Scania Engines

Operator's manual

ATSc
Instrumentation
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Preface

This Operator's manual describes operation of ATSc instrument panel.

The information in this manual was correct at the time of going to press. Scania reserves the right to make alterations without prior notice.

Note:

Always use Scania spare parts for repair work.

Function

The instrument panel for the automatic transfer switch (ATS) can be used when a generator set is being used as a stand-by generator set in an electrical consumer network. The instrument panel is located in the switchgear of the electrical consumer network.

When the instrument panel detects a power failure in the electrical power network, a signal is sent to the generator set requesting it to start and take over the load from the electrical consumers. When the instrument panel detects that the mains voltage is back up, the generator set stops.

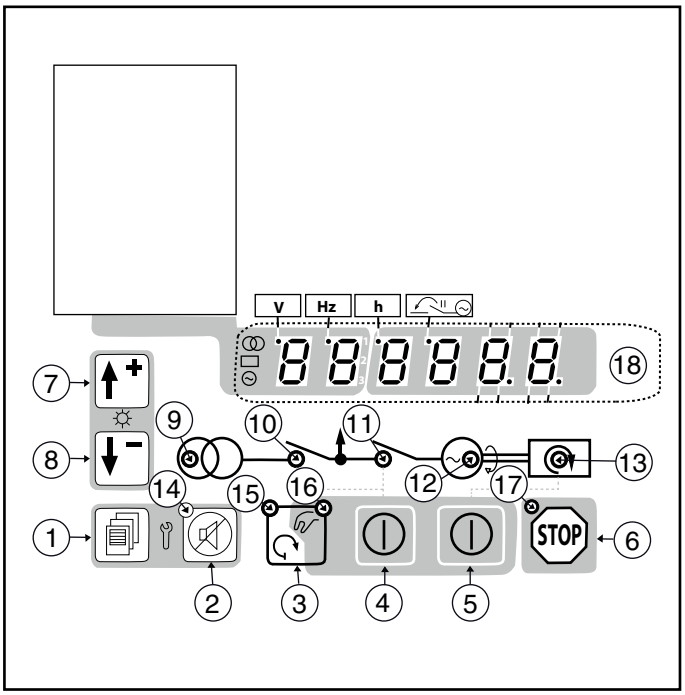
The display of the instrument panel indicates the voltages and frequencies of each phase, the engine running time, the next inspection, the number of times the generator has been connected and active alarm messages.

Indicator lamps show the current operating mode, the status of the circuit breakers and the availability of mains voltage and generator voltage.

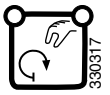
The instrument panel can be run in both automatic and manual operating modes.

Instrument panel

The figure below displays the instrument panel with switches, indicator lamps and display.



Switch

Item	Switch	Function
2		Acknowledges active alarm messages and cancels the alarm signal. Indicator lamp 14 goes out when there are no alarm messages.
3		Changes operating mode. In manual operating mode, indicator lamp 16 is on and in automatic operating mode indicator lamp 15 is on. This switch is deactivated when the operating mode has been selected externally.
4		Closes or opens the circuit breaker in the generator set and in the automatic transfer switch respectively, depending on the current status of the circuit breakers. This switch is only active in manual operating mode.
5		Starts the engine. This switch is only active in manual operating mode. If the instrument panel does not detect a generator voltage and frequency after 60 seconds, the Engine start failure alarm is triggered. This switch is deactivated when the instrument panel is in automatic operating mode or when the operating mode has been selected externally.

Item	Switch	Function
6		Switches off the engine. This switch is always active. If the switch is pressed once the engine is switched off following a cooling period. If the circuit breaker in the generator set is closed and the circuit breaker in the automatic transfer switch is open when the switch is pressed, the former opens while the latter is closed, if there is mains voltage. If the switch is pressed twice the engine is switched off immediately.

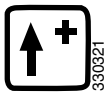
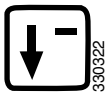
Indicator lamps

Item	Function
9	The indicator lamp is on when mains voltage is available and it is within the limits.
	The indicator lamp flashes when mains voltage or frequency is not within limits.
10	The indicator lamp is on when the circuit breaker in the automatic transfer switch is closed.
11	The indicator lamp is on when the circuit breaker in the generator set is closed.
12	The indicator lamp is on when there is a generator voltage and frequency and they are within limits.
	The indicator lamp flashes when the generator voltage or frequency are not within limits.
13	The indicator lamp is on when the engine is running.
	The indicator lamp flashes when the engine is running, but engine protection monitoring is not ready. The indicator lamp also flashes when the engine is in its startup or cooling phase.
14	The indicator lamp is on when there are alarm messages.
15	The indicator lamp is on in automatic operating mode.
16	The indicator lamp is on in manual operating mode.
17	The indicator lamp is on when the generator set is stopped.

Note:

Press switches 7 and 8 at the same time to carry out a function test of all indicator lamps and the display.

