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1	9.11.95	PS	MS	FOR PROJECT APPROVAL
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AUTEK AS				
Equipment type:				
Doc. title: Temperature Elements and Thermowells				
Valhall Wellhead				
Clients comments:				
Autek Job no.: 1849				
Autek doc. no.: 1016-VAL-005				
Client:				
ABB OFFSHORE TECH.				
Inq / PO no:				
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8	5			2

AUTEK AS

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1. Calibration:
Check the calibration at least once a year and perform as follows:

1.1 Recommended Calibration Equipment

- 1.1 Resistance decade, Inaccuracy <0,05%
- 1) Display 0—20 mA, Inaccuracy <0,05%
- 3) Power supply 24 VDC 40 mA, e.g. INOR 4 X SSG 2420
- 4) Copper wire
- 5) Screw-driver with maximum width 3,0 mm.

1.2

Connect the resistance decade, the read-out unit, and the power supply as shown in Fig. 1.1. Adjust the input signal to give an output of approximately 12 mA and leave the unit for 15 minutes, if possible in the ambient temperature it is intended to work in.

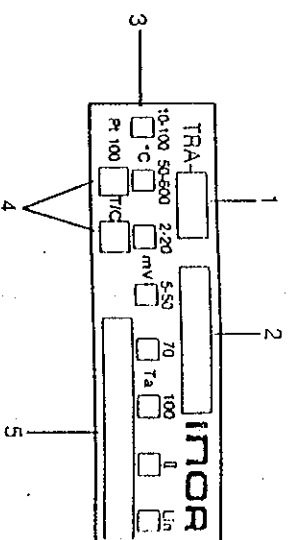
NOTICE: If the transmitter receives an overload on the input so that the current limitation is activated, then it may take up to one minute before the unit is working properly again. The same problem will occur if the input is shortened so that the output goes low. To avoid these problems always connect the appropriate input before the power supply is connected.

1.3 Adjustments TRA-R6

- a) Turn the potentiometer Range fully clockwise.
- b) Apply INmin = 100,00Ω (0°C) to the transmitter and adjust potentiometer Zero to get Iout = 4,00 mA.
- c) Apply INmax = 138,50Ω (100°C) for type R6A alternatively INmax = 313,59Ω (600°C) for type R6B and adjust potentiometer Span to get Iout = 20,00 mA.
- d) Repeat b)—c) until reading converge.
- e) The transmitter is now calibrated for the largest span. This is also an adjustment that linearises for the Pt100. The Span-potentiometer normally needs no further adjustments.
- f) To calibrate for other spans continue as follows.
- g) Apply INmin corresponding to desired minimum input signal and adjust potentiometer Zero to get Iout = 4,00 mA.
- h) Apply INmax corresponding to desired maximum input signal and adjust potentiometer Range to get Iout = 20,00 mA.
- i) Repeat g)—h) until readings converge.
- j) Secure the potentiometers with lacquer. Calibration is completed.

RTD Pt 100, DIN 43760. Resistance in ohm, as a function of temperature.

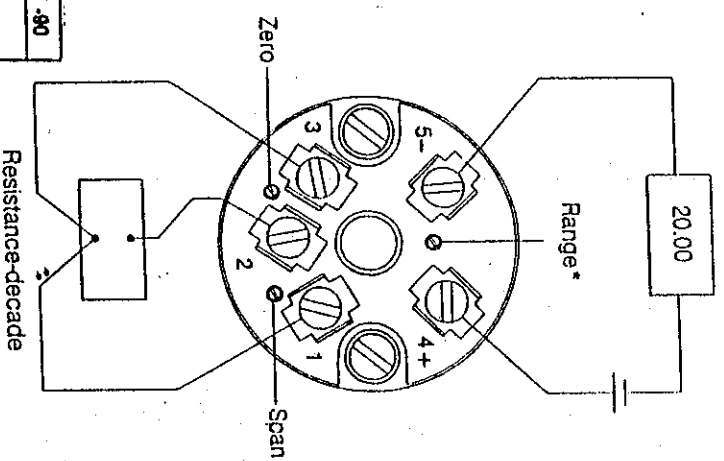
°C	0	-10	-20	-30	-40	-50	-60	-70	-80	-90
-200	18.49	56.19	52.11	48.00	43.87	39.71	35.53	31.32	27.08	22.80
-100	60.25	56.19	52.11	48.00	43.87	39.71	35.53	31.32	27.08	22.80
0	100.00	96.09	92.16	88.22	84.27	80.31	76.33	72.33	68.33	64.30
°C	0	10	20	30	40	50	60	70	80	90
0	100.00	103.90	107.79	111.67	115.54	119.40	123.24	127.07	130.89	134.70
100	138.50	142.29	146.06	149.82	153.58	157.31	161.04	164.765	168.46	172.16
200	175.84	179.51	183.17	186.82	190.45	194.07	197.69	201.29	204.88	208.45
300	212.02	215.57	219.12	222.65	226.17	229.67	233.17	236.65	240.13	243.59
400	247.04	250.48	253.90	257.32	260.72	264.11	267.49	270.86	274.22	277.56
500	280.90	284.22	287.53	290.83	294.11	297.39	300.65	303.91	307.15	310.38
600	313.59	316.80	319.99	323.18	326.35	329.51	332.66	335.79	338.92	342.03
700	345.13	348.22	351.30	354.37	357.42	360.47	363.50	366.52	369.53	372.52
800	375.51	378.48	381.45	384.40	387.34					



