DST4601

User's Manual

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SICES AUTOMAZIONE

Revision

Revision	Date	Pages	Notes
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01	05/07/2003	14	
02	16/01/2004	15	Revision 00.10 of DST4601 3.1, 3.3, 5.3, 7.2
03	26/04/2004	16	Revision 00.14 of DST4601 3,3
04	16/06/2004	16	Revision 00.16 of DST4601 1.1, 3.1
05	29/10/2004	16	Revision 00.19 of DST4601 1.2, 2.3, 3, 3.1, 3.3
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07	05/10/2005	20	From FW revision 00.27 2.3, 3.1, 7.2, added par.8
08	15/04/2011		Changes in the structure document

EU Declaration of Conformity

for

DST4601 and derived products

S.I.C.E.S. S.r.l.
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as manufacturer of the listed products,
declares that they comply with the requirements of the
EMC Directive 89/336/CEE
and of the
Low Voltage Directive 73/23/CEE

Reference Standard Specification

EN61326-1 (1998-04) Electrical equipment for measurement, control and laboratory use. EMC Requirements. Part 1: General requirements.

EN61326/A1 (1999-05) Electrical equipment for measurement, control and laboratory use. EMC Requirements.

EN61010-1 (2001-11) Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements

CE

Conformity is applicable for not damaged products that are properly installed and used.

Contents

1. General Information

NOTE: Before installing the device, carefully read par. 8.

NOTA: Before using the device, carefully read this operating manual.

DST4600A board, operating in special electric switchboard, is able to control the automatic intervention of a generator set, to monitor it during the operation and to keep it in the best possible conditions while inactive, in order to assure a quick and safe intervention in the event of power failure. It works with both three- and single-phase systems.

Please refer to SICES document EAAM008800 (or following versions) for programming and default values.

1.1 Definition

Throughout this document the word BLOCK is used to indicate an alarm that makes generation function impossible and causes immediate generator shutdown.

The word DISABLE is used to indicate an alarm that makes generation function impossible and causes the automatic generator shutdown after a proper cooling down cycle.

The word WARNING is used to indicate a warning that requires an operator action but doesn't require the automatic generator shutdown.

Throughout this document the words SOFTWARE and FIRMWARE are used as synonymous if they are referred to the board firmware.

Software code version is reported in a format like: EB0220040xxyy, where xx is the major version number and yy is the minor version number. Thus code EB02200400001 refers to 00.01 software release.

For DST4601 boards there are two different SW types:

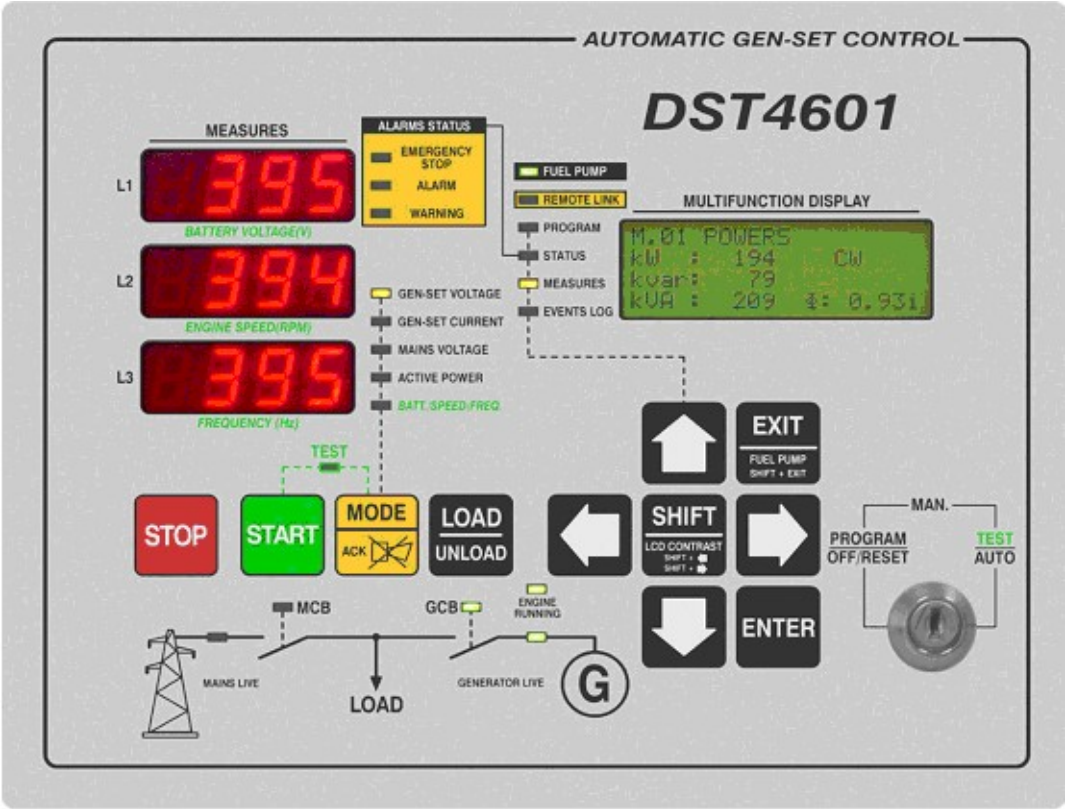
- EB0220040xxyy or EB0220073xxyy or EB0220082xxyy: for standard boards
- EB0220057zzyy or EB0220074xxyy or EB0220083xxyy: for boards for parallel application (DST4601/P).

