

SEALED SIX HEAT EXCHANGERS 1" PITCH ATR ENCLOSURE

- » Designed expressly for high wattage conduction-cooled VPX applications
- » Increased thermal performance with respect to CM 0.8" pitch SIXHEX
- » Available in 5 or 7 slot versions for conduction-cooled modules
- » Oversized forced-air heat exchanger sidewalls, top cover & rear panel
- » Two internal reverse forced-airflow heat exchangers
- » Extensive variety of military power supply options
- » Accepts payloads up to 150 watts per slot
- » Very high airflow dual PX3 military rear fans
- » Dry air contaminant-free applications
- » Extreme internal forced-air recirculation



SIXHEX-1"
SIX HEAT EXCHANGERS

↑ **600W**
PAYLOAD POWER DISSIPATION



SIX HEAT EXCHANGERS 6U ATR



Six Heat Exchangers 1" 6U ATR - Contaminant-free Enclosure suitable for very high wattage VPX applications with 0.8, 0.85 & 1" pitch 6U eurocards

Our 6U *Six Heat Exchangers* enclosures have been designed for latest generation 5 and 7 slot conduction-cooled VPX systems that require extreme power dissipation and extended 1" pitch slot size. CM SIXHEX-1" chassis improve SIXHEX-0.8" performance due to an extended card-cage and increased conduction capacity. Ideal for VPX systems operating in hostile air environments that require the integration of high power payload modules up to 150 watts.

CM ATR SIXHEX 1" Pitch Specifications

	CM-ATR-125/SIXHEX	CM-ATR-135/SIXHEX
SLOTS WEIGHT	5 Slots 10 Kg	7 Slots 14 Kg
DIMENSIONS	W 203 mm H 259 mm D 510 mm	W 254 mm H 259 mm D 510 mm
CGTR THERMAL RES.	$\Delta T/W = 0.063^{\circ}\text{C}$ (CIA = 200 CFM)	$\Delta T/W = 0.056^{\circ}\text{C}$ (CIA = 200 CFM)
MAX. PSU POWER	825 watts (28 VDC 675 watts)	825 watts (28 VDC 675 watts)
STD BACKPLANE	VME64X or cPCI or VPX or Hybrid VME64X/VPX 6U 1" pitch backplanes	
INTERNAL FAN	110 CFM	110 CFM
REAR FAN	200/280 CFM (2 x PX3)	200/280 CFM (2 x PX3)
FRONT PANEL AREA	161 mm x 170 mm	212 mm x 170 mm
CM FRONT PANEL I/O	6 Power Pins (23 Amp) & 504 I/O Pins (5 Amp)	6 Power Pins (23 Amp) & 798 I/O Pins (5 Amp)
MOUNTING TRAY	CM-TR-125/SIXHEX	CM-TR-135/SIXHEX

Board Format, PSU Input Voltages, MTBF & Operating Temperature are as per the 6U SIXHEX 0.8" pitch series

COMPLEMENTARY INFORMATION

- CM ATR Features
- CM ATR Backplanes
- CM ATR PSU

PART NUMBER EXAMPLE:

CM-ATR-135/SIXHEX/VPX/90-265VAC/C-825W/TSU/UDP/HTC/
SBC/CCS/F115-400/EMIG/E

RECOMMENDED PAYLOAD POWER RATINGS

(SELF DISSIPATING @ 55°C AMBIENT: NO EXTERNAL AIRFLOW OR COLD PLATE PROVIDED)

CM-ATR-135/SIXHEX (7 SLOT)

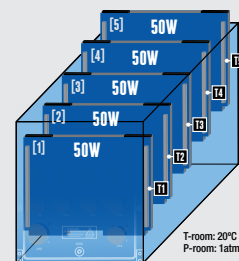
≤ 600 watts

CM-ATR-125/SIXHEX (5 SLOT)

