

# Carter Machinery EMCP Retrofit Program Standard Door-Box Kit & Accessories

APRIL 2020

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# RETROFITS

- Carter PSD Engineering- Generator control panel retrofit and engineering solutions since 2012.
- Major shift beginning in 2014
  - Production approach with a standard product, documentation, drawings, and processes
  - Currently supporting 38 Caterpillar dealers nationwide
  - Over 900 kits have been completed to date
- Carter Engineering Team
  - 3 Engineers (Matt Nolan, Tommy Coburn & Mark Nuckols)
  - Administrator & logistics coordinator (Michelle Crowder)
- Focus- CAT mechanical and electronic engine and generator applications with outdated or obsolete controls.

# RETROFITS CONT.

- Competitor Gensets- EMCP4.x solutions for Cummins, Kohler, Detroit Diesel, Katolight, etc....
- Other Control Platforms- Woodward, Basler, DEIF, Deep Sea and Auto Maskin.
- Dealer friendly, plug & play style kits
- Submittal packages available upon request
- EMCP4 Kits: Over 30 available options
  - EMCP 4.x door panel kits are available in various sizes and models.
    - EMCP 4.x complete box kits are available in the following standard sizes: 14x22, 14x27, 14x30, 17x28 & 17x11
    - EMCP4.x available in both local and remote configurations
  - Carter kits are compatible with all previous EMCP versions and with CAT Electro-mechanical controllers.
  - Custom configurations are available for anything ranging from a single generator to a paralleled system

# Site Survey

## CAT Control Panel Retrofit Site Survey



Carter Machinery Co., Inc.

<b>Location</b>			
Customer Name:		Site Name:	
Address:		City:	
State:		Zip Code:	
Main Contact:		Telephone No.:	
Alt. Contact:		Telephone No.:	
<b>Product Information</b>			
Package Serial No.:		Generator Model:	
Engine Serial No.:		Kilowatts:	
Engine Model:		KVA:	
Open or Enclosed Genset:		Voltage:	
		Amps:	
<b>Existing Gen Controls Info:</b>			
Is Existing Control Panel present?		CIM Module Installed:	
Control Panel Model:		CCM Module Installed:	
CP Box Measurements W x H:		Local Ann. Installed:	
CP Door Measure W x H:		Rem. Ann. Installed:	
Customer Comms Requirements:		Remote Ann. Qty:	
Mag Pickup Installed (QTY):		Engine ECM Type:	
Fuel Level Sensor Type:		Rem. E-Stop Installed:	
<b>Existing Voltage Regulator Info:</b>		<b>Recommended VR Upgrade Model:</b>	
Existing VR Model:		New Upgrade VR Model:	
Existing VR Manufacturer:		New Upgrade VR Manufacturer:	
Switchgear or Gen Mounted:		Switchgear or Gen Mounted:	
Self Excited, PMG or AREP:			
<b>SWGR/ATS Information (Only fill this section out if system parallels with utility or other gens)</b>			
Switchgear Manufacturer:		ATS Manufacturer:	
SWGR Closed/Open Transition:		ATS Controller Type:	
Does CP Communicate w/SWGR:		ATS Qty:	
***Please take pictures of the existing control panel inside/outside, wiring terminal strips, overall genset package, generator data tag and accessory modules as these retrofit kits are designed to integrate with the customers site specific equipment.***			
<b>Comments &amp; Recommendations</b>			
Technician:		Date:	

Technicians or PSSR's complete our site survey to determine which kit and what accessories are needed to meet each customer's specific application.

Quotes and Budgets are then produced, based off of this information to provide you with the most accurate solution.