1. Type
2. Manufacturing year and month
3. Indicates the transmitters input span, maximum ambient temperature, if it's low temperature-drift and if it is linearised
4. Type of input signal
5. Calibrated range (if ordered calibrated)

Adjustments TRA-R7

- a) Apply INmin to the transmitter and adjust potentiometer Zero to get Iout = 4,00 mA.
- b) Apply INmax to the transmitter and adjust potentiometer Span to get Iout = 20,00 mA.
- c) Repeat a)—b) until reading converge.
- d) Secure the potentiometers with lacquer. Calibration is completed.



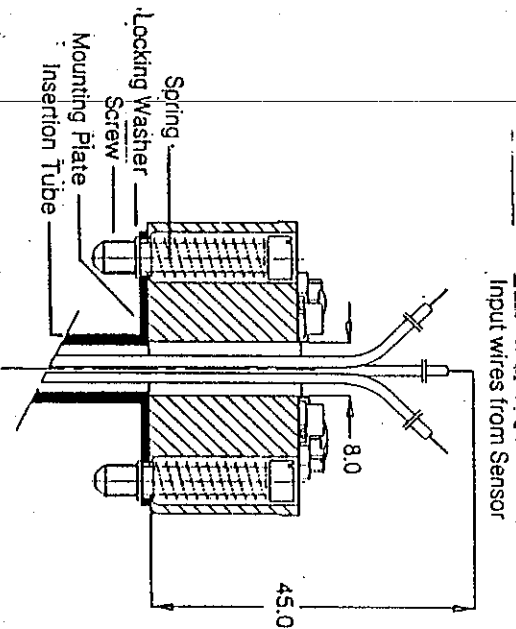
*Only TRA-R6

2. Installation

The transmitter is mounted inside a connection-head according to Fig. 2.1. Connect the wires according to Fig 2.2.

When connecting the sensor with two input wires attention must be paid to the input wiring resistance. The total input wire resistance is measured by short-circuiting the input sensor and measuring the input wire loop while disconnecting the transmitter. If the wire resistance is less than 5% of span this value can be calibrated into the measuring span with the Zero potentiometer as follows:

a) Replace the sensor with a resistance corresponding to the lower value of the range.



b) Adjust the Zero potentiometer for an output signal of 4.00 mA.

If the input wire resistance is larger than 5% of span, this value must be compensated for with an external resistor, R_c , as shown in Fig. 2.2. R_c to be chosen as follows:

a) The value of R_c shall be equal to the total input wire resistance as measured above.

b) R_c can be a fixed resistance or a potentiometer.

c) No recalibration necessary.

