Be42 & Be42N

AMF + ATS + Engine Controller
Sales bulletin
www.bernini-design.com

Summary

1.0 Description

The Be42 (or Be42N) is 3-phase A.T.S. controllers & Generator monitoring systems. Its programming runs quickly, and all parameters, alarms and operating functions are indicated by means of a high-luminosity display capable of operating in a temperature range between -30°C and +70°C. The Be42 interfaces with resistive sensors up to 2000 Ohm. Measurements including Vac, Aac, Vdc, Hz, hour count, R.p.m., Oil Pressure, Engine Temperature, Battery Vdc (Engine) and Fuel Level. A Windows XP © compatible remote monitoring and control software program is also provided. The Be42 provides RS485 MODBUS. Be42 complies with NFPA-110 / NFPA-99 specifications. The version Be42N (without Sensor inputs) allows you to save money in case the engine is equipped with switches instead of sensors (Oil / Temperature & Fuel) .

2.0 State-of-the-art Innovative features

- *RS485 & MODBUS protocol, RS232 converter available on request*
- *4-digit Led-Display operating between -30° and +70°*
- *Interfaces with 3 Resistive sensors up to 2000 OHM (Bar / °C / Fuel%)*
- *Low cost version Be42N (without input sensors) available on request*
- *Aac, Vac, Hz, Vdc, Charger Vdc, RPM-meter & h-meter*
- *26 Options for each programmable input & 59 Options for each Output*
- *8 digital Inputs, 9 digital Outputs and 3 Sensor Inputs*
- *High quality manufacturing, 72-hour dynamic burn-in, 3-Year warranty*
- *High luminosity Display indicating 40 alarms or Status messages*
- *More than 180 programmable parameters, password protected*

3.0 Programmable Inputs

The Be42 features 8 digital inputs and 3 analog inputs. 4 digital inputs can be configured normally closed or open with the following options:

OPTIONS				
Disable input		Remote LOCK		Remote Off Mode
Immediate Stop		Generator simulation		Idle Speed
Bypass and Stop		Mains Simulation		Engine Test
Cooling and Stop		Remote LEDs test		Genset test
Bypass + Cooling + Stop		Remote Acknowledge		KM Control
Warning only		Display Control ←		KM Control
Bypass and Warning		Display Control →		Overload
Remote Manual Mode		KG feedback		
Remote Auto Mode		KG feedback		

The 3 analog inputs, can be programmed with a 6-point response curve by means of a computer (not available in the BE42N version.

4.0 Programmable Outputs

The Be42 features 9 outputs. Four outputs can be configured as follows:

OPTIONS			
	The Output is disabled		Panel Stop Shutdown
	Under Speed Shutdown		**Common Input Alarm**
	Over Speed Shutdown		-
	Common Speed Alarms		Presence of Nominal Mains Parameters
	-		Presence of Nominal Generator Voltage
	Under Frequency Shutdown		Mains Failure Timing
	Over Frequency Shutdown		Mains Restore Timing
	Over Current Shutdown		KG Contactor of the GENERATOR Closed
	Over Current Warning		KM Contactor of the MAINS Closed
	Over/Under Voltage Shutdown		Crank Delay (Start Warning)
	Alternator Failure Shutdown		Pre-glow ACTIVATED
			PURGE (gas engine valve control)
	Maintenance SERVICE 1,2 and 3		-
	Auxiliary Alarm 1-2-3-4: Shutdown / Warning		Engine Running Status
			Cooling Timing
			Warm up Timing
	Common Generator Alarms		-
	-		RENT Warning(<48h)/Shutdown (Expired)
	Low Oil Pressure Warning or Sensor Failure		-
	Low Oil Pressure Shutdown (Sensor/Switch)		BE42 in OFF MODE (Status)
	Common Oil Pressure Alarms		BE42 in MANUAL MODE (Status)
	-		BE42 in AUTO MODE (Status)
	High Temperature Shutdown		BE42 in TEST MODE (Status)
	High – Low Temperature Warning (Sensor)		BE42 in LOCK MODE (Status)
	Common Temperature Alarms		-
	-		Automatic Periodic Test
	High – Low Battery Voltage Warning		Fail To START Shutdown
	No Fuel in Tank Shutdown		Fail To STOP Shutdown
	Low Level Fuel Warning		Engine Belt Break Shutdown
	Fuel Reserve Warning		Indication of Parameter Error warning
	High Fuel Warning		Idle Engine
	Fuel Sensor Failure Warning		Clock Error or Periodic Test Error
	Common Fuel Alarms / Sensor Failure		Control for Reserve Generator