1.2 Symbols

In this document a vertical bar on the right margin indicates that the chapter or the paragraph has been emended respect to the last document's version.

A gray background highlights changes in table's fields.

2. Front Panel



2.1 Commands

Command operations are carried out by means a key-lock switch and 11 pushbuttons.

2.1.1 Key-lock selector

Key position	**Function**
OFF/RESET PROGRAM	Gen-set is disabled. All the alarms are reset. It is possible to gain access to programming function.
MAN.	Gen-set is in manual mode.
AUTO / TEST	Gen-set is in automatic mode. Pressing START button while keeping pressed MODE button change the mode to TEST.

2.1.2 Pushbuttons

Button	Function
SHIFT	Dead key. Pressed together with another pushbutton, changes the pushbutton function.
Right arrow Left arrow	They allow selecting previous or followings pages of multifunction display if in STATUS, MEASURES or EVENT LOG mode. In Program mode, they are used to move the cursor while keying character strings. Used together with the SHIFT key it modifies the display contrast.
Up arrow down arrow	They allow selecting the multifunction display mode. In addition, in PROGRAM and EVENTS LOG mode they allow to scroll menus, increase/decrease variables or scroll records. Used in combination with the SHIFT button, in PROGRAM mode, it allows scrolling menu by step of 3 rows or increase/decrease variables in ten units' steps.
ENTER	Selects a menu entry or enables/disables the change mode of a variable.
EXIT	Brings up to the previous menu level. Used together with the SHIFT pushbutton changes the fuel pump mode to manual, enables/disables the fuel pump and recalls on the multifunction display the fuel pump management page.
LOAD/UNLOAD	Commands the genset loading/unloading. The pushbutton is enabled only if the system function mode allows the operation.
MODE /ACK	It is used to acknowledge any kind of alarm and to silence the horn. If there isn't any alarm to acknowledge, it can be used to select the MEASURES display mode, scrolling the mode list. Used in combination with the SHIFT pushbutton, allows to scroll backward the display mode list.
START	In MAN. mode it can be used to start the engine. In AUTO mode, used together with the MODE/ACK pushbutton, enables/disables TEST mode.
STOP	It is used to stop the engine. In AUTO mode it is issued a BLOCK. While the key lock is in OFF/RESET, the pushbutton drives the LAMP TEST function.

2.2 Display

2.2.1 MEASURES Display

It consists of three LED displays of four digits each. Display function is selectable by means MODE pushbutton.

For generator measures, L1, L2 and L3 inscriptions show relations between phases and functions and the display-selected function.

The selectable modes are the followings:

1. GEN-SET VOLTAGE phase to phase
2. GEN-SET VOLTAGE phase to neutral
3. GEN_SET CURRENT
4. MAINS VOLTAGE phase to phase
5. ACTIVE POWER
6. BATTERY VOLTAGE / ENGINE SPEED / FREQUENCY
7. GEN-SET VOLTAGE phase to phase / GEN-SET CURRENT / FREQUENCY

Mode 2 is indicated by means the flashing of GEN-SET VOLTAGE signal.

Mode 7 alternates the displaying of the three phase in sequence every 4 seconds. The active phase is indicated by the position of a dash on the fourth digit of FREQUENCY display: dash in upper position for L1-L2 phases, dash in middle for L2-L3 and dash in bottom for L3-L1. Mode is indicated by means the flashing of GEN-SET VOLTAGE, GEN-SET CURRENT and BATT/SPEED/FREQ. Signals.

2.2.2 MULTIFUNCTION Display

This LCD display works in four different modes. If a mode has more than one page that can be directly accessed, it is possible to scroll between them by means the horizontal scroll pushbuttons (left and right arrows): this feature is highlighted by the symbols ← and → flashing on the upper right of the MULTIFUNCTION display.

