

ST8150 Boost Gauge Display System

User's Guide Addendum

Preface

Congratulations

Congratulations on choosing the Stack ST8150 Rally Turbo Display System. This system will give you a wealth of information to enable you to obtain the maximum safe performance from your vehicle.

Purpose of this addendum

In conjunction with the ST8100 User Guide, this addendum will help you install and use the Stack ST8150 Display System. It explains how to set up and configure the system for your vehicle.

Edition Notice

This edition is for all versions of the ST8150 Display System distributed to customers world wide. The units of measurement used to illustrate the use of the Display System in this edition are for the UK version. Units used in the various versions are shown in the following table.

Parameter Type	UK Version	US Version	EC Version
Boost	N/A	N/A	Bar
Temperature	N/A	N/A	Degrees C
Pressure	N/A	N/A	Bar

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Contents

PREFACE	III
CONTENTS	V
Chapter 1. Introducing the Display System	1
How to Use this Manual	2
Chapter 2. Getting Started	3
Wiring Harness	4
Chapter 3. Operating the Display System	5
Changing the display layers	5
Peak Values (Tell Tales)	7
Alarms	8
Chapter 4. Configuring the Display System	9
Configuration mode	9
Chapter 5. Installing the Display System	12
Boost Pressure sensor	12
Exhaust Gas Temperature Sensor	12
Chapter 6. Troubleshooting	13
Appendix B. Wiring Harness Schematic Diagram	14
Index	15

Chapter 1. Introducing the Display System

The Stack ST8150 Display System monitors and displays a range of values, known as performance parameters, needed for effective car and driver management in most competitive situations.

The system combines an analogue Boost Gauge with a digital display for the following performance parameters:

1. Exhaust Gas Temperature
2. Oil pressure
3. Oil temperature
4. Water temperature
5. Fuel pressure
6. Battery voltage

You can view the peak values (tell-tales) for all the parameters.

The system provides a range of warning messages based on preset alarm values for the following performance parameters:

1. Exhaust Gas temperature
2. Oil pressure
3. Oil temperature
4. Water temperature
5. Fuel pressure
6. Battery voltage

You can enable or disable the warning system for each parameter individually.

You can redefine the preset alarm value for each parameter to a value that is more suitable for your vehicle.

The system provides a gear shift warning light that is based on an RPM value that you define for your vehicle.

How to Use this Manual

Stack recommends that you unpack and connect the components in the system **before** you install it in your vehicle. This will enable you to familiarise yourself with operating the display and configuring it for the vehicle in which you intend to install it.

Please use the ST8100 User Guide to install the system, referring to the corresponding section in this addendum to see whether there are special requirements for the ST8150 system.

Chapter 2. Getting Started

The sensors supplied with the ST8150 system differ from those supplied for the ST8100.

ST8150 Display System Items

The ST8150 Display System is supplied with the following standard components:

Quantity	Description
1	Display Module (ST867) with 2 mounting brackets
1	Wiring Harness (ST872)
1	Oil Pressure Sensor (ST744, ST745)
1	Fuel Pressure Sensor (ST741, ST 742, ST744, ST745)
2	Temperature Sensors (ST762, ST764)
1	Boost Sensor (ST453)
1	1.4 Mtr Extender (918021)
1	Exhaust Gas Temperature Interface (ST464)
4	Switches (supplied with and to be connected to the wiring harness)

Optional ST8150 Display System Items

The ST8150 Display System can be used with the following optional components:

Quantity	Description
1	RPM Sensor (ST696 Opto Isolator or ST697 H.T. Pick-up)
1	External Gear Shift Warning Lamp
1	External Alarm Warning Lamp

Wiring Harness

The ST8150 harness is slightly different to that of the ST8100.

Labels on short cables	Connection To
S1 to S4	Switches 1 to 4
(WS)	Boost Pressure sensor (ST453)
LAP	N/A
SL	Gear shift warning light
AL	Alarm warning light
NET	Data logging expansion pack

Labels on Long Cables:	Connection To
ES	Engine Speed (RPM)
OT	Oil temperature sensor
WT	Water temperature sensor
OP	Oil pressure sensor
F	Fuel pressure sensor
A	Auxiliary Channel EGT Interface (ST464)
B +	Battery Positive
B -	Battery Negative (Earth)

Chapter 3. Operating the Display System

The operation of the ST8150 is basically the same as that of the ST8100. This section highlights any differences.

