General Specifications

Panel Mounted Converter for Conductivity or Resistivity Model SC150

Housed in a compact panel mounted case with IP65 front and featuring an intuitive interface with touch screen, the EXAxt SC150 is ideally suited to the creation of control systems where panel size is at a premium.

With the certified sensors from Yokogawa measurement and control of SC (specific conductivity) or resistivity is made easy. The SC150 is ideally suited for use in the field of water treatment, where it provides accurate monitoring and control in an economical and convenient package.

Derived from the famous EXA series, the SC150 has the self-diagnostic features that have made EXA a market leader.

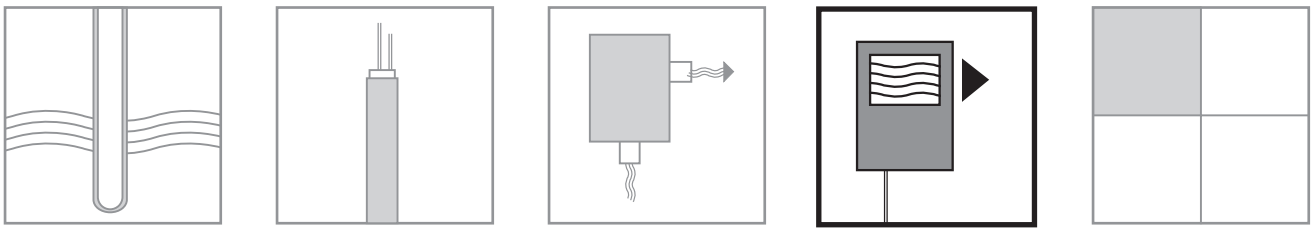
Included in the 96mm x 96mm square housing are two isolated mA outputs with linearisation, HART communication and PID control functions. Two SPDT relay contact outputs provide alarm and control functions. Remote range change can be initiated by a contact input.

The unique touch screen interface provides simple, intuitive configuration and access to the display features. A large clear display with backlight makes it very easy to read primary and secondary values. Trend charts, diagnostics, logbook and configuration data are all readily available. A flip-up transparent dust cover is fitted to keep the display clean.

FEATURES

- Compact panel mount design
- Interactive touch screen interface
- Trend display of SC, resistivity, concentration & temperature
- Specialized process temperature compensations
- Simple calibration adjustment
- On-line sensor checking
- HART communications (DD available)
- Event logbook
- Programmable security codes
- Adjustable output damping
- IP65 front panel
- English language interface
- French, German, Spanish or Japanese as second language.

SYSTEM CONFIGURATION



Sensors | Cables | Fittings | **Transmitters** | Accessories

General specifications of EXAxt SC150

A) Input specifications : Two or four electrodes measurement with square wave excitation, using max 60m (200ft) cable (WU40/WF10) and cell constants from 0.008 to 50.0 cm^{-1}

B) Input ranges

Conductivity : 1 µSxC to 200 mSxC at process temperature.

Resistivity : 5 Ω/C to 1 MΩ/C at process temperature.

Temperature :
- Pt1000, -20 to 250ºC
- Pt100, -20 to 200ºC
- Ni100, -20 to 200ºC
- NTC 8k55, -10 to 120ºC
- Pb36, (JIS NTC 6k) -20 to 120ºC

C) Accuracy

Conductivity/resistivity : ≤ 0.5 % of reading

Temperature : ≤ 0.3 ºC (≤ 0.4 ºC for Pt100)

mA outputs : ≤ 0.02 mA

Ambient temperature influence : ± 0.05% /ºC

D) Transmission Signals

General : Two isolated outputs of 4-20 mA. DC with common negative. Maximum load 600Ω.

Control function : Linear or 21-step table for Conductivity/resistivity, concentration or temperature. PID control. Burn up (21.0mA) or burn down (3.6mA) to signal failure.

E) Contact outputs

General : Two SPDT relay contacts with display indicators.

