# BE124 MODBUS-RTU

## 1.0 Description

The BE124 conforms to the  MODBUS RTU communication protocol specification (www.modbus.org).

## 2.0 Serial communication settings

| RS485 serial settings: | |
| --- | --- |
| Baudrate | 9600 |
| Data bits | 8 |
| Parity | none |
| Stop bits | 1 |
| Flow control | none |

Default MODBUS node is 1, but can be changed by the user.

## 3.0 Supported MODBUS functions

| Function code(HEX) | Function description |
| --- | --- |
| 01h | Read Coils |
| 03h | Read Holding Registers |
| 04h | Read Input Registers |
| 05h | Write Single Coil |
| 06h | Write Single Input Register |
| 0Fh | Write Multiple Coils |
| 10h | Write Multiple Holding Registers |

### 4.0 Coils map

| Address | Name | Description |
|---------|------|-------------|
| 0 | REMOTE ENGINE START | ON – Starts the engine without closing the GCB |
| 1 | REMOTE GENSET START | ON – Starts the engine and close the GCB |
| 2 | REMOTE STOP | ON – Stops the engine |
| 3 | REMOTE ALARMS ACK | ON – Acknowledge (clear) alarms |
| 4 | REMOTE EMERGENCY | ON – Remote emergency shutdown |
| 5 | REMOTE TOGGLE GCB | ON – GCB toggle (close/open) |
| 6 | REMOTE DATA LOGGER RUN/STOP | ON – Run/Stop data logger |
| 7 | REMOTE DATA LOGGER ERASE | ON – Erase data logger samples |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |

**Important information:**

BE124 should be in AUTO mode of operation to accept the commands through write coils function.

## 5.0 Input registers map

| Address | Name | Description |
|---------|------|-------------|
| 30001 | FIRMWARE VERSION | |
| 30002 | | |
| 30003 | | |
| 30004 | L1-L2 | VAC |
| 30005 | L2-L3 | VAC |
| 30006 | L1-L3 | VAC |
| 30007 | L1-N | VAC |
| 30008 | L2-N | VAC |
| 30009 | L3-N | VAC |
| 30010 | C1 | A (If CT SIZE ≤ 500 then Ax10) |
| 30011 | C2 | A (If CT SIZE ≤ 500 then Ax10) |
| 30012 | C3 | A (If CT SIZE ≤ 500 then Ax10) |
| 30013 | C-GND | A (If CT SIZE ≤ 500 then Ax10) |
| 30014 | KW 1 | KW (If CT SIZE ≤ 500 then KWx10) |
| 30015 | KW 2 | KW (If CT SIZE ≤ 500 then KWx10) |
| 30016 | KW 3 | KW (If CT SIZE ≤ 500 then KWx10) |
| 30017 | KW TOTAL | KW (If CT SIZE ≤ 500 then KWx10) |
| 30018 | KVA 1 | KVA (If CT SIZE ≤ 500 then KVAx10) |
| 30019 | KVA 2 | KVA (If CT SIZE ≤ 500 then KVAx10) |
| 30020 | KVA 3 | KVA (If CT SIZE ≤ 500 then KVAx10) |
| 30021 | KVA TOTAL | KVA (If CT SIZE ≤ 500 then KVAx10) |
| 30022 | KVAR 1 | KVAR (If CT SIZE ≤ 500 then KVARx10) |
| 30023 | KVAR 2 | KVAR (If CT SIZE ≤ 500 then KVARx10) |
| 30024 | KVAR 3 | KVAR (If CT SIZE ≤ 500 then KVARx10) |
| 30025 | KVAR TOTAL | KVAR (If CT SIZE ≤ 500 then KVARx10) |
| 30026 | PF 1 | PF x 100 |
| 30027 | PF 2 | PF x 100 |
| 30028 | PF 3 | PF x 100 |
| 30029 | PF TOTAL | PF x 100 |

| 30030 | SEQUENCE | 0 – CW, 1 – CCW |
|---|---|---|
| 30031 | FREQUENCY | Hz x 10 |
| 30032 | MODE OF OPERATION | See A1 |
| 30033 | ENGINE STATUS | See A2 |
| 30034 | STARTING STATUS | See A3 |
| 30035 | ENGINE SPEED | RPM |
| 30036 | OIL PRESSURE | BAR x 10 |
| 30037 | COOLANT TEMPERATURE | ºC(+40 offset  if CANBUS ENGINE) |
| 30038 | AUXILIARY TEMPERATURE | ºC |
| 30039 | OIL TEMPERATURE | ºC(+273 offset  if CANBUS ENGINE) |
| 30040 | FUEL LEVEL | % |
| 30041 | ALTERNATOR VOLTAGE | VDC |
| 30042 | ALTERNATOR VOLTAGE AVG | VDC |
| 30043 | BATTERY VOLTAGE | VDC |
| 30044 | BATTERY VOLTAGE AVG | VDC |
| 30045 | PUMP STATUS | 0 – OFF, 1 - ON |
| 30046 | RUNNING HOURS COUNTER | h |
| 30047 | RENTAL HOURS | h |
| 30048 | SERVICE 1 | h |
| 30049 | SERVICE 2 | h |
| 30050 | SERVICE 3 | h |
| 30051 | DATE DAY WEEK | 0-SU,1-MO,2-TU,3-WE,4-TH,5-FR,6-SA |
| 30052 | TIME HOUR | hour |
| 30053 | TIME MINUTE | minutes |
| 30054 | TIME SECOND | seconds |
| 30055 | DATE DAY | day |
| 30056 | DATE MONTH | month |
| 30057 | DATE YEAR | year |
| 30058 | N° OF START | unsigned integer |
| 30059 | ENERGY COUNTER HIGH WORD | kWh high word |
| 30060 | ENERGY COUNTER LOW WORD | kWh low word |
| 30061 | INPUT SWITCH 1 | 0 – OFF, 1 - ON |

