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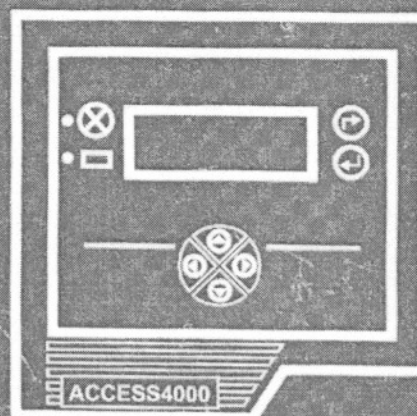


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ACCESS 4000 CONTROL SYSTEM OPERATION MANUAL

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1. INTRODUCTION

The ACCESS 4000 microprocessor based generating set control panel is an auto-start system providing a comprehensive array of operational features. Utilising the latest advances in embedded microprocessor technology, surface mount printed circuit board assembly and software development techniques, the design provides for a powerful, easy to use system together with high accuracy for all metering and protection functions.

Once activated the ACCESS 4000 module carries out all the start and stop procedures for the engine, indicates the operational status and fault conditions; and automatically shuts down the generating set in the event of a critical condition arising.

A range of optional features allow other functions such as two types of open protocol communication interface - GEN ACCESS and MODBUS, for communicating with Supervisory Control And Data Acquisition (SCADA) systems, or remote monitoring via a volt free relay interface module.

The module is housed in a robust plastic case for front panel mounting within a control panel. Connection to the unit is via locking plugs and sockets.

The ACCESS 4000 provides the following advanced features:

- Microprocessor based circuitry
- Sheet steel cabinet enclosure
- Large format alpha-numeric Liquid Crystal Display
- Open protocol communication interface
- Digital 3 or 1 phase voltage and current metering
- Digital engine parameter metering
- Up to 16 fault circuits utilising analogue and digital inputs
- 20 event fault log memory
- Password protected operator levels
- Site programmable using the integral keypad or Laptop PC
- Configuration stored in non-volatile memory

2. CONTROL SYSTEM OVERVIEW

The following installation guidelines are provided for general information only. For specific site installation information, consult your local dealer as required.

CAUTION:



All installation and/or service work performed must be done by qualified personnel only. Failure to do so may cause personal injury or death.

2.1 Panel Equipment

The ACCESS 4000 control panel consists of three main parts; an ACCESS 4000 control module, external control equipment and a panel enclosure. See Figure 2.1 – please note that this panel shows all options available, some of which you may not have ordered.

Note:

- The addition of non-standard optional equipment may add items not shown here. The following descriptions explain the function of each item on the panel, a more detailed description of the control module follows in section 3.

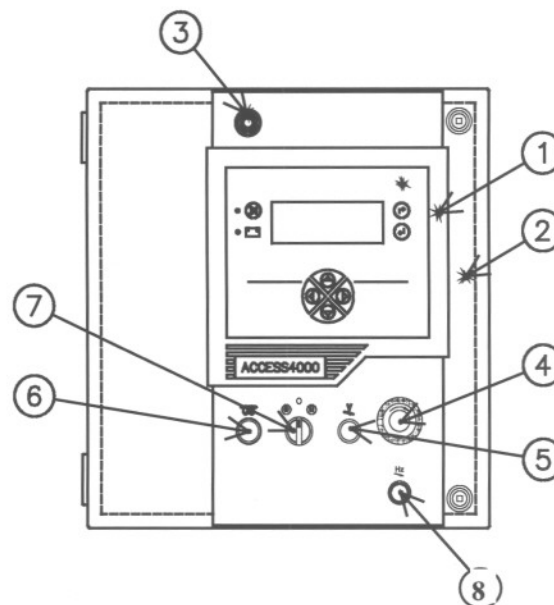


Figure 2.1 - Diagram of a Typical ACCESS 4000 Control Panel

1. ACCESS 4000 Control Module
2. Panel Enclosure - housing the module and associated external controls.
3. Audible Alarm - a buzzer that sounds on sensing a fault condition.
4. Emergency Stop push-button - a red lock-down button is used to initiate an emergency stop signal to the generating set. This will cause the engine to immediately stop and be prohibited from operation until the button is released.
5. Voltage Adjust Control - a potentiometer providing manual control of the alternator output voltage (AVR excitation).
6. Thermostart Control - a momentary action button is used to pre-heat the engine prior to cranking.
7. Control Switch - a three position switch controlling the mode of operation. Refer to the operating instructions for detailed information.



RUN

In this position, the engine will start and operate continuously providing no shutdown fault conditions are active. All protective functions will be operative in this mode. There will be no start delay or stop (cooldown) delay in this mode.



OFF

Manually initiates a stop signal to the generating set and prohibits automatic starting/running. The control switch must be returned to this position following a shutdown fault condition before any further generating set operation will occur.



AUTO

In this position, starting and stopping of the engine will be controlled by the REMOTE START contact. With the contact closed, the generating set will start and run. With the contact removed, the generating set will stop and return to standby.

8. Speed Adjust Control - a potentiometer providing manual control of the generating set output frequency (engine speed).

2.2 Environmental Constraints

The module when mounted correctly within a panel will conform to IEC 529 IP-56. The panel should be vibration isolated from the engine and alternator and protected against excessive temperature swings.

2.3 Power Supply

The ACCESS 4000 control system is designed to operate on any direct current (DC) battery supply in the range 9 to 32 volts. The battery negative must be grounded to the engine block, usually via the starter motor negative terminal. An internal battery is not provided and is not necessary.

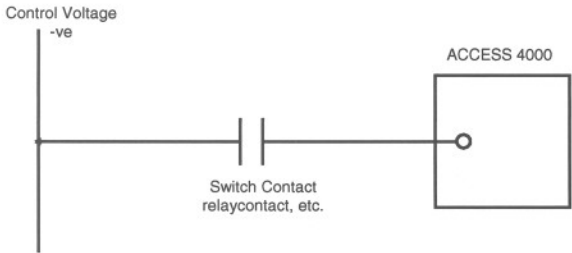


Figure 2.2 - Typical DC Control Input Wiring

2.4 DC Control Inputs

All DC control inputs to the ACCESS 4000 are optically isolated for protection from noise and transient spikes. All inputs are designed to switch low i.e. to the battery negative including the remote start contact. The use of POWERED CONTACTS may damage the control module.

