General Specifications

Panel Mounted Converter for Conductivity or Resistivity
Model SC150

EXAxt

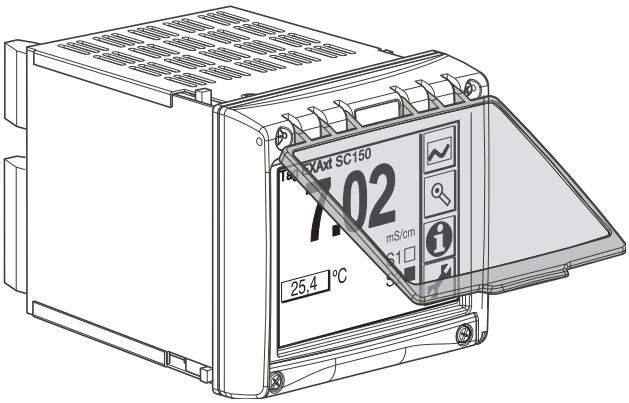
Housed in a compact panel mounted case with IP65 front and featuring an intuitive interface with touch screen, the EXAxt SC150 is ideally suited to the creation of control systems where panel size is at a premium.

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.

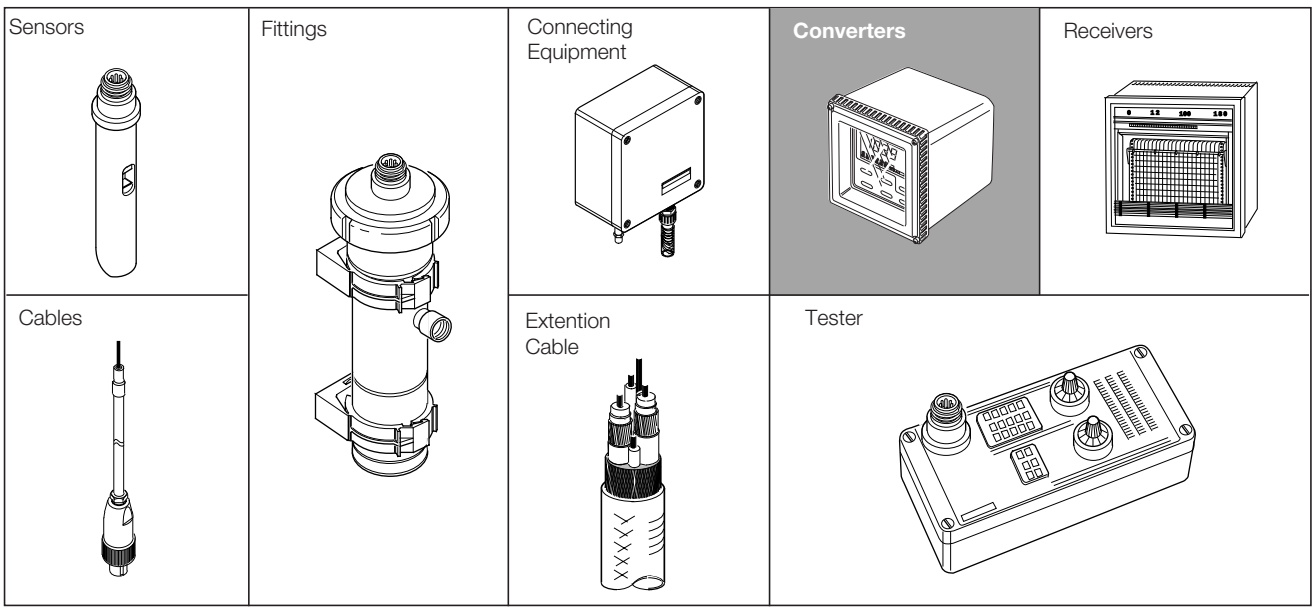
The unique touch screen interface provides simple, intuitive configuration and access to the display features. A large clear display with backlight makes it very easy to read primary and secondary value. Trend charts, diagnostics, logbook and configuration data are all readily available. A flip-up transparent 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
- Event logbook
- Programmable security codes
- Adjustable output damping
- IP65 front panel
- FM & CSA (applied for)
- CE mark & Kema Keur
- English language interface
- French German & Japanese language and other options (in preparation)