Display's backlight lamp is driven by the board that switches it off if no pushbutton is pressed for the LAMP-SAVER time (default 30s). Lamp can be switched on pressing any key (SHIFT key alone too).

The LAMP-SAVER time is programmable (menu **AUX. FUNC. -> OTHER AUX -> SCREEN SAVER**).

2.2.2.1 PROGRAM

This mode allows showing and modifying all the programming parameters.

Scroll menus by means up and down arrows to select an entry and press ENTER to confirm selection. Select then the variable or another menu. At the end of menu tree, there are variable lists: variable in lists are shown by dedicate page for each variable.

Variable value is shown delimited in square brackets, such as:

```
[400]
```

To modify the variable, press ENTER, brackets begin to flash.

Use the vertical scrolling pushbuttons (up and down arrows) to modify the value, press ENTER to confirm or EXIT to abort.

To go back the previous menu, press the EXIT pushbutton.

2.2.2.2 STATUS

This mode shows, by means of some different pages, information about the genset operation and status.

It is possible to scroll between different pages using horizontal scroll pushbuttons (left and right arrows).

Alarm page is automatically recalled in case of a new alarm event.

Fuel pump page is automatically recalled pressing SHIFT and EXIT pushbuttons together (fuel pump status toggle).

2.2.2.3 MEASURES

This mode shows, by means some different pages selectable by horizontal scroll pushbuttons (left and right arrows), all the measures that the board carries out.

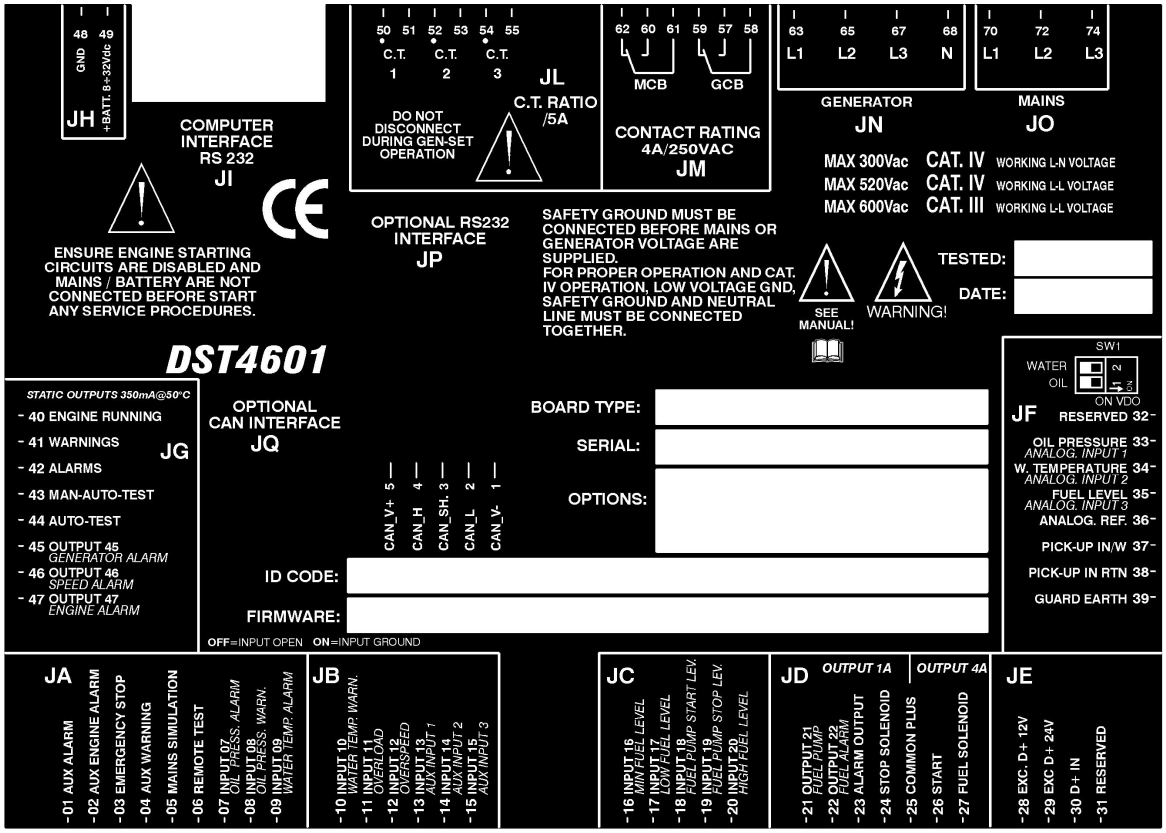
2.2.2.4 EVENTS LOG

It allows recalling to the display events and data records.

