



AUTOMATION PRODUCTS

# MAXIFLEX 1000 SERIES

Programmable Remote Terminal Unit System

## DATA SHEET

### FEATURES

- Modular design with optional base sizes
- AC, DC or solar powered with battery charging options
- Programmable in high level language from PC or notebook
- On-line parameter download/upload via program port or network
- Range of digital and analog I/O modules (8 and 16 channel)
- Hot plug-in facility
- Choice of RS232/485 links and 3 conet fieldbus networks  
CONET LAN : twisted pair, 62,5 kbaud, 10 km, 127 nodes  
CONET/e LAN : Ethernet 10BaseT (RJ45) 10 Mbaud  
CONET/m LAN : radio, 1200 baud MSK, 255 nodes  
CONET/s : RS232/485 with Conet Serial Protocol, 127 nodes
- RS232/485 gateways for 3rd party device interfacing (e.g. PLCs)
- Programmable NIMs (network interface modules) for expansion to other networks or interface to 3rd party devices



system designed for industrial data acquisition and control applications, and can be used in many diverse applications, including front ends for SCADA. It features a strong communications infrastructure with a variety of networks which can be interlinked for an optimum data communication strategy.

### PRODUCT RANGE OVERVIEW

The Maxiflex 1000 Series Programmable RTU is modular in design, comprising a number of bases (Master and Expander) into which the various modules are plugged.

These modules consist of:

- Power Supplies
- CPUs

- I/O modules (analogue and digital)
- Gateways
- Network Interface Modules (NIMs)
- Programming Tools.
- Accessories - PC Interfaces, terminators

A range of accessories to assist in system integration, testing and commissioning, will also become available as the product range develops. A powerful network

communications infrastructure provides the end user with the most flexible plant data communications system available anywhere.

### APPLICATIONS

Applications include Data Acquisition, Remote Control, Energy Management, Telemetry, 3rd party device interfacing, Pump control, MCC interfacing, Alarm Annunciation, Machine Monitoring and security systems for utilities, mining, minerals, manufacturing, food & beverage, chemical and petrochemical industries.

While Maxiflex has been designed for the end user to engineer his own solutions using standard modules, Omniflex also has System Integrators in mind where complete systems can be engineered to customer requirements. This includes engineering, cabinetry, wiring, installation and commissioning. Maxiflex is designed as a general purpose product range to provide system integrators and end users with a powerful, flexible tool to engineer solutions across a wide range of industries using a standard hardware platform which is cost-effective, compact and robust.

In addition to custom solutions using off-the-shelf modules and bases, Omniflex's OMNIFLEX product range also uses standard Maxiflex components to provide integrated solutions specific to certain industries.

### REMOTE COMMUNICATIONS

(See section on CPUs for more information)

Maxiflex has a powerful integrated local area networking capability using Conet, Conet/e, Conet/m Conet/s. It also has a number of Programmable Serial ports (RS232 or RS485) which can be used for 3rd party device interfacing. E.g. Modbus. Each CPU has a built-in RS232/485 port configurable as Modbus or Conet/s and an optional local area network port. Plug-in RS232/485 ports are also available (NIMS). This powerful plant data communications infrastructure gives the user a flexible integrated system solution across a wide range of industries and applications. Conet NIMs facilitate Network T-offs or even Star configurations.

### SYSTEM BUS

The Maxiflex bus provides all the necessary power rails and address and data bus for I/O.

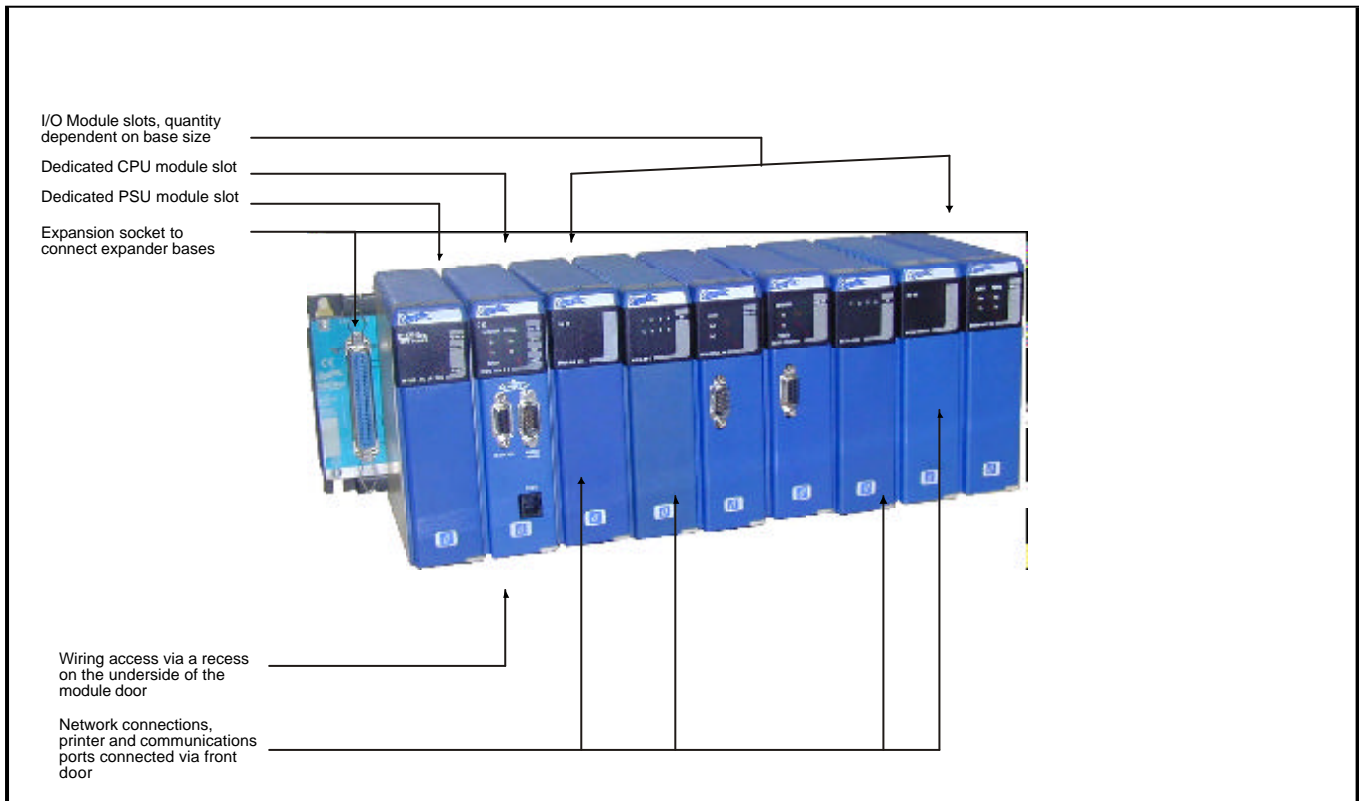


Fig 1: Typical Maxiflex Base with full set of modules

## SYSTEM SIZE

The Maxiflex 1000 Series RTU can accommodate up to 15 modules per CPU (7 I/O Master Base plus 8 I/O Expander Base). Using 16 channel modules, this gives 240 I/O (mixed analogs and/or digital). When 32 channel modules become available, the I/O count will double to 480.