Switch capacity : Maximum values 100 VA, 250 VAC, 5 Amps. Maximum values 50 Watts, 250 VDC, 5 Amps.

Status : High/Low process alarms, selected from conductivity, resistvity, concentration or temperature. Configurable delay time and hysteresis.

Control function : On / Off
PID duty cycle or pulsed frequency control.
FAIL alarm

F) Temperature compensation

Function : Automatic or manual. Process compensation by configurable temperature coefficient, NaCl curve, 12 pre-defined matrices or 2 user programmable matrices.

G) Calibration : Semi-automatic calibration using pre-configured OIML (KCl) buffer tables, with automatic stability check. Manual adjustment to grab sample.

H) Serial Communication : Bi-directional HART digital communication, superimposed on mA1 (4-20) signal. (DD available)

I) Logbook : Software record of important events and diagnostic data readily available in the display.

J) Display : Graphical Quarter VGA (320 x 240 pixels) LCD with LED backlight and touchscreen. Plain (English) language messages, with choice of alternative languages.

K) Shipping details

Package size w x h x d : 180 x 161 x 243 mm (7.1 x 6.3 x 9.6 inch)

Package weight : app. 1.1 kg (2.4lbs)

L) Housing

Enclosure : High quality chemical resistant plastic front 96x96 mm. SS housing behind the panel depth 98 mm behind the panel (121 mm including cover)

Mounting : Panel-mounted design in a standard DIN-size 92x92 mm cutout.

M) Power supply : 85-265 VAC (47-63 Hz) 10VA max 9.6-30 VDC 10W max

N) Regulatory compliance

EMC : Meets directive 89/336/EEC
Emission conform EN 55022 class A
Immunity conform IEC 61000-6-2

Low Voltage : Meets directive 73/23/EEC
Conform IEC 61010-1, UL/cUL 3101-1 and CSA 22.2 No. 1010, Installation category II, Pollution degree 2
Certification pending for cCSAus, Kema Keur and Geprüfte Sicherheit

O) Environment and operational conditions

Ambient temperature : -20 to +55 ºC

Storage temperature : -30 to +70 ºC

Humidity : Up to 90% RH at 40 ºC (non-condensing)

Environmental protection : IP65 (NEMA 4X) front panel, IP20 behind the panel

Data protection : EEPROM for configuration data and logbook. Lithium cell for clock.

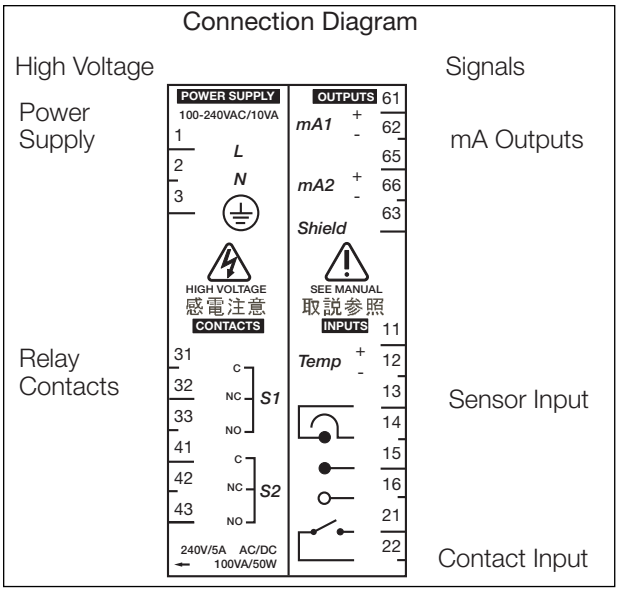
Watchdog timer : Checks microprocessor.

Power down : Reset to measurement.

Automatic safeguard : Auto return to measuring mode when touchscreen is untouched for 10 min.