SYSTEM CONFIGURATION



General specifications of EXAxt SC150

A) Input:
SC : 4 - electrode conductivity/resistivity input
Configurable ranges from 0-0.1 µS/cm up to 1 S/cm
Temperature input - software selectable from:-
Pt1000, Pt100, Ni100, NTC 8k55, Pb36 (JIS NTC 6K)
Contact input to initiate range change

B) Outputs:
2 independent isolated 4-20 mA outputs with common positive terminal
Input/output isolation - 1000 VDC minimum
Maximum load 600 W
Bi-directional HART communication on mA1

C) Contacts:
2 SPDT relays conforming to DIV2 requirements.

Max. Switch rating	: AC	100 VA, 250 V, 5 A
	: DC	50 W, 250 V, 5A

D) Power supply:

Either	DC	9.6-30 Volts 8 W max
Or	AC	85-265 Volts (47-63 Hz) 8 VA max

E) Functional specifications
Accuracy determinated under reference conditions with sensor simulation:

Conductivity/resistivity	≤ 0.5 % of reading
Temperature	≤ 0.3 °C
mA outputs	≤0.02 mA
Ambient temperature influence	± 0.01% /°C

F) Environment and operational conditions

Ambient temperature:	-20 to +55 °C
Storage temperature:	-30 to +70 °C
Humidity:	Up to 90% RH at 40 °C (non-condensing)
Environmental protection:	IP65 (NEMA 4X) front panel IP20 behind the panel
Data protection:	EEPROM (Initialization data protected)
Watchdog timer:	Checks microprocessor.
Power down:	Reset to measurement.

G) Construction
Enclosure:
Chemical resistant polycarbonate front
96x96 mm, depth 25 mm
SS housing with ventilation slots
depth 98 mm behind the panel
(121 mm including connectors and cover)
Mounting:
Panel-mounted design in a standard
DIN-size 92 x 92 cutout.
Display:
Graphical QVGA LCD with LED backlight
Plain (English) language messages, with choice of alternative languages

H) Regulatory compliance

EMC:	89/336/EEC
Emission:	EN 55022 class A. and Australian (SMA) requirements
Immunity:	EN 50082-2 and Australian (SMA) requirements
Low Voltage:	Meets directive 73/23/EEC
Installation:	Designed for installation conforming to IEC1010-1, Category II, pollution degree 2

Certification Pending

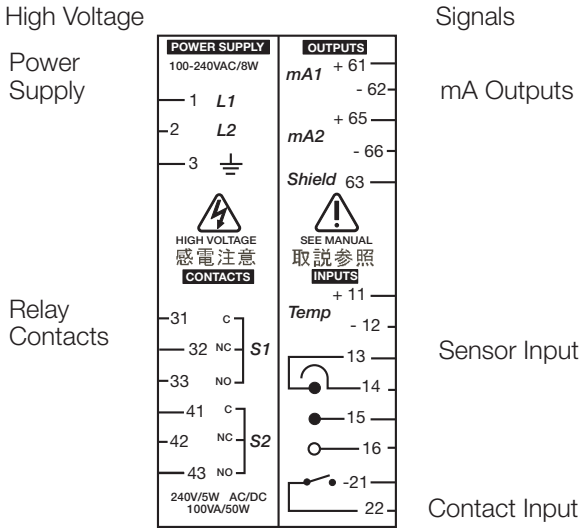
Safety:	*Cenelec, CSA and FM.*
Cenelec:	*Eex nA [L] IIC T6..T4 (non sparking)*
FM and CSA:	*CL I, DIV2, GP ABCD (non sparking)*

GS 12D7B4-E-H

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
	-AA		Always A A
		/SCT	Stainless steel tag plate

Note: Language choices in preparation

Connection Diagram



Note: When using the SC150 with a 2-electrode conductivity sensor, link terminals 13 & 14 together, and link 15 & 16 together. The inner (measuring) electrode should be connected to 15/16 and the outer (ground) electrode should be connected to 13/14.