5.0 Display features

The Be42 features 4 high-luminosity displays , to indicate the following:

- Electrical measurements	***- Engine parameters / measurements***
- Menu and sub Menu	***- Programming***
- Alarms & Messages	***- Miscellaneous parameters***

5.1 Display: alarm indications

The Be42 monitors the following alarms:

OVER/UNDER FREQUENCY (SD)	LOW OIL PRESSURE (SD)	
OVER/UNDER VOLTAGE (SD)	LOW OIL PRESSURE (W) **(**)**	MAINTENANCE 1-2 WARNING
		MAINTENANCE 3 SHUTDOWN
ALTERNATOR FAILURE (SD)		
	OIL SENDER FAILURE (W) **(**)**	
OVERLOAD (W)+(SD)		FUEL RESERVE (W)+(SD)
OVER CURRENT (W)+(SD)	HIGH-LOW COOLANT TEMPERATURE(W) **(**)**	NO FUEL SHUTDOWN
SHORT CIRCUIT (SD)	HIGH-LOW COOLANT TEMPERATURE (SD)	
	TEMPERATURE SENDER FAILURE (W) **(**)**	HIGH / LOW FUEL WARNING **(**)**
		FUEL SENSOR FAILURE (W) **(**)**
	REMOTE EMERGENCY (SD)	
OVER/UNDER SPEED (SD)	LOCAL EMERGENCY (SD)	LOW BATTERY V (W)
		HIGH BATTERY V (W)
MAINS FAILURE	ALARM INPUT 1-2-3-4 (W)+(SD)	
		PARAMETER ERROR (W)
CONTACTORS ALARM (W)	FAIL TO STOP (SD)	
	FAIL TO START (SD)	SYSTEM NOT IN AUTO (W)
	BELT BREAK (SD)	
KM / KG FAILURE		
	REMOTE LOCK (SD)	PERIODIC TEST ERROR (W)
RENT WARNING		
RENT SHUTDOWN		

note: (W) stands for Warning and (SD) stands for SHUTDOWN ***note: (**) Not available in the version Be42N***

5.2 Display: Menu & Measurements

The Be42 indicates the following:

MAIN MENU	**PARAMETERS MENU**	**MEASUREMENTS**
MEASUREMENTS	RESTORE DEFAULT	
ALARM STATUS	CHANGE PASSWORD	MAINS VOLTAGES / Hz
PROGRAMMING	CALIBRATION	CONTACTOR STATUS
SERVICE & MAINTENANCE	CLEAR MEMORY	
		GENERATOR VOLTAGES / Hz
MEASUREMENTS	MAINS CONTROL	GENERATOR CURRENT
GENERATOR	GENERATOR CONTROL	
MAINS	ENGINE PARAMETERS	
ENGINE & FUEL	SPEED PARAMETERS	COOLANT TEMPERATURE **(**)**
ALARM STATUS		
	FUEL LEVEL SETTINGS	OIL PRESSURE **(**)**
MISCELLANEOUS	OIL PRESSURE SETTINGS	ENGINE SPEED
RENT CONTRACT	TEMPERATURE SETTINGS	FUEL LEVEL **(**)**
SERVICE STATUS	FUEL SENSOR	CHARGER ALTERNATOR (V)
PERIODIC TEST		BATTERY VOLTAGE
	INPUTS & OUTPUTS	

note: (**) Not available in the version Be42N

6.0 Pushbuttons features

The Be42 features 12 membrane pushbuttons used for the following tasks :