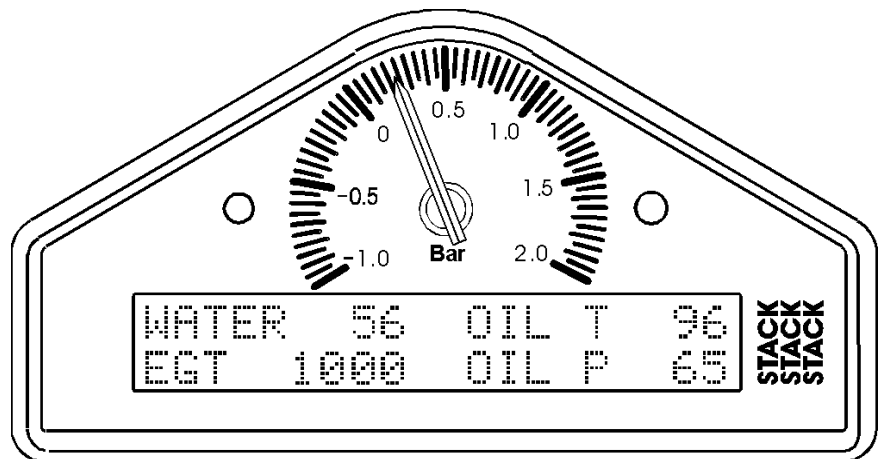
Changing the display layers

The ST8150 system has three display layers. These differ significantly from those of the ST8100 and their layouts are shown below.

Each of the display layers can be displayed in turn by pressing switch 3. Press switch 3 when displaying layer 3 to return to display layer 1.

The format of the values in these displays will vary for systems supplied outside the UK, as the parameters are displayed in different units.

Display Layer 1



Display layer 1 shows:

- Water Temperature (WATER)
- Oil temperature (OIL T)
- Exhaust Gas Temperature (EGT)
- Oil Pressure (OIL P)

Press Switch 3 to see display layer 2.

Display Layer 2

```
FUELP  56   OIL T  96  
BATT  13.1  OIL P  65
```

Display layer 2 shows:

- Fuel Pressure (FUELP)
- Oil Temperature (OIL T)
- Battery voltage (BATT)
- Oil Pressure (OIL P)

Note: The fuel pressure is displayed as 0.1 PSI

Press Switch 3 to change display to layer 3

Display Layer 3

```
FUELP  56   RPM  4675  
EGT   1000  OIL P  65
```

Display layer 3 shows:

- Fuel Pressure (FUELP)
- Engine Speed (RPM)
- Exhaust Gas Temperature (EGT)
- Oil Pressure (OIL P)

Press Switch 3 to display layer 1 again.

Chapter 4. Configuring the Display System. The number displayed is Gauge Pressure, where atmospheric is 0, boost shows as positive and vacuum as negative numbers. Due to atmospheric variations, the display may not show exactly 0.00 when the engine is stationary.

Peak Values (Tell Tales)

The system stores either a maximum or a minimum value as the peak value, depending on the parameter, as follows:

Parameter	Type of Peak Value	Gated to RPM
Oil Temperature	Maximum	Yes
Water Temperature	Maximum	Yes
Oil Pressure	Minimum	Yes
Fuel Pressure	Minimum	Yes
Battery Voltage	Minimum	Yes
Boost Pressure	Maximum	Yes
Exhaust Gas Temperature	Maximum	Yes

Resetting the Peak Values

The peak values for the channels will reset as follows:

Parameter	New Peak Value
Boost Pressure	-99.9 Bar
Oil Pressure	999 PSI
Fuel Pressure	999 PSI
Oil Temperature	0C
Water Temperature	0C
Exhaust gas Temperature	-99C
Battery Voltage	26.0V

Alarms

The ST8150 Display System has the following built-in alarms:

Parameter	Alarm is triggered when the:	Gated to RPM
Oil Temperature	current value exceeds the preset value	Yes
Water Temperature	current value exceeds the preset value	Yes
Oil Pressure	current value drops below the preset value	No
Fuel Pressure	current value drops below the preset value	Yes
Battery Voltage	current value drops below the preset value	No
Boost Pressure	current value exceeds the preset value	Yes
Exhaust Gas Temperature	current value exceeds the preset value	Yes

Chapter 4. Configuring the Display System

Configuration mode

The list of configurable parameters has changed significantly from that of the ST8100. Please note that the settings for the 30PSI/150PSI FUELP SENSOR (2BAR/10BAR for EC) must match the sensor fitted or incorrect readings will be shown.

Configurable Parameter	Setting Required	Switchable Parameter
E.S.Cylinders	Number of cylinders in engine (for RPM)	Not Applicable
GATE RPM	Minimum RPM for the Fuel Pressure, Oil Temperature and Pressure, and Water Temperature warnings to operate.	Yes
LOG RPM	RPM at which the logging option is started.	No
SHIFT RPM	RPM at which gear shift light is to come on	Yes
HIGH WATER	Maximum water temperature alarm	Yes
HIGH OIL T	Maximum oil temperature alarm	Yes
LOW FUEL P	Minimum fuel pressure alarm	Yes
LOW OIL P	Minimum oil pressure alarm	Yes
LOW BATT	Minimum battery voltage alarm	Yes
HIGH BOOST	Maximum boost pressure alarm	Yes
HIGH EGT	Maximum EGT alarm	Yes

Setting or resetting configuration values

Use Switch 1 to decrease the value being configured and Switch 2 to increase it. The rate at which the value increases or decreases itself increases while the switch is being held down. Example of the displays for each of the configuration items are shown below.

