

**ISORAC
MODEL 844**



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DRAWINGS

DRAWING:NO:

10. Assembly Drawing	X844-20-01
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11. Insulation Assembly	W844-20-02
12. Wire Connection Diagram	X844-20-03
13. Circuit Diagram	W844-20-04
14. Outline Drawing	X844-20-05

INTRODUCTION:

These units were specifically designed to eliminate the need for ice baths or thermal blocks (ovens) at the reference junctions of Thermocouples.

In an Isothermal system cold junctions are inserted into a block of uniform temperature, which is insulated, and slowly tracks ambient temperature.

A separate signal is generated to indicate the metal block temperature.

Isothermal systems are the most common type for Instruments, Data Acquisition and Computer Systems.

Power is supplied from an AC or DC supply as specified. The power supplied operates a power supply card which feeds a miniaturised solid state device, this produces a thermal E.M.F. which is added to the thermocouple output in the software of a data logger.

Uniformity, a critical factor in the comparison of thermocouples, is obtained by using junctions constructed of selected premium grade thermocouple wire to produce consistent output from the first to the last junction.

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This unit is for standard 19 inch rack mounting and can accommodate up to 100 channels. All terminations are sited at the rear of the unit. Incoming thermocouple connections are via klippon terminals and outgoing copper connections are via plugs and socket (see wire connection drawing and outline drawing at rear of manual).

SPECIFICATION:

Thermocouple Wire BS	To ASTM (E230 Special and 1041 Specification)
Junctions reference channel i.e., +ve ve	2 Welded Junctions per Junction 1 - Ni/Cr to Cu Junction 2 - Ni/Al to Cu -
Capacity	Up to 100 Channels
Size: Width:	483mm (19")
Height:	255mm (10")
Depth:	312mm (12")

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Weight: (Nett)	12 Kgs (26lbs)
Power Supply	As Specified
Temperature Gradient (max)	.05°C between probes (max) .05°C between junctions
Ambient Temperature Range	-20°C to +70°C
Temperature Uniformity	±0.01°C
Accuracy specification	According to agreed (Typically better then ±0.1°C per 10°C change in ambient temperature
Long Term Stability	Better than ±0.1°C per 1000 hours over temperature not exceeding 20°C increasing of 10°C on operating temperature range (assuming no supply voltage variations). Allow ±0.05°C per 1000 hours for power supply model.

THEORY OF OPERATION

If the temperature of the reference junction of a thermocouple is allowed to change, the output emf will vary in accordance with the seeback coefficient of the couple at the reference temperature. A compensating circuit containing a source of current, a combination of fixed resistors, and a temperature sensitive element can be designed which will have a similar variation of emf as the temperature of the circuit is varied. If the reference junction of the thermocouple is coupled thermally to the circuit and the compensating circuit is connected in series with the thermocouple so that its temperature variable emf opposes that caused by the reference junction, the thermocouple behaves as if the reference junction temperature were held constant. In addition, by suitable choice of the fixed resistors, any fixed reference junction temperature may be simulated. Since the circuit is at the temperature of the reference junctions, no warm-up or stabilization time is involved.

In the J11 or J13, all the thermocouples are routed to device called an Isothermal Block where each of the thermocouple conductors is joined to a copper wire which is routed to the emf measuring instrument.

Within the Isothermal Block all of the reference junctions between the thermocouple conductors and the copper wires are insulated electrically but kept in good mutual thermal contact with each other and with a circuit such as the one described above which compensates for the temperature within the Isothermal Block.

OPERATING INSTRUCTIONS

1. Connect thermocouple inputs and outputs to the desired channel terminals. Be certain that polarity and materials are correctly connected. Also connect output from ISOCOMP units to measuring or scanning equipment (see key to output/input terminations [Page 7] and wire connection drawings).

2. For Mains Operated Units

a) Connect mains input supply via connection on back of unit, checking that the correct voltage is being used, either 220/240v 50Hz, single phase or 110/115v 50Hz single phase.

b) The earth switch on the panel refers to an earth connection to the block which can either be floating or connected to chassis earth as required.

c) After making all connections energise the unit by pushing switch marked "Power On", the neon should then indicate this state. Allow three minutes for stabilisation of internal power supply.