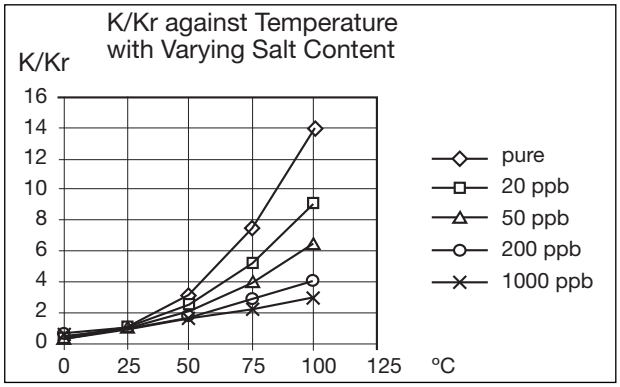
Model Code	Suffix Code	Option Code	Description
SC150			Panel mount SC converter
	-A		85 - 265 VAC power supply
	-D		9.6 - 30 VDC power supply
		-D	Second language - German
		-F	Second language - French
		-J	Second language - Japanese
		-S	Second language - Spanish
		-AA	Always AA
		/TAG	Tagnumber

Connection Diagram



PROCESS TEMPERATURE COMPENSATION

The graph shows the strong influence that temperature has on the measurement of conductivity. Of special note is the non-linear response, seen in each solution, and the fact that purer solutions show a much larger change with temperature. This is explained by the fact that two separate forces are at work. The speed at which ions move through the solution is temperature dependent, but so too is the dissociation of water into ions.



Note: - K = Specific conductivity at process temperature
Kr = SC at reference temperature.

EXAxt SC150 has three sorts of user-configurable compensation.
1) The NaCl (Sodium Chloride) compensation to IEC 746-3 uses the relationship shown in the graph to correct readings at process temperature to their equivalent at the 25°C reference temperature. This is a perfect compensation for neutral treated water.

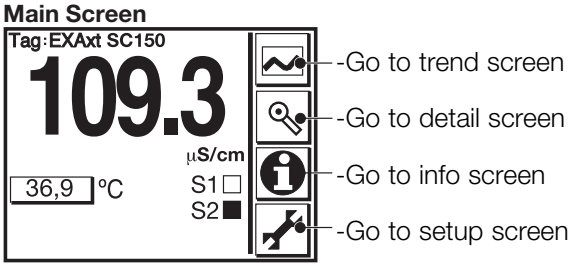
2) Temperature coefficient setting, which is easily determined from measuring a sample at two different temperatures. This is a simple compensation for systems with repeatable conditions.

3) Matrix table compensation that gives the user an accurate compensation over a range of temperature and concentration for a given system. There are matrices for pure water cation, and alkalized feed water, as well as for the common mineral acids and alkalis. In addition, the user may create his own matrix based on laboratory data.

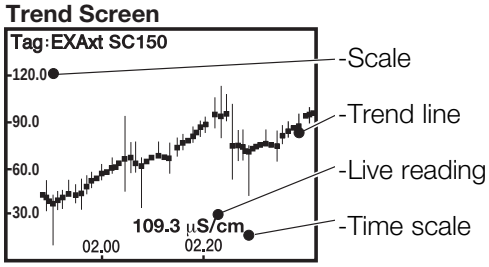
DISPLAYS AND OPERATING INTERFACE

The display is a large clear graphical LCD with LED back-light and QVGA resolution. Operation is by touch screen. Graphical keys on the right, and other areas of the screen respond to contact as virtual push buttons.