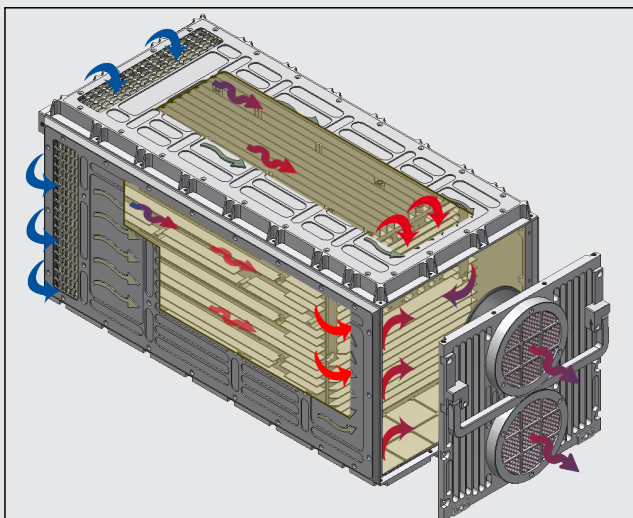
≤ 500 watts



CM ATR CHASSIS THERMAL TESTING



6U SIXHEX-1 Military ATR Chassis Performance designed for high wattage, 1" pitch - sealed applications



VERSIONS

	CGTR	CPTR
CM-ATR-125/SIXHEX :	0.063°C/W	0.069°C/W
CM-ATR-135/SIXHEX :	0.056°C/W	0.0618°C/W

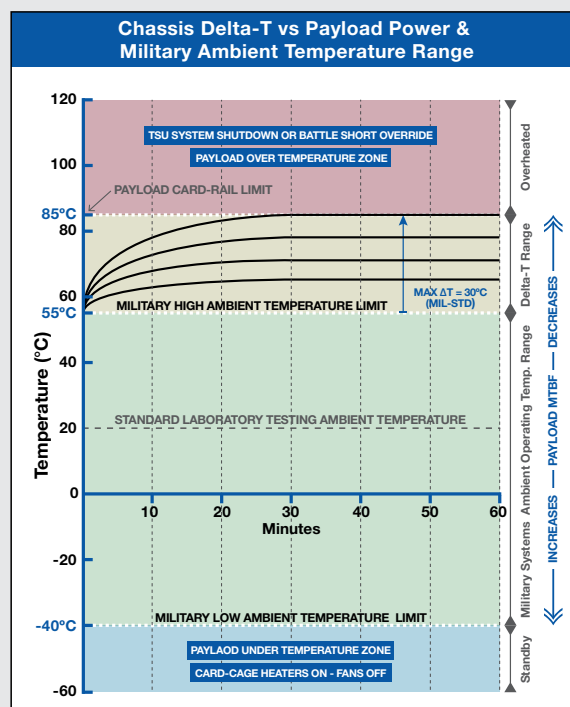
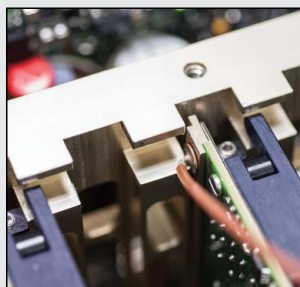
CAPABILITIES

- Contaminant-free enclosure
- Available in 1/2 ATR, 3/4 ATR versions
- VPX ready (1.0" Pitch)
- Accepts Conduction & Air-cooled 6U Modules
- Flexible Top & Bottom I/O wiring
- In-line EMI/EMC MIL-STD-461F Filter
- Up to 500 watts Total Payload Power @ 30°C Delta-T*
- Integrated Temperature Supervisory Unit (TSU)
- 6 Integrated Heat Exchangers
- Integrated Rear fan guards
- Maintenance free operation
- Front panel user indicators
- Stand alone low weight ATR
- Internal card-cage airflow recirculation
- Independent Fan & Power Supply input voltage
- Military Operating Temperature (-40°C | +85°C)
- Customizable to specific requirements
- Low Profile Mounting Tray with quick release
- Manufactured with US MIL components

MAXIMUM MILITARY SYSTEM DELTA-T

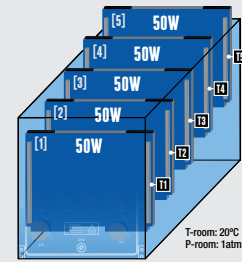
Maximum conduction-cooled payload card-rail temperature is typically 85°C. To comply with MIL-STD-810, systems must be operational up to 55°C ambient (worst case scenario).

