



CAT Control Panel Retrofit Notes

- Record engine hours from old panel
- Record KWH from old panel, if applicable
- Record flywheel teeth, if applicable
- Analog Inputs (if required) are in metric values, kPa and Celsius. See analog settings page for proper setpoints
- Remember to tie all analog(-) to battery (-) per drawing
- Typical CAT oil setpoints: 35 psi / 242 kPa for warning, 30 psi / 207 kPa for shutdown
- Typical CAT coolant temp setpoints: 212 F/ 100 C for warning, 225 F / 108 C for shutdown
- Low coolant temp is 70 F/ 21 C. Setpoint is in the coolant temp analog input
- Second MP may have to be added if the genset only has one
- Bring wire, loom, and connectors for any additional wire needs
- Disable service maintenance interval
- Check event response configuration
- Disable generator reverse '**reactive**' power or set values at max 20% to prevent nuisance alarms
- Download configuration file and product status report upon completion
- Cycle power to the control panel upon completion of programming as we have seen some of the parameters not take until this is done.

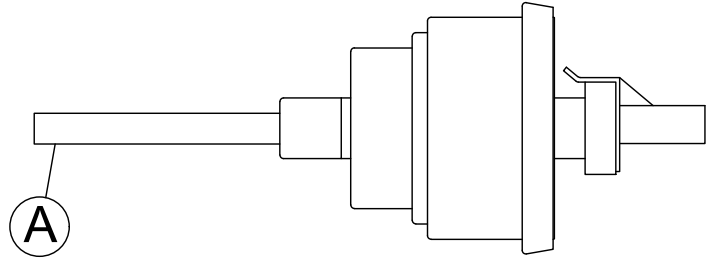


Carter Machinery Co., Inc.

Analog Input Settings

Analog Input #1 Signal Type	Voltage	
Analog Input #1 Signal Range	0.5 to 4.5 V	
Analog Input #1 Data Identification	Engine Oil Pressure	
Analog Input #1 Minimum Data Range	-88.000	
Analog Input #1 Maximum Data Range	1100.000	
Analog Input #1 Low Warning Event Threshold	239	
Analog Input #1 Low Warning Event Delay Time	5.0	sec
Analog Input #1 Low Shutdown Event Threshold	205	
Analog Input #1 Low Shutdown Event Delay Time	5.0	sec
Analog Input #2 Signal Type	Voltage	
Analog Input #2 Signal Range	0 to 5 V	
Analog Input #2 Data Identification	Engine Coolant Temperature	
Analog Input #2 Minimum Data Range	-15.000	
Analog Input #2 Maximum Data Range	127.000	
Analog Input #2 High Warning Event Threshold	102	
Analog Input #2 High Warning Event Delay Time	5.0	sec
Analog Input #2 High Shutdown Event Threshold	107	
Analog Input #2 High Shutdown Event Delay Time	5.0	sec
Analog Input #2 Low Warning Event Threshold	21	
Analog Input #2 Low Warning Event Delay Time	10.0	sec
Analog Input #3 Signal Type	Voltage	
Analog Input #3 Signal Range	0 to 5 V	
Analog Input #3 Data Identification	Engine Oil Temperature	
Analog Input #3 Minimum Data Range	-15.000	
Analog Input #3 Maximum Data Range	127.000	
Analog Input #3 High Warning Event Threshold	105	
Analog Input #3 High Warning Event Delay Time	5.0	sec
Analog Input #3 High Shutdown Event Threshold	110	
Analog Input #3 High Shutdown Event Delay Time	5.0	sec
Analog Input #3 Low Warning Event Threshold	0	
Analog Input #3 Low Warning Event Delay Time	0.0	sec
Analog Input #3 Low Shutdown Event Threshold	0	
Analog Input #3 Low Shutdown Event Delay Time	0.0	sec
Analog Input Supply Voltage	5 Volt	

LCL Sensor Operation:



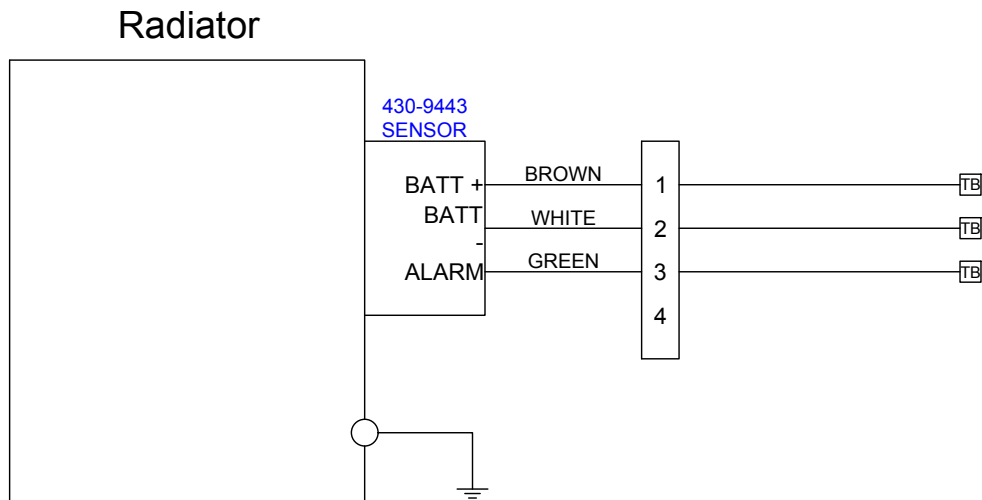
The CAT 430-9443 Coolant Loss Sensor is a solid state sensor for 12 or 24 volt systems which electronically senses the presence or absence of coolant

- 1) If the LCL probe (A) is fully submerged in fluid, the alarm output of the sensor is an open circuit.
- 2) If the cooling system level drops below the low coolant level sensor probe, the alarm output of the sensor is pulled to within 2 VDC of ground after a 10 second time delay.
- 3) If the sensing probe is only partially submerged, the output of the sensor can be open or closed.

Current requirements of the alarm circuit must not exceed 0.5 amps. The listed components meet this requirement.

Sensor Installation:

- 1) Locate the mounting position for the sensor on the tank. Generally, the sensor should be mounted high enough in the tank to warn the operator before damage can occur, but low enough in the tank to avoid false warnings due to machine tilt.
- 2) Drain the coolant tank.
- 3) Install the sensor in the 1/4-18" NPTF port.
NOTE: DO NOT use teflon pipe tape or any pipe sealant. The sensor is already supplied with sealant on the threads. Additional sealant could affect operation of the sensor..
- 4) Connect pin 1 of the 4-pin plug to Batt+ in the correct terminal block inside the new EMCP4 kit installed.
- 5) Connect pin 2 of the 4-pin plug to Batt- in the correct terminal block inside the new EMCP4 kit installed.
- 6) Connect pin 3 of the 4 pin plug to a Digital Input terminal block inside the new EMCP4 kit installed.



CATERPILLAR 5V Oil Pressure Sensor

Seal Part# 228-7100
(Part# stamped on seal)

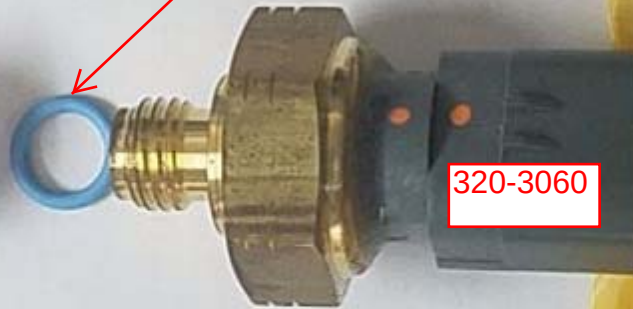
320-3060

353-5441

Seal Part# 214-7566
(No number on seal)