2.5 DC Control Outputs

All dc control outputs from the ACCESS 4000 are volt-free relay contacts. The contacts are rated for 2 Amps at 30Vdc and are isolated Form C type. The use of interposing relays between the ACCESS 4000 and the external device is necessary to prevent potential internal damage due to excessive current. For loads generating switching spikes, the application of transient suppression is also recommended.

Note:

- On power loss ALL outputs will switch to the de-energised state.

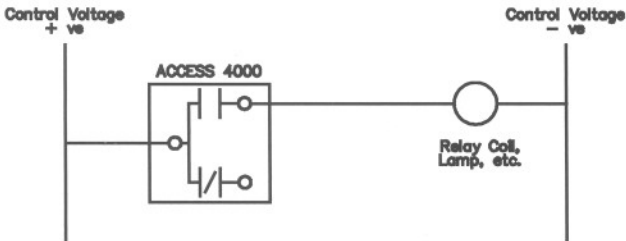


Figure 2.3 - Typical DC Control Output Wiring

2.6 DC Sender Inputs

Both engine sender inputs (oil pressure and engine coolant temperature) are designed to operate with variable resistive type senders.



Figure 2.4 - Typical DC Sender Input Wiring

2.7 AC Voltage Inputs

The ACCESS 4000 is designed using a multi-tapped potential transformer for all AC voltage input in the range 60 - 300Vac, using one of four tapings on the high accuracy potential transformers fitted external to the ACCESS 4000 (figure 2.5). Standard single or three phase systems can be accommodated using one of five alternator winding configurations as shown in figure 2.6. High voltage systems may be interfaced using additional specialised transformers.

WARNING

! The incorrect connection of the AC Voltage Inputs will damage the controller. Ensure that correct primary voltage tapping connections are made.

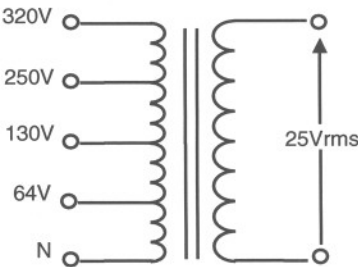


Figure 2.5 - Multi-tap Transformer

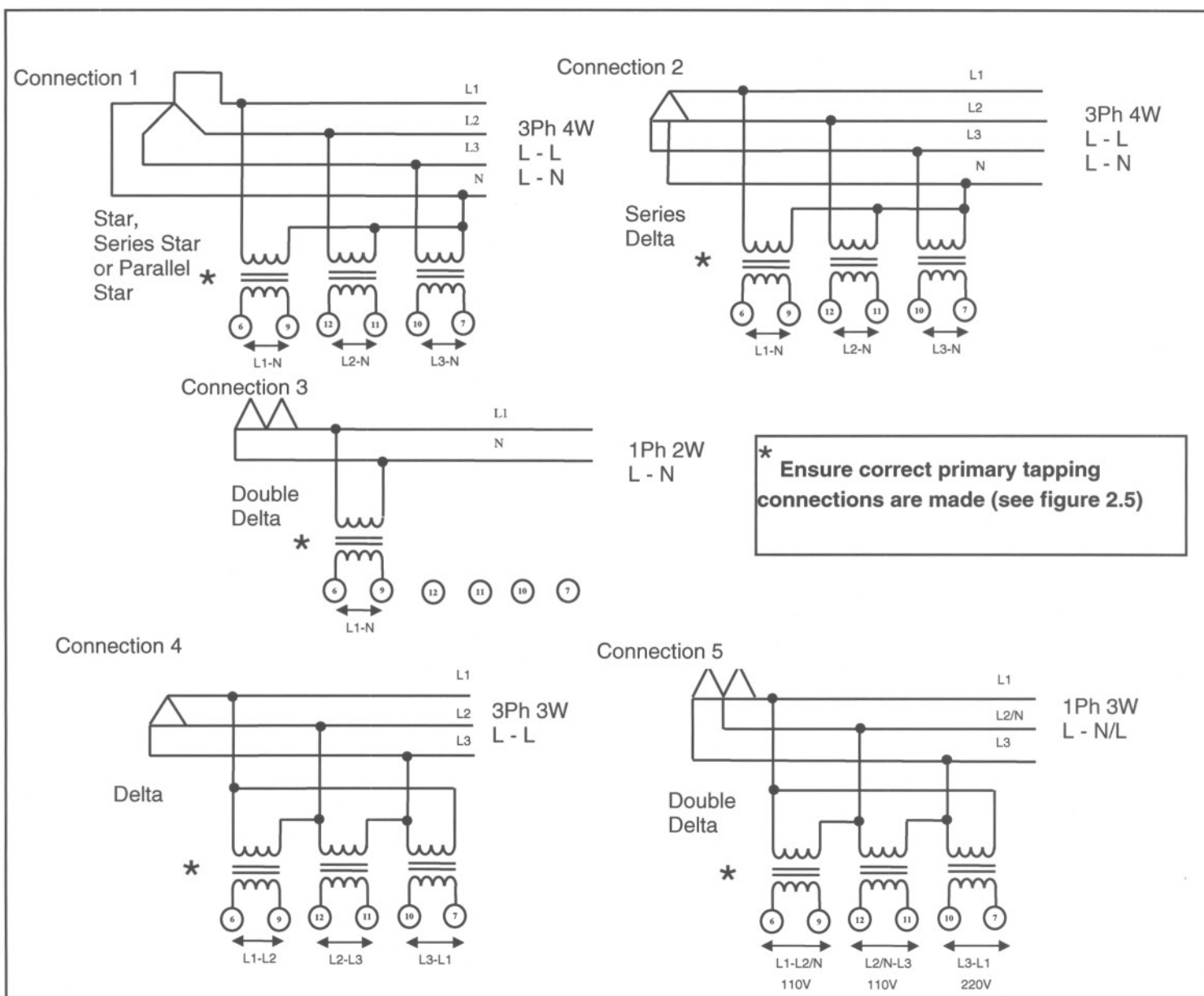


Figure 2.6 – Typical AC Voltage Input Wiring

2.8 AC Current Inputs

The ACCESS 4000 is designed to measure current indirectly using current transformers. The maximum secondary current is 5 Amps. It is recommended for improved accuracy that an independent six wire unearthed connection arrangement is adopted as shown in figure 2.7.