Click [here](#) to download the Retrofit Site Survey

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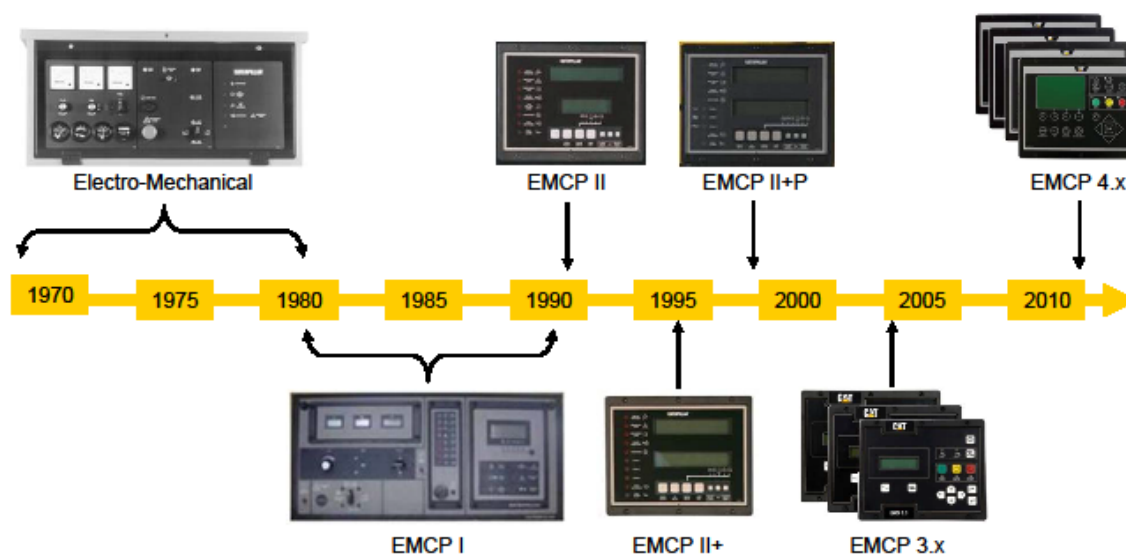


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# CAT Genset Controls History

## EMCP Evolution

One powerful future.



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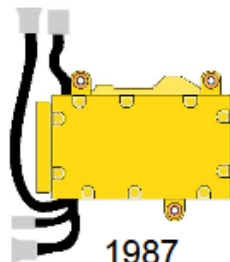


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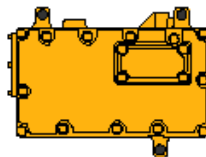
# CAT Genset Engine ECM History

## ADEM 4 Electronic Engine Control

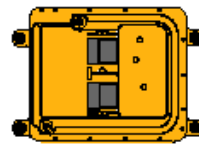
### Generations of Experience



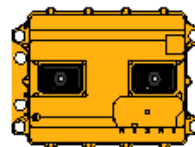
1987  
8-bit  
PEEC II



1991  
Advanced  
8-bit  
PEEC III



1993  
Two 8-bit  
ADEM II



1998 32-bit  
ADEM III



2004 32-bit  
ADEM 4

**Proven Reliability**

**CATERPILLAR**

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# CARTER-EMCP 4.2b DOOR ASSEMBLY KIT

- EMCP 4.2b door kits are typically kept in stock and are available in the following sizes:
  - 12x27 (EMCP4B-KIT-12X27) Price starts at: \$5,665.00
  - 14x30 (EMCP4B-KIT-14X30) Price starts at: \$5,665.00
  - 12x38 (EMCP4B-KIT-12X38) Price starts at: \$5,665.00
- Standard kit contents:
  - EMCP 4.2b, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, and CAN plugs wired on door assembly with 6ft harness
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, terminal blocks, fuse holders, fuses, miscellaneous connectors, panduit, dinrail, relays, and drawings



# CARTER-EMCP 4.2b DOOR INSERT KIT

- EMCP 4.2b custom insert kits are typically kept in stock and are available in two styles: (Older 3208, 3406 and 3116 Gensets)
  - 12x27 (EMCP4-CUSTOM-12X27) Price starts at: \$5,665.00
  - 12x27 Angled Price starts at: \$5,665.00
- Standard kit contents:
  - EMCP 4.2b, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, and CAN plugs wired on door assembly with 6ft harness
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, terminal blocks, fuse holders, fuses, miscellaneous connectors, panduit, dinrail, relays, and drawings