| 30062 | INPUT SWITCH 2 | 0 – OFF, 1 - ON |
|---|---|---|
| 30063 | INPUT SWITCH 3 | 0 – OFF, 1 - ON |
| 30064 | INPUT SWITCH OIL | 0 – OFF, 1 - ON |
| 30065 | INPUT SWITCH FUEL | 0 – OFF, 1 - ON |
| 30066 | INPUT SWITCH TEMPERATURE | 0 – OFF, 1 - ON |
| 30067 | CT SIZE EARTH CURRENT | |
| 30068 | IDLE SPEED ON | 0 – OFF, 1 - ON |
| 30069 | TIME REMAINING HOURS | hours |
| 30070 | TIME REMAINING MINUTES | minutes |
| 30071 | TIME REMAINING SECONDS | seconds |
| 30072 | | |
| 30073 | | |
| 30074 | | |
| 30075 | | |
| 30076 | ENGINE RUNNING | 0 – OFF, 1 - ON |
| 30077 | FLAGS REGISTER  0 | See A4 |
| 30078 | ENGINE TYPE | See A5 |
| 30079 | SPN 98 (OIL LEVEL) | % |
| 30080 | SPN 102 (TURBO BAR) | bar x 10 |
| 30081 | SPN 97 (WATER IN FUEL) | 0 – OFF, 1 - ON |
| 30082 | SPN 174 (FUEL TEMPERATURE) | ºC +40º |
| 30083 | SPN 94 (FUEL PRESSURE) | bar x 10 |
| 30084 | SPN 183 (FUEL RATE) | % |
| 30085 | SPN 91 (PEDAL POSITION) | % |
| 30086 | SPN 111 (COOLANT LEVEL) | % |
| 30087 | SPN 109 (COOLANT PRESSURE) | bar x 10 |
| 30088 | SPN 101 (CRANKCASE PRESSURE) | bar x 10 |
| 30089 | SPN 107 (AIR FILTER PRESSURE) | bar x 10 |
| 30090 | SPN 106 (INTAKE PRESSURE) | bar x 10 |
| 30091 | ENGINE RUNNING (ECU) | 1-Engine is running, 0-not running |
| 30092 | SPN 105 (BOOST TEMPERATURE) | ºC +40º |
| 30093 | SPN 173 (EXHAUST TEMPERATURE) | ºC +273º |

| | | |
|---|---|---|
| 30094 | ECU ENGINE HOURS LOW | Low word |
| 30095 | ECU ENGINE HOURS HIGH | High word |
| 30096 | SPN 512 (DEMAND TORQUE) | % |
| 30097 | SPN 513 (ACTUAL TORQUE) | % |
| 30098 | SPN 92 (LOAD) | % |
| 30099 | | |
| 30100 | ENERGY COUNTER LAST 24 HOURS | |
| 30101 | ENERGY COUNTER LAST 31 DAYS H | |
| 30102 | ENERGY COUNTER LAST 31 DAYS L | |
| 30103 | MAINTENANCE 1 | |
| 30104 | MAINTENANCE 2 | |
| 30105 | MAINTENANCE 3 | |
| 30106 | RENTAL  CONTRACT | |
| 30107 | ACTIVE ALARMS COUNTER | |
| 30108 | PRESSURE UNIT | 0 – bar, 1 - psi |
| 30109 | TEMPERATURE UNIT | 0 – ºC, 1 - ºF |
| 30110 | RUNNING HOUR MINUTES | minutes |
| 30111 | USER LOCK REGISTER | 0 – OFF, 1 - ON |
| 30112 | OEM LOCK REGISTER | 0 – OFF, 1 - ON |
| ... | ... | ... |
| 30500 | DATA LOGGER SAMPLE 0 | Sample number  0 |
| 30501 | DATA LOGGER SAMPLE 1 | Sample number  1 |
| 30502 | DATA LOGGER SAMPLE 2 | Sample number  2 |
| ... | ... | ... |
| 30559 | DATA LOGGER SAMPLE 59 | |
| 30560 | DATA LOGGER MIN | Minimum sample value |
| 30561 | DATA LOGGER MAX | Maximum sample value |
| 30562 | DATA LOGGER AVG | Average value |
| 30563 | DATA LOGGER LAST SAMPLE | Last sample value |
| 30564 | DATA LOGGER FUNCTION | Function to log |
| 30565 | DATA LOGGER SAMPLING RATE | Sampling rate |
| 30566 | DATA LOGGER HIGH LIMIT | Scale high limit |

| 30567 | DATA LOGGER LOW  LIMIT | Scale low limit |
|---|---|---|
| 30568 | DATA LOGGER RUNNING STATUS | 1-RUNNING, 0-NOT RUNNING |
| ... | ... | ... |
| 31000 | ACTIVE ALARM 0 ID | See A6 |
| 31001 | ACTIVE ALARM 0 VALUE | See A6 |
| 31002 | ACTIVE ALARM 1 ID | See A6 |
| 31003 | ACTIVE ALARM 1 VALUE | See A6 |
| 31004 | ACTIVE ALARM 2 ID | See A6 |
| 31005 | ACTIVE ALARM 2 VALUE | See A6 |
| 31006 | ACTIVE ALARM 3 ID | See A6 |
| 31007 | ACTIVE ALARM 3 VALUE | See A6 |
| 31008 | ACTIVE ALARM 4 ID | See A6 |
| 31009 | ACTIVE ALARM 4 VALUE | See A6 |
| 31010 | ACTIVE ALARM 5 ID | See A6 |
| 31011 | ACTIVE ALARM 5 VALUE | See A6 |
| 31012 | ACTIVE ALARM 6 ID | See A6 |
| 31013 | ACTIVE ALARM 6 VALUE | See A6 |
| 31014 | ACTIVE ALARM 7 ID | See A6 |
| 31015 | ACTIVE ALARM 7 VALUE | See A6 |
| 31016 | ACTIVE ALARM 8 ID | See A6 |
| 31017 | ACTIVE ALARM 8 VALUE | See A6 |
| 31018 | ACTIVE ALARM 9 ID | See A6 |
| 31019 | ACTIVE ALARM 9 VALUE | See A6 |
| ... | ... | |
| 32000 | EVENT 0 ID | See A6 and A7 |
| 32001 | EVENT 0 VALUE | See A6 and A7 |
| 32002 | EVENT 0 YEAR | Time stamp year |
| 32003 | EVENT 0 MONTH | Time stamp month |
| 32004 | EVENT 0 DAY | Time stamp day |
| 32005 | EVENT 0 HOUR | Time stamp hour |
| 32006 | EVENT 0 MINUTE | Time stamp minute |
| 32007 | EVENT 0 SECOND | Time stamp second |