8C-6427

Uses standard Deutsch Female Pins
CAT Part# 8T-8730 with this Delphi
(CAT 281-8804) connector



EMCP 4 Retrofit Commissioning Report



Service Representative

Service Dealer:		Work Order:	
Service Technician:		ID No.	
Dealer Address:		City:	
State / Country:		Zip code:	

Location

Customer Name:		Site Name:	
Address:		City:	
State / Country:		Zip Code:	
Main Contact:		Telephone No:	
Alt. Contact:		Telephone No:	

Product Information

Eng Serial No:		Generator Model:	
Eng Arrangement:		Kilowatts:	
Eng Model:		Voltage:	
Installation Type:		Amperage:	
Package Serial No:		Hertz:	
Generator Serial No:		Control Panel Model:	
Gen. Arrangement:		Voltage Reg. Model:	

Customer Acceptance

Start-up and commissioning is complete within factory standards.

Technician

Date:

EMCP 4 Retrofit Start-Up & Commissioning

1	Lock-out generator		18	Install new remote annunciator panel if applicable	
2	Turn off engine block heaters		19	Install DIO module and program if applicable	
3	Remove existing generator and control wiring		20	Start-up, verify operation and control	
4	Install EMCP 4 Retrofit kit door assembly		21	Verify motor operating dampers are operational	
5	Drain 1/2 of engine cooling system		22	Verify engine and gen parameters are within spec	
6	Replace temp sensor and LCL sensor.		22	Emergency stop(s) functional	
7	Fill cooling system		23	Verify auto start contacts	
8	Bleed off air from JWH and turn on		24	Hook up temporary LB and verify all gen values	
9	If required, install second mag pick-up for new panel		25	Verify voltage adjustment pot or switch	
10	Replace oil pressure sensor		26	Verify speed control pot or switch	
11	Install dinrail, relays, terminals, fuse holders from kit		27	Record gen voltage @ C.P Voltage:	
12	Integrate EMCP4 panel with existing control wiring		28	Record DC voltage @ C.P Voltage:	
13	Verify current transformers are 5amp CT's		29	Record coolant temp @ C.P Temp:	
14	Power up control panel and flash with latest revision		30	Record oil pressure @ C.P Pressure	
15	Load configuration file and program as needed		31	Return gen to automatic mode, breaker closed	
16	Secure all wiring and verify tightness of connections		32	Inspect engine for any leaks	
17	Program local annunciator panel as needed		33	Verify no alarms or shutdowns are active	

Alarms and Shutdowns

	Locations:	Panel	Local	Remote		Locations:	Panel	Local	Remote
1	LCL Alarm				12	OC Shutdown			
2	LCL Shutdown				13	OS Shutdown			
3	HCT Alarm				14	HFL Alarm			
4	HCT Shutdown				15	LFL Alarm			
5	LCT Alarm				16	CLFL Alarm			
6	LOP Alarm				17	FRB Alarm			
7	LOP Shutdown				18	LBV Alarm/Shutdown			
8	Low Oil Level Alarm				19	HBV Alarm/Shutdown			
9	E-Stop Shutdown				20	BCF Alarm			
10	Warning lamp				21	Shutdown Lamp			
11	Gen Running				22	Gen CB Open			

Generator Electronic Controllers (Please upload all configuration files to work order)

1	Download engine ECM configuration file		4	Download control panel configuration file	
2	Download DIO module configuration file		5	Download voltage regulator configuration file	
3	Download RTD module configuration file		6	Download Thermocouple module configuration file	

Comments:

EMCP 4.2b Retrofit for EMCP II+ Panel on a 3412 PEEC

1. Record the engine hours, number of flywheel teeth, and CT ratio. Take detailed pictures of existing wiring for reference. If possible verify the engine and generator are working properly.
2. De-energize the control panel, both AC and DC sources. Some units may have live SCADA wires carrying 120 V. Make sure SCADA is not energized. The heater circuit also runs through the crank relay (CR) so be sure the heater is not energized.
3. Remove existing door and associated wiring from existing control panel.
4. Remove parts from back plate that are not needed.
5. Install new din-rail components following the layout in the supplied drawings.
6. Install new door with new control panel and terminate wires following the drawings. (The wire labels on harness wires refer to the pin number on the control panel not the terminal block number.)
7. Land the engine and generator wires to their corresponding terminal block. The list at the end of this document shows where we recommend landing existing wires, but verify with each with your unit.
8. Connect unit specific wiring, such as fuel tank sensors, optional equipment, and site specific communications.
9. It may be necessary to install a new MPU. EMPC 4 cannot share the MPU with other components.
10. Once installation is complete and the new panel is operating properly, download the Product Status Report and keep on record for warranty.

This is a compilation of technician notes we received over the years and this document is continuously evolving. If you have something to add, suggestions, or comments please send them to matt_nolan@cartermachinery.com.

3412 PEEC

Engine Wire No.	Control Panel Wire No.	Description	Action	Notes
67P	67-EOPS-A	Oil Pressure	Connect to TB1-47	Pin A on sensor plug
62P	62-EOPS-B	Oil Pressure	Connect to TB1-42	Pin B on sensor plug
15	15-EOPS-C	Oil Pressure	Connect to TB1-41	Pin C on sensor plug
67T	67-ECTS-A	Coolant Temperature	Connect to TB1-47	Pin A on sensor plug
62T	62-ECTS-B	Coolant Temperature	Connect to TB1-44	Pin B on sensor plug
16	16-ECTS-C	Coolant Temperature	Connect to TB1-43	Pin C on sensor plug
67L	67-TB1-67AB	Low Coolant Level	Connect to TB1-3	Pin A on sensor plug (Pin 9 on Black 12 Pin Connector)
62L	62-TB1-62AB	Low Coolant Level	Connect to TB1-4	Pin B on sensor plug (Pin 7 on Black 12 Pin Connector)
18	18-TBD1-18B	Low Coolant Level	Connect to TB1-23 (DI-2)	Pin C on sensor plug (Pin 8 on Black 12 Pin Connector)
10	10-TBD1-10BT	PEECR and PWM	Connect thru FCR NO to TB1-3	Pin 8 on DC CONN 2 (Grey 12 Pin Connector)
3	3-TBD1-3BT	ESDR	Connect thru FCR NO to TB1-3	Pin 7 on DC CONN 2 (Grey 12 Pin Connector)