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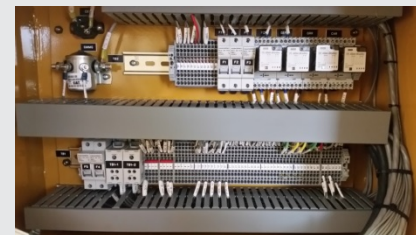
# CARTER-EMCP 4.3 DOOR ASSEMBLY KIT FOR EUI/MUI ENGINES

- EMCP 4.3 door kits are made to order with one week lead times and are available in the following sizes:
  - 12x27 (EMCP43-KIT-12X27) Price starts at: \$9,575.00
  - 14x30 (EMCP43-KIT-14X30) Price starts at: \$9,575.00
  - 12x38 (EMCP43-KIT-12X38) Price starts at: \$9,575.00
- Standard kit contents:
  - EMCP 4.3, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, and CAN plugs wired on door assembly with 6ft harness.
  - The EUI kits are usually paired with a CDL converter in order to read full engine telemetry via the engine's existing ECM, eliminating the need for installing new sensors
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, terminal blocks, fuse holders, fuses, miscellaneous connectors, panduit, dinrail, relays, RJ45 Ethernet port, and drawings.



# CARTER- EMCP 4.2B 14X22 BOX KIT

- EMCP 4.2 / 4.2b 14x22 boxes are typically kept in stock
  - 14x22 (EMCP4-BOX-14X22) Price starts at: \$6,050.00
- Standard kit contents:
  - EMCP 4.2 (4.2b), emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, SMMS solenoid, and CAN plugs fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, MPU, miscellaneous connectors, and drawings
- This kit provides a space sensitive solution without a local annunciator but retains an alarm function through the installed horn.



# CARTER- EMCP 4.2B 12x27 & 14X27 BOX KIT

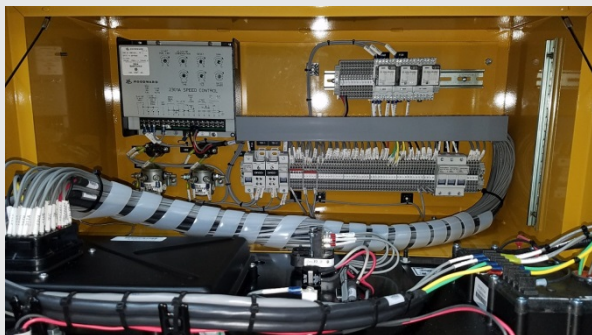
- These EMCP4.2b boxes are typically kept in stock
  - 14x27 (EMCP4-BOX-14X27) Price starts at: \$6625.00
  - 12x27 (EMCP4-BOX-12X27) Price starts at: \$6625.00
- Standard kit contents:
  - EMCP 4.2 (4.2b), local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, and CAN plugs fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, MPU, miscellaneous connectors, and drawings



# CARTER- EMCP 4.2B 14X30 BOX KIT (MUI & EUI)

These kits are typically used with CAT 3500 Series Engines

- EMCP 4.2b 14x30 boxes are typically kept in stock
  - 14x30 (EMCP4B-BOX-14X30) Price starts at: \$6885.00
- Standard kit contents:
  - EMCP 4.2b, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, and CAN plugs fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, MPU, miscellaneous connectors, and drawings
- EUI kits are usually paired with a CDL converter in order to read full engine telemetry via the engine's existing ADEM II ECM, eliminating the need for installing new sensors.