| 32008 | EVENT 1 ID | See A6 and A7 |
|---|---|---|
| 32009 | EVENT 1 VALUE | See A6 and A7 |
| 32010 | EVENT 1 YEAR | Time stamp year |
| 32011 | EVENT 1 MONTH | Time stamp month |
| 32012 | EVENT 1 DAY | Time stamp day |
| 32013 | EVENT 1 HOUR | Time stamp hour |
| 32014 | EVENT 1 MINUTE | Time stamp minute |
| 32015 | EVENT 1 SECOND | Time stamp second |
| 32016 | EVENT 2 ID | See A6 and A7 |
| 32017 | EVENT 2 VALUE | See A6 and A7 |
| 32018 | EVENT 2 YEAR | Time stamp year |
| 32019 | EVENT 2 MONTH | Time stamp month |
| 32020 | EVENT 2 DAY | Time stamp day |
| 32021 | EVENT 2 HOUR | Time stamp hour |
| 32022 | EVENT 2 MINUTE | Time stamp minute |
| 32023 | EVENT 2 SECOND | Time stamp second |
| ... | ... | |
| 35992 | EVENT 499 ID | See A6 and A7 |
| 35993 | EVENT 499 VALUE | See A6 and A7 |
| 35994 | EVENT 499 YEAR | Time stamp year |
| 35995 | EVENT 499 MONTH | Time stamp month |
| 35996 | EVENT 499 DAY | Time stamp day |
| 35997 | EVENT 499 HOUR | Time stamp hour |
| 35998 | EVENT 499 MINUTE | Time stamp minute |
| 35999 | EVENT 499 SECOND | Time stamp second |
| | | |

## 6.0 Holding registers map

| Address | Name | MIN | MAX | Description |
|---------|------|-----|-----|-------------|
| 40001 | UNDER VOLTAGE | 60 | 990 | VAC, 59 or 991 is OFF |
| 40002 | BYPASS DELAY UV | 1 | 15 | seconds |
| 40003 | OVER VOLTAGE | 60 | 990 | VAC, 59 or 991 is OFF |
| 40004 | BYPASS DELAY OV | 1 | 15 | seconds |
| 40005 | UNDERFREQUENCY | 200 | 5999 | Hz x 10, 199 or 6000 is OFF |
| 40006 | BYPASS DELAY UF | 1 | 15 | seconds |
| 40007 | OVERFREQUENCY | 200 | 5999 | Hz x 10, 199 or 6000 is OFF |
| 40008 | BYPASS DELAY OF | 1 | 15 | seconds |
| 40009 | WARNING CURRENT | 1 | 2000 | A, 0 or 2001 is OFF |
| 40010 | BYPASS DELAY WC | 1 | 74 | See A8 |
| 40011 | OVERCURRENT | 1 | 2000 | A, 0 or 2001 is OFF |
| 40012 | BYPASS DELAY OC | 1 | 74 | See A8 |
| 40013 | SHORTCIRCUIT | 1 | 2000 | A, 0 or 2001 is OFF |
| 40014 | BYPASS DELAY SC | 10 | 150 | Seconds x 10 |
| 40015 | PHASE UNBALANCE | 10 | 990 | VAC, 9 or 991 is OFF |
| 40016 | BYPASS DELAY PU | 1 | 59 | Seconds |
| 40017 | ALTERNATOR FAILURE | 0 | 1 | 0 – OFF, 1 – ON |
| 40018 | PHASE MODE | 1 | 4 | See A9 |
| 40019 | | | | |
| 40020 | | | | |
| 40021 | | | | |
| 40022 | | | | |
| 40023 | KVA SHUTDOWN | 10 | 1500 | KVA, 9 or 1501 is OFF, step 5, see A10 |
| 40024 | BYPASS DELAY KVAS | 1 | 118 | See A8 |
| 40025 | REVERSE POWER | 10 | 1500 | KVA, 9 or 1501 is OFF, step 5, see A10 |
| 40026 | BYPASS DELAY RP | 1 | 15 | Seconds |
| 40027 | EARTH FAULT | 1 | 2000 | A, 0 or 2000 is OFF |