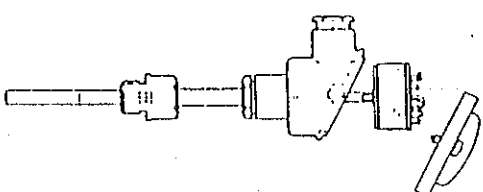
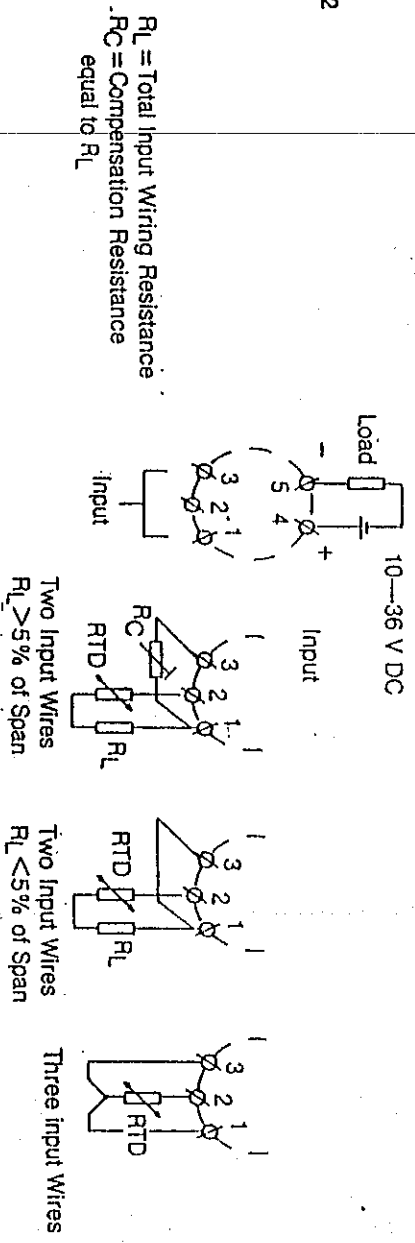


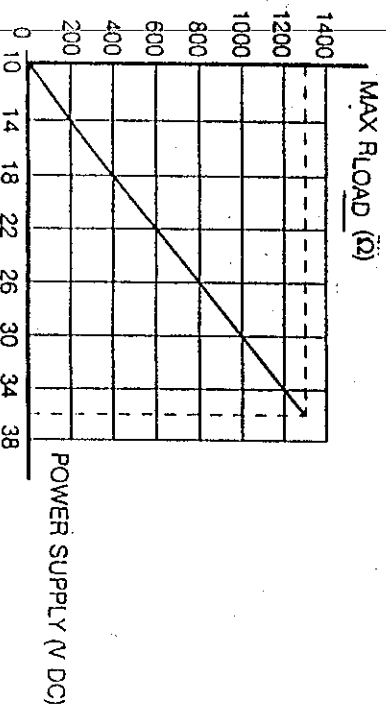
Figure 2.2



Short Data:

Supply Voltage	V DC	10—36
Permissible ripple of supply voltage	V	4
Current limitation	mA	25—30
Zero adjustment R6A/R6B	°C	±5/±25
Zero adjustment R7	%	±10
Range adjustment R6A/R6B	°C	10 to 100/50 to 600
Span adjustment R7	%	±10
Permissible load		see fig. 2.3

Figure 2.3



NOV 1988 868TR00042

1. CALIBRATION:

Check the calibration at least once a year and perform as follows:

1.1 RECOMMENDED CALIBRATION EQUIPMENT:

1. Resistance decade, inaccuracy < 0.05%
2. Display 0-20 mA, inaccuracy < 0.05%
3. Power supply 24 VDC 40 mA
4. Copper wire
5. Screw-driver with maximum width 3.0 mm

1.2

Connect the resistance decade, the read-out unit, and the power supply as shown in Fig.1.1. Adjust the input signal to give an output of approximately 12 mA and leave the unit for 15 minutes, if possible in the ambient temperature it is intended to work in.

NOTICE:

If the transmitter receives an overload on the input so that the current limitation is activated then it may take up to one minute before the unit is working properly again. The same problem will occur if the input is shorted so that the output goes low. To avoid these problems always connect the appropriate input before the power supply is connected.

If the transmitter is fieldcalibrated an isolated screw-driver must be used.

1.3 ADJUSTMENTS TRA-R6X

- a) Turn the potentiometer Range fully counter clockwise.
- b) Apply $I_{Nmin}=100.000$ (0°C) to the transmitter and adjust potentiometer Zero to get $I_{out} = 4.00$ mA
- b) Apply $I_{Nmax}=138.500$ (100°C) for type R6XA alternatively $I_{Nmax}=313.590$ (600°C) for type R6XB and adjust potentiometer Span to get $I_{out}=20.00$ mA.
- d) Repeat b)-c) until reading converge.
- e) The transmitter is now calibrated for the largest span. This is also an adjustment that linearises for the Pt100. The Span-potentiometer normally needs no further adjustments.