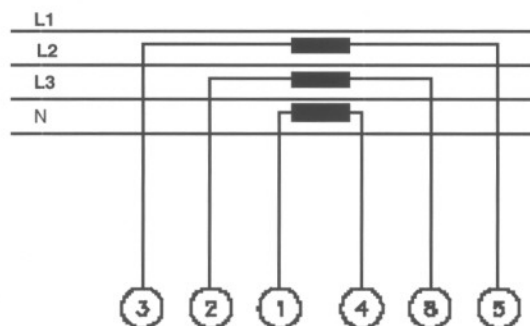


Figure 2.7 - Typical AC Current Input Wiring

2.9 Communication Interface

An industry standard RS422/485 communications port is provided for both factory programming and customer interface. Connections to the module should be made using individually screened twisted pair cable. Please also refer to section 3.12.

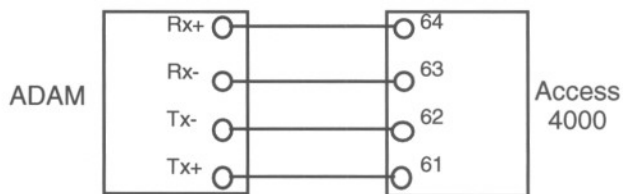


Figure 2.8 - Communication Wiring

3. CONTROL

The ACCESS 4000 control module utilises both analogue and digital inputs and outputs to perform its control and monitoring functions. The module provides the means of starting and stopping the generating set, monitoring its operation and output, and automatically shutting down the set in the event of a critical condition arising such as low lubricating oil pressure or high engine coolant temperature.

The main component of the module front is the membrane keypad, the features of which are described as follows with reference to figure 3.1.

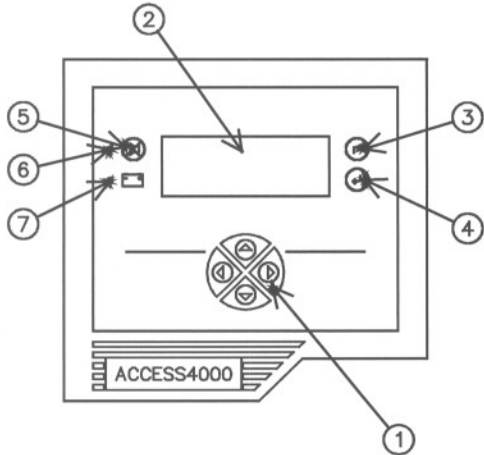


Figure 3.1 - ACCESS 4000 Control Module (front view)

1. CURSOR CLUSTER. The arrow keys are used to navigate around the status menus or for programming values within the configuration menu. The "UP Key" will increase numerical values of parameters or setpoints. The "DOWN Key" will decrease numerical values of parameters or setpoints. The "LEFT Key" will move the cursor to the previous item in the menu screens or to the left when programming parameters or setpoints. The "RIGHT Key" will move the cursor to the next item in the menu screens or to the right when programming parameters or setpoints.
2. LCD VIEWING WINDOW. The backlit LCD display is mounted behind and visible through the clear lexan viewing window.
3. ESCAPE Key. Pressing this key will exit from any menu or programming screen without saving the new value.
4. ENTER Key. Use of this pad selects the menu item or amends the new programmed parameter or setpoint. This key is also used to acknowledge and reset alarms or shutdowns from within the alarm log menu.
5. ALARM MUTE. De-energises the common alarm output relay thus muting any audible alarm (siren) if fitted.
6. FAULT LED. The fault LED illuminates when any pre-programmed fault has been activated. The LED will flash quickly alerting the user to a shutdown (critical) condition. The LED will flash slowly alerting the user to an alarm (non-critical) condition. Once all shutdowns have been acknowledged the LED will 'go solid' and de-energise once they are all reset.
7. Power LED. Illuminates when the unit is powered in the healthy state.

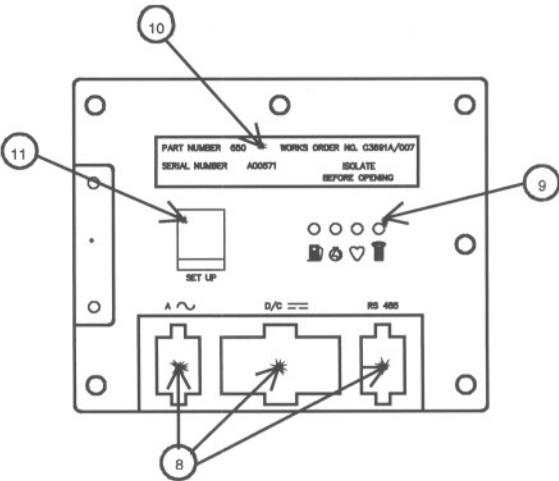


Figure 3.2 - ACCESS 4000 Control Module (rear view)

8. Electrical Connections. Connections to the ACCESS 4000 are via locking plug and sockets.
9. Diagnostic LED's. The ACCESS 4000 provides four diagnostic Light Emitting Diodes to facilitate simple module diagnosis. Their functions and symbols are described as follows:
 -  FUEL CONTROL SOLENOID. This LED is illuminated whenever the module has called for the engine to run. The LED mirrors the status of the output relay which controls the fuel control solenoid.
 -  STARTER CONTROL SOLENOID. This LED is illuminated whenever the module is initiating an engine crank cycle. The LED mirrors the status of the output relay which controls the auxiliary starter solenoid.
 -  WATCHDOG. This LED flashes on and off at regular intervals indicating that the microprocessor is functioning normally.
 -  REMOTE CONTROL. This LED is illuminated whenever the module is being controlled from a remote signal i.e. via the communication facility or via the remote start input.
10. Serial Number Label. A two part serial number label details the unit part number, individual unit serial number and generating set works order number. Please quote all three items of information when requesting dealer or factory support.
11. Communications Set Up. Set all dip switches to "ON" in a single ACCESS 4000 system. In a multiple ACCESS 4000 system, set dip switches to "ON" on the unit furthest away from the MCM2(PC) / MCM3(Tel) leaving the switches on the intermediate units to "OFF" position.