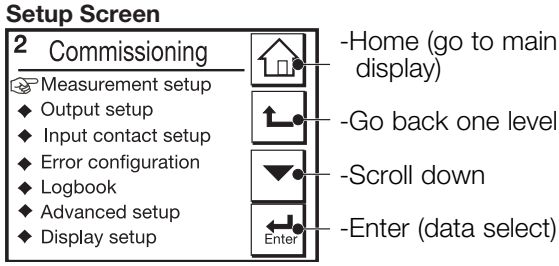
Main Screen



Trend Screen



Setup Screen



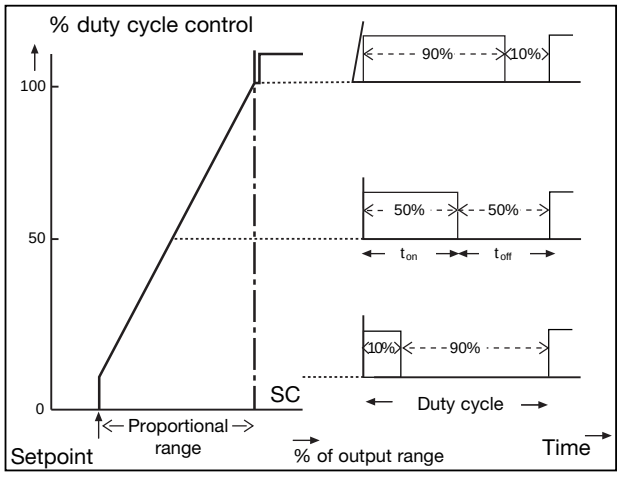
OUTPUT AND ALARM FUNCTIONS

Two isolated mA outputs are provided, and can be set for linear or scaled output signals. Alternatively PID analogue control is available on either or both mA outputs. The transmitter or control parameter may be SC, resistivity, concentration or temperature. Control settings are fully configurable.

Two SPDT relays are included as standard, and can be configured by the user as conventional process alarms, or in one of 2 control modes:

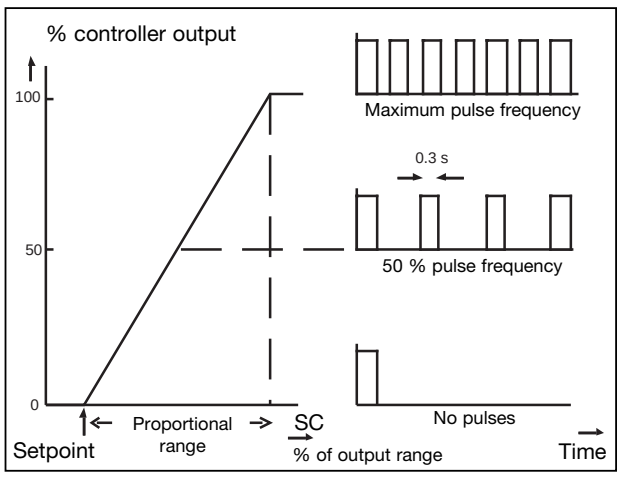
1) PID duty cycle control

In this type of control, the on/off ratio is controlled to vary the dose rate through a solenoid valve. This is a very economic way of achieving PID control.



2) PID pulse frequency control

The pulsing frequency is regulated to control electrical valve opening or pump stroke.
In each case the setpoint, PB, I and D terms are all easily adjustable in the SC150.