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# CARTER- EMCP 4.3 14X30 BOX KIT (MUI AND EUI)

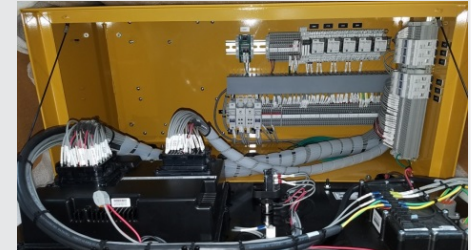
- EMCP 4.3 14x30 boxes are typically kept in stock
  - 14x30 (EMCP43-BOX-14X30) Price starts at: \$10,075.00
- Standard kit contents:
  - EMCP 4.3, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, RJ485 Ethernet port, and CAN plugs fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Low coolant level sensor, water temp sensor (MUI), oil pressure sensor (MUI), CDL booster (EUI), MPU, miscellaneous connectors, and drawings
- When integrating with an older electronic engine with an ADEM II ECM, the RS485 Modbus port can be programmed for CDL to gather engine telemetry & alarms via the engine's existing ECM. This eliminates the need for installing new sensors.





# CARTER- EMCP 4.4 14X30 BOX KIT (MUI AND EUI)

- EMCP 4.4 14x30 boxes are built as needed- Price starts at: \$11,250.00
  - EMCP44-BOX-14X30
  - EMCP44-BOX-18X28
- Standard kit contents:
  - EMCP 4.4, local annunciator, emergency shutoff switch, lights, voltage potentiometer, speed potentiometer, CDVR switch, RJ45 Ethernet port, and CAN plugs fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Low coolant level sensor, water temp sensor (MUI), oil pressure sensor (MUI), CDL booster (EUI), MPU, miscellaneous connectors, and drawings
- When integrating with an older electronic engine with an ADEM II ECM, the RS485 Modbus port can be programmed for CDL to gather engine telemetry & alarms via the engine's existing ECM. This eliminates the need for installing new sensors.



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# CARTER- EMCP 4.2B GENERAC/UNIVERSAL BOX KIT

- These EMCP 4.2b boxes are typically kept in stock.
  - Generac Kit (EMCP4-OLY-GNRC-KIT) Price starts at: \$3,165.00
  - Universal Kit (Any Genset) (EMCP4-UBOX) Price starts at: \$3,075.00
- Standard kit contents:
  - EMCP 4.2b, emergency shutoff switch, voltage potentiometer, and CAN plug fully wired to terminal blocks and fuse holders inside box
- Loose parts:
  - Water temp sensor, oil pressure sensor, MPU, miscellaneous connectors, and drawings
- This kit provides a space sensitive solution for CAT and competitor's generators (Kohler, Generac, Cummins, Katolight) without a local annunciator but retains an alarm function through the installed horn. Local annunciator options are available to pair with this kit.



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# CARTER- EMCP 4.2B OLYMPIAN DOOR KIT

- EMCP 4.2b Olympian doors are typically kept in stock
  - 2001 door (EMCP4-KIT-OLY-2001) Price starts at: \$2,800.00
  - 2001 plate (EMCP4-KIT-OLY-2001) Price starts at: \$2,800.00
  - 4001E door (EMCP4-KIT-OLY-4001E) Price starts at: \$2,800.00
- Standard kit contents:
  - EMCP 4.2B, emergency shutoff switch, voltage potentiometer, and CAN plug pre-wired on provided door
  - Water temp sensor, oil pressure sensor, MPU, miscellaneous connectors, and drawings



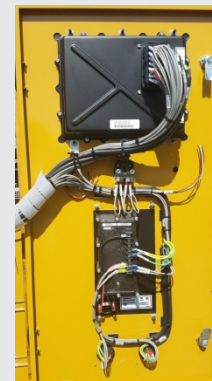
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# CARTER- EMCP 4.2B 3406 AND 3456 DOOR KIT

- EMCP 4.2b 3406 and 3456 door kits are made to order with one week lead times:
  - 3406/3456 Price starts at: \$5,665.00
- Standard kit contents:
  - EMCP 4.2b, emergency shutoff switch, voltage potentiometer, local annunciator, and CAN plugs pre-wired on provided door
- Loose parts:
  - Low coolant level sensor, water temp sensor, oil pressure sensor, terminal blocks, fuse holders, fuses, miscellaneous connectors, panduit, dinrail, relays, and drawings



# CARTER- EMCP 4.2B ONAN/CUMMINS POWER COMMAND KIT

- EMCP 4.2b Onan/Cummins box kits- Made to order with one-two week lead times.
  - Cummins Retrofit Kit Price starts at: \$9500.00
- Standard kit contents:
  - EMCP 4.2b, emergency shutoff switch, voltage potentiometer, local annunciator, and CAN plugs pre-wired in a box assembly kit with Woodward PT Governor Board
- Loose parts:
  - VR6 Voltage Regulator, Low coolant level sensor, water temp sensor, oil pressure sensor, terminal blocks, fuse holders, fuses, miscellaneous connectors, panduit, dinrail, relays, 10ft harness to go between new panel and rear gen box and drawings.