Connector "DC"

Pin Number	Description	Signal Type
1	Fuel control solenoid control - COM	Volt Free
2	Battery positive	Input 9 - 32Vdc
3	Battery negative	Input 0Vdc
4	Sender earth reference	Input 0Vdc
5	Not Used	
6	Not Used	
7	Water temperature sender	Output - 13mA
8	Oil pressure sender	Output - 37.5mA
9	Programmable relay no. 2 - COM	Volt Free
10	Fuel control solenoid control - N/C	Volt Free
11	Not Used	
12	Future development	Volt Free
13	High engine temperature switch input	Input - active low
14	Run switch input	Input - active low
15	Remote start switch input	Input - active low
16	Spare input 2	Input - active low
17	Spare input 4	Input - active low
18	Programmable relay no. 2 - N/C	Volt Free
19	Fuel control solenoid control - N/O	Volt Free
20	Magnetic Pickup (+)	5 - 30Vac (w.r.t. pin 21)
21	Magnetic Pickup (-)	5 - 30Vac (w.r.t. pin 20)
22	Low oil pressure switch input	Input - active low
23	Emergency stop switch input	Input - active low
24	Auto switch input	Input - active low
25	Spare input 1	Input - active low
26	Spare input 3	Input - active low
27	Programmable relay no. 2 - N/O	Volt Free
28	Starter solenoid control - COM	Volt Free
29	Starter solenoid control - N/O	Volt Free
30	Starter solenoid control - N/C	Volt Free
31	Common alarm - COM	Volt Free
32	Common alarm - N/O	Volt Free
33	Common alarm - N/C	Volt Free
34	Programmable relay no. 1 - COM	Volt Free
35	Programmable relay no. 1 - N/O	Volt Free
36	Programmable relay no. 1 - N/C	Volt Free

Connector "AC"

Pin Number	Description	Signal Type
1	AC Current - Phase C (send)	0 - 5 A ac
2	AC Current - Phase B (send)	0 - 5 A ac
3	AC Current - Phase A (send)	0 - 5 A ac
4	AC Current - Phase C (return)	0 - 5 A ac
5	AC Current - Phase A (return)	0 - 5 A ac
6	AC Voltage - Phase A (live)	25Vac nominal (w.r.t. pin 9)

Connector "AC" (Continued)

Pin Number	Description	Signal Type
7	AC Voltage - Phase C (neutral)	See pin 10
8	AC Current - Phase B (return)	0 - 5 A ac
9	AC Voltage - Phase A (neutral)	See pin 6
10	AC Voltage - Phase C (live)	25Vac nominal (w.r.t. pin 7)
11	AC Voltage - Phase B (neutral)	See pin 12
12	AC Voltage - Phase B (live)	25Vac nominal (w.r.t. pin 11)

Communications Connector "RS485"

Pin Number	Description	Signal Type
1	Isolated power supply - positive	5Vdc
2	Communication receive - RX+	TTL
3	Communications receive - RX-	TTL
4	Communications transmit - TX-	TTL
5	Communications transmit - TX+	TTL
6	Isolated power supply - common	0Vdc

4. OPERATING INSTRUCTIONS

The ACCESS 4000 control system is required to operate with an external changeover system designed to handle all mains sensing and load transfer functions. The ACCESS 4000 controller will start and stop the engine in either a local "manual" or remote "automatic" mode. When a 'required to run' command is issued, the controller issues engine fuel control solenoid on and starter motor crank output signals. The engine speed is monitored and once engine firing speed has been reached the module terminates the crank signal. While the engine accelerates up to and runs at nominal speed, the ACCESS 4000 continually monitors the engine speed signal. Should the engine speed exceed the setpoint determined by the OVERSPEED fault condition, the engine is shutdown by termination of the fuel control solenoid on signal.

In addition to the OVERSPEED fault condition, the ACCESS 4000 continuously monitors all other necessary engine conditions, together with additional optional fault conditions as required by the customer. For detailed information on all fault conditions, refer to section 5.

On removal of the 'required to run' command, the engine will automatically stop.

The ACCESS 4000 includes all necessary user programmable timer functions to enable start, cranking and stop (cooldown) time delays. For further information on configuration of the ACCESS 4000, refer to section 6.

4.1 Automatic Mode Of Operation

When the ACCESS 4000 control panel is selected for Automatic (AUTO) standby operation using the Control Switch (ref. Figure 1.1 - Item 7), the

Alarm: These non-critical faults do not interfere with the normal operation of the generating set but require operator acknowledgement. They therefore provide only a warning of a potential future shutdown condition.

To reset shutdowns/alarms refer to Section 4.3.5.

In addition, faults can be constrained as follows:

Immediate: These fault conditions are armed at all time.

Time Delayed: These alarms are inhibited for a programmable transient time period following receipt of the first fault signal. If, following the time delay, the fault is still present the fault condition is latched.

Fault Protection Timer (FPT): These fault conditions are inhibited until the generating set has reached normal running conditions and the FPT time has expired.

In the event of a fault condition, regardless of category, the cause will be indicated on the LCD, the visual fault LED will flash and any optional siren will sound. When acknowledged the LED will become continuous and the audible alarm will become silent. Once activated all fault conditions are logged in the ALARM LOG and latched active until manually reset. When the entire contents of the ALARM LOG have been reset the fault LED will go out.

The type and number of fault conditions are defined during factory configuration and so not all fault conditions described here may be enabled within your controller. If you have any queries regarding your configuration or require additional fault conditions, please contact your local dealer.