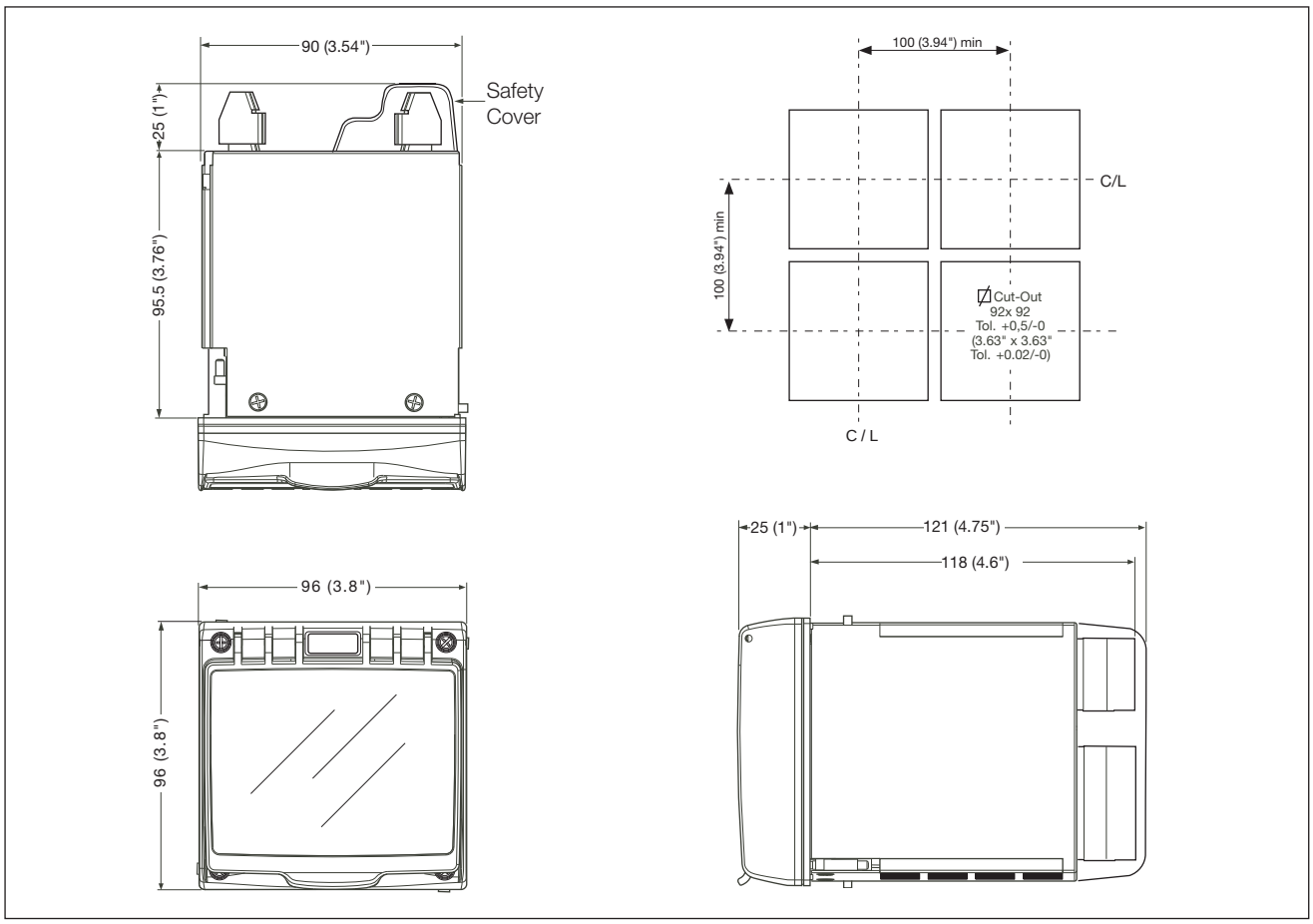


MAINTENANCE & CALIBRATION

For best results it is important that the system should be well maintained. The time needed for calibration and maintenance of an EXAxt SC150 is minimal. The calibration (cell constant) of the sensor is determined by its dimensions, and as long as the sensor is undamaged these will not change. Routine maintenance is thus limited to keeping the sensor clean. SC150 helps the user to achieve this.
A pollution alarm is built in to the unit that will detect the early onset of sensor fouling, and will warn the user of a developing problem before the reading is substantially affected. This is a particularly important feature in monitoring systems where the unit is often unattended for long periods.
When the sensor is kept clean and the instrument properly adjusted, regular calibration is unnecessary. The user should limit calibration checks to a simple comparison with a certified or trusted portable instrument, or by use of a check with solutions of known value above 50 µS/cm. The use of low conductivity solutions for calibration checks is not advisable.
Contact your local Yokogawa sales office or representative for more detailed advice about calibration

USP23 Monitoring

SC150 monitors water quality according to the USP23 directive (United States Pharmacopeia). Both compensated and uncompensated conductivity values can be read from the display, as can the solution temperature. A warning indication can be set to show that the signal is nearing or exceeding the USP23. USP23 determines a level of uncompensated conductivity for each temperature. The water must be below this level to be acceptable. This curve is preprogrammed into SC150.



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