AMERICAN AUTO-MATRIX®
A Cylon Energy Inc. Company

BACnet® Plant Controller
CBM08 / CBM12 / CBM16
CBM24 / CBM24k / CBM24LC

The CBM (BACnet Main Plant) range of controllers are ideally suitable for main plant control, including AHUs, Boilers, Rooftop Units, Lighting, etc.

BENEFITS

Unique Flexibility with UniPuts™

The CBM range has all the benefits of the Cylon BACnet range which uniquely presents UniPuts™ - a revolutionary answer to flexible point configuration, offering maximized utilization of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, it has a wide application scope with the flexibility of being stand-alone or network enabled.

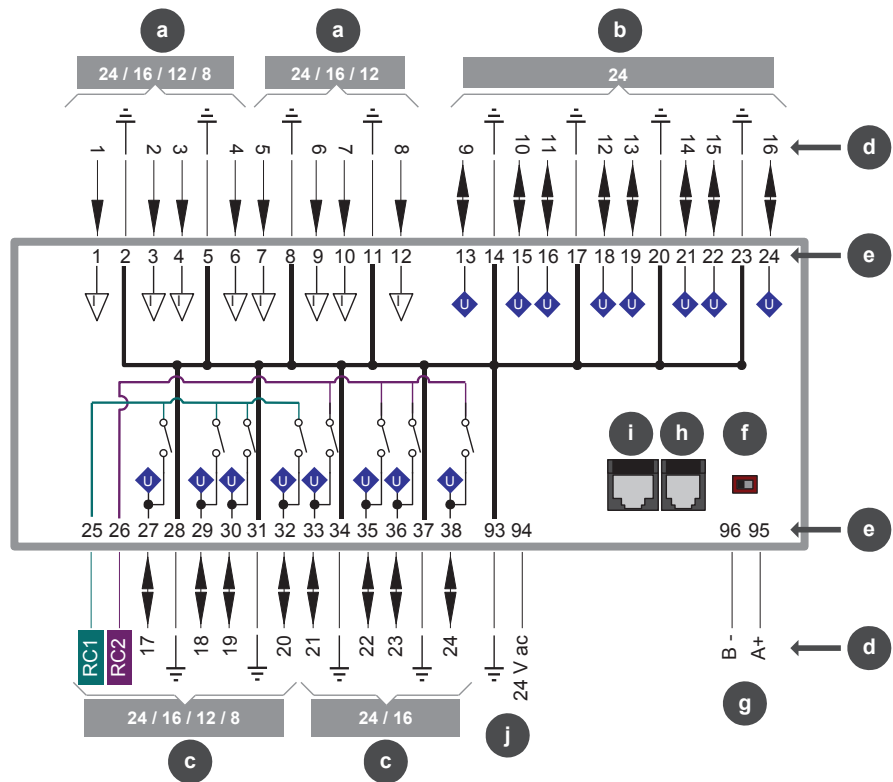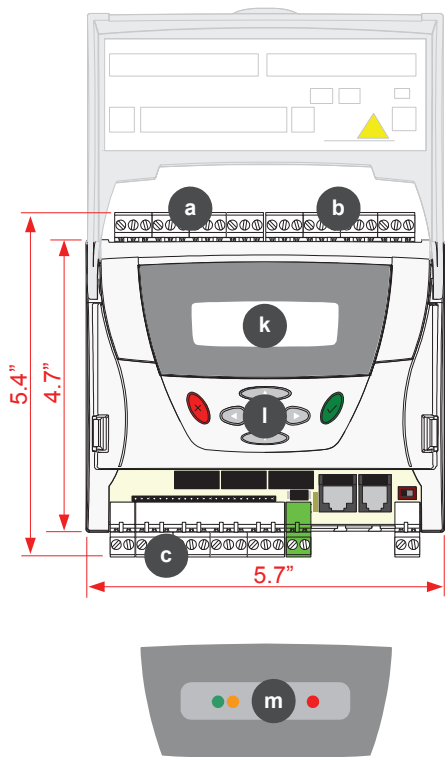### Cost-effective, Low Entry Point for Building Control

The CBM range offers reduced costs in terms of implementation, training, rollout, and maintenance. Modular, extendible packages along with low installation costs mean a low entry point for building control.