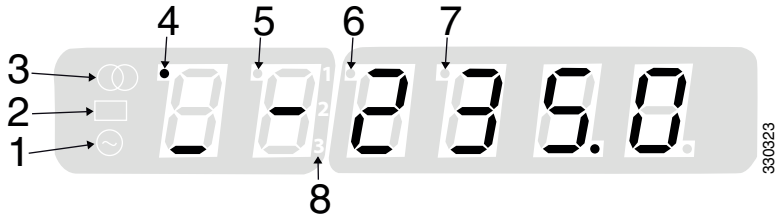
Display with switches

Item	Switch	Function
1		Scroll to show the monitored parameters on the display. This switch is active when the instrument panel is in normal operation.
7		Increase a value for the selected parameter when the instrument panel is in configuration mode.
8		Decrease a value for the selected parameter when the instrument panel is in configuration mode.
18		Alphanumeric display with 6 characters. Measured values, operating parameters and alarm messages are displayed here.

Display

Layout

The display shows a number of numerical measured values during operation.



Display with 6 characters

- The first character in the display (from the left) shows the unit being measured: generator 1, automatic transfer switch 2 or electrical power network 3.
- The second character in the display indicates the phase 8 being measured. The upper bar indicates L1, the central bar indicates L2 and the lower bar indicates L3. If only one bar is displayed the phase is being measured to neutral. If two bars are displayed, phase to phase is being measured.
- Characters 3 to 6 indicate a numeric value with one decimal for the displayed parameter.
- The indicator lamps located above to the left by the first 4 characters indicate the following:
  - Indicator lamp 4 on displays the unit of measurement voltage (V).
  - Indicator lamp 5 on displays the unit of measurement frequency (Hz).
  - Indicator lamp 6 on displays the number of running hours (h).
  - Indicator lamp 7 on displays the number of times the generator has been connected (n).

The example in the above figure shows that the generator voltage is 235.0 V between phase L2 and neutral.

- The bar in the first character indicates the unit generator.
- The bar in the second character indicates the measurement between phase L2 and neutral.
- Characters 3 to 6 indicate the numerical value 235.0.
- Indicator lamp 4 on at the first character shows that the unit of measurement is voltage (V).

Navigation through the measured values for the parameters

With the instrument panel in normal operation the basic value is always displayed first when the instrument panel evaluates the measured voltage and the positions of the circuit breakers.

Press switch 1 to see the measured values of the parameters in the following sequence.

Parameter	Display
Mains voltage V_{12} (V_{Line}).	
Mains voltage V_{23} (V_{Line}).	
Mains voltage V_{31} (V_{Line}).	
Mains voltage. Average of phase to phase voltages (two of three indicator lamps for phase are displayed alternately).	
Mains voltage V_{1N} (V_{Phase}).	
Mains voltage V_{2N} (V_{Phase}).	
Mains voltage V_{3N} (V_{Phase}).	
Mains voltage. Average of the phase voltages (the three indicator lamps for phase are displayed alternately).	
Rated mains frequency.	
Generator voltage V_{12} (V_{Line}).	
Generator voltage V_{23} (V_{Line}).	

Parameter	Display
Generator voltage V_{31} (V_{Line}).	
Generator voltage. Average of phase to phase voltages (two of three indicator lamps for phase are displayed alternately).	
Generator voltage V_{1N} (V_{Phase}).	
Generator voltage V_{2N} (V_{Phase}).	
Generator voltage V_{3N} (V_{Phase}).	
Generator voltage. Average of the phase voltages (the three indicator lamps for phase are displayed alternately).	
Rated generator frequency.	
Engine running time counter in hours (six digit display with one decimal).	
Hour counter to next inspection (a negative value indicates that the service due date has been passed).	
Counter for the number of times the generator has been connected.	
Battery voltage	

If switch 1 is pressed again the display returns to the basic value.

The display automatically returns to the basic value after 180 seconds if no switch is pressed.

Alarm

Alarm		Alarm class	Display
10	Generator overfrequency.	F Shutdown.	
11	Generator underfrequency.	F Shutdown.	
12	Generator overvoltage.	F Shutdown.	
13	Generator undervoltage.	F Shutdown.	
14	Incorrect phase rotation.	B Alarm.	
30	Engine start failure.	F Shutdown.	
31	Unintentional stop.	F Shutdown.	
40	Time for inspection.	B Alarm.	
51	Incorrect closing of the circuit breaker in the generator set.	B Alarm.	
52	Incorrect opening of the circuit breaker in the generator set.	B Alarm.	
53	Incorrect closing of the circuit breaker in the automatic transfer switch.	B Alarm.	
54	Incorrect opening of the circuit breaker in the automatic transfer switch.	B Alarm.	

Configuration mode

To go into configuration mode press switches 1 and 2 at the same time.

The following parameters are displayed:

- 00 – Password
- 01 – Time to alarm signal reset
- 72 – Display level.

To display the other parameters, enter the password for parameter 00 – Password (0003).

Press switch 1 to scroll down among the parameters that can be changed. Press switch 7 to increase the value of the selected parameter or press switch 8 to decrease the value.

