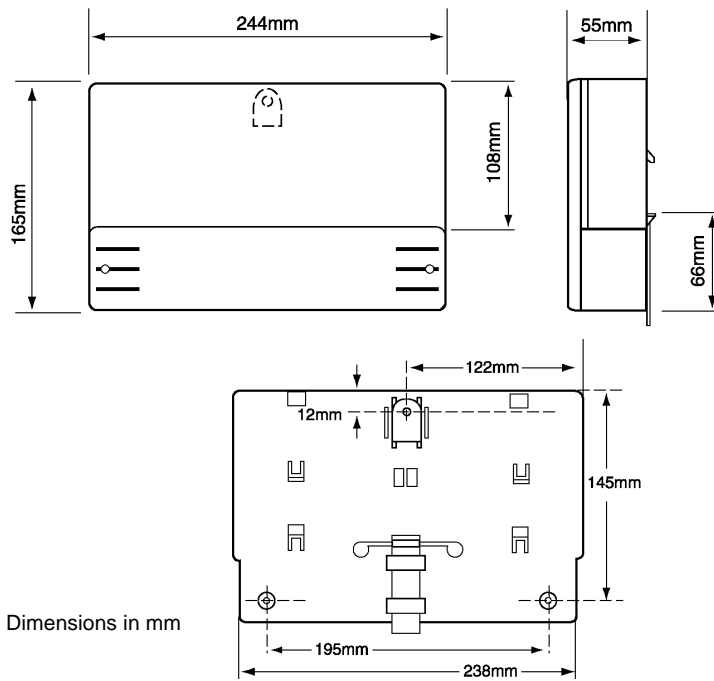
Caution:

All clock functions and data stored in RAM will be lost with power turned OFF and battery removed.

1. Turn OFF power to MI.
2. Remove cover.
3. Remove battery.
4. Check battery.
5. If battery is faulty, replace battery with same type and rating. (Siebe part number E17-129, 3.6V AA Non-rechargeable lithium)
6. Re-install cover.
7. Turn ON power to MI.
8. Dispose of battery properly.
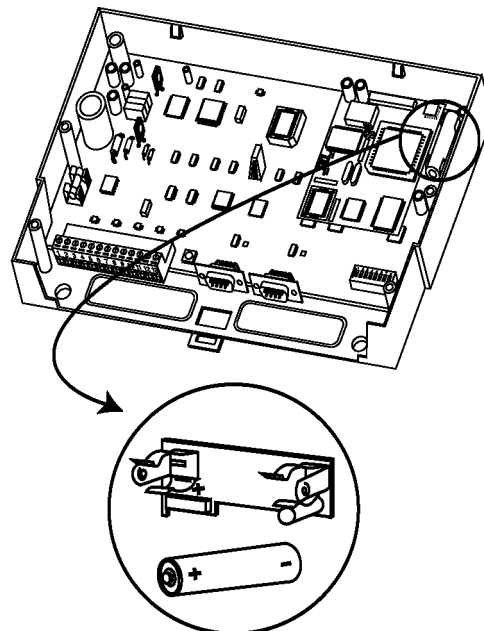
MOUNTING DIMENSIONS

Dimensions in mm

Satchwell

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Slough
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United Kingdom

Telephone +44 (0)1753 550550
Facsimile +44 (0)1753 824078

An Invensys company

CAUTION

- **This is a 24Vac device. Do not exceed rated Voltage. Local wiring regulations and usual safety precautions apply.**
- **24Vac must be supplied by a transformer conforming to EN 60742.**
- Do not exceed the maximum ambient temperature.
- Interference with parts under sealed covers invalidates guarantee.
- The design and performance of Satchwell equipment is 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 is 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.

Intelligent Automation