Highly Programmable & Extendable via Web-enabled HVAC Technology

The CBM range offers an advanced web-based 32-bit architecture, with advanced programmability. built-in diagnostics, along with expanded data logging and strategy storage, is further enhanced by UniPuts, offering up to 8 Universal inputs, up to 8 UniPuts (AI/DI/AO/DO) and up to 8 UniPuts with relays.

	CBM08	CBM12	CBM16	CBM24	CBM24k	CBM24LC
UniPuts				8	8	8
UniPuts + Relays Hardware connections that can be used as inputs, outputs, or relays (software selectable)	4	4	8	8	8	8
Universal Inputs Hardware connections that can be used as analog or digital inputs (software selectable)	4	8	8	8	8	8
Controllers per Fieldbus (up to)	32	32	16	16	16	16
Strategy Blocks	1024	1024	1024	1024	1024	400
Flash-upgradeable Firmware						
Time-stamped data logs for increased flexibility and longer monitoring times						
32 data logs with up to 1024 entries per catalog						
Powerful diagnostics with rapid error-free commissioning technologies						

Dimensions: 5.4", 4.7", 5.7"

Terminal groupings (top): a: 24 / 16 / 12 / 8 | a: 24 / 16 / 12 | b: 24
Point Numbers (d): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Terminal Numbers (e): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 93 94 96 95
RC1 RC2 17 18 19 20 21 22 23 24 24 V ac
B - A+
c: 24 / 16 / 12 / 8 | c: 24 / 16 | j

	CAUTION - DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENTTYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
a	**Universal Input**
b	**UniPut**
c	**UniPut + Relay** When these outputs are configured as 'relay' they use either terminal 25 RC1 or terminal 26 RC2 as their common point. Otherwise, they use 28, 31, 34, or 37 ($\frac{1}{=}$) as their common point
RC1 RC2	**Relay Common**
$\frac{1}{=}$	**Common**
d	**Point Numbers**
e	**Terminal Numbers**
f	**Fieldbus Terminator**
[□■]	**OFF** (fieldbus not terminated at this controller)
[■□]	**ON** (fieldbus terminated at this controller)
g	**Fieldbus Port**
h	**External Keypad Port**
i	**Service Port**
j	**Power 24 VAC**

KEYPAD VARIANTS

k	**Text Display (LCD)**
l	**Internal Keypad** Pressing ⬭ and ⊘ together toggles the display between configuration and program modes

Pressing ⬭ and ⊘ changes the contrast of LCD display |

NON-KEYPAD VARIANTS

m	**Indicator LEDs**
	Red LED Continuous : Optional battery is healthy Flash once/second : No battery / battery low *bettery is present only on custom versions*
	Green LED Continuous : Strategy servicing and no comms Flash rapidly (every 100ms) : Strategy not servicing Flash once/second : MS/TP comms & strategy servicing *when service port is in use, the green LED blinks off as service port communication is received*
	Orange LED Off : Normal operation On : Priority Array set above 16, for one or more hardware points, by external BACnet client or by the CEC
	Cycle left to right (green-orange-red) : terminal mode
	Cycle right to left (red-orange-green) : upgrade in progress while in terminal mode *strategy not serviced while in terminal mode*
	Cycle green to orange : global comms/setup problem
	Green and orange flash simultaneously : global comms/ setup problem and priority array set above 16 by external BACnet client, or the CEC.

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SPECIFICATIONS

MECHANICAL

Size (excluding terminal plugs)	5.7 x 4.7 x 2.6" (144 x 118 x 65 mm)
Enclosure / Mounting	Injection-molded ABS / DIN Rail

ENVIRONMENT *Intended for field installation within another enclosure*

Temperature / Humidity	32˚ - 122˚ F (0˚ - 50˚ C) / 0 - 90 % Relative Humidity non-condensing
EMC Immunity	EN 50082-1
EMC Emission	EN 55011 Class B