USP23 Monitoring
SC150 monitors water quality according to the USP23 directive (United States Phamacoepea). 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 the USP23 limit, and there is a trip alarm when the limit is exceeded. 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 and is used in the setpoint calculations.

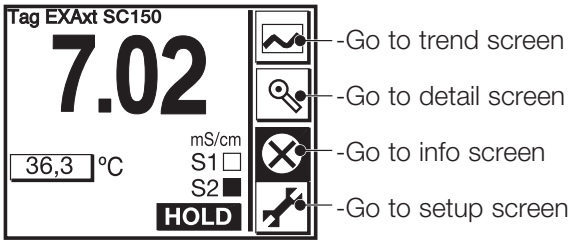
MAINTENANCE & CALIBRATION

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

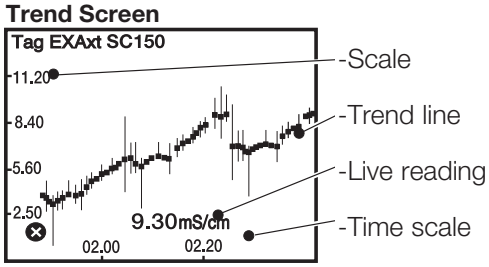
DISPLAYS AND OPERATING INTERFACE

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.

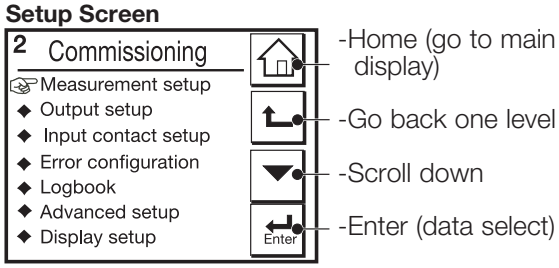
Main Screen



Trend Screen



Setup Screen



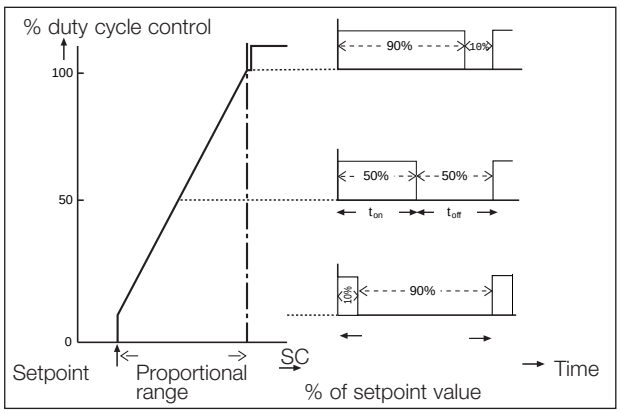
OUTPUT AND ALARM FUNCTIONS

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:

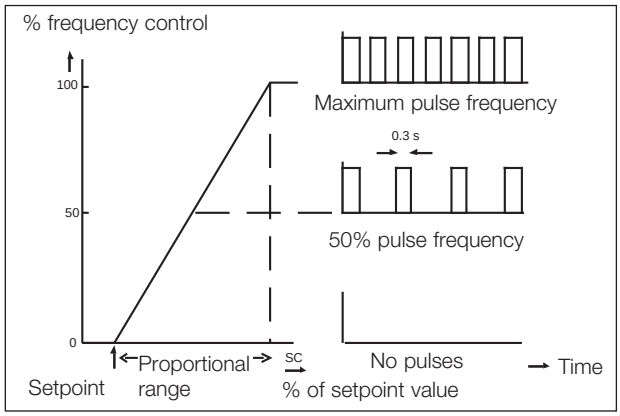
1) PID duty cycle control

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.



