

AUTO START MODULE WITH CAN BUS J1939 PROTOCOL – SMART-CAN

FEATURES

Microcontroller based design
CAN bus J1939 enabled
Operation by 3 push buttons
Easy to fit DIN standard 72x72 panel mount housing
Connection is via locking plug and socket connectors
Solid-state short circuit protected outputs
LCD display for engine status and to access the menu
Oil change notification alert
Front panel leds for status and alarm indication
Automatic engine starting and stopping
Automatic shutdown on fault condition
Low oil pressure alarm and shut down
High engine temperature alarm and shut down
Dynamo failure alarm and shut down
Over/Under speed alarm and shut down
Coolant level alarm and shut down
General alarm output

ACTUAL SIZE



DESCRIPTION

Smart-CAN is a new addition to the Smart series. It is an intelligent auto start and protection module with CAN bus J1939 communication protocol, engine status display, run hour counter and run hours since the last oil change. Automatic assembly and microcontroller based high integration design resulted in this low-cost yet high performance controller.

OPERATION

Stop Mode: In this mode, the engine is shut down along with the module. All alarms are reset.

Auto Mode: In this mode, the genset is ready to start. Starting is controlled by the remote control input. Following is a description of the operation in this mode:

1. The **Remote Control** input receives a start signal (activated by connection to $-V_{bat}$).
2. No action is taken until the delay set by **RSP** is elapsed.
3. A starting sequence of a preset number of attempts **ATT** will initiate.
4. The **Electric Valve** engages 0.5sec before the **Starter**.
5. If the start signal is removed before the engine starts, all timers are reset and the module is ready for a new sequence.
6. Cranking is disconnected when the RPM (divided by 60 to convert it to Hz) received through the CAN bus exceeds **CRF** or a voltage exceeding **dCd** (if not set to **N**) appears on the **Dynamo** input or the oil pressure switch opens given that **boP** is not set to **Y** and its preset delay has elapsed or for Volvo engines, when a running indication is received through the CAN bus.
7. If the engine fails to start after the preset number of attempts, a scan of the six red leds is initiated to indicate a start fail. The **Alarm** output is activated. The **Smart-CAN** would reattempt starting by selecting the **Stop Mode** then selecting **Auto Mode** or by recycling the remote control signal.
8. After elapse of the warm-up delay, set by **WUP**, the load contactor is engaged via terminal **Contactor** and yellow led activated.
9. All protections are enabled when the engine is running and after the elapse of the fault bypass time set by **bYP**.
10. Any fault will shut the load down and then shut the engine down and the corresponding led is lit. **Alarm** output is activated as well.
11. When the start signal is removed, the **Smart-CAN** will shut the load down after the elapse of the delay set by **oFF**. The engine is shut down after the elapse of the cooling time set by **COL**.

Manual Mode: This mode is similar to the **Auto Mode** except that the start signal is internally activated.

DISPLAY FUNCTIONS

Genset status: while standing-by for a start signal in **Auto Mode**, the display shows **READY** if the genset is ready to start. In case the genset is not ready, **NOTRDY** is displayed. This could be the result of three causes: oil pressure switch not connected (or damaged), dynamo input sees a voltage exceeding **dcd** or running status was received through the CAN bus. If there is no oil pressure switch, set **boP** to **Y**. If there is no dynamo (or dynamo not connected), set **dCd** to **N** and **dSd** to **N**. The display will show **CRANKG** during cranking and it will also show the count down of the response, warm-up, load shutdown (off delay) and cooling delays. Following a shutdown due to a fault, the display will show the DTC (J1939 protocol error code) description of the fault received from the CAN bus. The LCD will show **RUNING** when the engine is running, **LOADOK** when engine is running on load.

Measurements: The LCD also displays measurements received by the module from the engine through the CAN bus. Displayed measurements are: oil pressure (PSI), engine coolant temperature ($^{\circ}\text{C}$), fuel consumption (Liters/hour), battery voltage (Vdc), engine speed (RPM), engine total hours of operation (Hr) and the engine total fuel consumption (L). The display also shows the run hours since the last oil change (recorded by the Smart-CAN). When the oil run hour reaches **RHR**, the low oil pressure indicating led will start blinking. Following an oil change, the oil hour counter can be reset to zero by pressing simultaneously **AUTO** and **HAND** push buttons for 2 seconds. Autoscrolling between these measurements can be done by pressing the **AUTO** or **HAND** push button (user should press the one that is already active so as not to change the operating mode).

ACCESSING THE MENU

The menu is accessed by pressing either **AUTO** or **HAND** push buttons for 3 seconds. Once in menu mode (i.e. scrolling the menu and editing parameters), the **AUTO** and **HAND** push buttons will no longer affect the operating mode of the **Smart-CAN** controller. The **AUTO** push button scrolls down the menu and decrements values. The **HAND** push button selects the menu item for editing and increments values. The new value will be automatically memorized after 2 seconds if no push buttons are pressed. If no buttons are pressed for 25 seconds, the **Smart-CAN** will automatically exit the menu mode.