WIRING *Use Copper or Copper-clad Aluminum conductors only*

Termination	PCB-mounted plug terminal connections
Conductor Area	Max : AWG 12 (3.09 mm^2) Min : AWG 22 (0.355 mm^2)
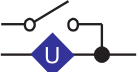
ELECTRICAL

Supply Requirements	24 VAC +/- 20% 50/60 Hz
Transformer Rating	With UCKRA420 : 25 VA without UCKRA420 : 20 VA
Power / Fuse Rating	10 Watts maximum / 1A resettable

PROCESSOR

Type	Hitachi (Renesas) SuperH SH17034 32-bit RISC @ 20 Mhz
Operating System Memory	512k flash
User-Programmable Memory	System Memory 768kb flash & 128kb RAM (battery backup for two years)
Real-time Clock	Battery backup for two years

INPUTS/OUTPUTS *Screened cable is recommended for all input connections*

	CBM24 CBM24K CBM24LC	CBM16	CBM12	CBM08	
Universal Inputs	8 (pts 1-8)	8 (pts 1-8)	8 (pts 1-8)	4 (pts 1-4)	**Software Selectable Interfaces** · Active Input 0 – 10 V @ 182 KΩ. 10-bit resolution · Passive Input for a large range of temp sensors, 10K3A1 sensors recommended. 10-bit resolution · Active Current Input 0 – 20 mA @ 390 Ohms. 10 bit-resolution · Digital Volt-Free contact @ 1 mA continuous · Pulse Counting up to 20 Hz, minimum pulse width 25 mS · Potentiometer input (0 KΩ -10 KΩ, 1 KΩ - 11 KΩ etc)
UniPuts	8 (pts 9-16)	0	0	0	**Software Selectable Interfaces** · Active Input 0 – 10 V @ 40 KΩ. 10-bit resolution · Active Output 0 – 10 V @ 20 mA max load · Digital Volt-Free contact @ 25 mA continuous · 24 VAC detect
UniPuts + Relays	8 (pts 17-24)	8 (pts 17-24)	4 (pts 17-20)	4 (pts 17-20)	**Software Selectable Interfaces** · Active Input 0 – 10 V @ 40 KΩ. 9-bit resolution · Active Output 0 – 10 V @ 20 mA max load · Digital Volt-Free contact @ 25 mA continuous · N.O. 24 VAC relay contacts, 2 A continuous / 15 A inrush · 24 VAC detect

COMMUNICATIONS

RS-232 Service Port	@ 1.2k, 2.4k, 9.6k 19.2k, or 38.4k Baud (defaults to 38.4k) [cable: CC20/CAB]
BACnet MS/TP Fieldbus Port	RS-485 @ 9.6k, 19.2k, 38.4k, or 76.8k Baud (defaults to 38.4k)
Keypad Port	@ 9.6k Baud, RJ-11 socket
Modem	Modem connection supported through RS-232 service port [cable: CC20/CAB]

INTERFACE

Software	Cylon Engineering Center / BACnet Operator Workstation
Optional Internal Keypad	CBM24K model - LCD 4x20 characters, 6 buttons. Compatible with UCKRA420
Remote Keypad	UCKRA420 Serial Text Keypad connected via RJ-11 port. Maximum cable length 50 m

SOFTWARE FEATURES

Configuration Mode	Accessible via Internal or External Keypad/display device	
Firmware Upgrading via Service Port		
	CBM08, CBM12, CBM16, CBM24, CBM24k	**CBM24LC**
Maximum Number of Analog Points	1024	1024
Maximum Number of Digital Points	1024	1024
Maximum Number of Strategy Blocks	1024	400
Maximum Controllers per Fieldbus	99*	99*
	It is recommended for typical conditions that the number of main plant controllers on a main plant fieldbus be limited to 16. MS/TP devices with a fractional (1/4 or smaller) unit load will be required in order to extend a single fieldbus trunk beyond 32 devices. Both CBM and CBT controllers are 1/4 load devices. Please refer to MAN0106 for recommendation on configuring a specific network for optimal communication speeds.	
Maximum Time Schedules	10	10
Maximum Time Schedules Weekly Events	24	24
Maximum Time Schedules Exceptions	5	5
Maximum Time Schedules Exception Events	10	10