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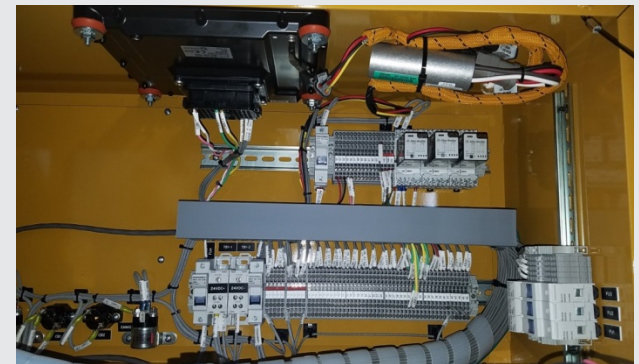
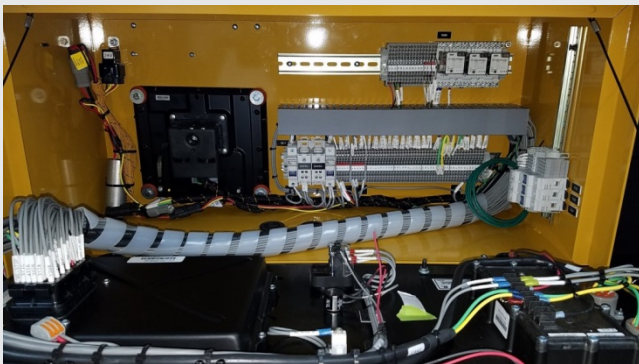


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# CARTER - CAT A5 CDL-J1939 PROTOCOL CONVERTER

- A5 ECM (CDL to J1939 converter option)
- Kit allows communication with an existing ADEM II engine ECM over the CAN network utilized by EMCP 4 series.
  - When ordered with a box kit, this option will be fully installed in one of two locations, depending on installed components.
  - Kit is also available with door kits as a loose part that has been flashed and tested to ensure proper communication.
  - Both options include VLPM harness, required fuses, relays, surge suppressors, tested and programmed
  - Price of converter installed, programmed & tested in box kit: \$1,500.00
  - Price of converter programmed, tested & shipped loose with door kit: \$1,150.00



# CARTER – REMOTE ANNUNCIATOR PLATE KIT

- Replacement Modbus annunciator plate kits
  - This 16 light Modbus annunciator kit provides a replacement for existing 16 light remote annunciators, while utilizing the existing boxes from previous product era.
  - Price of kit addition: \$550.00

Existing EMCP II 16 Light Rem. Ann.



New EMCP4 16 Light Modbus Rem Ann.





# CARTER – REMOTE ANNUNCIATOR BOX KIT

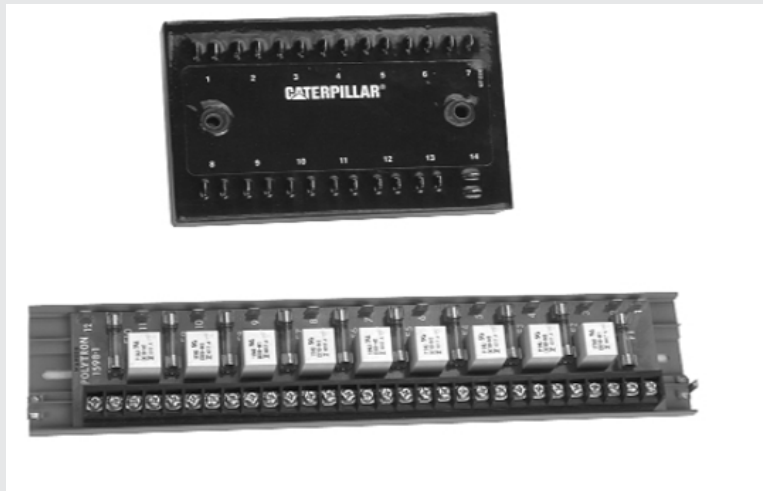
- New Modbus remote annunciator box kits
  - This kit adds a completely new remote Modbus annunciator.
  - Can be mounted on the surface of a structure or flush mounted. Every kit includes a trim ring that can be removed if not needed.
  - Price of kit addition: \$750.00