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MENU DESCRIPTION

Display	Description	Range	Factory Setting
rSP	Response delay	0 to 255sec	5sec
StA	Starter time	0 to 255sec	5sec
bEt	Time between trials	0 to 255sec	12sec
Att	Number of starting attempts	0 to 255	3
bYP	Fault bypass delay	0 to 255sec	15sec
WUP	Warm-up delay	0 to 255sec	10sec
OFF	Load shutdown delay (Off delay)	0 to 255sec	10sec
COL	Engine cooling time	0 to 255sec	5sec
CRF	Crank disconnect frequency set point	0 to 255Hz	15Hz
OFS	Over frequency set point	0 to 255Hz	55Hz
UFS	Under frequency set point	0 to 255Hz	45Hz
OFd	Over frequency delay or disables over frequency	DiS, 1 to 255sec	2sec
UFd	Under frequency delay or disables under frequency	DiS, 1 to 255sec	5sec
CHT	Selects whether to enable cool down after high temperature shutdown	N/Y	N
bOP	Selects whether to permanently bypass the Oil pressure switch for crank disconnect or whether to bypass it for a preset delay	Y: bypass OPS for crank disconnect 1 to 5sec	Y
dCd	Selects whether to permanently bypass the dynamo for crank disconnect or sets the voltage above which cranking stops	N: bypass dynamo for crank disconnect 10 to 26Volts	N
dSd	Selects whether to disable the dynamo shutdown or sets the voltage below which there will be a dynamo shutdown	N: disables bypass dynamo shutdown 5 to 10Volts	N
LCL	Low coolant input polarity logic	no, nc	nc
SF	Spare function	HET: High engine temperature HOT: High oil temperature LFL: low fuel level	HET
RHR	Sets the number of hours before alerting for an oil change	diS, 1 to 255hours	150
ECU	Type of engine electronic control unit used	SE: Standard engine (generic J1939) VE: Volvo engine PE: Perkins engine	SE
APP	Accelerator Pedal Position (only available if ECU is Volvo)	0 to 100%	50%
IdL	Idle speed delay (only available if ECU is Volvo)	0 to 99 sec	0sec
SPd	Speed select (only available if ECU is Volvo)	PRI: Primary speed SEC: Secondary speed	PRI
LFS	Load factory settings		
EXI	Exit the menu		

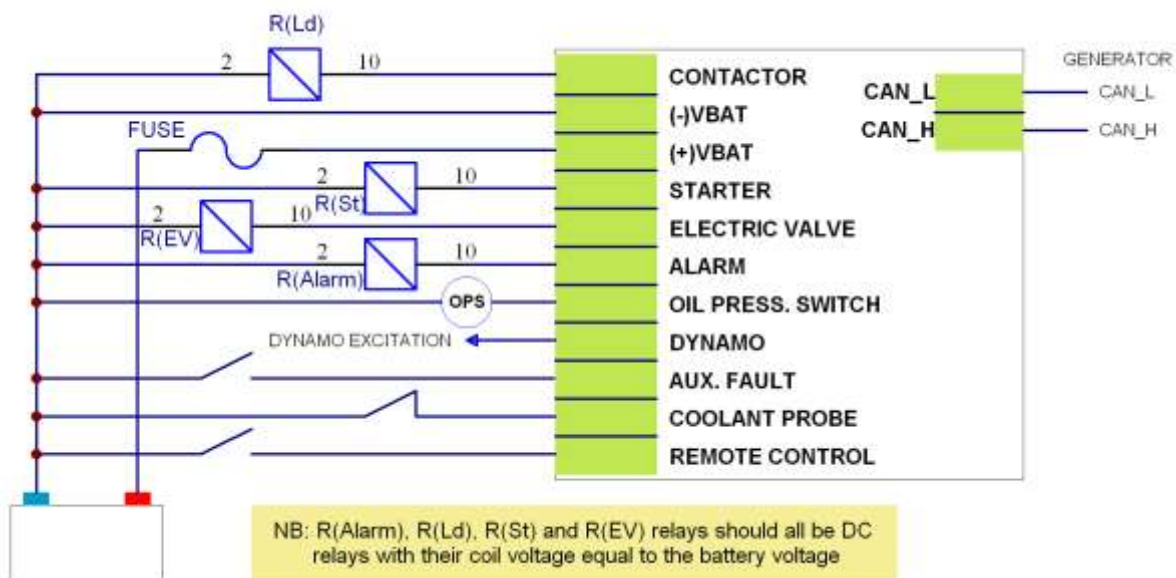
SPECIFICATION

Operating voltage	8 to 28vdc
Signal voltage range	50 to 250vac
Outputs	1A 50V
Dimensions (WidthxHghtxDpeth)	72x72x32 mm

ABSOLUTE MAXIMUM RATINGS

Supply voltage	8-30Vdc
Signal voltage	280vac
Outputs	1.4A
Operating temperature	-30 to 70°C

INSTALLATION



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