

Coulton Instrumentation

Data Sheet

FEATURES

RED72-AKC

- * Loop powered 4-20mA output with digital communication
- * 3-wire RTD and thermocouple inputs
- * 2-way programming through windows based IBM - PC
- * Spring loaded mounting screws
- * 6mm centre hole for fast sensor replacement
- * Head mounted or DIN rail mounted
- * Encapsulated in silicon gel
- * Resistant to high humidity and vibration
- * Input and output polarity protected
- * Power supply from 6.5 to 35 Vdc (28 Vdc for EExia)
- * Local and remote cold junction compensation
- * Certification to CENELEC EExia IIC T5

RED72-BKC

All of the above features plus

- * Galvanic isolation between input and output
- * Isolation voltage 3.75 kVac
- * Linear resistance and mV inputs
- * 4-wire RTD sensor connection
- * Programmable linearisation, damping and status indication
- * Test terminals for measurement of loop current
- * Accuracy better than 0.1 degC for Pt100 sensor input

RED72-BKH

All of the above features plus

- * HART[®] multi-drop communication

SCOPE

Coulton Instrumentation will supply the RED72 Temperature Transmitter for head mounting or alternatively will supply several units fitted inside a wall mounting weatherproof enclosure. Coulton is also able to supply a full range of solid drilled and fabricated thermowells to use with this transmitter. For information on the solid drilled thermowells refer to datasheet DS0796-R7.

The transmitter can be set to the customers requirements before despatch or supplied complete with a separate configuration unit to enable on-site configuration and ranging.

HAZARDOUS AREA INSTALLATION

If the transmitter is to be installed in a hazardous area then it must be installed in strict accordance with the certification requirements for intrinsically safe apparatus. Please refer to the appropriate documentation for the zone in which it is to be used.

The transmitter may only be used with sensors which are considered as simple apparatus, for example, a thermocouple or RTD element. It must be electrically connected via an approved or certified isolating interface/zener barrier placed outside the hazardous area. Suitable barriers are described in the ordering details section.



Transmitter Model RED72-AKC



Transmitter Model RED72-BKC

RED 72 TEMPERATURE TRANSMITTERS

The RED72 is a loop powered programmable universal temperature transmitter that is available in three basic models.

- Non-isolated
- Isolated
- Isolated with HART[®] communication

All three have CENELEC EExia certification and can be configured by using a windows based programme on a standard IBM compatible PC. Most types of RTD and thermocouple sensor can be connected.

Each unit can be fitted into a standard thermocouple head or DIN rail mounted using an optional fixing clip.

The transmitter printed circuit board is contained within a DIN form B enclosure of moulded black plastic and then encapsulated in silicon gel.

Versatility, ease of use, low cost of ownership, rugged construction, and simplified stock holding make the RED72 an obvious choice for all industrial applications.

CE Mark Approval

DS0297-R72

DATE 28 Feb 1997

SPECIFICATION

Input		
Accuracy		See measuring range
CJC error	(AKC)	< 1.2 °C (-40° to 85 °C)
CJC error	(BKC/BKH)	0.01 °C per °C (max 0.3 °C)
RTD current	(AKC)	0.2 mA pulsing
RTD current	(BKC/BKH)	0.2 mA continuous
Max cable res	(AKC)	10 Ohm/wire for 3-wire RTD
Resolution		16 bit
Repeatability		< 0.05 °C
Protection		+/- 35 Vdc
Sample time		< 0.7 sec

Output		
Signal type		4-20 mA reversible
Scale limit	(AKC)	3.8 mA and 22 mA
Scale limit	(BKC/BKH)	3.6 mA and 22 mA
Sensor break		3.6 mA or 23 mA
Linearity error		< 0.1 % of span
Resolution	(AKC)	12 bit
Resolution	(BKC/BKH)	16 bit
Damping		0 to 15 sec
Supply voltage	(AKC/BKC)	6.5 to 28 Vdc
Supply voltage	(BKH)	12 to 28 Vdc
Max load	(AKC/BKC)	< (Vcc - 6.5)/22 kohm
Max load	(BKH)	< (Vcc - 12)/22 kohm
Typical temperature drift		< 0.003 % per °C
Max temperature drift		< 0.01 % per °C

General		
Isolation	(AKC)	Not isolated
Isolation	(BKC/BKH)	3.75 kV
Transfer cap	(BKC/BKH)	nom 15 pF
Power on time	(AKC)	< 5 sec
Power on time	(BKC/BKH)	< 4 sec
Ripple immunity		3 V _{RMS}