Engine speed cylinders:

```
E.S. Cylinders 4
```

Gate RPM:

```
EDIT TEST  
GATE RPM 3000 on
```

Logging RPM:

```
EDIT TEST  
LOG RPM 7000 on
```

Shift RPM:

```
EDIT TEST  
SHIFT RPM 7000 on
```

High water temperature:

```
EDIT TEST  
HIGH WATER 105 on
```

High oil temperature:

```
EDIT TEST  
HIGH OIL T 130 on
```


Low fuel pressure:

```
EDIT TEST
LOW FUEL P    10    on
```

Low oil pressure:

```
EDIT TEST
LOW OIL P    35    on
```

Low battery voltage

```
EDIT TEST
LOW BATT    10.0    on
```

High boost pressure

```
EDIT TEST
HIGH BOOST  0.80    on
```

High exhaust gas temperature:

```
EDIT TEST
HIGH EGT    1000    on
```

Switching Alarms on or off

You can be enable (switch on) or disable (switch off) each of the alarm warnings by pressing and holding Switch 1 and then pressing Switch 2.

Note that you may change the preset value of the parameter slightly while pressing both switches. This does not matter when switching an alarm warning off and, if necessary, you can correct the preset value after you switch it on again.

Leaving configuration mode

When you wish to return to the normal display, press Switch 4.

Chapter 5. Installing the Display System

Boost Pressure sensor

Fitting the Boost Pressure sensors

The Display System is supplied with a ST453 (0-3.5Bar) sensor. Please refer to the installation instructions supplied in the sensor package

Exhaust Gas Temperature Sensor

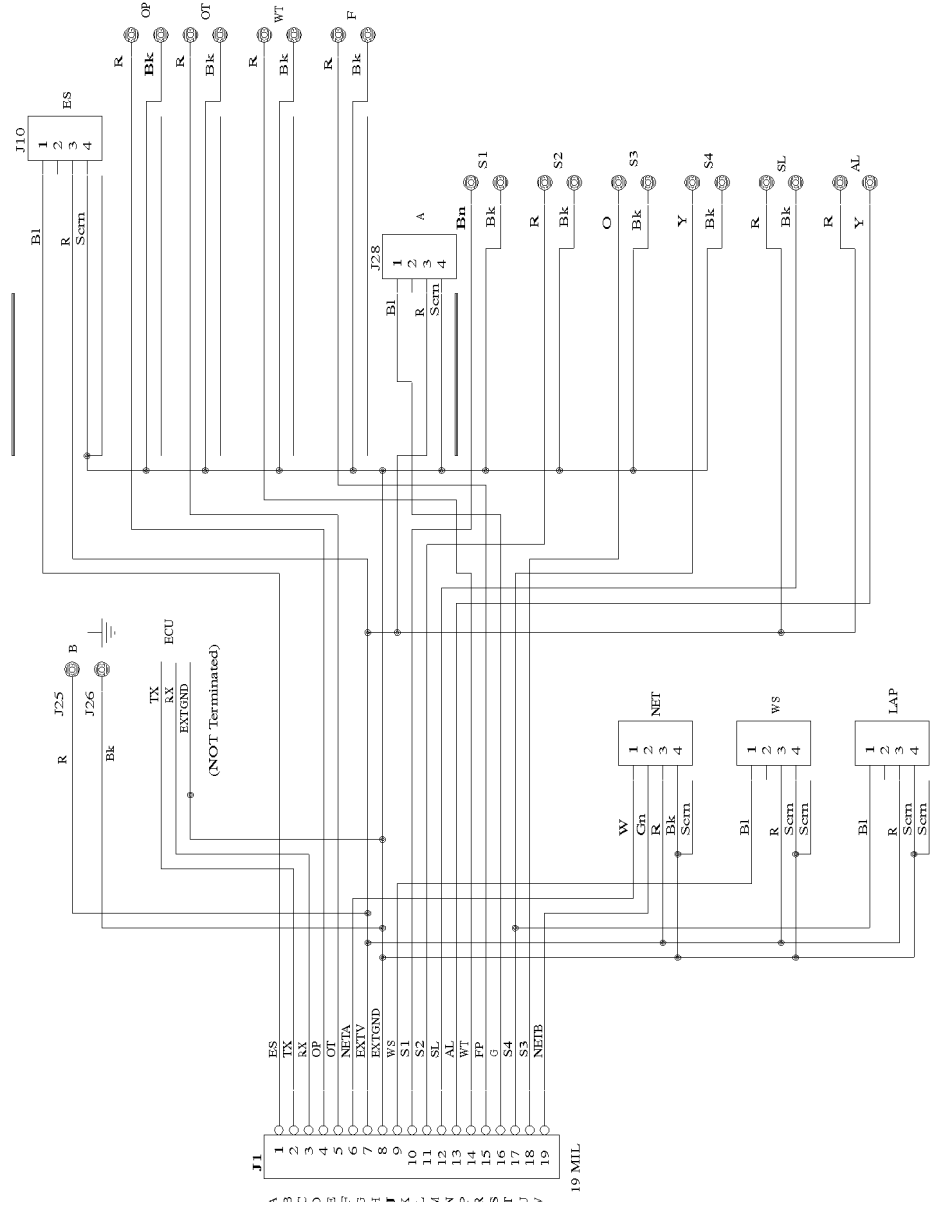
As well as the ST76x sensors supplied for Oil and Water temperatures, the ST8150 Display System is also supplied with an ST464 sensor interface for connection to a customer supplied K Type Thermocouple mounted for Exhaust Gas temperature monitoring.