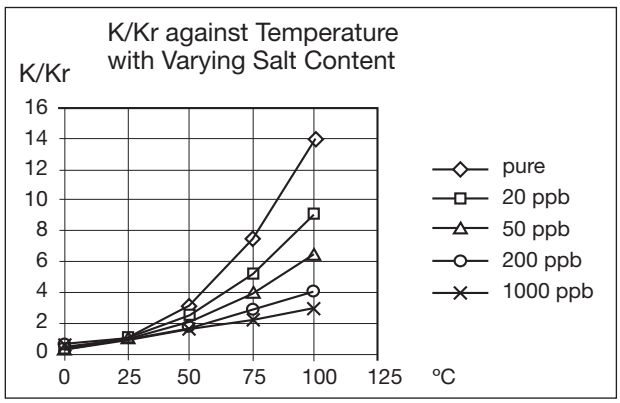
2) PID pulse frequency control

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.



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.

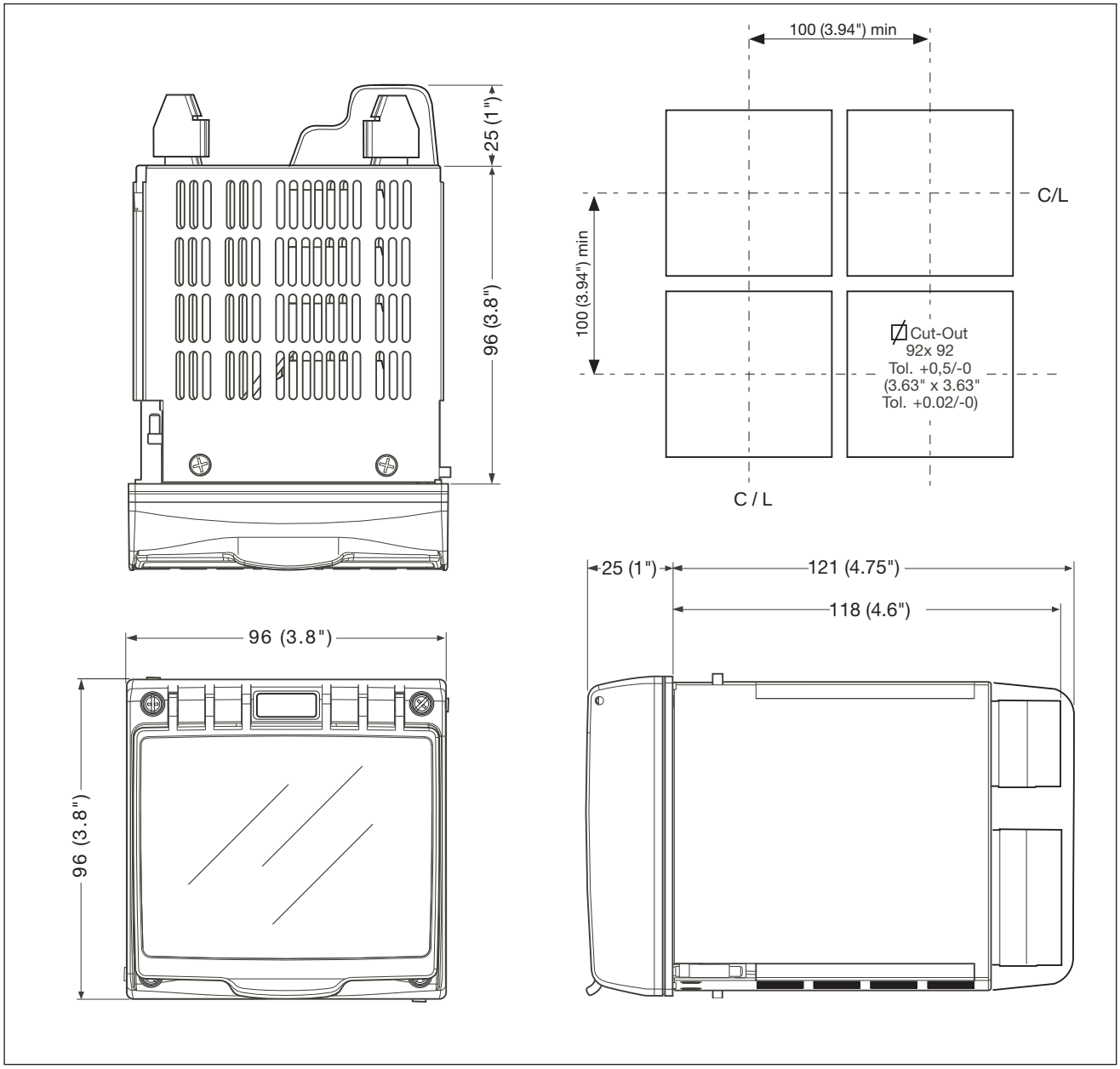


Note: - K = Specific conductivity at process temperature
Kr = SC at refrence temperature.