Each system requires 1 CPU which interfaces to all 15 modules in the two bases, storing data from these modules in memory for access by the relevant network.

Any combination of I/O modules, NIMs and Hubs can be used in any of the I/O slots. The CPU recognizes these intelligently and addresses them accordingly.

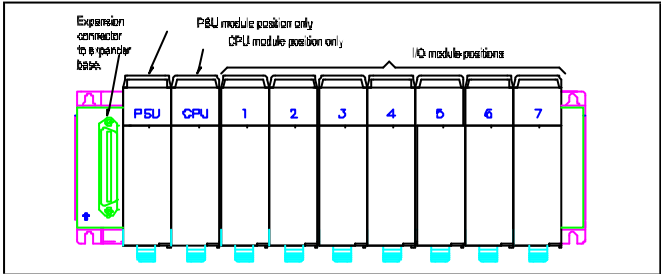


Figure 2: Typical Maxiflex master base layout

## MODULE MECHANICS

Maxiflex modules are manufactured from a blend of ABS and polycarbonate which is durable, UV stabilized, flame retardant and very tough. A single screw holds the entire module together to facilitate ease of assembly and dis-assembly for manufacture and servicing. The front door opens to reveal the removable screw terminals for field wiring on general I/O modules while others e.g. CPU, use connectors which are accessible through the module's door.

Each module has a set of status and/or diagnostic LEDs which are visible through a translucent LED cover. All modules use exactly the same housing, including PSUs.

## WIRING

All I/O module terminations are made via two part



Fig. 3: Module with door open to show terminals

screw clamp terminals behind the door on the front of the module, thus eliminating the need for field termination boards. The wiring is routed through an open slot at the bottom of the module for neatness with the closed door presenting a neat and tidy finish for the RTU. A label on the inside of each door identifies the terminal connections and any other important user information (e.g. relay contact ratings). (See figure 4)

The two part terminals enable modules to be removed without disturbing the field wiring, an important feature both for field servicing and maintenance of current loops in the plant. All I/O modules are designed for hot plug in and will not cause spurious triggering on others in the system during insertion or removal.

## INSTALLATION

In general, Maxiflex must be mounted in suitably spec i-

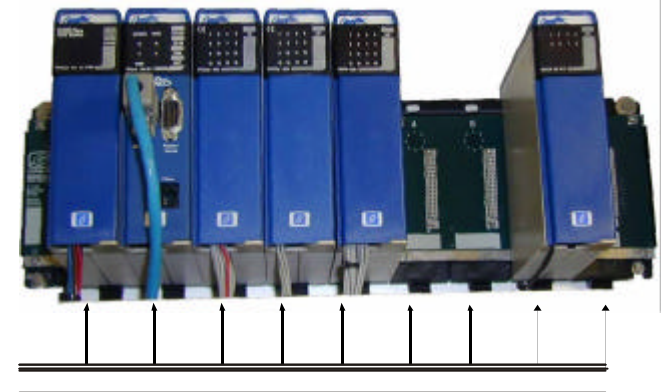
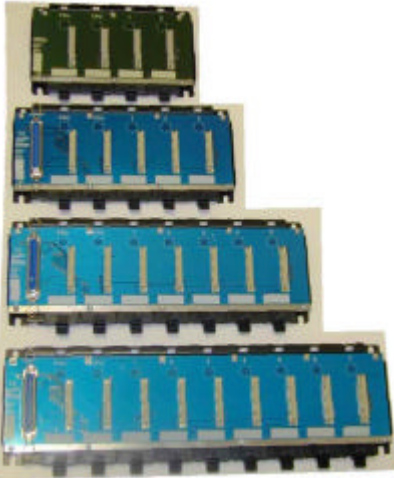


Figure 4: Front view of rack showing wiring routing

fied enclosures which prevent the ingress of dust and moisture. The modules have ventilation slots for heat dissipation and care must be thus be taken to prevent metal filings, wire-ends or conductive dusts settling on the module as this could result in damage or malfunction over a period of time. Typical instrumentation cabinets are ideal for Maxiflex installation. See specifications for environmental data.

# SYSTEM COMPONENTS

## BASES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1001A	2 I/O Master Base	Not Expandable 4 Modules wide (1PSU, 1CPU, 2I/O Slots)
M1021A	3 I/O Master Base	Expandable to slave base 5 Modules wide (1PSU, 1CPU, 3I/O Slots)
M1022A	7 I/O Master Base	Expandable to slave base 9 Modules wide (1PSU, 1CPU, 7I/O Slots)
M1031A	5 I/O Expander Base	Extra PSU required* 5 Modules wide (5I/O Slots) *A power supply is required on the expander base to power the I/O modules fitted to the expander base.
M1032A	8 I/O Expander Base	Extra PSU required* 9 Modules wide (1PSU, 8I/O Slots) * A power supply is required on the expander base to power the I/O modules fitted to the expander base.

### BASES

The Maxiflex bases are available in various sizes for application flexibility and to cater for enclosure limitations. The 3 I/O and 7 I/O Master Bases are designed to expand to the 5 I/O and 8 I/O Expander Bases respectively, via the M1811A extension cable. The modules are locked in position onto the base via a plastic retaining clip which can be depressed for module release. The bases are designed for surface-mounting but a special adaptor bracket (M1821A) facilitates mounting in a 19" frame.

The I/O modules in the Expander Base are always under control of the CPU in the Master Base and there is no CPU facility in the Expander. Either expander may be used with either master base and the length of the Expander cable is limited to 500mm, allowing a maximum space of 250mm between bases. At least 100mm must be allowed between bases to leave space for the wiring from the Master Base and for module insertion in the Expander Base. Note that an extra PSU is always required for the 8 I/O Expander Base, even if only one module is plugged in.

## POWER SUPPLY UNITS (PSUs)



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1101A	MX PSU DC SLC	24 Vdc, solar, logic and charger Power : 40 W Charger : 3 A @ 12 V Solar Panel : Voc 16-25 Vdc, 3 A
M1102A	MX PSU DC L	20 - 36 Vdc logic supply only Power : 40 W
M1151A	MX PSU AC LF	110/220 Vac (20 % logic and field supply) Frequency : 50-60 Hz Power : 40 W Field Supply : 24 Vdc @ 1 Amps
M1152A	MX PSU AC LC	110/220 Vac (20 % logic and charger) Frequency : 50-60 Hz Power : 40 W
M1154A	MX PSU AC F	110/220 Vac (20 % field supply only) Frequency : 50-60 Hz Power : 40 W Field Supply : 24 Vdc @ 2 Amps <small>* This power supply may be fitted into any of the I/O slots on the Maxiflex base</small>

### POWER SUPPLIES

A range of plug-in modular power supplies is available for Solar, DC and AC applications. With the exception of the M1154A, all PSUs supply the base with +12 Vdc and +5 Vdc logic (L) rails. Some PSUs cater for different requirements such as battery charging (C), isolated field power supply (F) and solar power input (S).