Chapter 6. Troubleshooting

Use this table in conjunction with the ST8100 manual.

No.	Symptom	Possible Cause	Remedy	Notes
1	Boost shows -9.99 (Bar) or -99.9 (psi)	ST453 sensor disconnected	Reconnect	
		Faulty connections	Check connections	Refer to harness diagram
		ST453 faulty	Return for service	
2	Boost shows 0.00 (Bar) or 0.0 (psi) approximately	ST453 not connected to intake correctly	Check hose and fittings	
3	Boost display incorrect or inaccurate	Units (PSI/Bar) set wrongly	Modify setting	1 Bar is about 14.5 psi
4	EGT Display gives a fixed temperature reading of 999°C	EGT sensor has failed	Replace sensor	Disconnect sensor. If reading changes to -99, replace sensor
		Faulty sensor connections	Check continuity of sensor leads	Otherwise check harness for short circuit
5	EGT Reading gives Intermittent readings	Sensor has failed	Replace sensor	
		Faulty sensor connections	Check continuity of sensor leads for open circuits.	Check harness for open circuits (refer to the harness diagram)
6	Fuel Pressure display shows an incorrect reading	Wrong FUELP SENSOR fitted	Fit correct sensor	Other sensors are 150psi/10Bar

Appendix B. Wiring Harness Schematic Diagram



ST872 'D'isplay System Harness

Index

- alarm for
 - battery voltage, 8
 - boost pressure, 8
 - exhaust gas temperature, 8
 - fuel pressure, 8
 - oil pressure, 8
 - oil temperature, 8
 - water temperature, 8
- alarm warning light
 - wiring label, 4
- alarms, 8
 - switching on or off, 11
- battery voltage, 6
 - alarm, 8, 9
- boost pressure
 - alarm, 8
 - sensor, 12
- boost pressure sensor
 - wiring label, 4
- configuring the display system, 9
- data logging subsystem
 - wiring label, 4
- display layers, 5
 - Layer 2, 6
 - Layer 3, 6
- engine cylinders, 9
- engine speed
 - wiring label, 4
- engine speed display, 6
- exhaust gas temperature sensor
 - wiring label, 4
- Exhaust Gas Temperature
 - alarm, 8
 - EGT, 5, 6
 - sensor, 12
- fuel pressure, 6
 - alarm, 8, 9
- fuel pressure sensor
 - wiring label, 4
- GATE RPM, 9
- gear shift warning light
 - RPM setting, 9
- gear shift warning light, 2
 - wiring label, 4
- HIGH BOOST, 9
- HIGH OIL T, 9
- HIGH WATER, 9
- installing the Stack ST8110, 12
- lap timing switch**
 - wiring label, 4**
- logging rpm, 9
- LOW BATT, 9
- LOW FUEL P, 9
- LOW OIL P, 9
- oil pressure, 5, 6
 - alarm, 8, 9
- oil pressure sensor
 - wiring label, 4
- oil temperature
 - alarm, 9
 - oil temperature, 5, 6
 - alarm, 8
- oil temperature sensor
 - wiring label, 4
- on or off, 11
- optional components, 3
- peak values (tell-tales), 1, 7
 - resetting, 7
- performance parameters, 1
- resetting peak values, 7
- shift light. *See* gear shift warning light
- SHIFT RPM, 9
- standard components, 3
- tools needed, 12
- warning messages, 1
- water temperature, 5, 6
 - alarm, 8, 9
- water temperature sensor
 - wiring label, 4
- wiring harness, 4
- wiring harness schematic diagram, 14