| 40028 | BYPASS DELAY EF | 10 | 100 | Seconds x 10 |
|---|---|---|---|---|
| 40029 | CT SIZE | 5 | 2000 | Current transformer size, step 5 |
| 40030 | EARTH CT SIZE | 0 | 2000 | Earth current transformer, step 5 |
| 40031 | | | | |
| 40032 | PRELUBE TIME(CRANK DELAY) | 1 | 15 | Seconds |
| 40033 | CRANK TIME | 1 | 15 | Seconds |
| 40034 | CRANK REST TIME | 3 | 15 | Seconds |
| 40035 | CRANK ATTEMPTS | 3 | 15 | Number of attempts |
| 40036 | CRANK VDC | 30 | 300 | VDC x 10, 29 or 301 is OFF |
| 40037 | CRANK VAC | 60 | 990 | VAC, 59 or 991 is OFF |
| 40038 | CRANK HZ | 200 | 5999 | Hz x 10, 199 or 6000 is OFF |
| 40039 | CRANK RPM | 100 | 800 | Rpm, 99 or 801 is OFF |
| 40040 | PICKUP RATIO | 100 | 5000 | Ratio x 10, 99 or 5001 is OFF |
| 40041 | PREGLOW TIME | 1 | 74 | 0 or 75  is OFF, see A8 |
| 40042 | PREGLOW MODE | 1 | 4 | |
| 40043 | GAS PURGE | 1 | 15 | Seconds |
| 40044 | WARMUP TIME | 0 | 74 | See A8 |
| 40045 | COOLING TIME | 0 | 74 | See A8 |
| 40046 | STOP SOLENOID | 1 | 74 | See A8 |
| 40047 | BELT BREAK CHARGER | 30 | 300 | VDC x 10, 29 or 301 is OFF |
| 40048 | LOW OIL BAR WARNING | 1 | 200 | bar x 10, 0 or 201 is OFF |
| 40049 | LOW OIL BAR SHUTDOWN | 1 | 200 | bar x 10, 0 or 201 is OFF |
| 40050 | HIGH OIL °C WARNING | 1 | 250 | °C, 0 or 251 is OFF |
| 40051 | HIGH OIL °C SHUTDOWN | 1 | 250 | °C, 0 or 251 is OFF |
| 40052 | HIGH COOLANT °C SHUTDOWN | 1 | 250 | °C, 0 or 251 is OFF |
| 40053 | HIGH COOLANT °C WARNING | 1 | 250 | °C, 0 or 251 is OFF |
| 40054 | LOW COOLANT °C WARNING | 1 | 250 | °C, 0 or 251 is OFF |
| 40055 | HIGH AUXILIARY °C SHUTDOWN | 1 | 250 | °C, 0 or 251 is OFF |
| 40056 | HIGH AUXILIARY °C WARNING | 1 | 250 | °C, 0 or 251 is OFF |
| 40057 | ALARM BYPASS | 2 | 99 | Seconds |
| 40058 | FAIL TO STOP | 0 | 1 | 0 – OFF, 1 – ON |

| 40059 | UNDER SPEED | 100 | 4000 | Rpm, 99 or 4001 is off, step 10 |
|-------|-------------|-----|------|--------------------------------|
| 40060 | BYPASS DELAY US | 1 | 15 | Seconds |
| 40061 | OVER SPEED | 100 | 4000 | Rpm, 99 or 4001 is off, step 10 |
| 40062 | BYPASS DELAY OS | 1 | 15 | Seconds |
| 40063 | IDLE TIME | 1 | 118 | 0 or 119 is off, see A8 |
| 40064 | IDLE SPEED | 100 | 4000 | Rpm, 99 or 4001 is off |
| 40065 | NOMINAL SPEED | 100 | 4000 | Rpm, 99 or 4001 is off |
| 40066 | DROOP SETTING | 1 | 100 | x10 |
| 40067 | NUMBER OF  POLES | 2 | 32 | 0 or 34 is off, step 2 |
| 40068 | TANK EMPTY SHUTDOWN | 1 | 99 | %, 0 or 100 is off |
| 40069 | TANK EMPTY DELAY | 15 | 118 | See A8 |
| 40070 | LOW FUEL WARNING | 1 | 99 | %, 0 or 100 is off |
| 40071 | HIGH FUEL WARNING | 1 | 99 | %, 0 or 100 is off |
| 40072 | TANK PUMP START | 1 | 99 | %, 0 or 100 is off |
| 40073 | TANK PUMP STOP | 1 | 99 | %, 0 or 100 is off |
| 40074 | TANK FILL TIME | 15 | 118 | 14 or 119 is off, see A8 |
| 40075 | HORN TIMEOUT | 5 | 118 | 14 or 119 is off, see A8 |
| 40076 | HOUR COUNTER SET | 0 | 65534 | hours |
| 40077 | RENTAL CONTRACT | 1 | 9999 | Hours, 0 or 10000 is off |
| 40078 | GCB TEST CONTROL | 0 | 1 | 0 – OFF, 1 – ON |
| 40079 | RUN TIMEOUT | 60 | 1429 | 59 or 1430 is OFF |
| 40080 | MAINTENACE 1 | 1 | 9999 | Hours, 0 or 10000 is off |
| 40081 | MAINTENACE 2 | 1 | 9999 | Hours, 0 or 10000 is off |
| 40082 | MAINTENACE 3 | 1 | 9999 | Hours, 0 or 10000 is off |
| 40083 | MODBUS NODE | 1 | 127 | Modbus device address(node) |
| 40084 | ENERGY COUNTER LOW | 0 | 65535 | Low word energy counter |
| 40085 | ENERGY COUNTER HIGH | 0 | 65535 | High word energy counter |
| 40086 | RTC DAY | 1 | 31 | Real time clock day |
| 40087 | RTC MONTH | 1 | 12 | Real time clock month |
| 40088 | RTC YEAR | 2000 | 2099 | Real time clock year |
| 40089 | RTC HOUR | 0 | 23 | Real time clock hour |
| 40090 | RTC MINUTE | 0 | 59 | Real time clock minute |