In theory, this restricts payload maximum ΔT to 85°C - 55°C ($\Delta T_{max} = 30^\circ C$). Temperatures in excess of 85°C dramatically increase the risk of module failure and reduce component MTBF. Military limits may be relaxed for systems serving in 'indoor environments' (e.g. to 40°C ambient). Under these conditions ΔT margin can be increased to 85°C - 40°C = 45°C ΔT_{max} .



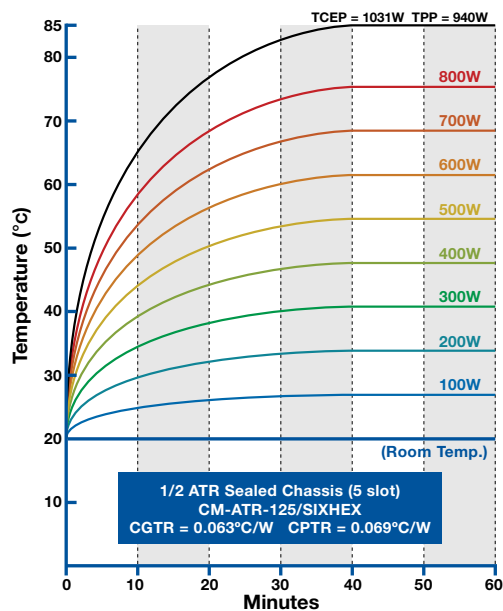


CM ATR CHASSIS THERMAL TESTING

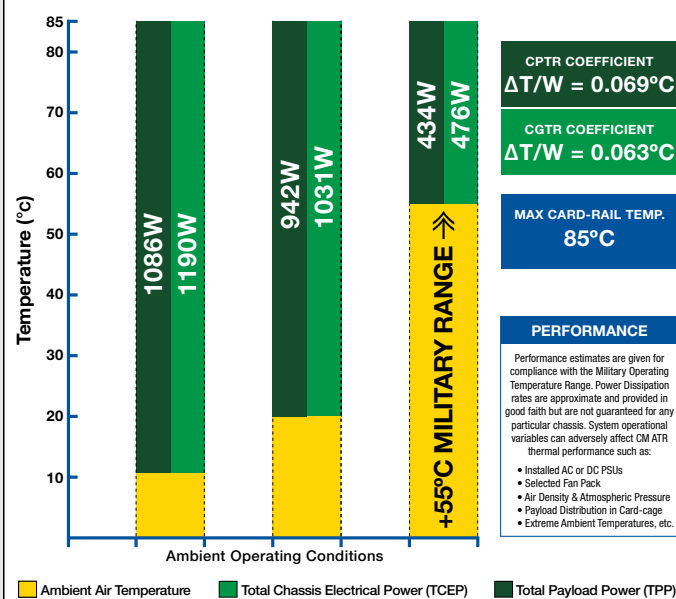


6U SIXHEX-1 Military ATR Chassis Performance designed for high wattage, 1" pitch - sealed applications

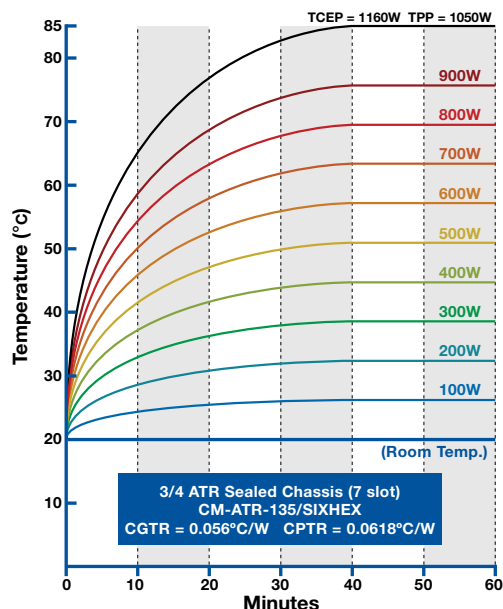
**Self-dissipation Military Chassis Figures
Total Payload Power vs Board Card-rail Temperature**