Note that in battery charging applications, the batteries are always a separate item in the system and are not built into the PSU. PSUs with built-in battery chargers are supplied with a temperature sensor (thermistors) which must be mounted near the battery terminals to sense the ambient temperature. The charging current is then adjusted automatically to prevent over-charging in hot conditions, thus prolonging the life of the battery.

When used with a solar panel, the M1101A PSU is usually required to deliver a relatively high battery charging current (3 A at 12 Vdc) while the M1152A (AC operation with battery back-up) is usually required for short mains outages periods only and has a 0,5 A battery charger.

The 24 Vdc isolated field (F) output on some power supplies is provided for powering (typically) digital inputs or an analog loops in the system.

The M1154A AC F PSU is NOT plugged into the PSU slot but into any I/O slot in the system. It merely provides an isolated 24 Vdc Field supply for powering digital inputs, solenoids or an analog loops. These PSUs have no connections on the backplane and any quantity can be used in the system.

LED indicators on the power supplies indicate the power healthy condition, charging condition and power failure condition on the backplane.

All PSUs (with exception of M1154A) have detection circuitry which advises the CPU via the backplane if there is a fault with the logic supplies. In addition, battery charging PSUs (M1101A and M1152A) will alert the CPU if the battery voltage falls below 11,7 Vdc and then cut off the battery if this drops below 10,8 Vdc. This battery check is done under control of the CPU application program.



# SYSTEM COMPONENTS

## CENTRAL PROCESSOR UNITS (CPUs)



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1240A	MX T2	No network comms board Serial port : RS232/RS485 Serial Port Specification Transmission : 300 to 38400 baud Media : Multi core cable (DB9 connector) Distance : 15 m (RS232) 1 km (RS485) Isolation : None
M1241A	MX T2c CPU	Integral Conet/c twisted pair network Port Serial port : RS232/RS485 Conet Port Specification Transmission : 62.5 kbaud (7800 option) Media : Twisted pair cable Nodes : 127 max. Distance : Up to 10 km Isolation : 1500 Vac rms
M1242A	MX T2e CPU	Integrated Ethernet Port Serial port : RS232/RS485 Ethernet Port Specification Transmission : 10BaseT Protocols : Modbus/TCP TCP Connections : Modbus over Ethernet TCP Connections : four for each protocol
M1243A	MX T2m CPU	Integral Conet/m Radio Network Port Serial port : RS232/RS485 Conet/m Port Specification Transmission : 1200 baud Media : Radio Network Nodes : 255 max. Distance : Limits of Radio Network Isolation : 1500 Vac rms
M1260A	MX P3 CPU	Same as M1240 but with IEC61131 Programming
M1261A	MX P3c CPU	Same as M1260 but with Conet/c network port
M1262A	MX P3e CPU	Same as M1260 but with Ethernet TCP/IP port

### GENERAL

A range of CPUs are available for different applications, with only one CPU required per system, controlling both master and expander bases. All CPUs have a built-in RS232/485 port which can be used as a computer port/ a printer port or configured as a Modbus Port while a separate program port is used for downloading programs to a PC via the PC's RS232 port. Maxiflex programmes can not be downloaded while on-line, but parameters can be, via the program port or over the network. A battery-backed up real time clock is provided for time-stamping and other clock applications. All RAM is battery backed-up so programme storage is non-volatile. Currently the CPUs are programmable in EziForth, an easy-to-use high level programming language based on Forth. Ezi-Edit, a PC editing utility, is available from Omniflex for this purpose. Ezi-List allows the CPU to be programmed in statement list environment for PLC familiar users.

### I/O MODULE SCANNING

Parallel data transfer takes place at 2 Mhz on the data bus, providing fast I/O scanning. Each I/O module has a unique ID and scan code which the CPU recognizes when the module is plugged in. This unique ID is used for fault diagnosis and if a module fails, or is removed (or a wrong module is inserted), the CPU will flag this status in a fault register which can be read by the SCADA master. Standard "Drivers" are available for each module type and are built into the CPU BIOS (Basic Input Output System) code. These drivers eliminate the need for time-consuming programming and the end user can construct applications in the high-level programming language quickly and easily.

### TELEME TRY ENABLED (T2) CPU's

T2 CPUs M124X series scan I/O automatically assembling the data into DIT tables and are intended to make Telemetry and Data Acquisition applications effortless for users. No user programming is necessary to implement a telemetry system, simple configuration of DIT tables is all that is required.

5 T2 series CPUs are currently available:

- M1240A CPU
- M1241A CPU C (Conet interface)
- M1243A CPU C/m (Conet/m interface-radio communications)

- M1242A CPU T2 with Ethernet port

### PLC (P3) CPU's

#### M1260A CPU (no network)

The M1260 has no add-on network interface, provides the user with a programmable PLC with an RS232/485 port which can be used for stand-alone functions with IEC61131 programming capability. All five IEC61131 programming languages are supported including: Ladder Diagram, Flowchart, Function Block, and Structured Text 60,000 Data Registers provide an easy to use communications interface for versatile SCADA interfacing.

#### M1261A (P3c) CPU (with Conet Interface)

The P3c CPU has all the features of the P3 CPU, but with an additional built-in fully isolated Conet port which uses a DB9 connector mounted through the door. Conet operates on twisted pair cable up to 10 km in distance at 62,5 kbaud allowing up to 127 nodes on the network.

#### M1262A (P3e) CPU (with Ethernet Interface)

The P3e CPU has all the features of the P3 CPU, but with an additional built-in full function Ethernet port which uses a RJ45 connector mounted through the door. Up to four Modbus/TCP connections and four Conet/e connections can be made simultaneously, providing full remote programming and configuration capability over the network. Powerful inter-networking capability allows subnetworks from remote locations to be integrated seamlessly with the main SCADA network. Parameters to facilitate node and message priorities. Up to 6 levels of Digipeating (Store-and-Forward) are available as standard.


### DITview Configuration utility

All of these CPU's are configured using the same easy to use utility. All configuration can be done from any network port of the CPU.

### EASE OF USE

All of these CPU's have been designed with ease of use in mind to provide lowest engineering overhead during system design providing large savings in the overall system implementation.