2.3 Signals

Signals	Function
EMERGENCY STOP	Signals the EMERGENCY STOP command activation. If flashing, the status isn't already acknowledged (it is to press the MODE/ACK pushbutton).
ALARM	Signal a BLOCK or a DISABLE. If flashing, the status isn't already acknowledged (it is to press the MODE/ACK pushbutton).
WARNING	Signal a WARNING. If flashing, the status isn't already acknowledged (it is to press the MODE/ACK pushbutton).
GEN-SET VOLTAGE	If ON, the MEASURES display is showing the phase-to-phase genset voltages. If flashing it is showing the phase to neutral voltages.
GEN-SET CURRENT	If ON, the MEASURES display is showing the genset phase currents.
MAINS-VOLTAGE	If ON, the MEASURES display is showing the phase-to-phase mains voltages. If flashing indicates that the inhibition input (MAINS SIMULATION) is active.
ACTIVE POWER	If ON, the MEASURES display is showing the genset phase active powers.
BATT./SPEED/FREQ.	If ON, the MEASURES display is showing the battery voltage (L1), the engine speed (L2) and the genset frequency (L3).
GEN-SET VOLTAGE GEN-SET CURRENT BATT./SPEED/FREQ. **All flashing**	The display is showing the phase-to-phase genset voltage (L1), the genset phase current (L2) and the genset frequency (L3). Every 4 seconds is changed the displayed phase.
TEST	ON or FLASHING: if in TEST mode.
FUEL PUMP	OFF: fuel pump command in manual and inactive. ON: fuel pump command in automatic and inactive. FLASHING: fuel pump command in automatic or manual and active.
REMOTE LINK	ON if the board is connected by the RS232 port to an external communication device (modem, PC etc.)
PROGRAM	MULTIFUNCTION display is in PROGRAM mode.
STATUS	MULTIFUNCTION display is in STATUS mode. FLASHING: there is a remote start command or a changeover inhibition command pending.
MEASURES	MULTIFUNCTION display is in MEASURES mode.
EVENTS LOG	MULTIFUNCTION display is in EVENTS LOG mode.
MAINS LIVE	OFF if MAINS is not present. ON if MAINS voltages fall into the working threshold levels. Flashing if MAINS is present but outside the working windows.
MCB	"Mains circuit breaker". OFF if open, ON if closed. Flashing 25% ON and 75% OFF if open while it is driven to close. Flashing 75% ON and 25% OFF if closed while it is driven to open.
GCB	"Generator circuit breaker". OFF if open, ON if closed. Flashing 25% ON and 75% OFF if open while it is driven to close. Flashing 75% ON and 25% OFF if closed while it is driven to open.
GENERATOR LIVE	OFF if generator voltages are not present. ON if GENERATOR voltages fall into the working threshold levels. Flashing if GENERATOR is present but outside the working windows.
ENGINE RUNNING	OFF if engine is dead. ON if engine is running. Flashing if cooling down.

3. Rear panel



3.1 Digital inputs

Connectors JA, JB and JC are the terminals of the optocoupled inputs of the board. These inputs are active if connected to ground.

Some inputs have programmable functions that can be changed by a programming menu.

Terminal	Function
JA 01	Auxiliary alarm (BLOCK) input.
JA 02	Auxiliary alarm (BLOCK) input enabled only after a delay time from engine running.
JA 03	EMERGENCY STOP.
JA 04	Auxiliary warning input.
JA 05	Inhibition / Mains simulation.
JA 06	INPUT 06 *REMOTE TEST*. Programmable input preset to test command. If driven and the key-lock is in AUTO, actives the TEST mode.
JA 07	INPUT 07 *OIL PRESS. ALARM*. Programmable input preset to a BLOCK for engine minimum oil pressure.
JA 08	INPUT 08 *OIL PRESS. WARN.* Programmable input preset to a WARNING for engine low oil pressure.
JA 09	INPUT 09 *WATER TEMPERATURE ALARM.* Programmable input preset to a BLOCK for maximum coolant temperature.
JB 10	INPUT 10 *WATER TEMPERATURE WARN.* Programmable input preset to a WARNING for high coolant temperature.
JB 11	INPUT 11 *OVERLOAD*. Programmable input preset to a BLOCK for external OVERLOAD sensor.
JB 12	INPUT 12 *OVERSPEED*. Programmable input preset to a BLOCK for an external OVERSPEED sensor.