41	41-RM 13	Rated Speed	Connect to TB1-4	Pin 1 on DC CONN 1 (Black 12 Pin Connector)
41	41-RM 13	Spare Rated Speed	Remove	Pin 2 on DC CONN 1 (Black 12 Pin Connector)
30		Remote E-stop	Connect to TB1-4	Remote E-stop wire on enclosure
17		Remote E-stop	Connect to TB1-22	Program DI-1 for Remote E-Stop
45	45-TBD1-45T	ECM E-Stop	Remove wire	Pin 4 on DC CONN 1 (Black 12 Pin Connector)
45A	45A-TBD1-45T	ECM E-Stop	Remove wire and install jumper to Pin 4 on DC CONN 1	Pin 5 on DC CONN 1 (Black 12 Pin Connector)
136	136-TBA1-136B	Heater	Connect to NO contact on FCR	Pin 38 on 70 WAY Connector
137	137-TBA1-137B	Heater	Connect to Heater COMM on FCR	Pin 66 on 70 WAY Connector
57	57-TB1-57BB	ATS Start Signal	Connect to TB1-21	Pin 30 on 70 WAY Connector
5	5-TB1-SAT	KWR	Remove	Pin 48 on 70 WAY Connector
61	61-GSC-34	KWR	Remove	Pin 43 on 70 WAY Connector
99	99-TB1-99B	Power for CCM	Remove	Pin 35 on 70 WAY Connector
91			Remove	T1 from PT
90	90-TB1-90B	Alarm Modules	Remove	Pin 5 on 70 WAY Connector
63	63-TB1-63B	Spare	Remove	Pin 6 on 70 WAY Connector
101	101-TBA1-101B	Spare	Remove	Pin 14 on 70 WAY Connector
108	108-TBA1-108B	Voltage Sensing	Remove	Pin 8 on 70 WAY Connector
109	109-TBA1-109B	Voltage Sensing	Remove	Pin 10 on 70 WAY Connector
110	110-TBA1-110B	Voltage Sensing	Remove	Pin 12 on 70 WAY Connector
157	157-TBA1-157B	Synchronizing Module	Remove	Pin 23 on 70 WAY Connector
159	159-TBA1-159B	Synchronizing Module	Remove	Pin 51 on 70 WAY Connector
206	206-TBA1-206B	Pump Stop Pushbutton	Remove	Pin 64 on 70 WAY Connector
207	207-TBA1-207B	Pump Stop Pushbutton	Remove	Pin 36 on 70 WAY Connector
203	203-TBA1-203B	Pump Stop Pushbutton	Remove	Pin 42 on 70 WAY Connector
131	131-TBA1-131B	Pump Pushbuttons	Remove	Pin 70 on 70 WAY Connector
GND	GND-TBA1-GND6T	Chassis Stud	Connect to TB1-GND	Pin 68 on 70 WAY Connector
202	202-TBA1-202B	Pump Run Pushbutton	Remove	Pin 40 on 70 WAY Connector
71	71-CAM-9	Custom Alarm Module	Remove	Pin 1 on 70 WAY Connector
6	6-TB1-6B	Genset Fault Relay	Remove	Pin 2 on 70 WAY Connector
3	3-TB1-3AT	Start Aid Switch	Remove	Pin 3 on 70 WAY Connector
84	84-F23-B or 84-PRPB-3	Pump Run Pushbutton	Remove	Pin 4 on 70 WAY Connector
7	RDM-GSC-30	Relay Driver Module	Remove	Pin 7 on 70 WAY Connector
2	2-TBD1-2BT	Battery Negative	Connect to TB1-4	Pin 15 on 70 WAY Connector
30	30-TBD1-30AT	Low Fuel Level Shutdown Relay Common	Remove	Pin 16 on 70 WAY Connector
72	72-LFSR-A	Low Fuel Level Shutdown Relay	Remove	Pin 17 on 70 WAY Connector
81	81-PRPB-4	Pump Run Pushbutton	Remove	Pin 18 on 70 WAY Connector
D(+)	D(+)-TBD1-D(+)B	Customer Communication Module	Remove	Pin 19 on 70 WAY Connector