| 40091 | RTC SET TIME | 0 | 1 | 0 – OFF, 1 – ON |
|---|---|---|---|---|
| 40092 | DATE FORMAT | 0 | 1 | 0 - DD/MM/YY, 1 - MM/DD/YY |
| 40093 | PRODUCTION DAY | | | |
| 40094 | PRODUCTION MONTH | | | |
| 40095 | PRODUCTION YEAR | | | |
| ... | ... | ... | ... | ... |
| | | | | |
| 40098 | POINT 1 AUXILIARY °C | 0 | 250 | °C |
| 40099 | POINT 1 AUXILIARY Ω | 0 | 1000 | Ω |
| 40100 | POINT 2 AUXILIARY °C | 0 | 250 | °C |
| 40101 | POINT 2 AUXILIARY Ω | 0 | 1000 | Ω |
| 40102 | POINT 3 AUXILIARY °C | 0 | 250 | °C |
| 40103 | POINT 3 AUXILIARY Ω | 0 | 1000 | Ω |
| 40104 | POINT 4 AUXILIARY °C | 0 | 250 | °C |
| 40105 | POINT 4 AUXILIARY Ω | 0 | 1000 | Ω |
| 40106 | POINT 5 AUXILIARY °C | 0 | 250 | °C |
| 40107 | POINT 5 AUXILIARY Ω | 0 | 1000 | Ω |
| 40108 | POINT 6 AUXILIARY °C | 0 | 250 | °C |
| 40109 | POINT 6 AUXILIARY Ω | 0 | 1000 | Ω |
| 40110 | POINT 1 FUEL % | 0 | 99 | % |
| 40111 | POINT 1 FUEL Ω | 0 | 1000 | Ω |
| 40112 | POINT 2 FUEL % | 0 | 99 | % |
| 40113 | POINT 2 FUEL Ω | 0 | 1000 | Ω |
| 40114 | POINT 3 FUEL % | 0 | 99 | % |
| 40115 | POINT 3 FUEL Ω | 0 | 1000 | Ω |
| 40116 | POINT 4 FUEL % | 0 | 99 | % |
| 40117 | POINT 4 FUEL Ω | 0 | 1000 | Ω |
| 40118 | POINT 5 FUEL % | 0 | 99 | % |
| 40119 | POINT 5 FUEL Ω | 0 | 1000 | Ω |
| 40120 | POINT 6 FUEL % | 0 | 99 | % |
| 40121 | POINT 6 FUEL Ω | 0 | 1000 | Ω |
| 40122 | POINT 1 OIL BAR | 0 | 200 | bar x 10 |

| 40123 | POINT 1 OIL  Ω | 0 | 1000 | Ω |
|-------|----------------|---|------|---|
| 40124 | POINT 2 OIL BAR | 0 | 200 | bar x 10 |
| 40125 | POINT 2 OIL  Ω | 0 | 1000 | Ω |
| 40126 | POINT 3 OIL BAR | 0 | 200 | bar x 10 |
| 40127 | POINT 3 OIL  Ω | 0 | 1000 | Ω |
| 40128 | POINT 4 OIL BAR | 0 | 200 | bar x 10 |
| 40129 | POINT 4 OIL  Ω | 0 | 1000 | Ω |
| 40130 | POINT 5 OIL BAR | 0 | 200 | bar x 10 |
| 40131 | POINT 5 OIL  Ω | 0 | 1000 | Ω |
| 40132 | POINT 6 OIL BAR | 0 | 200 | bar x 10 |
| 40133 | POINT 6 OIL  Ω | 0 | 1000 | Ω |
| 40134 | INPUT 1 OPTION | 0 | 13 | See BE124 OEM manual 11.8 |
| 40135 | INPUT 1 CONTACT | 0 | 1 | 0 – N.O., 1 – N.C. |
| 40136 | INPUT 2 OPTION | 0 | 13 | See BE124 OEM manual 11.8 |
| 40137 | INPUT 2 CONTACT | 0 | 1 | 0 – N.O., 1 – N.C. |
| 40138 | INPUT 3 OPTION | 0 | 13 | See BE124 OEM manual 11.8 |
| 40139 | INPUT 3 CONTACT | 0 | 1 | 0 – N.O., 1 – N.C. |
| 40140 | OUTPUT 1 | 0 | 25 | See BE124 OEM manual 11.9 |
| 40141 | OUTPUT 2 | 0 | 25 | See BE124 OEM manual 11.9 |
| 40142 | ENGINE TYPE | 0 | 26 | See A5 |
| 40143 | FUNCTION TO LOG | 0 | 14 | See A12 |
| 40144 | SAMPLING RATE | 0 | 11 | See A13 |
| 40145 | LOW LIMIT | - | - | Depends on the value register 40143 |
| 40146 | HIGH LIMIT | - | - | Depends on the value register 40143 |
| 40147 | LCD CONTRAST | 0 | 15 | Contrast value |
| 40148 | LANGUAGE | 0 | 3 | See A14 |
| 40149 | DISPLAY TIMEOUT | 1 | 60 | Minutes, 0 or 61 is OFF |
| 40150 | BACKLIGHT | 0 | 100 | %, step 50 |
| 40151 | PRESSURE UNIT | 0 | 1 | 0 – bar, 1 - psi |
| 40152 | TEMPERATURE UNIT | 0 | 1 | 0 - °C, 1 - °F |