Communication		
Hardware		2-way IBM-PC compatible interface
Software		Configuration program windows based
HART ^R protocol (BKH)		HCF standard
Data Access (BKH)		Read serial number
		Read/change user ID
		Read/change configuration
		Read input signal value
		Read output signal value
		Input signal logging
		Sensor trim

EMC Data		
Immunity		Complies with EN 50082-2
Emission		Complies with EN 50081-2

Environmental Protection		
Storage temperature		-30 to 60 °C
Operating temperature		-40 to 85 °C
Humidity		< 98 %RH condensing
Vibration		Lloyds Register test 2
Unmounted in head		IP 55 (case only)
Mounted in head		IP 65 or higher

Hazardous Areas		
Voltage	Ui	≤ 28 Vdc
Current	Ii	≤ 100 mA
Inductance	Li	≤ 15 μH
Cap (AKC)	Ci	≤ 10 nF
Cap (BKC/BKH)	Ci	≤ 1 nF
Ambient Temp Class T5		-40°C < Tamb < +85°C
Ambient Temp Class T6		-40°C < Tamb < +70°C
Certification		CENELEC EExia IIC T5/T6
Standards		EN 50014 including amm 1 - 5 EN 50020 including amm 1 - 5

Mechanical

Dimensions	44 mm Dia x 27 mm Deep
Weight	Approx 45 g
Fixing screws	2 x M4
Fixing screw centres	33 mm
Centre hole	6 mm Dia

NOTES ON USE

Testmeter

The two temperature transmitters with suffix codes BKC and BKH are fitted with test terminals. A testmeter on mA range may be touched across these terminals to measure the loop current (4-20 mA).

HART^R Configurator

The HART^R type transmitter can be connected for point-to-point communication or in multi-drop mode. In both cases it is possible to connect a HART^R configurator across the transmitter terminals, junction box terminals or control panel terminals. The total loop resistance for a HART^R configurator to work must exceed 250 ohm, if necessary, place a 250 ohm resistor in series with the power supply.

Multidrop Connection

When the HART^R type transmitter is connected in multi-drop mode, only the digital output signal can be used. If a 4-20 mA signal is required then point-to-point communication is necessary.

MTL/Psion Communicator

The MTL/Psion communicator is also available with Datapacks for pressure, flow and temperature transmitters manufactured by a wide range of companies including Fuji, ABB Kent, Siemens, Rosemount and many others.

T/C Cold Junction Compensation

The transmitter will normally be programmed for internal cold junction compensation. If external compensation is required then connect an external RTD sensor as shown in the diagrams opposite.