D(-)	D(-)-TBD1-D(-)-B	Customer Communication Module	Remove	Pin 20 on 70 WAY Connector
74	74-CAM-8	Custom Alarm Module	Remove	Pin 21 on 70 WAY Connector
10	10-TB1-10AB	Battery Positive	Connect to TB1-3	Pin 45 on 70 WAY Connector
GND	GND-TBD1-GND1B	Ground	Connect to TB1-4	Pin 47 on 70 WAY Connector
36	36-F15-B	Battery Charger B+	Connect to TB1-1	Pin 49 on 70 WAY Connector
87	87-TB1-87B	Generator Run Relay Contact	Can be reused to supply customer with gen run/stop	Pin 57 on 70 WAY Connector
88	88-TB1-88B	Generator Run Relay Contact	Can be reused to supply customer with gen run/stop	Pin 58 on 70 WAY Connector
89	89-TB1-89B	Generator Run Relay Common	Can be reused to supply customer with gen run/stop	Pin 59 on 70 WAY Connector
SP1	SP1-TBD1-SP1B	Spare Inputs	Remove if not used	Pin 60 on 70 WAY Connector
SP2	SP2-TBD1-SP2B	Spare Inputs	Remove if not used	Pin 61 on 70 WAY Connector
SP3	SP3-TBD1-SP3B	Spare Inputs	Remove if not used	Pin 62 on 70 WAY Connector
SP4	SP4-TBD1-SP4B	Spare Inputs	Remove if not used	Pin 63 on 70 WAY Connector
38-TBD1-38L			Can be reused by running through relay output N/O contact	
67O	67-TB1-67AT	Oil Temperature Sensor	Optional Connect to TB1-47	Pin A on sensor plug (Pin 12 on Black 12 Pin Connector)
62O	62-TB1-62AT	Oil Temperature Sensor	Optional Connect to TB1-46	Pin B on sensor plug (Pin 10 on Black 12 Pin Connector)
19	19-TBD1-19B	Oil Temperature Sensor	Optional Connect to TB1-45	Pin C on sensor plug (Pin 11 on Black 12 Pin Connector)
1	1-TBD1-1AT	Battery Positive	Connect to TB1-1?	Pin 1 on DC CONN 2 (Grey 12 Pin Connector)
1	1-TBD1-1AB	Battery Positive	Connect to TB1-1?	Pin 2 on DC CONN 2 (Grey 12 Pin Connector)
59	59-TB1-59B	Start Aid Switch	Remove	Pin 3 on DC CONN 2 (Grey 12 Pin Connector)
30	30-TBD1-30AB	GSC B-	Remove	Pin 4 on DC CONN 2 (Grey 12 Pin Connector)
23A	23A-TBD1-23AB	Unknown	Remove but can jump to Pin 9 on DC CONN 2	Pin 5 on DC CONN 2 (Grey 12 Pin Connector)
4	4-TBD1-4B	SMMS A1	Connect thru SMR NO to TB1-3	Pin 6 on DC CONN 2 (Grey 12 Pin Connector)
23A	23A-TBD1-23AT	Unknown	Remove but can jump to Pin 5 on DC CONN 2	Pin 9 on DC CONN 2 (Grey 12 Pin Connector)
20	20-RM-14	GSC B- for EGR	Remove	Pin 10 on DC CONN 2 (Grey 12 Pin Connector)
2	2-TBD1-2AT	Battery Negative	Connect to TB1-2	Pin 11 on DC CONN 2 (Grey 12 Pin Connector)
2	2-TBD1-2BB	Battery Negative	Connect to TB1-2	Pin 12 on DC CONN 2 (Grey 12 Pin Connector)
51	51-TBC-51 or 51-TBA1-51B	Phase A Current Sensing	Connect to TB1-50	Pin 1 on AC CONN (Green 12 Pin Connector)
52	52-TBC-52 or 52-TBA1-52B	Phase B Current Sensing	Connect to TB1-51	Pin 2 on AC CONN (Green 12 Pin Connector)
53	53-TBC-53 or 53-TBA1-53B	Phase C Current Sensing	Connect to TB1-52	Pin 3 on AC CONN (Green 12 Pin Connector)
GND	GND-TBA1-GND5B	Ground	Connect to TB1-4 or Chassis	Pin 4 on AC CONN (Green 12 Pin Connector)
T2	T2-F12	Phase B VoltageSensing	Connect to TB1-F2	Pin 5 on AC CONN (Green 12 Pin Connector)
T1	T1-F11	Phase A Voltage Sensing	Connect to TB1-F1	Pin 7 on AC CONN (Green 12 Pin Connector)
T0	T0-TBA1-T0T	Neutral Sensing	Connect to TB1-48	Pin 8 on AC CONN (Green 12 Pin Connector)
T3	T3-F13	Phase C Voltage Sensing	Connect to TB1-F3	Pin 19 on AC CONN (Green 12 Pin Connector)
50	50-TBA1-50AB	Phase A Current Sensing	Connect to TB1-49	Pin 10 on AC CONN (Green 12 Pin Connector)
50	50-TBA1-50BB	Phase B Current Sensing	Connect to TB1-49	Pin 11 on AC CONN (Green 12 Pin Connector)
50	50-TBA1-50CB	Phase C Current Sensing	Connect to TB1-49	Pin 12 on AC CONN (Green 12 Pin Connector)