Terminal	Function
JB 13	INPUT 13 *AUX INPUT 1.* Free programmable input.
JB 14	INPUT 14 *AUX INPUT 2.* Free programmable input.
JB 15	INPUT 15 *AUX INPUT 3.* Free programmable input.
JC 16	INPUT 16 *MIN FUEL LEVEL* Programmable input preset to the MINIMUM FUEL LEVEL function.
JC 17	INPUT 17 *LOW FUEL LEVEL* Programmable input preset to the LOW FUEL LEVEL function.
JC 18	INPUT 18 *FUEL PUMP START LEV.* Programmable input preset to the FUEL PUMP START function.
JC 19	INPUT 19 *FUEL PUMP STOP LEV.* Programmable input preset to the FUEL PUMP STOP function.
JC 20	INPUT 16 *HIGH FUEL LEVEL* Programmable input preset to the HIGH FUEL LEVEL function.

The following functions can be assigned to the digital inputs.

Code	Description
0	Not used
1	External warning
2	External disable
3	External block
4	External engine block
5	Reset command
6	KR Status
7	KG Status
8	Minimum fuel level
9	Low fuel level
10	Fuel pump start level
11	Fuel pump stop level
12	Fuel pump high level
13	Minimum oil pressure
14	Low oil pressure
15	High coolant temperature
16	Maximum coolant temperature
17	Overload
18	Over speed
19	External engine warning
20	Monostable function
21	External gas masked alarm
22	External gas masked block
23	External regulator masked alarm
24	External regulator masked block
27	Remote start request
29	Remote start enable
30	Changeover inhibition
31	External GCB masked alarm
32	External GCB masked block

3.2 Measure inputs

Terminal	Function
JL 50/51	TA input, L1 phase
JL 52/53	TA input, L2 phase
JL 54/55	TA input, L3 phase
JN 63	Generator Voltage phase L1
JN 65	Generator Voltage phase L2
JN 67	Generator Voltage phase L3
JN 68	Generator Voltage neutral line N
JO 70	Mains/Grid Voltage phase L1
JO 72	Mains/Grid Voltage phase L2
JO 74	Mains/Grid Voltage phase L3

3.3 Digital Outputs

The following table lists outputs that share input JD-25 as common input terminal. Sourced voltage will be the applied voltage to this terminal.

Terminal	Output type	Function
JD 21	Relay, 1A, N.O.	OUTPUT 21 *FUEL PUMP*. Programmable output preset to the function FUEL PUMP COMMAND.
JD 22	Relay, 1A, N.O.	OUTPUT 22 *FUEL ALARM*. Programmable output preset to the function FUEL ALARM.
JD 23	Relay, 1A, N.O.	ALARM OUTPUT. Output for additional external alarm horn.
JD 24	Relay, 1A, N.O.	STOP SOLENOID. Programmable output preset to the command issued during stop cycle. Useful for engines having excitation shutdown system.
JD 26	Relay, 4A, N.O.	START. Command for engine's starting motor.
JD 27	Relay, 4A, N.O.	FUEL SOLENOID. Fuel solenoid command for engines having drop-down shutdown system.

The following table lists outputs that have the battery negative pole (GND) as common terminal.

If active, they connect the input to ground otherwise they are open circuit.

Terminal	Output type	Function
JG 40	Open collector, 350mA.	ENGINE RUNNING. Programmable output preset to signal an engine running status.
JG 41	Open collector, 350mA.	WARNINGS. Programmable output preset to signal the presence of one or more warnings.
JG 42	Open collector, 350mA.	ALARMS. Programmable output preset to signal the presence of one alarm or disable.
JG 43	Open collector, 350mA.	MAN-AUTO-TEST. Programmable output preset to signal the presence of one of the three listed mode (also the REMOTE START status is signaled).
JG 44	Open collector, 350mA.	AUTO-TEST. Programmable output preset to signal the presence of one of the two listed mode (also the REMOTE START status is signaled).
JG 45	Open collector, 350mA.	OUTPUT 45 *GENERATOR ALARM*. Programmable output preset to signal a block or disable dues to the generator.
JG 46	Open collector, 350mA.	OUTPUT 46 *SPEED ALARM.* Programmable output preset to signal block dues to engine speed.
JG 47	Open collector, 350mA.	OUTPUT 47 *ENGINE ALARM.* Programmable output preset to signal a block or disable dues to the engine.

The following table lists the function that can be assigned to the programmable outputs.