| 40153 | CONFIGURABLE C00 C01 | 0 | 65535 | See A15 |
|-------|----------------------|---|-------|---------|
| 40154 | CONFIGURABLE C02 C03 | 0 | 65535 | See A15 |
| 40155 | CONFIGURABLE C04 C05 | 0 | 65535 | See A15 |
| 40156 | CONFIGURABLE C06 C07 | 0 | 65535 | See A15 |
| 40157 | CONFIGURABLE C08 C09 | 0 | 65535 | See A15 |
| 40158 | CONFIGURABLE C10 C11 | 0 | 65535 | See A15 |
| 40159 | CONFIGURABLE C12 C13 | 0 | 65535 | See A15 |
| 40160 | CONFIGURABLE C14 C15 | 0 | 65535 | See A15 |
| ... | ... | ... | ... | ... |
| 40167 | TEST MO START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40168 | TEST MO START MINUTE | 0 | 59 | minutes |
| 40169 | TEST MO STOP HOUR | 0 | 24 | Hours, 24 - OFF |
| 40170 | TEST MO STOP MINUTE | 0 | 59 | minutes |
| 40171 | TEST TU START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40172 | TEST TU START MINUTE | 0 | 59 | minutes |
| 40173 | TEST TU STOP HOUR | 0 | 24 | Hours, 24 - OFF |
| 40174 | TEST TU STOP MINUTE | 0 | 59 | minutes |
| 40175 | TEST WE START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40176 | TEST WE START MINUTE | 0 | 59 | minutes |
| 40177 | TEST WE STOP HOUR | 0 | 24 | Hours, 24 - OFF |
| 40178 | TEST WE STOP MINUTE | 0 | 59 | minutes |
| 40179 | TEST TH START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40180 | TEST TH START MINUTE | 0 | 59 | minutes |
| 40181 | TEST TH STOP HOUR | 0 | 24 | Hours, 24 - OFF |
| 40182 | TEST TH STOP MINUTE | 0 | 59 | minutes |
| 40183 | TEST FR START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40184 | TEST FR START MINUTE | 0 | 59 | minutes |
| 40185 | TEST FR STOP HOUR | 0 | 24 | Hours, 24 - OFF |
| 40186 | TEST FR STOP MINUTE | 0 | 59 | minutes |
| 40187 | TEST SA START HOUR | 0 | 24 | Hours, 24 - OFF |
| 40188 | TEST SA START MINUTE | 0 | 59 | minutes |
| 40189 | TEST SA STOP HOUR | 0 | 24 | Hours, 24 - OFF |

| 40190 | TEST SA STOP MINUTE | 0 | 59 | minutes |
|---|---|---|---|---|
| 40191 | TEST SU START HOUR | 0 | 24 | Hours,  24 - OFF |
| 40192 | TEST SU START MINUTE | 0 | 59 | minutes |
| 40193 | TEST SU STOP HOUR | 0 | 24 | Hours,  24 - OFF |
| 40194 | TEST SU STOP MINUTE | 0 | 59 | minutes |
| 40195 | CALIBRATION L1-N VOLTAGE | 480 | 530 | |
| 40196 | CALIBRATION L2-N VOLTAGE | 480 | 530 | |
| 40197 | CALIBRATION L3-N VOLTAGE | 480 | 530 | |
| 40198 | CALIBRATION L1-N CURRENT | 1200 | 1500 | |
| 40199 | CALIBRATION L2-N CURRENT | 1200 | 1500 | |
| 40110 | CALIBRATION L3-N CURRENT | 1200 | 1500 | |
| 40111 | CALIBRATION TEMPERATURE | 900 | 1100 | |
| 40112 | CALIBRATION OIL PRESSURE | 900 | 1100 | |
| 40113 | CALIBRATION FUEL LEVEL | 900 | 1100 | |
| 40114 | CALIBRATION BATTERY | 440 | 485 | |
| 40115 | CALIBRATION FREQUENCY | 4890 | 4990 | |
| 40116 | CALIBRATION SPEED | 5500 | 6500 | |
| ... | ... | ... | ... | ... |

### 7.0 Appendix

### A1) Mode of operation
```
0 - OFF, 1 - MANUAL, 2 - AUTO, 3 - TEST
```

### A2) Engine status
```
0  - "NOT RUNNING"
1  - "STOPPING"
2  - "STARTING"
3  - "COOLING"
4  - "WARMUP"
5  - "----"
6  - "----"
7  - "----"
8  - "----"
9  - "RUNNING"
10 - "IDLE SPEED"
11 - "REMOTE START"
12 - "RUN ON LOAD"
```

### A3) Starting status
```
0 - ""
1 - "CRANK"
2 - "REST"
3 - "PREGLOW"
4 - "PRELUBE"
```

### A4) Flags register 0

| Bit N | Name | Description |
|---|---|---|
| LSB 0 | CT_OVER_500 | 1-CT SIZE > 500, 0-CT SIZE ≤ 500 |
| 1 | CT_EARTH_OVER_100 | 1-CT EARTH > 100, 0-CT EARTH ≤ 100 |
| 2 | ENGINE_RUNNING | 1-Engine is running, 0-is not running |
| 3 | START_SOLENOID | 1-Start solenoid is on, 0-is off |
| 4 | FUEL_SOLENOID | 1-Fuel solenoid is on, 0-is off |

| | | |
|---|---|---|
| 5 | GCB_SWITCH | 1-GCB is CLOSED, 0-GCB is open |
| 6 | GEN_PRESENCE | 1-Generator presence is on, 0-is off |
| 7 | SHUTDOWN_ALARM | 1-Shutdown is on, 0-is off |
| 8 | WARNING_ALARM | 1-Warning is on, 0-is off |
| 9 | GEN_OK | 1-Generator is OK, 0-is not OK |
| 10 | - | - |
| 11 | REMOTE_ENGINE_START | 1-Remote engine start on, 0-off |
| 12 | REMOTE_GENSET_START | 1-Remote genset start on, 0-off |
| 13 | ALLOW_GCB_TOGGLE | 1-GCB close/open allowed, 0-not allowed |
| 14 | ALLOW_REMOTE_STOP | 1-Remote stop allowed, 0-not allowed |
| MSB 15 | - | - |