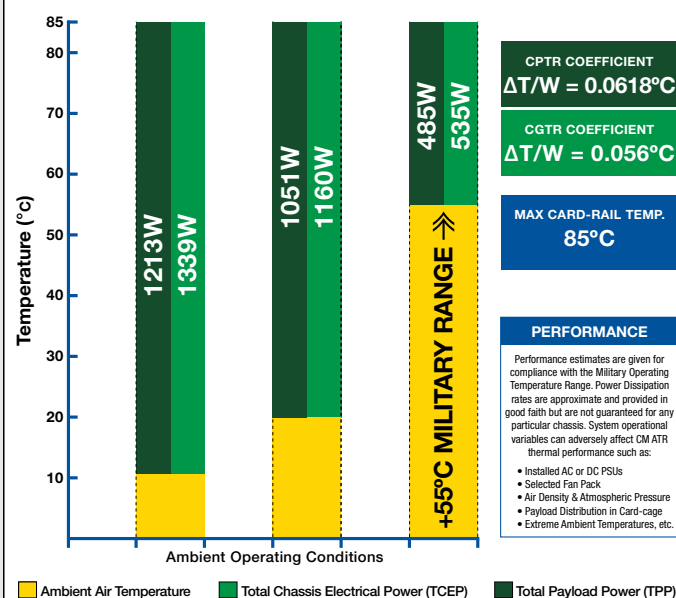
**CM-ATR-125/SIXHEX (5 Slot - 6U ATR - 1" Pitch)
Power Dissipation vs Ambient Temperature**



**Self-dissipation Military Chassis Figures
Total Payload Power vs Board Card-rail Temperature**



**CM-ATR-135/SIXHEX (7 Slot - 6U ATR - 1" Pitch)
Power Dissipation vs Ambient Temperature**





CM ATR ORDERING INFORMATION



6U Military ATR Chassis Ordering high performance military aerospace enclosure part number configuration

CHASSIS GENERIC PART NUMBER:

CM-ATR-S5 /CT /B /I /W /3.3 /D1 /D2 /R /S /FP /TC /BC /CS /F /G /C

/S5 COTS Enclosure Size/Model

CM-ATR-25: 5 Slot 6U Enclosure (0.8" pitch - 1/2 ATR type)
CM-ATR-125: 5 Slot 6U Enclosure (1" pitch - 1/2 ATR type)
CM-ATR-35: 7 Slot 6U Enclosure (0.8" pitch - 3/4 ATR type)
CM-ATR-135: 7 Slot 6U Enclosure (1" pitch - 3/4 ATR type)
CM-ATR-45: 12 Slot 6U Enclosure (0.8" pitch - 1 ATR type)

/CT Enclosure Cooling Technique

S: Standard Sealed (0.8" pitch)
SEF: Sealed with Extended Fins (0.8" pitch)
SEF-HP: Sealed with Extended Fins + 18/20 Heat Pipes (0.8" pitch)
HES: Sealed with 4 Heat Exchangers (0.8" and 1" pitch versions)
SIXHEX: Sealed with 6 Heat Exchangers (0.8" and 1" pitch versions)
SIXHEX-HP: Sealed with 6 Heat Exchangers and integrated Heat Pipes (0.8" pitch with 16HP and 1" pitch with 20HP versions)
FAC: Flowthrough Air Cooled Enclosure (open, non-sealed) (0.8" pitch)

/B Backplane Type (slot pitch according to chassis model)

VME64x: Military VME64x Backplane
cPCI: Military Compact PCI Backplane
VPX: VITA 46 Military VPX Backplane
VME64x/VPX: Hybrid VME64x mixed with VPX Military Backplane
VME64x/cPCI: Hybrid VME64x mixed with cPCI Military Backplane
Note: Hybrid dual bus backplanes are available for a limited set of chassis only

/I PSU Input Power Voltage

28VDC: 28 VDC Input
48VDC: 48 VDC Input
72VDC: 72 VDC Input
270VDC: 270 VDC Input
90-264VAC: Autorange 90-264 VAC @ 47-880 Hz Input
200VAC-3PH: 200 VAC 3 Phase @ 47-880 Hz Input

/W Power Supply Unit Watts

All PSUs = All PSUs except 28 VDC input | 28 VDC = 28 VDC input only

PSUs for CM-ATR-25 (5 slot)

Models: /S or /SEF or /SEF-HP or /HES (0.8") or /FAC

300W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 5A, ±12 VDC @ 8A)
400W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 5A, ±12 VDC @ 12A)