5.1 Internal Fault Conditions

Internal fault conditions are those which are activated internally by the system, many of them from the analogue instrumentation channels. The ACCESS 4000 is supplied from the factory with two standard internal fault conditions, and six optional internal fault conditions.

FAIL TO START (Overcrank) – (standard, shutdown, immediate). The fail to start fault condition is initiated when the engine fails to start after the selected crank time and number of crank cycle repeats. The fail to start fault condition is internally programmed as a shutdown fault and is not user programmable.

OVERSPEED (standard, shutdown, immediate). The overspeed fault condition is initiated when the engine's speed has increased above the overspeed setpoint as detected by the flywheel mounted magnetic pick-up. The overspeed fault condition is internally programmed as a shutdown fault and is user programmable as an engine speed approximately 10% above nominal for diesel engines and 15% above nominal for gas engines. Refer to the configuration instructions (section 6.2) for further programming information.

OVER FREQUENCY (standard, shutdown, alarm, time delay). The ACCESS 4000 controller provides an over frequency relay generated from the voltage waveform frequency instrumentation. The over frequency relay is programmable for the type of fault (i.e. shutdown or alarm), frequency setpoint, and transient time delay. Refer to the configuration instructions (section 6.2) for further programming instructions.

UNDER FREQUENCY (standard, shutdown, alarm, time delay, FPT). The ACCESS 4000 controller provides an under frequency relay generated from the voltage waveform frequency instrumentation. The under frequency relay is programmable for the type of fault (i.e. shutdown or alarm), frequency setpoint, and transient time delay. Refer to the configuration

instructions (section 6.2) for further programming instructions.

OVER VOLTAGE (standard, alarm/shutdown, time delay). The ACCESS4000 controller provides a three phase over voltage relay generated from the voltage waveform instrumentation. The over voltage relay is user programmable for the type of fault (i.e. shutdown or alarm), voltage setpoint, and transient time delay. Refer to the configuration instructions (section 6.2) for further programming information.

UNDER VOLTAGE (standard, alarm/shutdown, time delay, FPT). The ACCESS4000 controller provides a three phase under voltage relay generated from the voltage waveform instrumentation. The under voltage relay is user programmable for the type of fault (i.e. shutdown or alarm), voltage setpoint, and transient time delay. Refer to the configuration instructions (section 6.2) for further programming information.

APPROACHING LOW OIL PRESSURE (standard, alarm, FPT). The approaching low lubricating oil pressure fault condition is activated when the lubricating oil pressure drops below a pre-determined setpoint. The approaching low oil pressure fault is internally programmed as an alarm condition and is user programmable for pressure setpoint level. Refer to the configuration instructions (section 6.2) for further programming information.

APPROACHING HIGH ENGINE TEMPERATURE – (standard, alarm, FPT): The approaching high engine coolant temperature fault condition is activated when the engine jacket coolant rises above a pre-determined setpoint. The approaching high coolant temperature fault is internally programmed as an alarm condition and is user programmable for temperature setpoint level. Refer to the configuration instructions (section 6.2) for further programming information.

HIGH BATTERY VOLTAGE (option, alarm, time delay). The high battery voltage fault condition is activated when the engine battery voltage rises above a pre-determined setpoint for a specified time delay. The high battery voltage fault is internally programmed as an alarm condition and is user programmable for voltage setpoint level and transient time delay. Refer to the configuration instruction (section 6.2) for further programming information.

LOW BATTERY VOLTAGE (option, alarm, time delay). The low battery voltage fault condition is activated when the engine battery voltage drops below a pre-determined setpoint for a specified time delay. The low battery voltage fault is internally programmed as an alarm condition and is user programmable for voltage setpoint level and transient time delay. Refer to the configuration instruction (section 6.2) for further programming information.

BATTERY CHARGER FAILURE (standard, alarm, time delay). The battery charger failure fault condition is activated when the engine battery voltage drops below a pre-determined setpoint for a specified time delay, indicating a failure in the battery trickle/float charging system. The battery charger failure fault is internally programmed as an alarm condition and is user programmable for voltage setpoint level and transient time delay. The battery charger failure fault is normally programmed for a higher battery voltage setpoint than the low battery voltage fault condition. Refer to the configuration instruction (section 6.2) for further programming information.

NOT IN AUTO MODE (option, alarm). The not in auto mode fault condition is activated when the control

switch (ref. Figure 1.1 - item 7) is changed from the AUTO position to any other position. The not in auto mode fault condition is internally programmed as an alarm condition and may be enabled or disabled by the user.

5.2 External Fault Conditions

The ACCESS 4000 controller provides up to seven digital fault inputs. Each digital fault input is activated via a remote sensing contact that is external to the controller. The ACCESS 4000 is factory fitted with three standard external fault inputs and the remaining four fault inputs are available as options.

Each optional external fault input may be programmed with a unique fault label and must be specified at the time of equipment purchase.

HIGH ENGINE TEMPERATURE (standard, shutdown, FPT). The high engine temperature fault condition is activated when the engine jacket coolant rises above a setpoint as determined by the engine mounted temperature switch. The high engine coolant temperature fault is internally programmed as a shutdown condition.

LOW OIL PRESSURE (standard, shutdown, FPT). The low lubricating oil pressure fault condition is activated when the engine oil pressure drops below a setpoint as determined by the engine mounted pressure switch. The low lubricating oil pressure fault is internally programmed as a shutdown condition and is inhibited until normal running conditions are established.

EMERGENCY STOP (standard, shutdown, immediate). The emergency stop fault condition is activated when the control panel mounted emergency stop push-button is pressed or the canopy mounted emergency stop push-button (if applicable) is pressed. The emergency stop fault condition is internally programmed as a shutdown condition. This shutdown fault can be reset by turning the control switch to the OFF position.

USER PROGRAMMABLE EXTERNAL FAULT INPUTS (option, alarm/shutdown, time delay, FPT). The four user programmable external fault conditions are activated when their corresponding inputs are switched low. The fault conditions are fully user programmable for action and time delays. Refer to the configuration instructions (section 6.3) for further programming information.