Push buttons	Notes
[START-ON] [STOP-OFF]	Are used to Start-Stop the Engine or programming
[I] - [0] - [I]	Control the status of the contactors
[MAN] [OFF] [AUTO] [TEST]	Select the operating modes
[RIGHT] [LEFT] [UP] [DOWN]	Are used to control the display or programming
[ACK]	It silences the horn

7.0 Speed detect

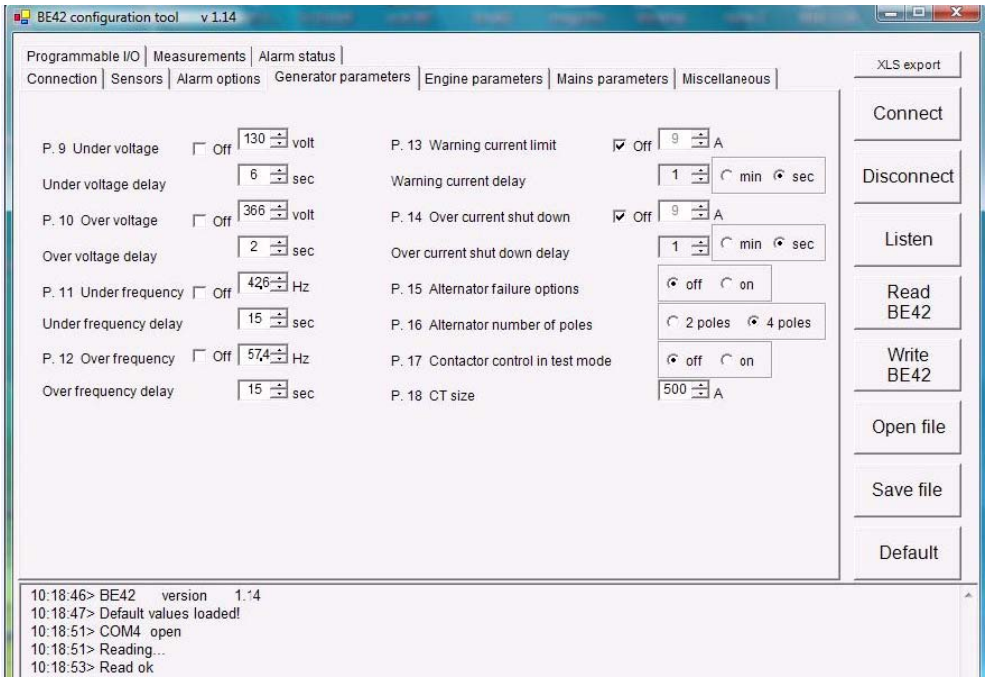
Generator	Be42 detects the speed from the frequency of the Generator. You can program 2 or 4 poles in order to obtain the proper reading on the display. You can set the limit of High/Low speed with independent delay timers.