Models: /S or /SEF or /SEF-HP or /HES or /SIXHEX or /SIXHEX-HP

A-475W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 8A)
A-575W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 12A)
B-450W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 45A, ±12 VDC @ 8A)
B-550W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 45A, ±12 VDC @ 12A)
C-475W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 16A, -12 VDC @ 8A)
C-575W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 21A, -12 VDC @ 12A)

MOUNTING TRAY GENERIC PART NUMBER:

CM-TR-S5 /CT

PSUs for CM-ATR-(1)35 (7 slot) & CM-ATR-125 (5 Slot 1" Pitch)

Models: /S or /SEF or /SEF-HP or /HES (0.8") or /FAC

400W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 5A, ±12 VDC @ 8A)
500W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 5A, ±12 VDC @ 12A)

Models: /S or /SEF or /SEF-HP or /HES or /SIXHEX or /SIXHEX-HP

A-475W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 8A)
A-575W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 12A)
A-675W: 28 VDC (+5 VDC @ 80A, +3.3 VDC @ 22A, ±12 VDC @ 8A)
A-775W: All PSUs (+5 VDC @ 80A, +3.3 VDC @ 22A, ±12 VDC @ 12A)
B-450W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 45A, ±12 VDC @ 8A)
B-550W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 45A, ±12 VDC @ 12A)
B-564W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 80A, ±12 VDC @ 8A)
B-664W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 80A, ±12 VDC @ 12A)
C-475W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 16A, -12 VDC @ 8A)
C-575W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 21A, -12 VDC @ 12A)
C-775W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 41A, -12 VDC @ 8A)
C-825W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 22A, +12 VDC @ 41A, -12 VDC @ 12A)
D-550W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 45A, ±12 VDC @ 8A)
D-650W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 45A, ±12 VDC @ 12A)
E-550W: 28 VDC (+5 VDC @ 20A, +3.3 VDC @ 45A, +12 VDC @ 16A, -12 VDC @ 8A)
E-650W: All PSUs (+5 VDC @ 20A, +3.3 VDC @ 45A, +12 VDC @ 21A, -12 VDC @ 12A)
F-575W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 22A, +12 VDC @ 16A, -12 VDC @ 8A)
F-675W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 22A, +12 VDC @ 21A, -12 VDC @ 12A)

Dual-redundant PSUs for /HES or /SIXHEX or /SIXHEX-HP models

R2x500W: (+5 VDC @ 25A, +3.3 VDC @ 23A, ±12 VDC @ 12A)

PSU for CM-ATR-45 (12 slot)

Models: /S or /SEF or /SEF-HP or /HES (0.8") or /FAC

950W: 28 VDC (+5 VDC @ 80A, +3.3 VDC @ 45A, ±12 VDC @ 16A)
1050W: All PSUs (+5 VDC @ 80A, +3.3 VDC @ 45A, ±12 VDC @ 21A)

Models: /HES or /SIXHEX or /SIXHEX-HP

A-950W: 28 VDC (+5 VDC @ 80A, +3.3 VDC @ 45A, ±12 VDC @ 16A)
A-1050W: All PSUs (+5 VDC @ 80A, +3.3 VDC @ 45A, ±12 VDC @ 21A)
B-950W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 45A, +12 VDC @ 33A, -12 VDC @ 16A)
B-1100W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 45A, +12 VDC @ 41A, -12 VDC @ 20A)
B-1065W: 28 VDC (+5 VDC @ 80A, +3.3 VDC @ 80A, ±12 VDC @ 16A)
B-1165W: All PSUs (+5 VDC @ 80A, +3.3 VDC @ 80A, ±12 VDC @ 21A)
C-864W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 80A, ±12 VDC @ 16A)
C-964W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 80A, ±12 VDC @ 20A)
C-1225W: 28 VDC (+5 VDC @ 80A, +3.3 VDC @ 160A, ±12 VDC @ 16A)
C-1425W: All PSUs (+5 VDC @ 80A, +3.3 VDC @ 160A, ±12 VDC @ 21A)
D-1350W: 28 VDC (+5 VDC @ 160A, +3.3 VDC @ 80A, ±12 VDC @ 16A)
D-1550W: All PSUs (+5 VDC @ 160A, +3.3 VDC @ 80A, ±12 VDC @ 21A)

