Cod. 27863364/C

操作手册

C 3630

两线制　E.C. 电导率变送器
DIN标准轨道安装

概述

本手册适用于DIN标准导轨外壳的数字两线制变送器C 3630。

它解释了设备的用途，描述系统的组成和安装过程，变送器的操作和校准方法，还提供了一些维护建议。

FUNCTIONAL DESCRIPTION

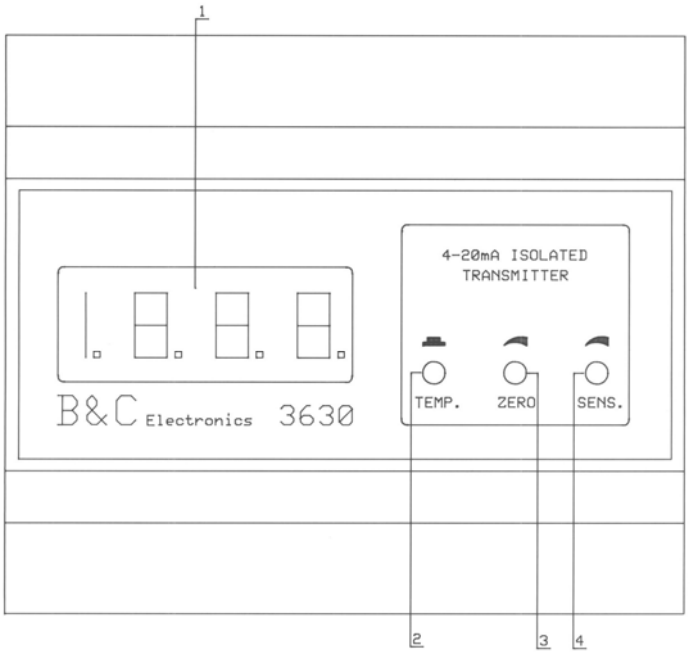
This transmitter, when connected to the E.C. cell provides a digital readout of the Conductivity of aqueous solutions.

The transmitter will perform manual or automatic Temperature compensation to correct Conductivity readings for Temperature related variations.
Temperature information is displayed by pushing button "2" marked "TEMP".

Measuring scales, operating Frequency and decimal point are selectable.

The transmitter provides an isolated 4/20 mA output, proportional to the Conductivity value which is suitable for data acquisition systems, recorders, controllers or other input devices that require a 4/20 mA input.

The front panel contains trimmer pots for Zero and Cell constant adjustment. Zero is adjusted by trimmer "3" marked "zero" and Cell constant is adjusted by trimmer "4" marked "sens".



1. DISPLAY
2. TEMPERATURE DISPLAY ACTUATOR
3. ZERO CALIBRATION
4. SLOPE CALIBRATION

PHYSICAL DESCRIPTION

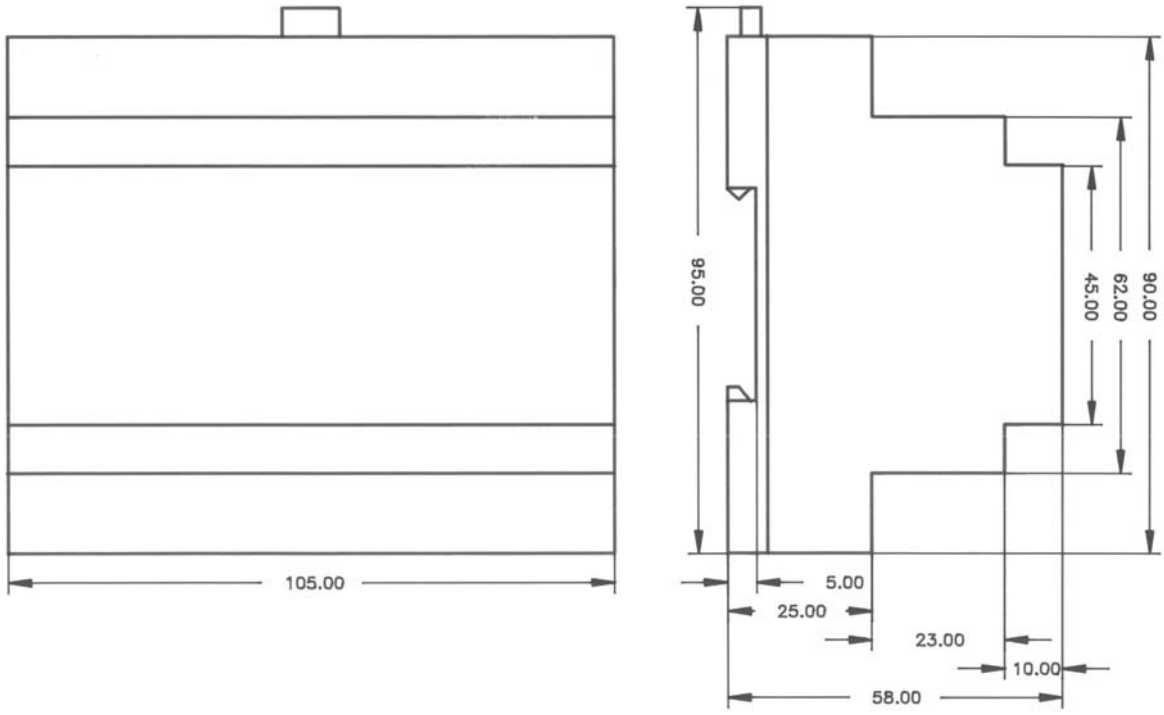
The transmitter enclosure is designed for DIN Rail mounting.