# SYSTEM COMPONENTS

DIGITAL INPUT MODULES	MODEL No.	DESCRIPTION	BASIC SPECIFICATION
	M1321A	MX 8DI-C	8 Contact inputs. (Potential free) Isolation : 1500 Vrms Input to Logic : 1500 Vrms between Inputs Wetting Potential : <4.5 V load dependent Sense Current : <0.5 mA load dependent Closed Resistance : <2 kΩ Open Resistance : >20 kΩ Input Voltage : 4.5 Vdc min. to 200 Vdc max. Input Response : 15 ms to register change
	M1322A M1323A	MX 16DI-24 MX 16DI-48	16 Contact inputs (Potential free or wetted) : Single Common input Wetted Inputs : 9 to 30 Vdc Inputs Isolation (Opto) : 1500 Vrms Input to Logic Off Voltage : <4.5 V Off Current : <0.3 mA On Voltage (16DI-24) : 9 to 30 V On Voltage (16DI-48) : 40 to 60 V On Current : 1.5 to 8 mA Input Response : 15 ms to register change
	M1326A	MX 32DI	32 Contact inputs via 2 Ribbon Headers (Potential free or wetted) External Supply Volts : 18 to 28 Vdc Inputs Current Consumption : 25mA Max. Excl loads Max rated current : 200mA all inputs on Max Voltage for 1 : 2 V Max Voltage for 0 : 8V Input Current : 8.5 mA at 28Vdc supply Input Response : 15 ms to register change

## DIGITAL INPUT MODULES

Digital Input Modules are used to monitor field binary field conditions and are scanned every few milliseconds by the CPU. The modules can be used for a variety of applications, including alarm annunciation and sequence of events recording. In the latter case, the CPU time-stamps and makes data available to the network via a queue. Input status indication is always indicated by individual green LEDs mounted behind the LED cover. An input present (contact closed) will turn the respective LED on.

### M1322A 16 DI-24 (16 Digital Input 10-30 Vdc)

This module accepts 16 x 10 - 30 Vdc inputs directly in two groups of 8 each with a separate common. The inputs are isolated from the logic via opto-couplers (1500 Vac rms) and no inter-input isolation. Typical input response time is 15ms.

### M1323A 16 DI-48 (16 Digital Inputs 40-60 Vdc)

As above for M1322A except 40 to 60 Vdc inputs.

### M1321A 8 DI-C (8 Contact Inputs, fully isolated)

The 8DI-C provides full inter-input isolation and logic isolation. Field isolation is provided by individual transformers on each input which supply a 5V 8mA potential for wetting contacts in the field. The module can also monitor series contacts in a dc chain, with up to 200 Vdc across each contact, as would be found in a dc motor control circuit.

### M1342 32DO (32 Channel Open Collector Transistor output)

The 32 DO provides 32 NPN transistor outputs capable of driving 80 mA each. The outputs are on two 20 Way ribbon headers and share a common terminal per 16 O/Ps. Ribbon cables connect the outputs to a DIN rail mounting 16 way terminal board (C6321). Output status is represented by 16 RED LEDs on the terminal board C6321

## DIGITAL OUTPUT MODULES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1341A	MX 16 DO	16 Channel Potential Free transistor output Type : NPN Transistor Voltage : 5-90 VDC Current Sink* : 100 mA max @ 25 °C. *Derate current @ : 0.75 mA/°C up to 70 °C Vce (On) : 1.1 VDC max. @ 100mA Isolation : 1500 Vrms Logic to Output Protection : Flywheel diode for each output
M1372A	MX 8 RO	8 Channel Relay Output Contacts : Normally open (Form A) Rating (max.) : 1250 VA or 150 W Resistive : 500 VA or 60 W Inductive Current : 5 A max Min Load : 5 V @ 10mA Operate Time : 10 ms max. Release Time : 10 ms max. Operating Freq : 1800 operations/hr (Mech) : 1800 operations/hr (Electrical)
M1342A	MX 32 DO	32 Channel Open Collector Transistor Output External Supply : 18-28 Vdc Current Consumption : 25mA Max. Excl loads Load Current : 0-80mA per output Output voltage for a 1 : 1V max with 80mA load Output current for a 0 : 100µA max at 28V

## DIGITAL OUTPUT MODULES

Digital Output Modules are generally used for switching and control purposes and are scanned every few milliseconds by the CPU. Output status indication is always indicated by individual RED LEDs mounted behind the LED cover except on 32Ch modules where the terminal board has indication. An output turned on (or relay energised) will result in the respective LED being turned on.

### M1341A 16 DO (16 Digital Outputs)

The 16 DO provides 16 NPN transistor outputs capable of driving 100 mA each. These would typically be used for switching external relays, mimic lamps/LEDs or as inputs to other systems (e.g. PLCs). The outputs share a common terminal. Output status is represented by 16 RED LEDs.

### M1342 32DO (32 Channel Open Collector Transistor output)

The 32 DO provides 32 NPN transistor outputs capable of driving 80 mA each. The outputs are on two 20 Way ribbon headers and share a common terminal per 16 O/Ps. Ribbon cables connect the outputs to a DIN rail mounting 16 way terminal board (C6321). Output status is represented by 16 RED LEDs on the terminal board C6321

### M1372A 8 RO (8 N/O Relay Outputs)

The 8 RO plugs into any of the available I/O slots and provides 8 normally open (form-A) contacts for general purpose control applications. Each of the outputs is fully isolated from the other and in di-vidual common and N/O contacts are brought out to the terminals. Any or all of the relays may be energised at any one time, this being done under control of the application program in the CPU.

# SYSTEM COMPONENTS

## ANALOG INPUT MODULES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1403A	MX 16AI	16 Channel Analog inputs. Inputs : 0-20 mA*, 4-20 mA*, 0-5 V, : 1-5 V, 0-10 V, 2-10 V, 0-1 V, 0,2-1 V * Current Inputs can have the 50 Ω 0.1% conditioning resistor fitted either internally or externally Inputs have a shared common Inputs ranges are DIP switch selectable Accuracy : 0,25% of FSR max. Linearity : 0,1% of FSR typ i cal. Resolution : 12 bits Response Time : 320 ms max. 10-90% step Drift : 100 ppm/°C typ i cal Isolation : 2500 Vrms Input to Logic
M1431A	8VC iso	8 Ch independantly isolated inputs Accuracy : 0,04% of FSR max(mV). Linearity : 0,04% of FSR typ i cal. Resolution : 1mV/1µA Response Time : 200 ms to within 3% 10-90% step Drift : 100 ppm/°C typ i cal Isolation : 1500 Vrms Input to Logic : 500 Vrms Input to input.
M1432A	8 TC/mV iso	8 Ch independantly isolated inputs Accuracy : 0,017% of FSR max(10V). Resolution : 0.1°C/0.1°F Response Time : 200 ms to within 3% 10-90% step Drift : 100 ppm/°C typ i cal Isolation : 1500 Vrms Input to Logic : 500 Vrms Input to input.
M1433A	6 RTD	6 Ch independantly isolated inputs(3 wire RTD) Accuracy : 1°C. Line Resistance : 1000Ω/leg balanced. Resolution : 0.1°C/0.1°F Response Time : 200 ms to within 3% 10-90% step Drift : 100 ppm/°C typ i cal Isolation : 1500 Vrms Input to Logic : 500 Vrms Input to input.