Dual-redundant PSUs for /HES or /SIXHEX or /SIXHEX-HP models

R2x725W: (+5 VDC @ 20A, +3.3 VDC @ 23A, ±12 VDC @ 12A, ±28 VDC @ 9A)
R2x675W: (+5 VDC @ 60A, +3.3 VDC @ 23A, ±12 VDC @ 12A)
R2x625W: (+5 VDC @ 20A, +3.3 VDC @ 68A, ±12 VDC @ 12A)
R2x710W: (+5 VDC @ 20A, +3.3 VDC @ 23A, +12 VDC @ 32A, -12 VDC @ 12A)



/3.3 DC/DC AUX0 fitted for 3.3VDC (CM-ATR-25 & CM-ATR-35)

3.3-75W: 3.3VDC @ 22A (in lieu of default 3.3 VDC @ 5A)

Optional DC/DC AUX0 converter on Backplane fitted for 3.3VDC. Option suited for 1st generation PSU models 300W/400W/500W. Note: If /3.3-75W is not selected, DC/DC power socket AUX0 remains free to the user.

/D1 DC/DC AUX1 (CM-ATR-35 & CM-ATR-45)

/D2 DC/DC AUX2 (CM-ATR-45)

D1: 100W Optional DC/DC Converter on Backplane. User-defined output 1
D2: 100W Optional DC/DC Converter on Backplane. User-defined output 2

Backplane auxiliary DC/DC converter output options: +2VDC 50W, -2VDC 50W, +3.3VDC 75W, -3.3VDC 75W, +5VDC 100W, -5VDC 100W, +12VDC 100W, -12VDC 100W, +15VDC 100W, -15VDC 100W, +28VDC 100W, -28VDC 100W, +48VDC 100W, -48VDC 100W.

Ordering Examples: 48-100W » 48VDC @ 2A / -5-100W » -5VDC @ 20A / 2-50W » 2VDC @ 25A / ±15-100W » ±15VDC @ 6A

/R Redundant PSU (Plug-in for VMEbus systems only)

RPSU for CM-ATR-35 (7 slot) & CM-ATR-45 (12 slot)

RA-475W: 28 VDC (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 8A)

RB-575W: All PSUs (+5 VDC @ 40A, +3.3 VDC @ 22A, ±12 VDC @ 12A)

/S Temperature Supervisory Unit

TSU: Optionally installed in backplane (for /S or /SEF or /FAC models)

Note: TSU is fitted as standard in /SEF-HP, /HES, /SIXHEX & /SIXHEX-HP models

/FP Front Panel Layout

CMP: Standard CM front panel fitted with MIL-DTL-38999 connectors

UDP: User-defined front panel layout (requires customer drawing)

/TC Chassis Top Cover

STC: Standard top cover (wiring clearance 20mm)

FTC: Finned top cover (wiring clearance 20mm)*

HTC: High profile top cover (wiring clearance 35mm)

HETC: Heat Exchanger top cover (wiring clearance 20mm)**

EHETC: Extended Heat Exchanger top cover (wiring clearance 35mm)

** FTC chassis top cover is standard on /SEF & /SEF-HP models*

*** HETC chassis top cover is standard on /HES, /SIXHEX & /SIXHEX-HP models*

/BC Chassis Bottom Cover

SBC: Standard bottom cover (wiring clearance below backplane 25mm)

HBC: High profile bottom cover (wiring clearance below backplane 50mm)*

** 50mm bottom clearance is standard on /HES-1", /SIXHEX & /SIXHEX-HP models*

/CS Chassis Card-Cage Slot

MCS: Mixed Card-cage slots (mixed conduction-cooled & air-cooled boards)

CCS: Conduction-cooled Card-cage slots (conduction-cooled boards only)*

** CCS card-cage is standard on /HES-1", /SIXHEX-1" & /SIXHEX-HP-1" models*

/F Rear-Mounted Fan Assembly

Fans for CM-ATR-(1)25 (5 slot) & CM-ATR-(1)35 (7 slot)