It consists of a plastic case with front panel which is coated by a polycarbonate membrane (Fig. 1), to ensure maximum anticorrosion characteristics.

For field applications mounting in a splash proof or weather resistant box is suggested.

Figure 3 describes the physical details and dimensional characteristics.

Connections to power supply, loads, recorder, RTD, electrodes and probe are installed on to the terminal block connector.



技术规格

显示:	LCD
输入:	2-electrodes E.C. cell 4-electrodes E.C. cell RTD Pt100 2 or 3 wire
输出:	4/20 mA isolated
量程:	0/200.0 µS - 0/2000 µS 0/20.00 mS -10.0/120.0 °C
温度补偿:	手动或自动
温补系数:	0/4.0 %/°C 可调
参考温补:	20 °C
零点:	可调范围 +/- 15 %
斜率:	86~112 %窄幅可调 0~160 % 宽幅可调
工作温度:	0/50 °C
工作湿度:	95 % 无凝露
供电:	10/30 VDC
隔离:	500 V 输入到输出
接线端子排:	可拆式
净重:	200 克.
尺寸:	105 x 95 x 58 mm (6 modules)
安装:	DIN标准轨道安装

PHYSICAL INSTALLATION

The transmitter must be installed into an enclosure for outdoor or indoor use and may be located close to the measuring point or some distance away in a control area.

The transmitter's housing is designed for DIN Rail mounting.

The Conductivity cell must be mounted properly if the system is to operate accurately and efficiently.

It must meet the following requirements:

- the sample in the cell must be representative of the whole solution
- the solution must circulate continuously through the cell
- the flow velocity in the cell must not be so high as to cause cavitations
- the position and orientation of the cell must not trap air-bubbles near the electrode area
- sediments must not accumulate within the electrode area
- in all dip cell installations the water must be continuously stirred.

Keep the cable away from power wires on the overall length.

This cable too must not be interrupted on overall length. If interruption is necessary, the extension cable must be fastened to the high insulation terminal strip.

The cell's cable must be protected by a sheath and not installed near power cables.

Interrupting cables must be avoided or carried out using high insulation terminals.

电气安装

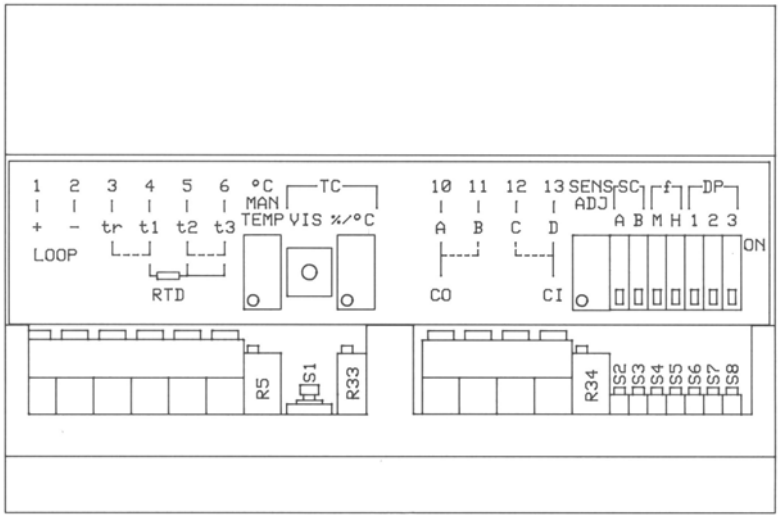
电气安装包括以下步骤:

- 将电源连接到变送器
- 将电极或是传感器连接到变送器
- 连接温度变送器

所有的接线端子排均分布在电路板底部

电源接线
- 连接24V直流电源 " + " 到“1”号端子排标记有 " + "
- 连接端子排标记 " - " 到测量回路标记 " + "端
- 连接24V直流电源 " - " 到测量回路标记 " - "端