### ANALOG INPUT MODULES

The M1403A can be used for any general purpose analog signal monitoring applications, providing an extremely cost-effective solution due to signal density. The 16 inputs share a common (2 terminals) but are isolated from the bus by 2500 Vrms. The module provides 12 bit accuracy (0,25%) on each input.

The inputs are DIP switch selectable from the front for all common process voltage and current inputs.

M1431A 8VC isolated

8 Independantly isolated inputs for Voltage and Current inputs.

Scaleable through DIT tables. Each input has 4 soft setpoints with deadband.

M1432 8TC/mV isolated

8 Independantly isolated inputs for Thermocouple or milli-Voltage inputs. Scaled directly to temp in DIT tables. Each input has 4 soft setpoints with deadband. Inputs may have mixed Thermocouples.

M1433 6RTD isolated

6 Independantly isolated inputs for RTD inputs. Scaled directly to temp in DIT tables. Each input has 4 soft setpoints with deadband. Inputs may have mixed RTDs.

## ANALOG OUTPUT MODULES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1412A	MX 8 AO	8 Channel 4-20 mA output Load : 1000 Ω max @ 26,4 Vdc External Supply : 24 Vdc ( 10% : 230 mA all output 20 mA.  Accuracy : 0,25 % of FSR max. Linearity : 0,1 % of FSR typ i cal Resolution : 12 bits Drift : 100 ppm/°C typ i cal Response Time : 80 ms 10 to 90 % step Isolation : 1500 Vrms Logic to Output

### ANALOG OUTPUT MODULE

The 8AO ISO provides 8 isolated 4-20 mA (0-20 mA) current loop outputs which can be used in any general purpose analog applications. Each output circuit is isolated from the bus by 1500 Vac rms.

The analog output module is micro processor controlled and thus requires no individual zero and span calibration for each channel. It also provides a diagnostic RUN LED which tells the user when the

module is healthy. The module uses a 12-bit D/A converter which provides 0,25% accuracy.

More analog input modules will be added as the range expands.

# SYSTEM COMPONENTS

## SPECIAL FUNCTION MODULES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1701A	DM	Dummy Module
M1711A	4 HSC	4 Ch High Speed Counter Module. : Up to 50kHz
M1712A	8 HSC	8 Ch Counter Module. : CH 1-7 1kHz CH 8 Up to 10kHz
M1751A	MEM	Memory Module fitted with 256k Static RAM. EXP TO 1MEG
M1752A	MEM EXP	Memory Upgrade Kit -256k Static RAM BLOCKS.

### SPECIAL FUNCTION MODULES

The Dummy Module is used to fill blank spaces on bases for aesthetics and longer term protection of the bases spare slot positions.

### HIGH SPEED COUNTERS

The counter modules come in two forms. The first being a 4 channel high speed counter for inputs up to 50kHz. The second is an 8 channel general purpose counter with channels 1 to 7 counting up to 1kHz and channel 8 counting at up to 10kHz.

### MEMORY MODULES

The Memory Modules are used in logging applications where there is not enough storage space for data in the CPU. The memory Module is battery backed up. The memory module is expandible from 256k to 1Meg in 4x256k blocks. These may be purchased separately.



# SYSTEM COMPONENTS

## NETWORK INTERFACE MODULES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1585A	MX Serial NIM	Programmable Serial Network interface module Serial port : RS232/RS485 Protocols : Modbus Master/Slave and Custom
M1586A	MX Conet NIM	Programmable Conet NIM Network port : Conet twisted pair industrial LAN Isolation : 1500 Vac rms
M1589A	MX Dual HART NIM	Programmable dual HART Network Interface HART interface ports : Secondary master Isolation : 1500 Vac rms
M1591A	MX Ethernet NIM	Programmable Ethernet network interface Isolation : 600 Vac rms
M1584A	MX Conet/m NIM	Programmable Conet/m Radio network interface RadioNetwork : Full peer-to-peer network

### NETWORK INTERFACE MODULES

Network Interface Modules (NIMS) are used to provide an interface between the main CPU and another network, which may be Conet, Ethernet, Conet/m or RS232/485. The NIM communicates on the backplane via the data bus and appears to the CPU as another network port on the CPU. NIMS provide a very powerful communications infrastructure for Maxiflex and allow multiple networks, network routing and 3rd party device interfacing on all networks. NIMS incorporate their own CPU, RAM, ROM and EEPROM, thus unloading the main CPU from their task.

By using a combination of NIMs, data can be routed from one to the other (under control of the main CPU) thus effectively providing gateways between one network type and another (e.g. Conet to Conet/m or Ethernet).

# SYSTEM COMPONENTS

## ACCESSORIES



MODEL No.	DESCRIPTION	BASIC SPECIFICATION
M1811A	MX Extension cable	Length : 500 mm For expansion to expander bases
M1701A	MX Dummy Module	No PCB and No screening Used for aesthetic blanking of spare base positions

### ACCESSORIES

A number of accessories are available which facilitate the complete system implementation. The C7011A is a BNC T-piece and a termination cap (C7010) with a built in 93 ohm resistor and must be used at the end of every co-axial Conet/+ link on a BUS hub (not on STAR hub). The C7011A T-piece is used to make through connections on the M1601B BUS hub.

The M1701A Dummy Module is used for aesthetic reasons to cover unused I/O slots and creates a neater finish for the system.

The M1811A cable is standard for both sizes of expander base. Due to the high speed bus, it is important that only the original Omniflex cable must be used. Users must not extend the cable beyond 500 mm.

While not part of the Maxiflex product range (as they can be used with other Conet/+ products), the C7000A and C7001A Conet/+ PC interface cards are available from Omniflex to provide a hardware link into a PC for SCADA (or other) applications.

# COMMUNICATIONS AND NETWORKING



## NETWORKING

Maxiflex has a powerful integrated local area networking capability which includes 3 fieldbus local area networks and programmable serial links (RS232 or RS485). Each CPU has a built-in serial port and one optional network interface which is either Conet, or Conet/s or Conet/m. This choice of networks enables Maxiflex RTUs to be used in a wide range of applications and industries, catering for the widest variety of possible data flow strategies. (See figure 7)

“CONET” is a total solution for industry, with a range of networks, I/O products, Network Interfaces and applications. These all work together to form an integrated solution for data acquisition, telemetry, energy management, alarm annunciation and many other applications. Conet networks all feature a presentation layer which enable a host (computer or other) on the network to access all devices in a standard format. In addition, formats for data type presentation are standardized so the user always expects data for digitals, analogs, BCD, HEX and decimal information in the same way, irrespective of the product or application.

Conet is a token-passing, twisted pair network operating over 10 km at 62,5 kbaud with up to 127 nodes. Conet/s allows Conet to function over fibre-optic links, GSM or Digital Radio Links. Conet/m is a CSMA/CD radio network operating at 1200 baud with up to 255 nodes. (See figure 6). Conet/e provides this full networking capability over Ethernet TCP/IP.