# CARTER – DIO MODULE KIT

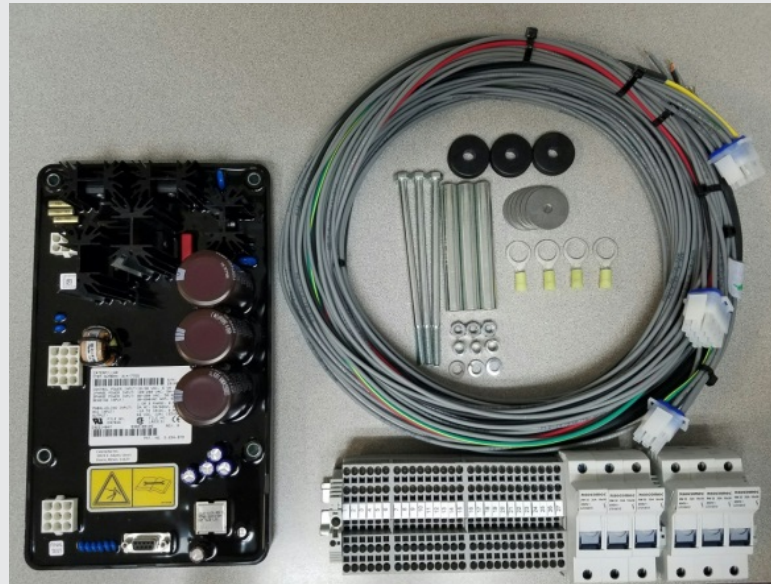
- Complete DIO module kit
  - This kit provides the components for a DIO module and the required terminals for wires included on the provided harness. Drawing included as well.
  - Price of kit addition: \$1,600.00

## Existing (CIM) Customer Interface Module



# CARTER – CDVR Voltage Regulator KIT

- Complete CDVR Voltage Regulator Kit
  - This kit provides the components for a CDVR module and the required terminals for wires included on the provided voltage regulator harness. Drawing included as well.
  - Price of kit addition: \$2,480.00



# CARTER – RS485 TO ETHERNET CONVERTER KIT

- Ethernet Gateway Kit
  - This kit provides the components for a Modbus RS485 RTU to TCP/IP Ethernet.
  - The Gateway is programmed with a provided IP address during testing prior to shipment.
  - Price of kit addition: \$650.00



# CARTER – Control & Accessory Kit Options

1. Starter Motor Mag Switches
2. Local Annunciator Panel Kits
3. Remote Annunciator Panel and Plate Kits
4. DIO Module Kit
5. RTD Module Kit
6. Thermocouple Module Kit
7. Modbus to Ethernet, Modbus to Bacnet, Modbus to SNMP Converter Kits
8. CDVR Voltage Regulator Kit
9. VR6 Voltage Regulator Kit
10. IVR EM10 & EM15 Voltage Regulator Kits
11. Woodward 2301A, 1724, 2301E, LSM, Easygen, DIEF, Etc...
12. CAT CDL to J1939 Protocol Converter
13. Wiring Harness Kits
14. Current Transformers
15. Potential transformers
16. CAT PL1000 Kits- custom communications
17. HMI Touchscreen Interface- 6"-21" available and customizable

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# Questions?

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**Matt Nolan**

Systems Engineer

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