8.0 LED indicators

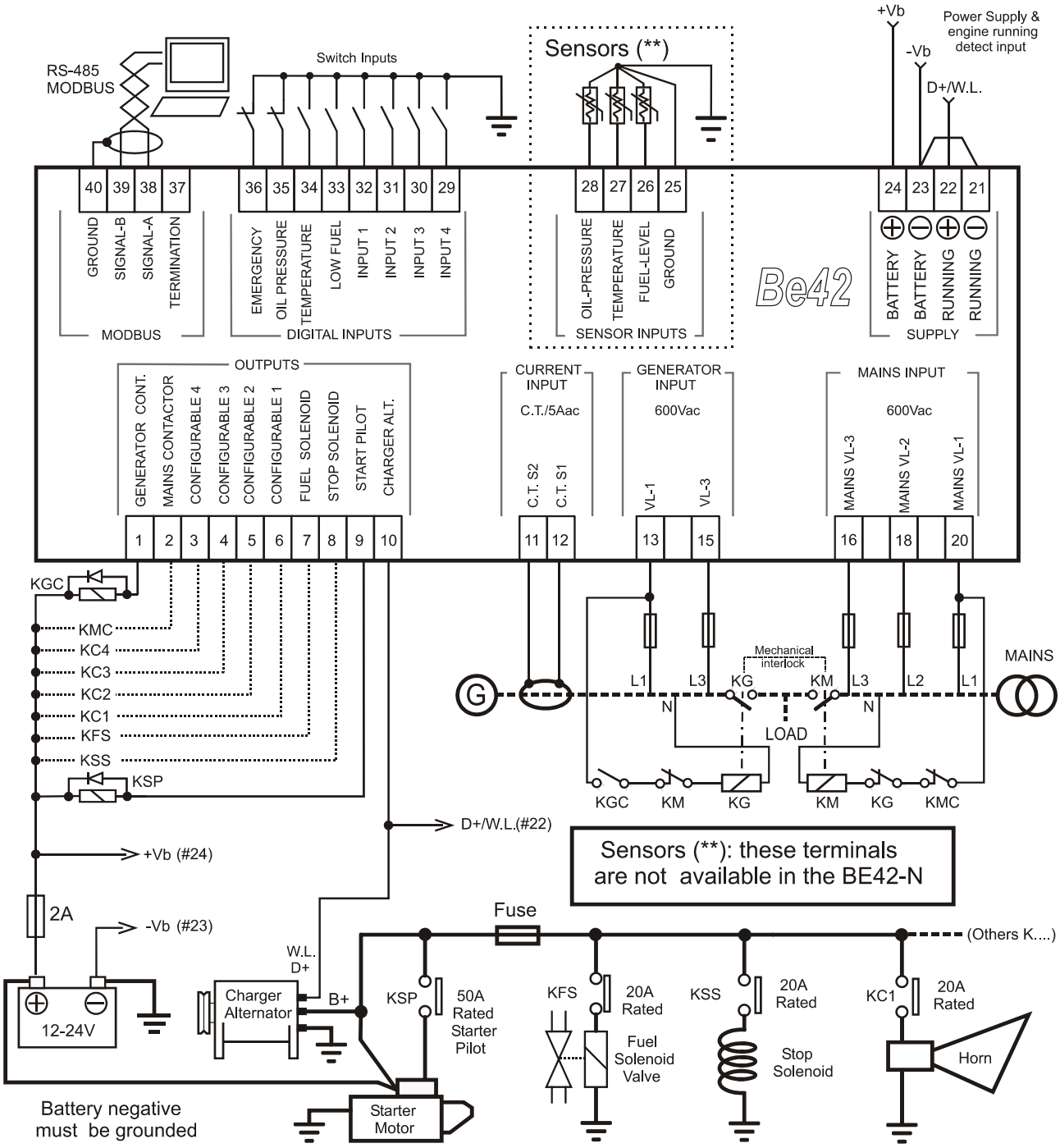
LEDs	Notes
1 Green indicator	Indicates that the engine is running
6 Green indicator	Indicate operating modes and the status of the contactors
5 Yellow indicator	Indicate the Menu on the display

9.0 Serial communications

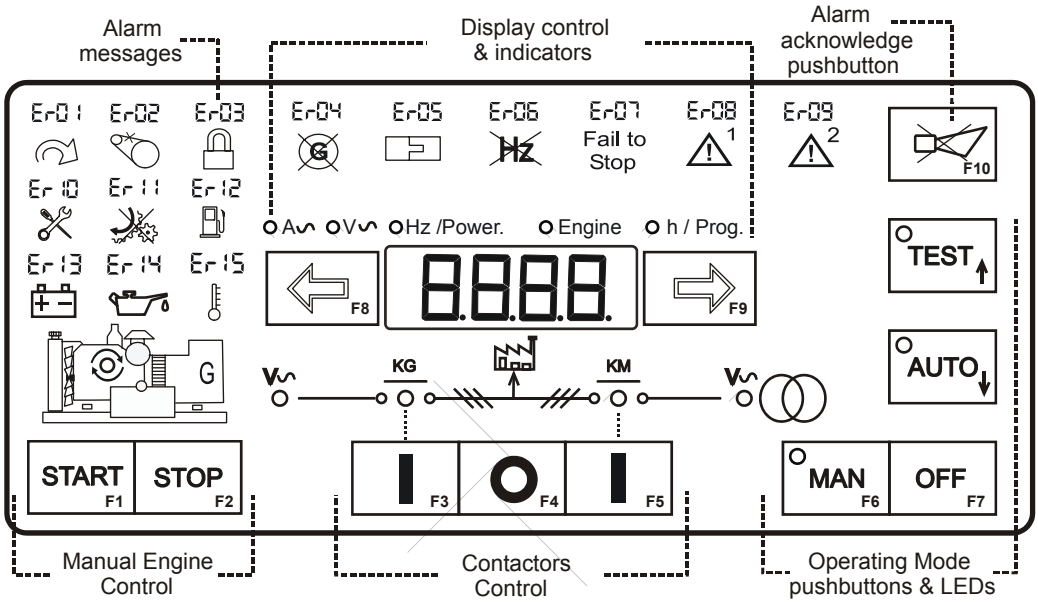
The Be42 features an RS485 serial interface. The protocol MODBUS provides an easy way to interface with other equipment. Software running on the XP operating system is available. The software, running on PC, can generate .XLS compatible files and allows Wireless TCP-IP data communications (an external GPRS modem is required).