6. CONFIGURATION

The ACCESS 4000 is fully programmed before it leaves the factory however an operator may, if required, modify the factory defaults to best suit the site application. Configuration of the ACCESS 4000 control system is selected via the CONFIGURE option within the main menu. The operator will be presented with a sub-menu displaying the following:

		S	Y	S	T	E	M	*	*	S	E	T	P	O	I	N	T	S		
		I	N	P	U	T	S	*	*	O	U	T	P	U	T	S				
		S	E	C	U	R	I	T	Y	*	*	C	A	L	I	B	R	A	T	E

Note:

- Pressing the ESCAPE key will return the control to the main menu.

All sub-menus are password level protected. In total there are four levels, each giving the holder a greater degree of responsibility. The four levels are defined as follows:

Level	Default Password	Authorisation
One (Operator)	1111	Resetting alarms and shutdowns
Two (Technician)	2222	The above plus configuration of system, setpoints, inputs and outputs.
Three (Factory/Dealer)	****	The above plus re-calibration of the analogue channels
Remote (option)	9999	Permits control and monitoring access via the communication facility

6.1 System Menu

Within this menu selection the operator may change settings relating to the generating set system. A level two password is required for entry. A series of twenty screens are presented requesting input or conformation of data entry. The first in the series is as shown in the following table:

				U	N	I	T			A	D	D	R	E	S	S					
										*	*										
																	e	n	t	e	r

The cursor keys are used to modify the values, the UP and DOWN keys cause the value to increment and decrement and the LEFT and RIGHT keys move the cursor along the data field. Pressing ENTER will input a new value or confirm the existing value. The controller will automatically move onto the next programming screen. ESCAPE will return the controller to the configure sub-menu.

Unit Address (0 to 15) - Unique address for each slave in the system. The default address is 01. Maximum of 16 slaves on the network.

Data Speed (9600, 14400, 19200, 32768 or 38400) - Communication bus data speed. The master and slaves should use the same speed. The default speed is 9600. For more reliable communication at longer distances select the lowest speed which provides an adequate system refresh rate.

Comms Type (GEN ACCESS, or MODBUS) - Communication protocol type. The default protocol is GEN ACCESS which is used with FG Wilson remote monitoring and control software. Communication using MODBUS will not work unless MODBUS is selected.

Oil Pressure (0 - 5 Bar or 0 - 10 Bar) - Defines oil pressure sender type.

Phase A inside PT ratio (64V, 130V, 250V, 320V or 370V) - Defines the internal transformer primary voltage for phase A.

Phase B inside PT ratio (64V, 130V, 250V, 320V or 370V) - Defines the internal transformer primary voltage for phase B.

Phase C inside PT ratio (64V, 130V, 250V, 320V or 370V) - Defines the internal transformer primary voltage for phase C.

Rated kW (5 - 5000kW) - Rated electrical power of the generating set

Rated kVA (5 - 5000kVA) - Rated apparent power of the generating set

System Frequency (50 or 60Hz) - Defines the nominal operating frequency of the generating set

			F	A	U	L	T		I	N	P	U	T		1				
T	I	M	E		D	E	L	A	Y										
						*	*	*		s	e	c							
															e	n	t	e	r

The cursor keys are used to modify the values, the UP and DOWN keys cause the value to increment and decrement and the LEFT and RIGHT keys move the cursor along the data field.

Pressing ENTER will input a new value or confirm the existing value. The controller will automatically move onto the next programming screen. ESCAPE will return the controller to the configure sub-menu.

Fault Input 1

Time Delay (0 - 99 sec) - Defines the fault transient ride through period

Action (alarm, shutdown) - Defines how the generating set will respond to the fault

FPT Delay (enabled, disabled) - Defines if the fault is to be inhibited during startup

Fault Input 2

Time Delay (0 - 99 sec) - Defines the fault transient ride through period

Action (alarm, shutdown) - Defines how the generating set will respond to the fault

FPT Delay (enabled, disabled) - Defines if the fault is to be inhibited during startup

Fault Input 3

Time Delay (0 - 99 sec) - Defines the fault transient ride through period

Action (alarm, shutdown) - Defines how the generating set will respond to the fault

FPT Delay (enabled, disabled) - Defines if the fault is to be inhibited during startup

Fault Input 4

Time Delay (0 - 99 sec) - Defines the fault transient ride through period

Action (alarm, shutdown) - Defines how the generating set will respond to the fault

FPT Delay (enabled, disabled) - Defines if the fault is to be inhibited during startup

Remote Start

Time Delay On (0 - 99 sec) - Defines the delay period between receiving the remote start signal and the controller initiating the engine start sequence.

Time delay Off (0 - 99 min) - Defines the delay period between receiving the remote stop signal and the controller terminating the engine run signal

6.4 Outputs Menu

Within this menu selection the operator may change settings relating to the optional two programmable relay outputs. A level two password is required for entry. Depending on the number of optional outputs specified at time of order, a series of up to three screens may be presented requesting input or conformation of data entry. A typical screen is shown below :

			O	U	T	P	U	T		R	E	L	A	Y		1			
A	C	T	I	O	N														
						O	V	E	R	L	O	A	D						

The cursor keys are used to modify the values, the UP and DOWN keys cause the value to scroll through the option list. Pressing ENTER will input a new value or confirm the existing value. The controller will automatically move onto the next programming screen. ESCAPE will return the controller to the configure sub-menu.