Code	Description
0	Not used
1	Output reset pulse
2	Glow-plugs preheater
3	Fuel pump
4	Load (power) level status
5	Remote signal test running
6	Remote signal mains OK
7	Remote signal generator live
8	Remote signal engine running
9	Remote signal generator alarm
10	Remote signal engine alarm
11	Remote signal speed alarm
12	Remote signal fuel alarm
13	Remote signal contactors alarm
14	Gas valve
15	Monostable output
16	Stop solenoid
17	Remote signal or warnings
18	Remote signal or alarms
19	Remote signal MAN-AUTO-TEST
20	Remote signal AUTO-TEST
21	External horn
22	Remote signal configured by bits
23	Engine idle speed command

The following table lists outputs having free potential contacts.

Terminal	Output type	Function
JM 57	Relay, 4A	GCB – N.O. Genset contactor command. Open at rest.
JM 58	Relay, 4A	GCB – COM. Genset contactor command. Common terminal.
JM 59	Relay, 4A	GCB – N.C. Genset contactor command. Closed at rest.
JM 60	Relay, 4A	MCB – N.O. Mains contactor command. Open at rest.
JM 61	Relay, 4A	MCB – COM. Mains contactor command. Common terminal.
JM 62	Relay, 4A	MCB – N.C. Mains contactor command. Closed at rest.

Notice: GCB relay is driven to load the genset; MCB relay is driven to disconnect the load from the mains.

3.4 Engine input/output terminals

Terminal	Output type	Function
JE 28	Output; max. 320mA	EXC D+ 12V. Excitation output for 12V battery charger alternator.
JE 29	Output max. 200mA	EXC D+ 24V. Excitation output for 24V battery charger alternator.
JE 30	Measure input	D+ IN. Battery charger excitation voltage measure input.
JE 31		RESERVED. **DO NOT USE**
JF 32		RESERVED. **DO NOT USE**
JF 33	Measure input	OIL PRESSURE. Input for oil pressure sensor VDO, VEGLIA or optional 0..10V
JF 34	Measure input	W. TEMPERATURE. Input for coolant temperature sensor VDO, VEGLIA or optional 0..10V
JF 35	Measure input	FUEL LEVEL. Input for floater fuel level sensor.
JF 36	Measure input	ANALOG REF. Input for engine reference ground measurement.
JF 37	Measure input	PICK-UP IN/W. Engine pick-up input. Battery charger W can be also connected by means an additional filter.
JF 38	Measure input	PICK-UP IN RTN. Return signal for pick-up (normally connected to GND).
JF 39		GUARD EARTH. Input for pick-up cable shield connection.

3.5 Other connectors.

3.5.1 JH (Power Supply)

Connect a direct current source in range starting from 7.5V to 32V. Negative terminal (GND) should be externally connected to reference and safety earth. For application having separate GND and HEARTH, please ask to SICES for proper working condition.

3.5.2 JI (RS232)

JI is used to interface external RS232 device. For supported functions and protocol, please ask for “DST4601 Interface” manual (EAAS006301 or following revisions).

3.5.3 JP and JR connector

These connectors are available only installing specific board options.

4. Programming notice

Each programming page, used for input/modify a variable value, contains a 3-digit code that is useful to identify the variable across different language text.

Each menu or page shows, on top right of the display, a number pair. The first one is used to identify the current page or the selected menu; the second one shows how many items are in the present menu/list.

Please refer to SICES document EAAM008800 (or following versions) for programming and default values.

4.1 Access code

Program access can be restricted by means a password. There are 3 different access level and password:

1. Maker
2. System (installer)
3. User.

First page of **SYSTEM** menu (**000-Access code**) let the user input password, if at least one of the three passwords is different from 0.

If any password is set to 0, it is not assigned and not required.

As **USER** it is possible to modify only the User Password.

As **INSTALLER** it is possible to modify the User and the System Password.

As **MAKER** it is possible to modify all the three passwords.

Only enabled pages for the access level the operator has gained access to be shown in the menu, included the password modify pages.

It's possible that, after password input, menu doesn't show all the allowed pages. In this case press EXIT (to go to previous menu) and access again the menu, allowing the board to reload again the menu.

The keyed access code is kept alive for a time of about 10 minute after the programming function is ended. After this time, the code should be keyed again, if requested, to gain access to the same level.

In case of forgotten password, only knowing password of greater level is possible to rescue the access level. Otherwise and in case of MAKER password the board should be returned to the factory to reset password level.

4.2 How to modify text

Some parameters require text input or modify.

In these cases, pressing ENTER to activate the modify function on the selected variable, besides the square brackets flashing, it is activated an underline cursor at the first character string position. Using horizontal scroll keys (left and right arrows), select the character to modify then use the vertical scroll key (up and down arrows) to scroll allowable values and select the needed one. Repeat the operation for all the characters that must be modified.