10.0 Be42, Be42N Application wiring diagram



Section 11.0 Be42, Be42N Front Fascia



12.0 Be42 Programmable Parameters Table

MAINS MONITORING
-Mains Failure timing
-Mains Breaker timing
-Mains Restore timing
-Contactors changeover timing
-Over/Under voltage & delay
-Over/ Under Hz limit & delay
-Phase Mode

AUTOSTART CONTROL

MAINS failure, Periodic Test
Remote Controls

GENERATOR

-Under voltage & delay
-Over voltage & delay
-Under Frequency & delay
-Over Frequency & delay
-Warning current & delay
-Over current & delay
-Alternator failure settings
-Alternator Poles
-Contactor Control
-Phase Mode
-CT size

ENGINE
-Crank delay
-Crank time
-Rest time
-Crank attempts
-Pre-glow time / Modes
-Warm up time
-Cooling down time
-Stop Solenoid time
-Crank termination Vdc
-Belt break setting
-Charger Failure
-Crank termination Vdc
-Crank termination Vac
-Crank termination Hz
-Low Oil pressure warning **(**)** / shut down
-High Temperature warning **(**)**/ shut down
-Low Temperature warning **(**)**
-Gas Purge
-Idle Speed
-Alarms bypass timing
-Fail to stop enable
-Under/Over Speed & bypass delay

MISCELLANEOUS

-EJP time and Test timeout
-Maintenance 1-2-3 setting
-NFPA - 110 Level 1&2
-RENT CONTRACT

TEST
-Periodic Test enable
-Test Duration

FUEL CONTROL

-Low Fuel Warning % **(**)**
-High Fuel Warning % **(**)**
-No Fuel /Reserve bypass

SECURITY SETTINGS
-Passwords
-Calibration
-Memory
-Default settings

OIL PRESSURE, TEMPERATURE &FUEL
Warnings / Shutdowns
0-1000 OHM INPUTS
NOTE (**)

INPUT & OUTPUTS

Warning / Shutdown

26 Options for inputs and
59 Options for outputs

NOTE (**): ***Analog sensor inputs are not available for the version Be42N. You have to connect the Oil Pressure / Engine Temperature & Fuel Level switches in order to protect the engine (consult the Be42N user manual).***

13.0 Be42, Be42N Characteristics

- Supply Voltage: 5.5-36Vdc (120mA)
- Dimensions: 224X105X70(mm)
- Weight: 850 gr.,
- Static Outputs: 300mA/100Vdc
- Digital Inputs: -100 / +100Vdc
- Charger Alternator: up to 36Vdc
- Rated Vac Max: 600Vac. Rated Aac Max: 7Aac
- Cut-out: 190mm X 93mm, indoor-outdoor operation
- Vibration: 40mm/sec.
- Operating / StorageTemperature: -30 / +70°C
- Humidity: 5% up to 95% non-condensing
- Sensor current: 10mA max.

Be42 Design: 89/336 EEC, 89/392 EEC, 73/23 EEC, 93/68 EEC, IEC 68-2-6 Certification: CE

14.0 Front panel view