Testing the instrument panel

Test with load

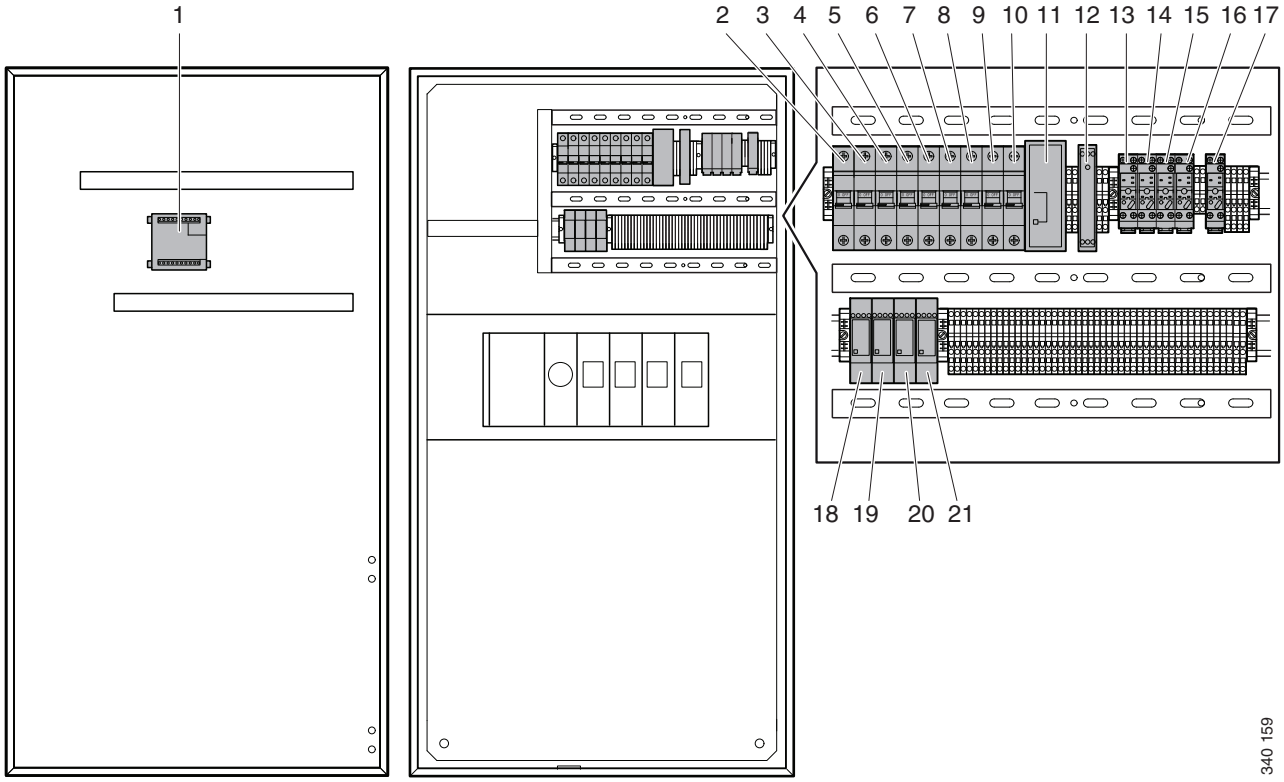
1. Press switch 3 to put the instrument panel in manual operating mode.
2. Press switch 5 to start the generator set engine.
3. When the frequency and voltage are within limits and indicator lamps 12 and 13 have switched from flashing to steadily lit, the circuit breaker in the automatic transfer switch can be opened and the circuit breaker in the generator set closed by pressing switch 4. This puts a load on the generator.
4. When the test with load is completed: return the load to the electrical power network by opening the circuit breaker in the generator set and closing the circuit breaker in the automatic transfer switch. Stop the generator set by pressing switch 3. This completes the test with load procedure and puts the instrument panel into automatic operating mode, in stand-by to detect a power failure in the electrical power network.

Test without load

1. Press switch 3 to put the instrument panel in manual operating mode.
2. Press switch 5 to start the generator set engine.
3. When the test without load is completed, stop the generator set by pressing switch 3. This completes the test without load procedure and puts the instrument panel into automatic operating mode, in stand-by to detect a power failure in the electrical power network.

Components in the central electric unit

The illustration below shows the location of the components inside the central electric unit.



Pos.	Designation	Description
1	ATSc	Instrument panel for an automatic transfer switch
2-4	F6-F4	Miniature circuit breakers for detecting mains voltage
5	F8	Miniature circuit breaker for network supply of 2-way power supply
6	F7	Miniature circuit breaker for external power supply
7	F9	Miniature circuit breaker for voltage supply from generator set to 2-way power supply
8-10	F3-F1	Miniature circuit breakers for detecting voltage from generator set
11	2-way power supply	
12	Direct current power supply	
13	GR1	Relay for supply from generator set
14	GAR	Relay for supply of external voltage to generator set
15	MAR	Relay for supply of external voltage
16	RSR	Relay for remote start
17	RSR2	Relay for remote start
18	MCRC	Circuit breaker closes
19	MCRO	Circuit breaker opens
20	GCR	Generator set switch closes

Pos.	Designation	Description
21	MCRAC	Circuit breaker closes automatically