Pressing ENTER, save text and left the function, pressing EXIT the procedure is aborted and the previous text is restored.

4.3 Direct access to the last used programming page

It is possible to directly access the last used page. If the EXIT key is pressed for about 3 seconds, programming function is left and the displayed page is stored. When programming is again entered, this page is shown at first (then, if required, pressing EXIT it is possible to go up trough menus).

The same feature is obtained when programming is automatically aborted. Programming is aborted if for about 60 seconds no operation is carried out on programming functions.

4.4 Protection and alarm parameters

Protections and alarms are normally configurable by means dedicated variables. For quite all these protections can be specified the delay time. Setting to 0 the delay time of a protection or alarm function, that function is disabled.

5. Notice about EVENTS LOG archive

5.1 Record identification

A number and time stamp identify each record.

The number is shown in the upper right position of multifunction display together with the total number of available records.

Consider that, when the archive is full, a new record overwrite the old one; thus identification number may change over the time.

5.2 Peak archive

This archive store the highest value measured of the following quantities:

1. Total active power and relative engine temperature
2. Phase current L1 and relative power factor
3. Phase current L2 and relative power factor
4. Phase current L3 and relative power factor
5. Maximum engine temperature
6. Minimum board internal temperature
7. Maximum board internal temperature

Each record is filled with timestamp.

In order to clear the archive, press together MODE and EXIT pushbuttons for at least 5 seconds. When the command is executed, the main event log page is recalled.

When the archive is cleared, it records the first measures until greater values are encountered.

6. Counters

All counters can be cleared except the absolute hour counter.

To clear a counter, follow this procedure:

1. Move the key selector to OFF/RESET position.
2. Set MULTIFUNCTION display mode to MEASURES.
3. Select the COUNTERS page that contains the counter that is to be cleared.
4. Press MODE and EXIT pushbutton together for at least 5 seconds.
5. After 5 seconds all the page counters will be cleared.

7. Special settings

7.1 Language selection

DST4601 board can shows text strings in different languages.

To select a language, keep pressed STOP and START button together while supplying the board (selector key in OFF/RESET). Buttons shall be kept pressed until the following screen is shown:

```
Special Function
Function [RESERVED]
```

Press ENTER and use vertical scroll keys to select LANGUAGE, then press ENTER again.

At this point board will ask for the password.

If the keyed password is correct, will be shown a page that allows selecting the operating language. To make effective the new language switch off and on the board.

The value required for this password is **1**.

7.2 Fuel level sensor calibration

Before start the calibration procedure, connect the sensor that must be mounted in a way that let the floater be manually operated.

Supply the boar while keeping pressed STOP and START button (selector key in OFF/RESET) until the following message is shown on the display:

```
Special Function
Function [RESERVED]
```

Press ENTER and use vertical scroll keys to select FUEL LEV, then press ENTER again.

At this point board will ask for the password.

The value required for this password is **135**.

If the keyed password is correct, will be shown a page that show the current measured fuel level. To calibrate the sensor, follow displayed instructions.

8. Fuel pump (optional)

DST 4601 implements a fuel pump full management for the loading of the tank on genset board from the storage tank. The pump management is inclusive of automatic working and manual controls, accessible from the frontal panel. It must at first to force the multifunctional display on page S.04 by selecting the STATUS mode and browsing the pages with the RIGHT or DOWN arrows. Here it is possible to use the standard setting procedure (ENTER to begin, ▲ and ▼ to modify and ENTER to confirm) to select the fuel pump control mode.

The available modes are:

- AUTO
- MAN-ON (pump activated)
- MAN-OFF (pump deactivated)

The second mode can be inhibited by the DST4601, relating to the fuel level (the pump cannot be started with full tank).

9. Installations

DUE TO THE HIGH VOLTAGE CONNECTED TO THE MEASURE INPUTS, THE DEVICE ENCLOSURE MUST BE CONNECTED TO SAFETY GROUND.

For a proper use of the device, it must be mounted in a fixed way onto a panel or cabinet. The rear panel of the device must not be accessible without the use of tools or keys. The device must not be removable without tools.

Safety EARTH connection must be made in a fixed way by means at least one of the dedicated terminals.

The generator and mains voltage lines connected to the measure inputs of DST4601 Controller must have an over current protection (such as fuse). The input load of the board is about 1Mohm. A 1A protection threshold is suitable.

The safety heart connection wire must be at least equal in section as wires used to cable mains and generator voltage lines to the board. Wire section must be conforming to the over current protection used.