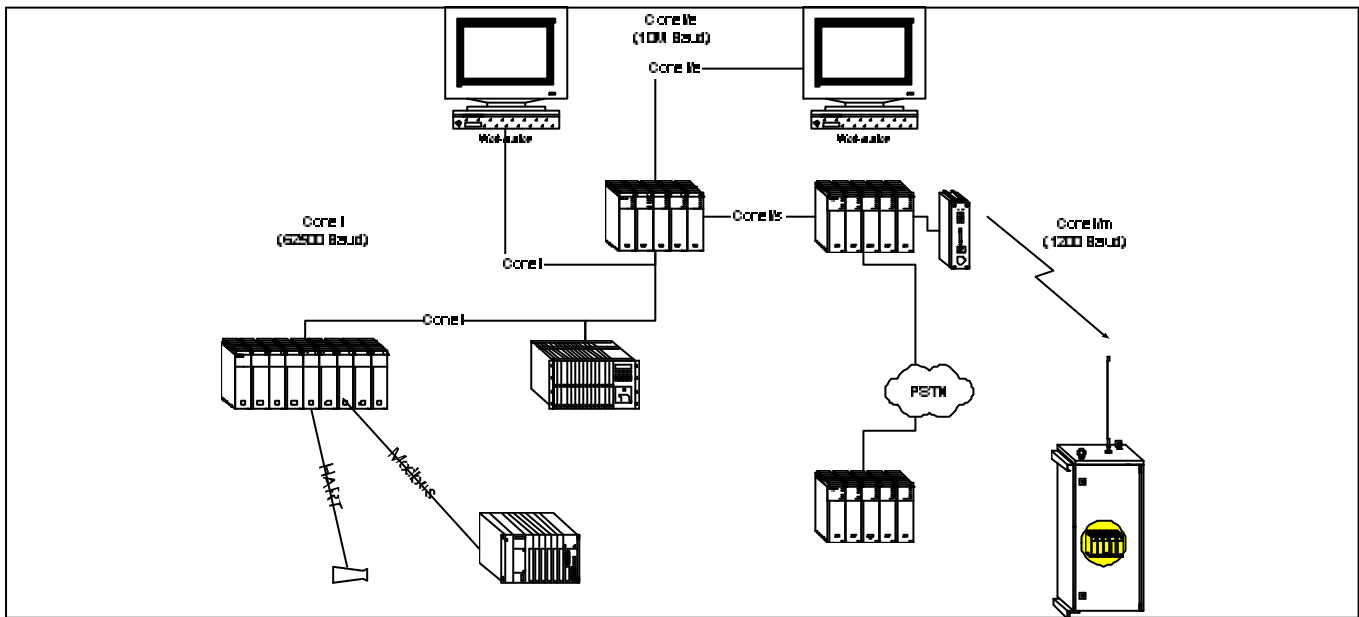
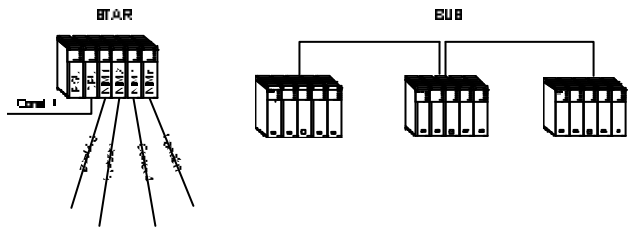


Figure 5: Conet fieldbus hierarchy

## CONET TOPOLOGIES

Conet networks can be configured for both bus and star network topologies. The Bus topology is the standard Topology for a Conet Network. Standard point to point or multidrop links (BUS) are accomplished with the usual connections to the front of the CPUs however Network Interface Modules (NIMs) are used for fanouts (STAR), to cater for geographically spread locations. Any number of NIMs can be linked in series on one network to extend the Conet Network and up to 15 NIMs may be connected in star fashion from one CPU, each NIM supporting a Conet Network. A Star may be used anywhere on the Conet Network. Allowing Conet topologies to be extremely flexible and robust.

Fibre optic links require the use of the Conet/s port and fibre to serial converters allowing many different fibre



media to be used Fibre optic and Twisted pair media can be easily mixed on a Conet network using Maxiflex as well as mixed topologies (Star and Bus) within a single network. This flexibility allows a wide range of applications to be undertaken.