Models: /FAC

F115-400: 1x65 CFM 115 VAC @ 400Hz Rotron PX2 Military fan

F200-400: 1x120 CFM 200 VAC 3PH @ 400Hz Rotron PX2 fan

F28: 1x65 CFM 28 VDC Rotron PX2 Military fan (through DC/AC converter)

Models: /HES (0.8")

F115-400: 2x65 CFM 115 VAC @ 400Hz Rotron PX2 Military fans

F200-400: 2x120 CFM 200 VAC 3PH @ 400Hz Rotron PX2 fans

F28: 2x65 CFM 28 VDC Rotron PX2 Military fans (through DC/AC converter)

Models: /HES (1") /SIXHEX or /SIXHEX-HP

F115-400: 2x100 CFM 115 VAC @ 400Hz Rotron PX3 Military fans

F200-400: 2x140 CFM 200 VAC 3PH @ 400Hz Rotron PX3 fans

F28: 2x100 CFM 28 VDC Rotron PX3 Military fans

F115-60: 2x100 CFM 115 VAC @ 60Hz Rugged fans

F220-50: 2x100 CFM 220 VAC @ 50Hz Rugged fans

Fans for CM-ATR-45 (12 slot)

Models: /FAC

F115-400: 2x100 CFM 115 VAC @ 400Hz Rotron PX3 Military fans

F200-400: 2x140 CFM 200 VAC 3PH @ 400Hz Rotron PX3 fans

F28: 2x100 CFM 28 VDC Rotron PX3 Military fans

Models: /HES

F115-400: 4x65 CFM 115 VAC @ 400Hz Rotron PX2 Military fans

F200-400: 4x120 CFM 200 VAC 3PH @ 400Hz Rotron PX2 fans

F28: 4x65 CFM 28 VDC Rotron PX2 Military fans (through DC/AC converter)

Models: /SIXHEX or /SIXHEX-HP

F115-400: 4x100 CFM 115 VAC @ 400Hz Rotron PX3 Military fans

F200-400: 4x140 CFM 200 VAC 3PH @ 400Hz Rotron PX3 fans

F28: 4x100 CFM 28 VDC Rotron PX3 Military fans

F115-60: 4x100 CFM 115 VAC @ 60Hz Rugged fans

F220-50: 4x100 CFM 220 VAC @ 50Hz Rugged fans

VAP: Vehicle Air-Plenum according to system specs (external forced air source)

- No rear fan required for /S, /SEF & /SEF-HP models, omit option from part number

- Rugged fans are fitted with aluminum housing. Operating range: -10°C to +70°C

- Full military Rotron PX2 & PX3 AC fans. Operating range: -54°C to +125°C

- Note: Fan input voltage can be selected independently of main PSU voltage

/G Fan Finger Guards

STDG: Standard Rotron PX2/PX3 finger guards

EMIG: Optional EMI shielding finger guards with honeycomb filter

GNF: Optional finger guards with acoustic noise filter (-5dB)

/C Chassis Color

B: Black, **G:** Navy Grey, **E:** Army Dark Earth, **W:** White, **R:** Red, **PT:** Platinum,

YW: Yellow, **GN:** Green, **BLU:** Dark Blue, **CR:** Chromate, **O:** Other (user-defined)

PART NUMBER EXAMPLE:

CM-ATR-45/HES/VME64x/90-264VAC/A-1050W/15-100W/-15-100W/UDP/HTC/HBC/MCS/F200-400/EMIG/B

- 12 slot, Heat Exchanger Sidewalls. 6U Avionics Enclosure.
- 12 slot VME64x backplane for 6U boards (0.8" pitch).
- Auto-range 90-264VAC @ 47-880Hz Input Power Supply.
- A-1050W power supply (+5VDC @ 80A, +3.3VDC @ 45A, ±12VDC @ 21A).
- (±)15VDC @ 6.6A DC/DC AUX1 & AUX2 user output on backplane.
- Temperature Supervisory Unit fitted as standard.
- User-defined front panel layout.
- High profile Top & Bottom cover. Universal Card-cage Slots.
- 4x Rotron PX2 military fan 115VAC @ 400Hz (260 CFM total).
- EMI shielded finger guards. Enclosure color: Black.



based on system total payload power dissipation

CM COMPUTER MILITARY COTS TECHNOLOGIES