- g) To calibrate for other spans continue as follows.
- g) Apply I_{Nmin} corresponding to desired minimum input signal and adjust potentiometer Zero to get $I_{out}=4.00$ mA.
- h) Apply I_{Nmax} corresponding to desired maximum input signal and adjust potentiometer Range to get $I_{out}=20.00$ mA.
- i) Repeat g)-h) until reading converge.
- j) Secure the potentiometers with lacquer. Calibration is completed.

1. Type
2. Serial number
3. Range
4. Ambient temperature
5. Input type

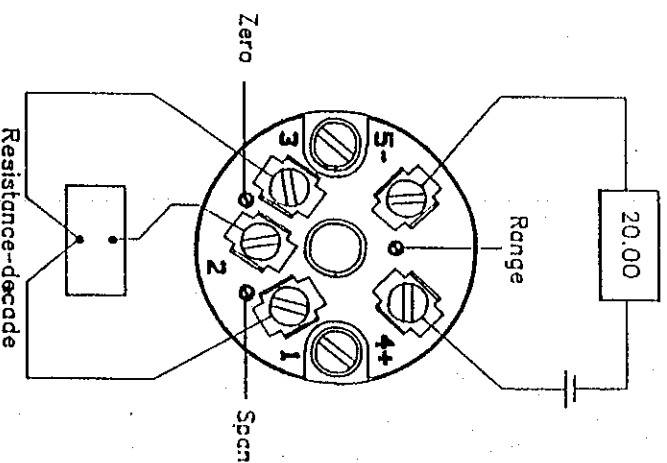
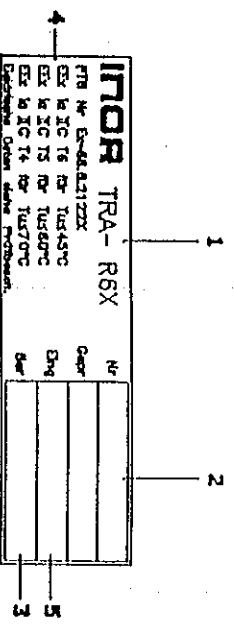
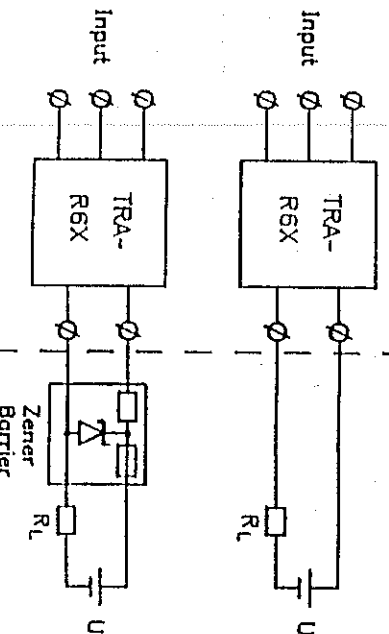


fig.1.1

Hazardous area | Non hazardous area



U and R_L intrinsically safe

Zener Barrier intrinsically safe

fig.2.1

2. INSTALLATION

The transmitter is mounted inside a connection-head occurring to Fig.2.2. For mounting in hazardous areas see Fig.2.1. When connecting the sensor with two input wires attention must be paid to the input wiring resistance. The total input wire resistance is measured by short-circuiting the input sensor and measuring the input wire loop while disconnecting the transmitter. If the wire resistance is less than 5% of span this value can be calibrated into the measuring span with the Zero potentiometer as follows:

a. Replace the sensor with a resistance corresponding to the lower value of the range.

b. Adjust the Zero potentiometer for an output signal of 4.00 mA.

If the input wire resistance is larger than 5% of span, this value must be compensated for with an external resistor, R_c , as shown in Fig.2.3. R_c to be chosen as follows:

- The value of R_c shall be equal to the total input wire resistance as measured above.
- R_c can be a fixed resistance or a potentiometer.
- No recalibration necessary.