# MECHANICAL DETAIL

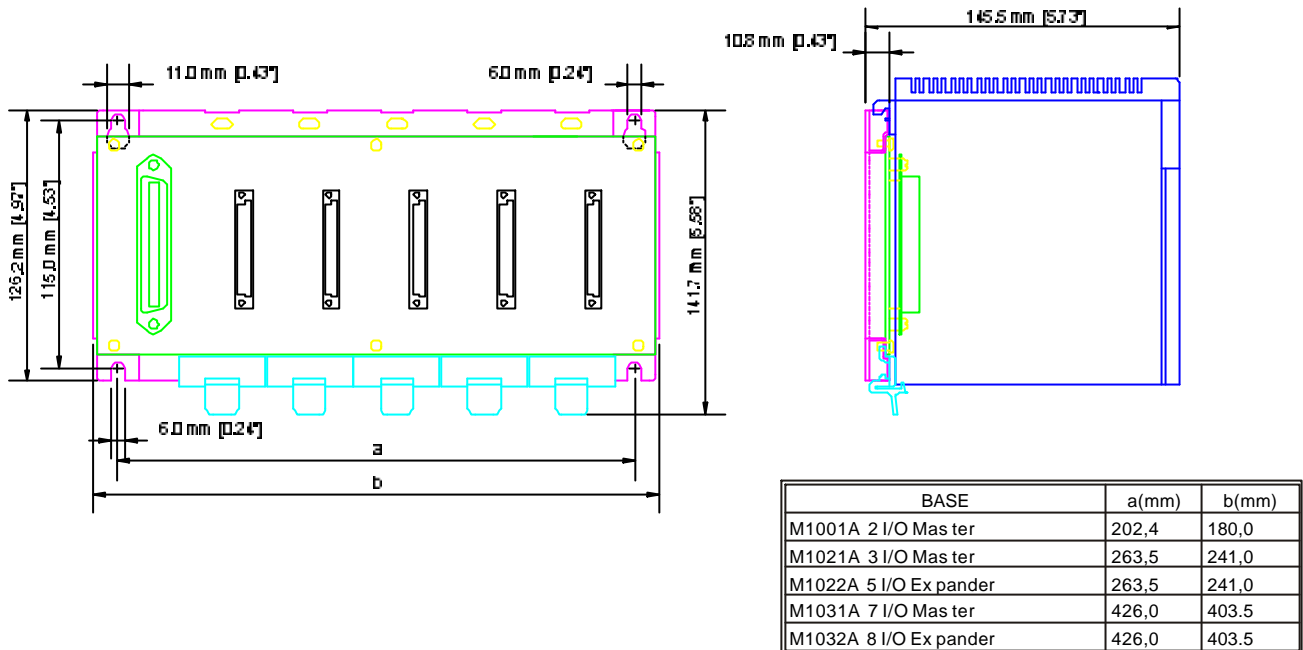


Fig. 7: Base dimensions and mounting detail

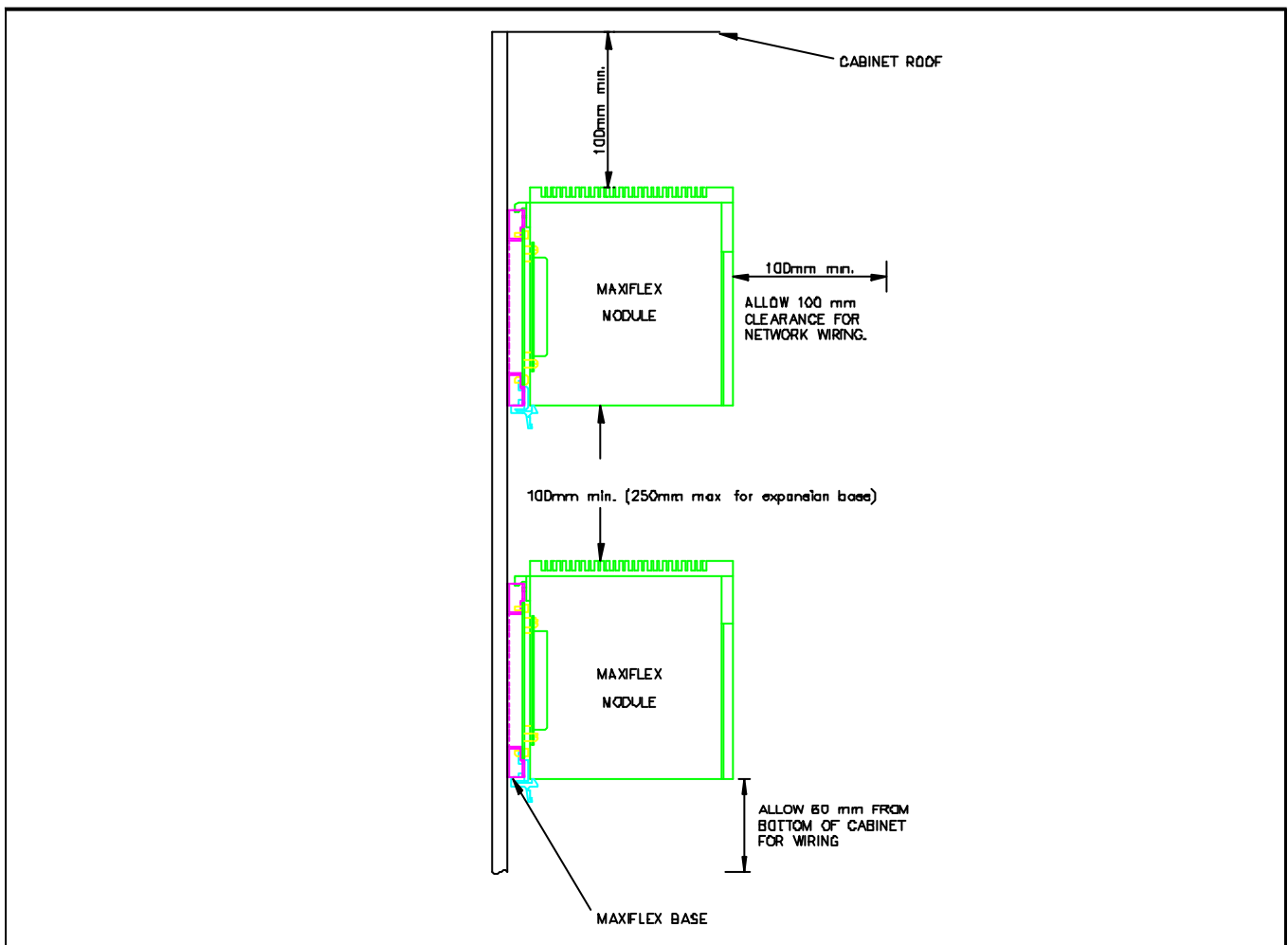


Fig. 8: Base mounting arrangement and wiring information



# SYSTEM SPECIFICATIONS

## Power Requirements

### Range of Power Supply Modules

M1101A	: 24 Vdc; Logic; Solar option and battery charger
M1102A	: 24 Vdc; Logic only
M1151A	: 110/220 Vac; Logic; Field
M1152A	: 110/220 Vac; Logic with charger
M1154A	: 110/220 Vac; Field only(24V/2A)

## Power Consumption (Worst case base full with expander)

24 Vdc	: 40 W max.
110/220 Vac	: 50 VA max

## Electrical Connections

Location	: Behind Front panel door
Via	: Screw Terminals
Wire Guage	: 1,5 mm <sup>2</sup> recommended
	: 2,0 mm <sup>2</sup> max.

## Ambient Temperature

Operating	: -20 to +70 °C (Digital Modules only)
	: 0 to 60 °C (Analog Modules only)
Storage	: -40 to 85 °C

## Atmosphere

Environment	: Must be free of corrosive gases
Humidity	
Operating Range	: 5% to 95% RH (without condensation)
	: All PCBs are conformal coated
	: Tested in accordance with IEC 68-2-30

## Mass

Base	Mass (kg)*
M1001A 2I/O Mas ter	1,6
M1021A 3I/O Mas ter	2,0
M1022A 7I/O Mas ter	4,5
M1031A 5I/O Ex pander	1,9
M1032A 8I/O Ex pander	4,5

\* These figures are the approximate average as the exact mass will depend on the type of modules fitted

## Type Tests

Vibration	: 10 - 150 Hz, 1g (9.8 m/s <sup>2</sup> ), 20 cycles, swept at 1 octave/min
	: Tested in accordance with IEC 68-2-6
Shock	: 30g(294 m/s <sup>2</sup> ) for 18 ms in packing.
	: Tested in accordance with IEC 68-2-27

## Degree of Protection

Rating	: IP-30 (mounted on a panel)
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## Grounding

Measured	: Must be less than 100Ω
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## Safety

Complies	: With Low Voltage directive 73/23/EEC 26 March 1973
Standard	: Meets HD 401 S1 1980 (IEC 348: 1978) Safety requirements for electronic measuring apparatus

## Voltage Withstand/Impulse Test

This test applies only to certain modules. Generally Isolated digital and analog modules and isolated power supplies.