## A5) Engine type

| Value | Text |
|---|---|
| 0 | "CONVENTIONAL" |
| 1 | "STANDARD J1939" |
| 2 | "VOLVO EDC3" |
| 3 | "VOLVO EDC4" |
| 4 | "VOLVO EMS2" |
| 5 | "SCANIA EMS" |
| 6 | "SCANIA EMS2" |
| 7 | "ENG JOHN DEERE" |
| 8 | "PERKINS 2003 2008" |
| 9 | "PERKINS 1100" |
| 10 | "CUMMINS CM850" |
| 11 | "CUMMINS CM876" |
| 12 | "CUMMINS CM570" |
| 13 | "CUMMINS MCM700" |
| 14 | "CUMMINS CM558" |
| 15 | "CUMMINS PCC13XX" |

| 16 | "DEUTZ EMR2" |
| 17 | "DEUTZ EMR3" |
| 18 | "DETROIT DIESEL" |
| 19 | "IVECO CURSOR" |
| 20 | "IVECO VECTOR" |
| 21 | "MTU MDEC302 303" |
| 22 | "KUBOTA" |
| 23 | "ISUZU" |
| 24 | "YANMAR" |
| 25 | "DAIMLER CRYSLER" |
| 26 | "CATERPILLAR" |

### A6) Alarms registers

ALARM ID:

```
Code  Text
000 - ""
001 - "OVER FREQUENCY      SHUTDOWN  "
002 - "BELT BREAK          SHUTDOWN  "
003 - "REMOTE LOCK         SHUTDOWN  "
004 - "ALTERNATOR FAILURE  FAILURE   "
005 - "UNDER FREQUENCY     SHUTDOWN  "
006 - "FAIL TO STOP        SHUTDOWN  "
007 - "SERVICE 1           WARNING   "
008 - "SERVICE 2           WARNING   "
009 - "SERVICE 3           WARNING   "
010 - "FAIL TO START       SHUTDOWN  "
011 - "TANK EMPTY LEVEL    SHUTDOWN  "
012 - "LOW FUEL LEVEL      WARNING   "
013 - "HIGH FUEL LEVEL     WARNING   "
014 - "TANK EMPTY LEVEL    SHUTDOWN  "
015 - "BATTERY VOLTAGE     WARNING   "
016 - ""
017 - "LOW OIL PRESSURE    SHUTDOWN  "
018 - "LOW OIL PRESSURE    WARNING   "
019 - "OIL BAR SENDER      OPEN      "
020 - "COOLANT SENDER      OPEN      "
021 - "AUX #C SENDER       OPEN      "
022 - "OVER CURRENT        SHUTDOWN  "
```

```
023 - "OVER CURRENT        WARNING    "
024 - "OVER VOLTAGE        SHUTDOWN   "
025 - "UNDER VOLTAGE       SHUTDOWN   "
026 - "EMERGENCY 1         WARNING    "
027 - "EMERGENCY 2         WARNING    "
028 - "EMERGENCY 3         WARNING    "
029 - "RENTAL 48h          WARNING    "
030 - "RENTAL EXPIRED      SHUTDOWN   "
031 - "PARAMETER ERROR     WARNING    "
032 - "OVER KVA            SHUTDOWN   "
033 - "MEMORY ERROR        WARNING    "
034 - "OVER SPEED          SHUTDOWN   "
035 - "UNDER SPEED         SHUTDOWN   "
036 - "PICK UP ERROR       FAILURE    "
037 - "PHASE SEQUENCE      SHUTDOWN   "
038 - "CLOCK ERROR         WARNING    "
039 - "CAN BUS ERROR       WARNING    "
040 - "REVERSE POWER       SHUTDOWN   "
041 - "SHORT CIRCUIT       SHUTDOWN   "
042 - "EMERGENCY 1         SHUTDOWN   "
043 - "EMERGENCY 2         SHUTDOWN   "
044 - "EMERGENCY 3         SHUTDOWN   "
045 - "TEMPERATURE SW      SHUTDOWN   "
046 - "HIGH COOLANT #C     SHUTDOWN   "
047 - "HIGH COOLANT #C     WARNING    "
048 - "LOW COOLANT #C      WARNING    "
049 - "OIL TEMPERATURE     SHUTDOWN   "
050 - "OIL TEMPERATURE     WARNING    "
051 - "AUX #C SENSOR       SHUTDOWN   "
052 - "AUX #C SENSOR       WARNING    "
053 - "FUEL RESERVE        WARNING    "
054 - "FUEL RESERVE        WARNING    "
055 - "OIL BAR SENDER      SHUTDOWN   "
056 - "TANK FILL TIME      WARNING    "
057 - "EARTH CURRENT       SHUTDOWN   "
058 - "MAXIMUM RUN TIME    SHUTDOWN   "
059 - "PHASE UNBALANCE     SHUTDOWN   "
060 - "FUEL SENDER         OPEN       "
061 - "GND SENSE           OPEN       "
062 - "RED STOP LAMP       ALARM      "
063 - "REMOTE EMERGENCY    SHUTDOWN   "
064 - ""
065 - ""
066 - ""
067 - ""
```

```
068 - ""
069 - ""
070 - ""
071 - ""
072 - ""
073 - ""
074 - ""
075 - ""
076 - ""
077 - ""
078 - "WATER PRESSURE     SPN_20     "
079 - "ACCELERATOR        SPN_28     "
080 - "ACCELERATOR        SPN_29     "
081 - "THROTTLE           SPN_91     "
082 - "FUEL PRESSURE      SPN_94     "
083 - "WATER IN FUEL      SPN_97     "
084 - "OIL LEVEL          SPN_98     "
085 - "OIL SENSOR         SPN_100    "
086 - "BOOST SENSOR       SPN_102    "
087 - "BOOST SENSOR       SPN_105    "
088 - "BOOST SENSOR       SPN_106    "
089 - "AIR FILTER         SPN_107    "
090 - "AIR PRESSURE       SPN_108    "
091 - "COOLANT SENSOR     SPN_110    "
092 - "COOLANT SWITCH     SPN_111    "
093 - "CRANKCASE SENSOR   SPN_153    "
094 - "BATTERY VOLTAGE    SPN_158    "
095 - "INJECTOR BAR       SPN_164    "
096 - "AIR SENSOR         SPN_172    "
097 - "EXHAUST SENSOR     SPN_173    "
098 - "FUEL TEMPERATURE   SPN_174    "
099 - "OIL TEMPERATURE    SPN_175    "
100 - "SPEED              SPN_189    "
101 - "SPEED              SPN_190    "
102 - "BUS ERROR          SPN_608    "
103 - "INJECTOR ERROR     SPN_611    "
104 - "SUPPLY FAULT       SPN_620    "
105 - "INLET AIR          SPN_626    "
106 - "POWER SUPPLY       SPN_627    "
107 - "J1587 ERROR        SPN1_629   "
108 - "CAN ERROR          SPN2_629   "
109 - "ECU ERROR          SPN_630    "
110 - "FUEL VALVE         SPN_632    "
111 - "SPEED SENSOR       SPN_636    "
112 - "SPEED SENSOR       SPN_637    "
```

```
113 - "J1939 BUS              SPN_639    "
114 - "INJECTOR 1            SPN_651    "
115 - "INJECTOR 2            SPN_652    "
116 - "INJECTOR 3            SPN_653    "
117 - "INJECTOR 4            SPN_654    "
118 - "INJECTOR 5            SPN_655    "
119 - "INJECTOR 6            SPN_656    "
120 - "STARTER              SPN_677    "
121 - "KEY OFF              SPN_970    "
122 - "ENGINE DERATE        SPN_971    "
123 - "INJECTOR CONTROL     SPN_679    "
124 - "PREHEAT SENSE        SPN_729    "
125 - "PUMP INJECTOR        SPN_1076   "
126 - "INJECTOR CONTROL     SPN_1077   "
127 - "PUMP SPEED           SPN_1078   "
128 - "SENSOR VDC           SPN_1079   "
129 - "SENSOR VDC           SPN_1080   "
130 - "SHUTDOWN             SPN_1109   "
131 - "SHUTDOWN             SPN_1110   "
132 - "ECU TEMPERATURE      SPN_1136   "
133 - "COMMON RAIL          SPN_1239   "
134 - "FUEL PUMP 1          SPN_1347   "
135 - "FUEL PUMP 1          SPN_1348   "
136 - "ECU RELAY            SPN_1485   "
137 - "ENGINE DERATE        SPN_1569   "
138 - "START RELAY          SPN_1675   "
139 - "PUMP OR VALVE        SPN_2000   "
140 - "EGR STATUS           SPN_2791   "
```