Output Relay 1

Action - Defines under what alarm/status condition the output relay will energise

1. Running - generating set started and producing rated speed and voltage
2. Alarm - alarm fault condition active
3. Shutdown - shutdown fault condition active
4. Ready to Load - generating set started in automatic and producing rated speed and voltage
5. Overspeed - the controller has detected an engine overspeed condition
6. Overload - the controller has detected an overload fault condition
7. Not Defined - future development
8. Not Defined - future development
9. Not Defined - future development

Output Relay 2

Action - Defines under what alarm/status condition the output relay will energise

1. Running - generating set started and producing rated speed and voltage
2. Alarm - alarm fault condition active
3. Shutdown - shutdown fault condition active
4. Ready to Load - generating set started in automatic and producing rated speed and voltage
5. Overspeed - the controller has detected an engine overspeed condition
6. Overload - the controller has detected an overload fault condition
7. Remote Control - can be remotely activated or deactivated using GenAccess or Modbus protocol
8. Not Defined - future development
9. Not Defined - future development

6.5 Security Menu

Within this menu selection the operator may change the level one, level two or remote access passwords. In order to change the password the original password must first be entered:

			E	N	T	E	R				Y	O	U	R				P	A
											*	*	*	*					S
																			W
																			O

	N	E	W	L	1	P	A	S	S	W	O	R	D						
						*	*	*	*										
										e	n	t	e	r	J				

C	O	N	F	I	R	M	L	1	P	A	S	S	W	O	R	D					
							*	*	*	*											
															e	n	t	e	r	_	J

Entering a level 1 password enables the operator to change only the level 1 password. Entering the level 2 password enables the operator to change either the level 1 or level 2 passwords. Entering the remote access password enables the operator to change only the remote access password.

While each ACCESS 4000 unit is fully calibrated before it leaves the factory, there may be a requirement to re-calibrate during commissioning. Within this menu selection the operator may only modify factory calibration settings, returning all gain values to one (1) and offset values to zero (0) will return the unit to the factory calibrated default. A level three password is required for entry and so may only be performed by suitably qualified and authorised personnel. A series of sixteen screens will be presented requesting input or conformation of data entry. The first in the series is as shown below:

				V	T			P	H	A	S	E		A									
G	A	I	N	:																			
								+	*	.	*	*	*										
																		e	n	t	e	r	.

For detailed information on the procedure for re-calibrating the controller please contact your local dealer.

A large variety of options may be fitted to customise the control system for a specific installation. The following sections cover the use and operation of these options.

A battery charger is required for maintaining a correct battery charge level, especially on the stand-by generating sets. Please consult your dealer for this item.

Battery trace heaters may be fitted to the engine starter battery system to maintain the battery electrolyte at a temperature which will ensure good battery performance under engine starting conditions.

Maximum Distances of ANNUNCIATOR from generator using a 12V battery.

Cable Size	ANNUNCIATOR	ANNUNCIATOR + Relay Board
1.5mm ²	420 meters	110 meters
2.5mm ²	750 meters	190 meters

Greater distances can be achieved by using a separate power supply. The RS422 Communications can operate up to 1000 meters.

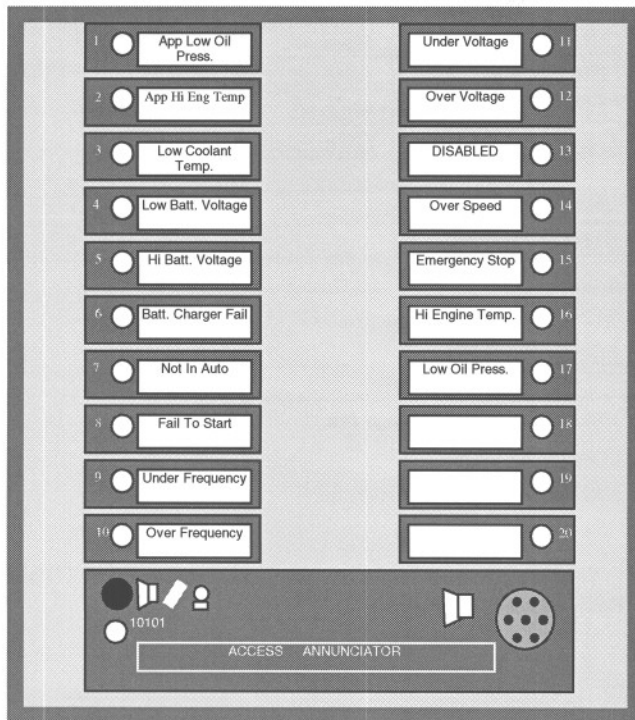


Figure 7.1: Layout of MCM5 Access Annunciator

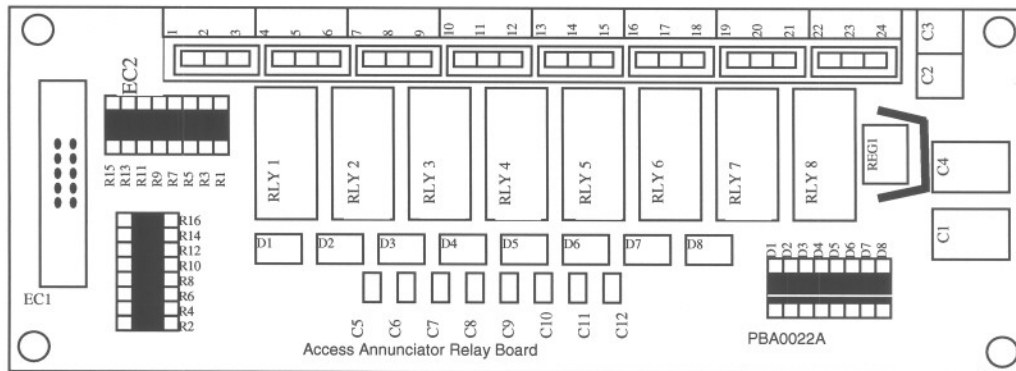


Figure 7.2: Layout of MCM6 Access Annunciator Relay Board

MCM5 Dip Switch Settings

SW1		
	ON	OFF
L1	Siren on	Siren off
L2	Siren on	Siren off
L3	Siren on	Siren off
L4	Siren on	Siren off
L5	Siren on	Siren off
L6	Siren on	Siren off
L7	Siren on	Siren off
L8	Siren on	Siren off

SW2		
	ON	OFF
L9	Siren on	Siren off
L10	Siren on	Siren off
L11	Siren on	Siren off
L12	Siren on	Siren off
L13	Siren on	Siren off
L14	Siren on	Siren off
L15	Siren on	Siren off
L16	Siren on	Siren off

SW4				
Speed (bps)	1	2	3	4
9600	0	0	0	0
14400	0	0	0	1
19200	0	0	1	0
Address	5	6	7	8
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Fault Priorities

The Access 4000 control panel has 21 faults available for selection. If a fault is disabled, the corresponding number will show "DISABLED".