注意不要电源反向连接到变送器。



1.	LOOP SUPPLY (+ INPUT)
2.	LOOP SUPPLY (-INPUT)
3. 4.	MANUAL TEMPERATURE COMPENSATION JUMPER
5. 6.	MANUAL TEMPERATURE COMPENSATION JUMPER
4. 5. 6.	RTD INPUT (A.T.C.)
10.13.	2-ELECTRODE CELL INPUT
10.11.12.13.	4-ELECTRODE CELL INPUT
R5	MANUAL TEMPERATURE CONTROL
R33	TEMPERATURE COEFFICIENT CONTROL
R34	COARSE SENSITIVITY ADJUSTMENT
S1	TEMPERATURE COEFFICIENT VISUALIZATION
S2	2000µS SCALE SWITCH
S3	20mS SCALE SWITCH
S4	MEDIUM FREQUENCY SWITCH
S5	HIGH FREQUENCY SWITCH
S6	DECIMAL POINT X.XXX SWITCH
S7	DECIMAL POINT XX.XX SWITCH
S8	DECIMAL POINT XXX.X SWITCH

1.	两线制电源+
2.	两线制电源-
3,4.	手动温度补偿
5,6.	手动温度补偿
4,5,6.	RTD输入（自动温补）
10,13.	2电极探头输入
10,11,12,13.	4电极探头输入
R5.	手动温度控制
R33.	温度补偿控制
R34	灵敏度粗调
S1	温度系数
S2	2000uS量程开关
S3	20mS量程开关
S4	中频率开关
S5	高频率开关
S6	小数点位置X.XXX
S7	小数点位置XX.XX
S8	小数点位置XX.XX

提示

在连接以下信号时，请确保电源正常

连接两电极传感器（探头）

正确的电极接线是系统正常运行的关键。

- 请使用原配的电缆连接电极到变送器的输入端子排；

- 避免使用延长电缆，必须延长时，请使用高绝缘的端子连接；

- 请避免传感器电缆靠近任何供电电缆。

- 连接电极电缆到标记有"CO - CI"的端子排"10-13" 。

连接四电极传感器

这种特殊的传感器接线必须连接端子" 10-11-12-13 "；
详情请见相关传感器说明书。

连接温度探头

配合外接Pt100温度传感器，C 3630变送器具备自动温度补偿功能 ；

温度探头须置于电导探头的同一种被测介质中，尽量靠近电导率探头，在线安装或是安装在同一罐体中。

注意

为实现自动温度补偿功能，首选在标记"T1-T2-T3"的端子"4-5-6"连接温度传感器RTD，同时**用户必须拆除端子 "3-4"和"5-6"的短接跳线**。

当用户使用手动温度补偿模式时，用户必须重新安装短接跳线。

如上述的RTD温补安装方式，均可以为用户提供变送器的温度显示值。

用户按下面板上标注"TEMP" 的按键"2" 可以选择显示样品温度值。

这个温度的读取过程不影响变送器的测量功能。

系统检查

系统通电前：

- 检查所有的连线是否正确，
- 检查连线确保紧固，以防止连接上的错误。
- 检查所有接线端子连接是否机械和电气牢固。

操作系统

操作前检查

系统的控制和指示器都位于前面板上；

变送器通电后，面板上的LCD将直接显示；

按下面板的按键"2"可以选择显示样品温度（必须连接有温度变送器RTD），或是手动输入的温度值（不接RTD温补传感器且连接短接线）；

按下按键"S1"可以微调标注有"TC"符号的电位器"R33"，根据显示数值来调节温补系数值， (见 Fig. 2)
(标准的系数为 2.0 %/°C)

量程设置

根据下表对应的操作标记 A的拨码开关 S2 和标记 B的拨码开关 S3 来完成量程设置:

量程	开关 S2	开关 S3
200.0 µS	OFF	OFF
2000 µS	ON	OFF
20.00 mS	OFF	ON

频率选择

根据下表对应的操作标记 M 的拨码开关 S4 和标记 H 的拨码开关 S5 来完成对应的频率选择的设置:

频率	开关 S4	开关 S5
低	OFF	OFF
中	ON	OFF
高	OFF	ON

选择低频用于 200.0 µS量程
选择中频用于2000 µS量程
选择高频用于20.00 mS量程

小数点的位置选择

根据下表对应的操作标记 1 的拨码开关 S6，标记 2 的拨码开关 S3 和标记 3 的拨码开关 S8 来完成对应的小数点位置的设置:

小数点位置	开关 S6	开关 S7	开关 S8
XXXX	OFF	OFF	OFF
X.XXX	ON	OFF	OFF
XX.XX	OFF	ON	OFF

XXX.X	OFF	OFF	ON

出厂前，仪表已经过并完成调校工作；如果如前面描述的那样安装正确传感器和探头，该系统应正确工作，只需调整K系数。

警告:不正确的接线导致变送器损坏不在保修范围内。

电极标定

下面的程序可以用来判断系统运行是否令人满意，它可以周期性地重复检查变送器是否需要电气校准：

- 连接导电模拟器到端子"10 - 13"
-在全量程范围内模拟电导率值
- 调整前面板上的两个"zero" 和 "slope"旋钮

为了便于用户使用，以下特提供电阻（欧姆）和电导率（西门子）之间的对应关系表：

$$1\ \text{西门子} = \frac{1}{1\ \text{欧姆}}$$

R 欧姆	1 兆欧	100 千欧	10 千欧	1 千欧	100 欧姆	10 欧姆
C 西门子	1 µS	10 µS	100 µS	1000 µS	10 mS	100 mS

正常操作

如果安装EC电极一切正常，该显示器将立即显示当前测量的溶液的电导率值。

手动温度补偿

手动温度补偿时可用于未安装热电阻RTD Pt100。

-安装跳线"3-4" 和 "5-6".

- 按住前面板上的按键"2" (fig. 1) 调整标记有 " T MAN "的旋钮 "R5" (fig. 2) 完成显示所需的温度值。

电极常数的确定

如果电极常数值不是准确的K = 1.00 (参见电极上标记的值) ，为了使仪表匹配电极，必须对仪表进行校准。

校准是通过以下S.C.S. (标准电导率溶液) 方式来完成的, 微调标明“SENS”调节灵敏度。

必要时，需要调整灵敏度粗调标记"SENS ADJ" 的“R34”来完成。

电导率的化学标定

当电极常数未知或需要检查时，建议使用电导率标准溶液进行以下校准过程：

- 准备 KCl标液 （见表格）

- 操作仪表，测量无温度补偿。

- 如有必要，将电极浸入溶液中，调整微调灵敏度或粗灵敏度微调装置。

- 校准的准确性取决于水的纯度和溶解盐的纯度。

电导率标准溶液

KCl 浓度	1 N	0.1 N	0.01 N
温度 °C			
0	65.410	7.150	0.776
5	74.140	8.220	0.896
10	83.190	9.330	1.020
15	92.520	10.480	1.147
16	94.410	10.720	1.173
17	96.310	10.950	1.199
18	98.220	11.190	1.225
19	100.140	11.430	1.251
20	102.070	11.670	1.278
21	104.000	11.910	1.305
22	105.940	12.150	1.332
23	107.890	12.390	1.359
24	109.840	12.640	1.386
25	111.800	12.880	1.413
26	113.770	13.130	*
27	115.740	13.370	*
28	*	13.620	*
29	*	13.870	*
30	*	14.120	*

KCl 1摩尔当量溶液:

准备74.35克分析纯氯化钠定容至1升蒸馏水中即可，浓度对应为1N；

以上单位为 mS (millimhos/cm.).

低电导率标准溶液将不稳定。

PREVENTIVE MAINTENANCE

Transmitter

Quality components have been used to ensure a high level of reliability.
Frequency of maintenance or recalibration is variable based on each particular application.

As with any electronic device, the mechanical components, such as potentiometers and connectors, are the most probable sources of potential problems.

- check for damage of the electrolytic capacitors if the meter is exposed to temperatures above 60 °C
- check for damage in all the electronic components if the meter is subjected to excessive voltage or power surges
- check for damage of the electronic and mechanical components if the meter is dropped
- repeat the pre-operation check periodically to ensure proper operation
- check that all the connections are free from moisture and contamination such as rust and corrosion

WARNINGS:

Disconnect the power supply to the monitor before performing the following procedures:

- Inspect the printed circuit boards for dirt and corrosion; clean as necessary and blow dry.

- Tighten all the terminal-board connections and mounting hardware.

- Replace the front panel circuit board or the base circuit board. sensor

Coatings on the Conductivity cells measuring surface can affect operation. Solutions which are high in alkaline content and or solutions which contain slurries, oils, grease etc., will require regular cleaning and inspection of the cell's measuring surface.

故障排除指南

Symptoms	**Probable cause**	**Remedy**
LCD not displayed meter reading	Power source problem; incorrect power wiring	check power supply check wiring
Display reading too high/low	cell failure; meter uncalibrated	clean sensor calibrate with S.C.S.
Display reading does not change	cell damage; short circuit	sensor replacement check cable
Slope will not adjust	Cell damage; open Temp.circuit	sensor replacement check ATC sensor/jumpers