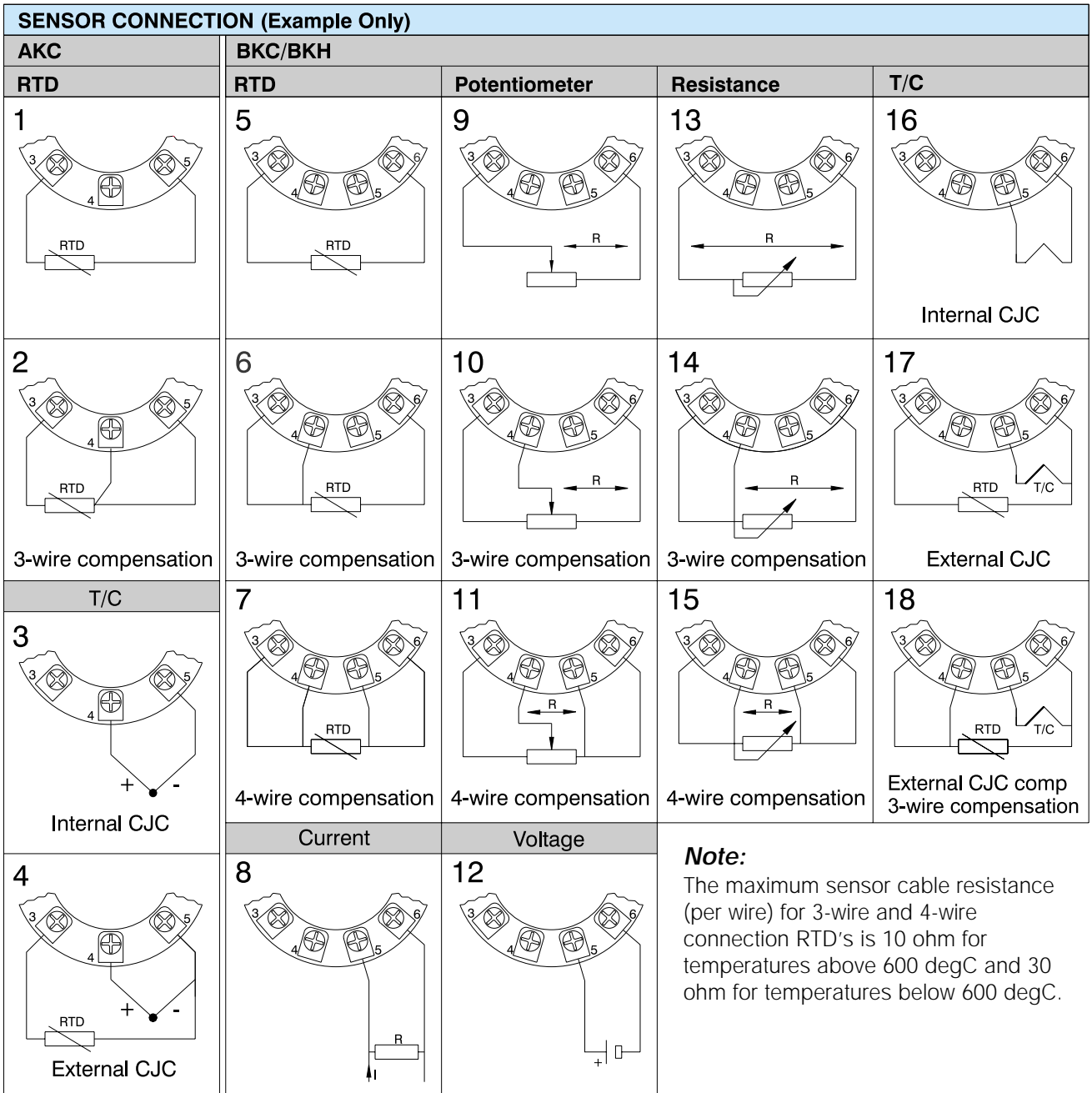
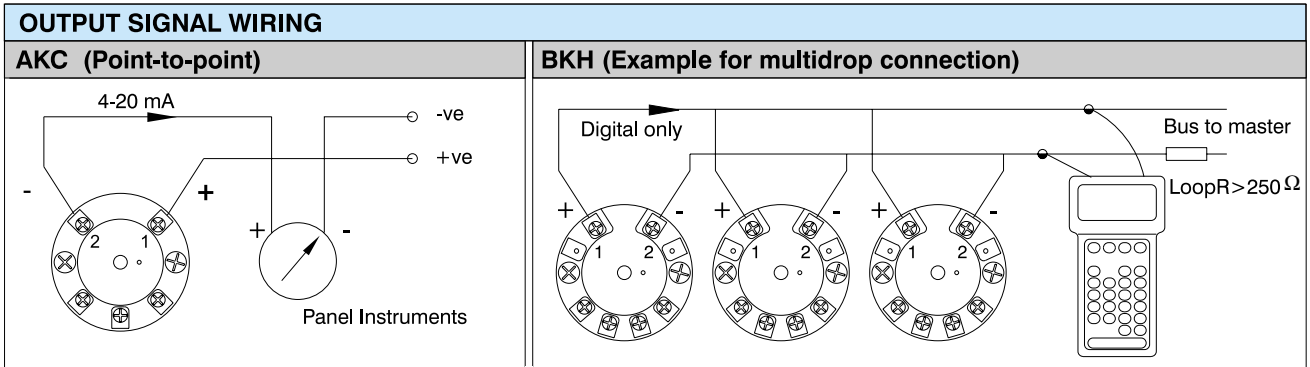
Cable & Transfer Resistance Compensation

In RTD, potentiometer and resistance applications, use 3-wire connection to compensate for the cable resistance (and potentiometer wiper transfer resistance). If it is only possible to use 2-wire, then enter the total cable resistance into the transmitter during programming. Where the highest possible accuracy is required, use 4-wire connection.

CONFIGURATION INFORMATION

If Coulton is required to configure the transmitters then the following information will be required for each device:

Thermocouple Tag number Type of sensor Measuring range Cold Junction Comp Burnout direction	 Internal or External 4mA or 20mA
RTD or Potentiometer Tag number Type of sensor Measuring range 2, 3 or 4-wire connection Cable resistance if 2-wire Burnout direction	 4mA or 20mA



ORDERING DETAILS

The following codes may be used to order the device required. All transmitters are head mounting type and are certified to CENELEC EExia requirements.