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.



YOKOGAWA

EUROPEAN HEADQUARTERS
Yokogawa Europe B.V.
Vanadiumweg 11,
3812 PX AMERSFOORT
The Netherlands
Tel. +31-33-4641 611
Fax +31-33-4641 610
E-mail: info@yokogawa.nl
www.yokogawa-europe.com

THE NETHERLANDS
Yokogawa Nederland B.V.
Hoofdveste 11
3992 DH HOUTEN
Tel. +31-30-635 77 77
Fax +31-30-635 77 70

AUSTRIA
Yokogawa Austria Ges.m.b.H.
Franzensbrückenstrasse 26
A-1021 WIEN
Tel. +43-1-2165 043 0
Fax +43-1-2165 043 33

BELGIUM
Yokogawa Belgium N.V./S.A.
Minervastraat 16
1930 ZAVENTEM
Tel. +32-2-719 55 11
Fax +32-2-725 34 99

FRANCE
Yokogawa Contrôle Bailey S.A.
Vélizy Valley
18-20 Rue Grange Dame Rose
78140 VELIZY VILLACOUBLAY
Tel. +33-1-39 26 10 00
Fax +33-1-39 26 10 30

GERMANY
Yokogawa Deutschland GmbH
Berliner Strasse 101-103
D-40880 RATINGEN
Tel. +49-2102-4983 0
Fax +49-2102-4983 22

HUNGARY
Yokogawa Hungaria Ltd.
Alkotas Center 39 C
1123BP BUDAPEST
Tel. +36-1-355 39 38
Fax +36-1-355 38 97

ITALY
Yokogawa Italia S.r.l.
Vicolo D. Pantaleoni, 4
20161 MILANO
Tel. +39-02-66 24 11
Fax +39-02-645 57 02

SPAIN
Yokogawa España S.A.
C/Francisco Remiro, N°2, Edif. H
28028 MADRID
Tel. +34-91-724 20 80
Fax +34-91-355 31 40

UNITED KINGDOM
Yokogawa United Kingdom Ltd.
Stuart Road, Manor Park,
RUNCORN
Cheshire WA7 1TR
Tel. +44-1-928 597100
Fax +44-1-928 597101

AUSTRALIA
Yokogawa Australia Pty Ltd.
Private mail bag 24
Centre Court D3
25-27 Paul Street North
NORTH RYDE, N.S.W. 2113
Tel. +61-2-805 0699
Fax +61-2-888 1844

SINGAPORE
Yokogawa Engineering Asia Pte. Ltd.
5 Bedok South Road
SINGAPORE 469270
Tel. +65-241 99 33
Fax +65-444 62 52

JAPAN
Yokogawa Electric Corporation
2-9-32, Nakacho, Musashino-shi
TOKYO, 180
Tel. +81-422 52 5617
Fax +81-422 52 0622

SOUTH AFRICA
Yokogawa South Africa (Pty) ltd.
67 Port Road, Robertsham
Southdale 2135, JOHANNESBURG
Tel. +27-11-680-5420
Fax +27-11-680-2922

UNITED STATES OF AMERICA
Yokogawa Corporation of America
2 Dart Road
NEWNAN, GA 30265-1040
Tel. +1-770-253 70 00
Fax +1-770-251 20 88

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CENTRAL/EAST REGION
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Czechia, Slovakia, Poland, Croatia, Slovenia, Jugoslavia, Bulgaria, Romania, Macedonia, Bosnia & Herzegovina

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