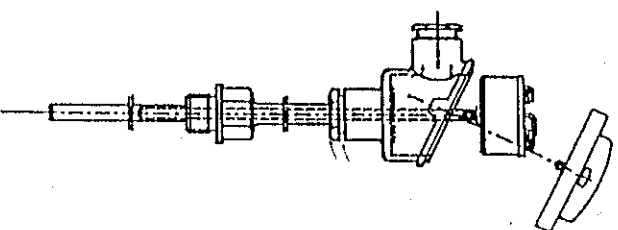
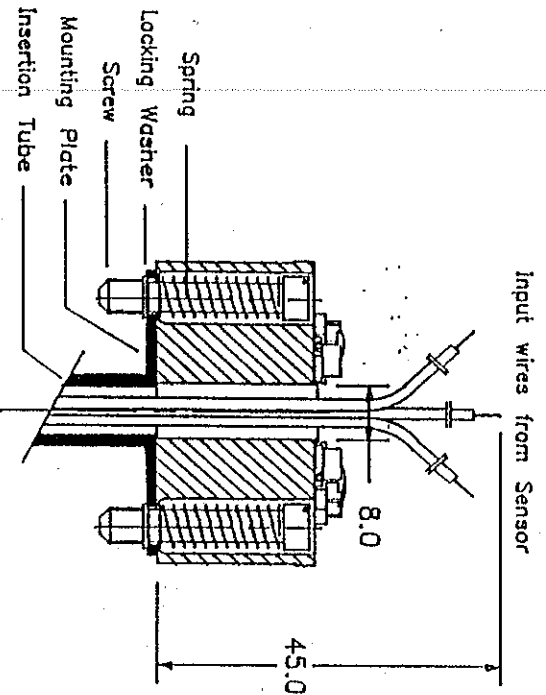


fig.2.2

R_L = Total Input Wiring Resistance
 R_c = Compensation Resistance equal to R_L

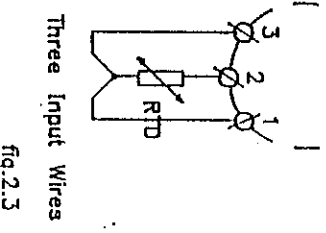
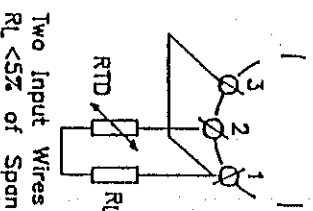
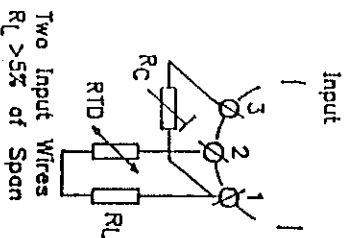
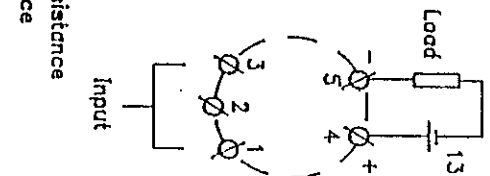
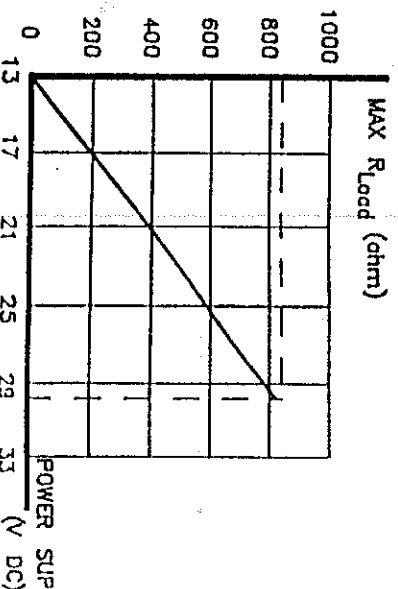


fig.2.3



SHORT DATA:

Supply Voltage
 Permissible ripple of supply voltage
 Current limitation
 Zero adjustment
 Range adjustment
 Permissible load
 Approval PTB—Cenelec
 Intrinsic safe EEx ia IIC, T6 t amb ≤45°C
 Intrinsic safe EEx ia IIC, T5 t amb ≤60°C
 Intrinsic safe EEx ia IIC, T4 t amb ≤70°C
 PTB-No. Ex-88.B.2122X

V DC 13-30
 Vp-p <4
 mA 25-30
 ±10/±50
 °C 10-100/50-600
 see fig.2.4

Output	Uo	V
Ik	mA	≤100
P	W	≤0.9
Ca	nF	≤37
Lg	mH	≤20

fig.2.4