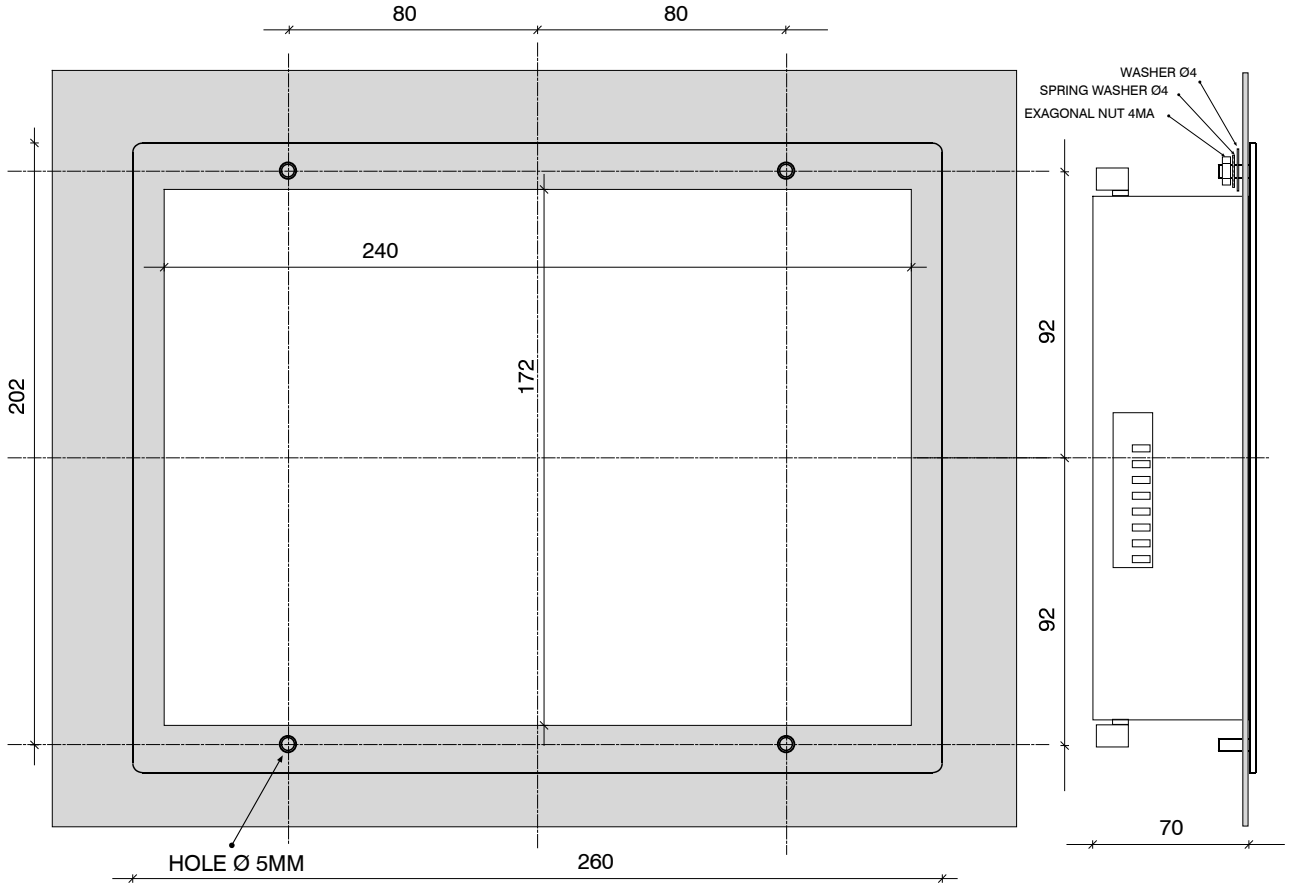
For CAT.IV operation, the negative pole of low voltage supply (GND at JH-48) must be connected to the SAFETY EARTH. If required operation with GND isolated from SAFETY EARTH, please ask to S.I.C.E.S. for the allowable operation condition.

For CAT.IV operation the maximum allowable phase to neutral voltage is 300Vac (520 Vac phase to phase). Maximum allowable input voltage toward SAFETY EARTH is 300Vac.

For CAT.III operation, the maximum allowable phase to neutral voltage is 345Vac (600 Vac phase to phase). Maximum allowable input voltage toward SAFETY EARTH is 600Vac.

For CAT.IV operation and GCB contactor supplied by generator voltage, L1 phases must be used for terminal JM-58 supply.

9.1 Dimensions and panel cut for mounting



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