	: Meets Class III in accordance with IEC 255-2
	: Impulse - 1,2 micro second rise time and 50 micro second duration Peak amplitudes are :
a)	1 kV Differential mode(between an input/output and its common.)
b)	5 kV Common mode (between inputs/outputs and the bus logic)

## Electro-Magnetic Compatibility

Complies with	: Electromagnetic directive 89/336/EEC of 3 May 1989 as amended by directive 92/31/EEC of 28 April 1992.
Applicable specifications	: EN50081(2)-1: 1992 Generic emission and immunity standard
	: EN55011 - emissions
	: IEC 801 - immunity
	Part 2 : Electrostatic discharge requirements (HD 481.2 S1) - Level 4 - 15 kV
	Part 3 : Radiated electromagnetic field requirements (HD 481.3 S1) - Meets Class 3 - 10 V/m electric field in the range 27 to 500 MHz
	Part 4 : Fast Transients/Burst requirements - Level 4 - 2 kV both common and differential mode.

## HF Disturbance

	: Meets IEC 255-22-1 Class 3 - 2,5 kV common mode, 1 kV differential.
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# PRODUCT RANGE OVERVIEW LIST

GROUP	MODEL No.	SHORT NAME	MODULE DESCRIPTION	SCAN CODES	MODULE ID
BASE	M1001A	2 I/O M BASE	2 I/O MASTER BASE (NOT EXPANDABLE)	N/A	N/A
BASE	M1021A	3 I/O M BASE	3 I/O MASTER BASE (EXPANDABLE)	N/A	N/A
BASE	M1022A	7 I/O M BASE	7 I/O MASTER BASE (EXPANDABLE)	N/A	N/A
BASE	M1031A	5 I/O E BASE	5 I/O EXPANDER BASE	N/A	N/A
BASE	M1032A	8 I/O E BASE	8 I/O EXPANDER BASE	N/A	N/A
PSU	M1101A	DC SLC PSU	24VDC/12V SOLAR/12V LOGIC +3A CHRGR	N/A	N/A
PSU	M1102A	DC L PSU	24VDC LOGIC	N/A	N/A
PSU	M1151B	AC LF PSU	110/220 VAC LOGIC/FIELD	N/A	N/A
PSU	M1152A	AC LC PSU	110/220 VAC/12V LOGIC + CHRGR (0.5A CHRGR)	N/A	N/A
PSU	M1154A	AC F PSU	110/220 VAC FIELD (24V/2A)	N/A	N/A
CPU	M1240A	T2 CPU	CPU WITH SERIAL PORT	N/A	N/A
CPU	M1241A	T2c CPU	CPU WITH INTEGRAL CONET PORT	N/A	N/A
CPU	M1260A	P3 CPU	CPU WITH IEC61131 PROGRAMMING	N/A	N/A
CPU	M1261A	P3c CPU	P3 CPU WITH INTEGRAL CONET PORT	N/A	N/A
CPU	M1262A	P3e CPU	P3 CPU WITH INTEGRAL ETHERNET TCP/IP PORT	N/A	N/A
DI/O	M1321A	8 DI C	8 DI CONTACT I/P (PFC & WETTED) FULL ISO.	6	1
DI/O	M1322A	16 DI/24	16 DIG INPUT LOGIC ISOLATION. COMMON	6	2
DI/O	M1323A	16 DI/48	16 DIG INPUT LOGIC ISOLATION. COMMON	6	18
DI/O	M1326A	32DI	32 DIG INPUT LOGIC ISOLATION. COMMON Uses Ribbon Headers	7	4
DI/O	M1341A	16 DO	16 DIG OUTPUT LOGIC ISOLATION	9	7
DI/O	M1342A	32 DO	32 DIG OUTPUT LOGIC ISOLATION Uses Ribbon Headers	16	8
DI/O	M1372A	8 RO N/O	8 RELAY O/P 2A 250V AC N/O CONTACTS	13	12
AI/O	M1403A	16 AI	16 ANALOG IN (4-20mA) 2 x COMMON -VE	14	30
AI/O	M1412A	8 AO	8 ANALOG OUT (4-20mA) COMMON -VE	17	34
GW	M1431A	8 VC iso	8 ANALOG INPUT FULLY ISOLATED	41	42
GW	M1432A	8TC/mV iso	8 THERMOCOUPLE/MILLIVOLT FULLY ISOLATED INPUT	41	41
GW	M1433A	6RTD iso	6 RTD FULLY ISOLATED INPUT	41	43
NIM	M1581A	MODBUS NIM	MODBUS SERIAL NETWORK INTERFACE MODULE	96	97
NIM	M1582A	CONET NIM	CONET NETWORK INTERFACE MODULE	96	98
NIM	M1583A	PANAMETRICS NIM	PANAMETRICS ANALYSER NETWORK INTERFACE MODULE	95	99
NIM	M1584A	VISTA NIM	VISTA ANALYSER NETWORK INTERFACE MODULE	95	100
NIM	M1585A	SERIAL NIM	PROGRAMMABLE SERIAL NETWORK INTERFACE MODULE	97	101
NIM	M1586A	CONET PNIM	PROGRAMMABLE CONET NETWORK INTERFACE MODULE	97	102
NIM	M1589A	HART DUAL NIM	DUAL CHANNEL HART NETWORK INTERFACE MODULE	96	105
SFM	M1701A	DM	DUMMY MODULE	N/A	N/A
SFM	M1711A	4 HSC	4 CH HIGH SPEED COUNTER MODULE. : UP TO 50KHZ		
SFM	M1712A	8 HSC	8 CH COUNTER MODULE. : CH 1-7 1KHZ CH 8 UP TO 10KHZ	106	55
SFM	M1751A	MEM	MEMORY MODULE FITTED WITH 256K STATIC RAM. EXP TO 1MEG	24	16
SFM	M1752A	MEM EXP	MEMORY UP GRADE KIT -256K STATIC RAM BLOCKS.	24	16
ACC	M1801A	CM EBUS	CONFIG MODULE EPROM BUS	N/A	N/A
ACC	M1811A	EC 400	EXTENSION CABLE 400mm	N/A	N/A
ACC	M1831A	PROG CABLE	PROGRAMMING CABLE FOR CPUs	N/A	N/A
ACC	M1850A	MODULE KEYS	MODULE KEYS TO FIX MODULE POSITIONS ON BASES	N/A	N/A
SW	CC030A	ISaGRAF	IEC61131 PROGRAMMER'S WORKBENCH	N/A	N/A
SW	M1921A	MAXILARM	MAXILARM DISTRIBUTED ANNUNCIATOR SOFTWARE	N/A	N/A
SW	M1922A	MAXITEL	MAXITEL POINT TO POINT TELEMETRY SOFTWARE	N/A	N/A
SW	M1983A	MODBUS	MODBUS SLAVE OR MASTER SOFTWARE DRIVER	N/A	N/A
SW	CC011A	EZI-FORTH	EZIFORTH PROGRAMMERS KIT	N/A	N/A
SW	CC007A	CONET EXPLORER SUITE	CONET EXPLORER FOR M123X SERIES (T1) CPUs	N/A	N/A