ALARM VALUE
The alarm value decoding is the same as measurement.

### A7) Events registers

The codes from A4 and additional events:
```
Code  Text
141 - "MODE OFF             EVENT      "
142 - "MODE MANUAL          EVENT      "
143 - "MODE AUTO            EVENT      "
144 - "MODE TEST            EVENT      "
145 - ""
146 - ""
147 - "KG OPEN              EVENT      "
```

```
148 - "KG CLOSED              EVENT      "
149 - "POWER ON               EVENT      "
150 - ""
```

REGISTER EVENT VALUE
The event value field is the same as measurement

### A8) Holding registers time encoding seconds-minutes

To program the parameter with a value in seconds we need just to send the value. To program with a value in minutes we must sum 59 to the value;
**Example:**
1) For programming parameter "STOP SOLENOID" with value 48 sec we send the value 48. If we want with value 5 min, we send 64 (5 + 59).

### A9) Phase mode

Parameter has the following values:
```
1 - 1PHASE;
2 - 3PHASE;
3 - 3PHASE+CW;
4 - 3PHASE+CCW;
```

### A10) Current Transformer dependent values

**If CT SIZE ≤ 500 then value := value x10
else value := value**

### A11) Time: seconds, minutes, hours

To program parameter with a value in seconds we need just to send the value. To program with a value in minutes we must sum 59 to the value; if we want hours and minutes must do the calculation after formula:    ( hours * 60 + minutes + 59 )

### A12) Function to log

```
Code - Text
0     - CURRENT 3(A)
1     - L3-N(VAC)
```

```
2     - CURRENT 2(A)
3     - L2-N(VAC)
4     - CURRENT 1(A)
5     - L1-N(VAC)
6     - POWER(KVA)
7     - OIL(BAR)
8     - COOLANT(#C)
9     - AUXILIARY(#C)
10    - FUEL(%)
11    - FREQUENCY(Hz)
12    - SPEED(RPM)
13    - BATTERY(V)
14    - ALTERNATOR(V)
```

## A13) Sampling rate

```
Code - Text
0     -  AUTO
1     - 200 ms
2     - 500 ms
3     - 1 sec
4     - 2 sec
5     - 5 sec
6     - 1 min
7     - 2 min
8     - 5 min
9     - 10 min
10    - 1 hour
11    - 1 day
```

## A14) Language

```
Code    Text
0     - ENGLISH
1     - ITALIAN
2     - SPANISH
3     - FRENCH
```

### A15) Configurable text

On the "About" page, line 3, appears 16 configurable characters. Configurable characters are stored in holding registers, two chars in one registers (high,low).

Example: string "1234567890123456"

```
Register                        Hex         ASCII
CONFIGURABLE C00 C01            0x3132      "12"
CONFIGURABLE C02 C03            0x3334      "34"
CONFIGURABLE C04 C05            0x3536      "56"
CONFIGURABLE C06 C07            0x3738      "78"
CONFIGURABLE C08 C09            0x3930      "90"
CONFIGURABLE C10 C11            0x3132      "12"
CONFIGURABLE C12 C13            0x3334      "34"
CONFIGURABLE C14 C15            0x3536      "56"
```