These are:

1. APPROACHING LOW OIL PRESSURE
2. APPROACHING HIGH ENGINE TEMPERATURE
3. LOW COOLANT TEMPERATURE
4. LOW BATTERY VOLTAGE
5. HIGH BATTERY VOLTAGE
6. BATTERY CHARGER FAILURE
7. NOT IN AUTO
8. FAIL TO START
9. UNDER FREQUENCY
10. OVER FREQUENCY
11. UNDER VOLTAGE
12. OVER VOLTAGE
13. OVER CURRENT (Disabled)
14. OVERSPEED
15. EMERGENCY STOP
16. HIGH ENGINE TEMPERATURE
17. LOW OIL PRESSURE
18. SPARE FAULT CHANNEL 1
19. SPARE FAULT CHANNEL 2
20. SPARE FAULT CHANNEL 3
21. SPARE FAULT CHANNEL 4

The Access Annunciator has 20 fault channels available, which can be prioritised in any order. The default set up is the first 20 faults from the above list i.e. Channel 1 is for "APPROACHING LOW OIL PRESSURE", Channel 2 is for "APPROACHING HIGH ENGINE TEMPERATURE", etc.

SW3		
	ON	OFF
L17	Siren on	Siren off
L18	Siren on	Siren off
L19	Siren on	Siren off
L20	Siren on	Siren off
RELAY	LEDs Solid	LEDs Flash
RX-	Pull Down	
RX+	Pull Up	

0 = Dip Switch OFF
1 = Dip Switch ON

The factory default settings are:
Speed = 9600 bps
Address = 1
RX+ = ON
RX- = ON
Relay = OFF

To change the priority of the fault channels, follow the instructions below.

Method to change fault allocations on the Access Annunciator using an Access 4000 Control Panel.

- Go into the CONFIGURE menu and press return key (↵)
- Go into the OUTPUTS menu and press return key (↵)
- Enter a LEVEL 2 password 2222 and press return key (↵)
- Press return key until you come to the ANNUNCIATOR menu
- Use the UP/DOWN key (↑) to go through the available faults.
- Allocate a fault to the desired fault channel position.
- Use the return key (↵) to confirm a selection and go on to the next channel.
- You can use the LEFT key (←) to go back to the previous channels.

Note: If priorities have been changed, then new labels must be fitted to the Access Annunciator.

8. CONTROL SYSTEM FAULT FINDING/TROUBLE SHOOTING GUIDE

A number of faults may cause the ACCESS 4000 control module not to function correctly. Refer to the following list of typical problems. For further detailed information or any problems not listed, please consult your local dealer.

CAUTION

! **There are NO user serviceable parts within the ACCESS 4000 control module. Any attempt to open the module will result in termination of the product warranty.**

All fault finding and service procedures must be undertaken by qualified and authorised personnel only.

Fault	Cause	Remedy
Unit does not power up	No input dc power supply	Check the 9 - 32 Vdc power supply
LCD does not display screen text	Microprocessor not functioning	Check the watchdog LED on the rear of the unit, it should flash at regular intervals
Start command (i.e. RUN or AUTO) does not start the engine	Starter motor not engaging	Check the starter motor LED on the rear of the unit, it should energise on for a few seconds and then off.
	Fuel control solenoid not energising	Check the fuel control LED on the rear of the unit, it should energise on.
	Shutdown fault condition active	Check the fault log for active shutdown faults
		Refer to a qualified generating set technician
Starter motor stays engaged after the engine starts	Crank cut-out setpoint in the system menu is too large	Adjust the setpoint down
ACCESS 4000 indicates OVER-SPEED	Engine has overspeed during start-up	Refer to a qualified generating set technician
	Inadequate MPU signal	Check the connections of the MPU.
Generating set voltage fluctuates or is unstable.	AVR dynamics are improperly setup	Refer to a qualified generating set technician

Fault	Cause	Remedy
Engine speed is unstable	Speed control dynamics are improperly set-up	Refer to a qualified generating set technician
FAIL TO START	The engine has no fuel supply	Check fuel level/pressure
HIGH ENGINE TEMP fault displayed	Engine stops due to high engine temperature	Check engine was not overloaded
		Check radiator for obstructions
		Check coolant level within radiator
		Refer to a qualified generating set technician
LOW OIL PRESSURE fault displayed	Engine stops due to low lubricating oil pressure	Check oil level
		Refer to a qualified generating set technician
EMERGENCY STOP fault displayed	Emergency Stop pushbutton has been pressed	Check and release emergency stop buttons.
Incorrect voltage or current meter reading	Incorrect VT & CT ratio programming	Verify that the VT & CT ratios are correct
	Incorrect primary PT connection	Verify that PT input voltages tapping connections are correct (see figure 2.5 & 2.6)
	Incorrect primary PT ratio setting	Verify that PT ratios are correct
Incorrect engine temperature or oil pressure meter reading (or displaying #####)	Incorrect wiring connection	Verify that the voltage and current sensing wiring is as per the appropriate wiring diagram
	Incorrect analogue calibration	Refer to a qualified generating set technician

9. SPECIFICATION

Power Supply 9 - 32 Vdc, negative ground (voltage dip transient, 4.5V dc for 50 ms)

- Operating Temperature -10 to +50° (14 to 22°F)
- Ingress Protection - IEC 529 IP-56
- Power Consumption 6 Watts (maximum)
- AC Metering Accuracy $\pm 1.5\%$ @ 25°C
- Engine Parameter Accuracy $\pm 1.0\%$ @ 25°C (plus sender accuracy)
- Inputs:
 - Engine Speed Sensing 50Hz - 10,000Hz,
(Magnetic Pick up) 5 - 30Vac (rms)
 - AC Voltage (nominal) 110 - 480Vac (L-L)/63.5 277Vac
(L-N) 50 - 60 Hz
 - AC Current (nominal) 0 - 5A
 - Engine Parameters Variable resistance type senders
 - Digital Inputs Switch to power supply negative
- Outputs 2A, 30 Vdc, Form C