TEMPERATURE TRANSMITTERS

RED72 - AKC Coulton Temperature Transmitter

Input: RTD and T/C programmable
Isolation: Non-isolated
Comm: IBM-PC compatible

RED72 - BKC Coulton Temperature Transmitter

Input: Universal, programmable
Isolation: Galvanically isolated
Comm: IBM-PC compatible

RED72 - BKH Coulton Temperature Transmitter

Input: Universal, programmable
Isolation: Galvanically isolated
Comm: HART^R

CONFIGURATORS

RED74 - AAC Coulton Computer Interface

Interface and software to enable 2-way communication between RED72 and IBM-PC compatible for configuration purposes.

RED74 - MKC MTL/Psion Communicator

Universal device for HART^R communication, including HART^R configuration module, communication cable and CENELEC intrinsically safe certificate.

RED74 - MKD Coulton Datapack

Data pack to enable connection of RED72 to MTL/Psion universal HART^R Configurator

BARRIERS

MTL 7087+ Zener barrier for use in hazardous area applications when there is a regulated power supply and good earth

MTL 7206 Zener barrier for use in hazardous area applications when the power supply is not regulated but there is a good earth

MTL 5042 Galvanic isolator for use in hazardous area applications when there is not a high integrity earth

MEASURING RANGES (AKC)

Sensor type	Standard	Measuring span	Minimum range	Accuracy (+/-)	Program'ble resolution
Pt100	IEC 751	-50 to 450°C	20°C	0.25°C	0.1°C
Ni100	IEC 751	-50 to 200°C	20°C	0.25°C	0.1°C
Cu100	N/A	-50 to 200°C	20°C	0.25°C	0.1°C
J Fe-CuNi	IEC 584	-50 to 800°C	50°C	1°C	0.1°C
K NiCr-Ni	IEC 584	-50 to 1200°C	50°C	1°C	0.1°C
L Fe-CuNi	DIN 43710	-50 to 800°C	50°C	1°C	0.1°C
N NiCrSi-NiSi	IEC 584	-50 to 1200°C	50°C	1°C	0.1°C
T Cu-CuNi	IEC 584	-50 to 400°C	50°C	1°C	0.1°C
R PtRh 13-Pt	IEC 584	-50 to 1700°C	200°C	2°C	0.1°C
S PtRh10-Pt	IEC 584	-50 to 1700°C	200°C	2°C	0.1°C
B PtRh30-Pt	IEC 584	600 to 1800°C	200°C	2°C	0.1°C

MEASURING RANGES (BKC/BKH)

Sensor type	Standard	Measuring span	Minimum range	Accuracy (+/-)	Program'ble resolution
Pt25 to Pt500	IEC 751	-200 to 850°C	10°C	0.1°C	0.1°C
Pt501 to Pt1000	IEC 751	-200 to 350°C	10°C	0.1°C	0.1°C
Ni25 to Ni1000	IEC 751	-50 to 250°C	10°C	0.1°C	0.1°C
Cu25 to Cu1000	N/A	-50 to 200°C	10°C	0.1°C	0.1°C
B PtRh30-Pt	IEC 584	100 to 1820°C	50°C	2°C	0.1°C
C W5-Re	ASTME988	0 to 2300°C	100°C	2°C	0.1°C
D W3-Re	ASTME988	0 to 2300°C	100°C	2°C	0.1°C
E NiCr-CuNi	IEC 584	-270 to 900°C	50°C	1°C	0.1°C
J Fe-CuNi	IEC 584	-210 to 1200°C	50°C	1°C	0.1°C
K NiCr-Ni	IEC 584	-250 to 1370°C	50°C	1°C	0.1°C
L Fe-CuNi	DIN 43710	-200 to 900°C	50°C	1°C	0.1°C
N NiCrSi-NiSi	IEC 584	-200 to 1300°C	50°C	1°C	0.1°C
R PtRh 13-Pt	IEC 584	-50 to 1750°C	100°C	2°C	0.1°C
S PtRh10-Pt	IEC 584	-50 to 1750°C	100°C	2°C	0.1°C
T Cu-CuNi	IEC 584	-250 to 400°C	40°C	1°C	0.1°C
U Cu-CuNi	DIN 43710	-200 to 600°C	50°C	1°C	0.1°C
Lin. voltage		-10 to 70 mV	2 mV	0.04 mV	0.1 mV
Lin. voltage		-0.1 to 1.1 V	20 mV	0.4 mV	1 mV
Lin. resistance		0 to 390 Ω	5 Ω	0.05 Ω	0.01 mV
Lin. resistance		0 to 2200 Ω	25 Ω	0.25 Ω	0.1 mV

Coulton Instrumentation Ltd
17 Somerford Business Park
Christchurch, Dorset
BH23 3RU, England
Tel: +44 (0)1202 480303
Fax: +44 (0)1202 480808

Represented by