3) For 24v Dc Operated Units

a) The unit need only be switched on as required (stabilisation is immediate). To increase the life of the battery, the unit should be switched off after use.

TROUBLE SHOOTING GUIDE

Malfunctions involving the reference junction will usually be open and short circuits between channels or the reference block. Simple continuity checks with a Ohm-meter will reveal these faults, use earth continuity switch.

Calibration Faults

If the unit does not give the specified accuracy, then the following points should be considered.

1. Are the junctions making good thermal contact with reference block?
2. Has enough heat sink compound been used in the holes?
3. Are all input/output termination screws tightened?
4. The output of the internal power supply should be about 1.350V. This voltage is factory set. If the ISOCOMP output is incorrect it can be brought back within specification by slightly adjusting the Potentiometer on the Power Supply Board.

5. Are the correct standards being used for the thermal emf calibration tables?

KEY TO INPUT/OUTPUT TERMINATIONS

Incoming thermocouple wires will be colour coded to correspond with British Standards requirements in most cases. i.e.

+Brown	Nickel/Chromium	-	
Blue	Nickel/Aluminium	-	-

NOTE: We may deviate from these colours for our internal thermocouple loom because certain elements have the same colour coding, i.e. Nickel/Aluminium and Constantan.

Output terminations are usually coded red and blue, positive and negative respectively.

SCHEMATIC THERMOCOUPLE CONNECTION DIAGRAM

Example showing connections for Ni/Cr - Ni/Al thermocouple channel.

INPUT TERMINALS

OUTPUT TERMINALS

PARTS LIST, ASSEMBLY DRAWING, X844/20/01

PART NO:	DIAGRAM REFERENCE SPECIFICATION OR CIRCUIT REFERENCE	DESCRIPTION
Y884-01-01/02	1	Front Panel (Large) To I.T.L. Specification

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Y884-01-03/04	1	Front Panel (Small) To I.T.L. Specification
Z828-01-03	2	Chassis To I.T.L. Specification
X828-01-04	3	Side Panel (Large) Pair To I.T.L. Specification
X828-01-05	3	Side Panel (Small) Pair To I.T.L. Specification
X828-01-06	4	Top Cover To I.T.L. Specification
X828-01-07	5	Bottom Cover To I.T.L. Specification
X828-01-08	6	Back Panel (Large) T o I.T.L. Specification
X828-01-09	6	Back Panel (Small) T o I.T.L. Specification
X839-01-07	7	Shield Section (Large) To I.T.L. Specification
X839-01-06	7	Shield Section (Small) To I.T.L. Specification

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W828-01-12	8	Assembly Rail	To I.T.L. Specification
W828-01-13	9	RH. Rail Bracket	To I.T.L. Specification
W828-01-14	10	LH Rail Bracket	To I.T.L. Specification

PARTS LIST, ASSEMBLY DRAWING., X844-02-01

PART NO:	DIAGRAM REFERENCE OR CIRCUIT REFERENCE	DESCRIPTION	SPECIFICATION
935-16-38	11	Socket (Male Receptacle) (Amphenol, 7 Pine Type T 3105000)	
935-11-11	12	Fuse Holder	Belling Lee Type L1596
935-12-22	13	Fuse Link	Belling Lee Type L562 1 Amp
935-30-17	14	End Brackets	Klippon Type EWK 12062

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935-30-16	15	End Section	Klippon Type AP1509
935-30-15	16	Terminals	Klippon Cat. 2155 S.A.K.N.
935-27-06B	17	Mains Switch	Arrow 10 AMP 2600/12E
935-34-19B	18	Neon Red	Arrow 110 Volt 1606/R11E
935-34-23B	18	Neon Red	Arrow 240 Volt 1609R21E
844-05-01		PCB Assembly 1.5 Volt	

PARTS LIST (INSULATION ASSEMBLY DRAWING NO: X844-20-02)

PART NO:	DIAGRAM REFERENCE OR CIRCUIT REFERENCE	DESCRIPTION	SPECIFICATION
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X844-01-00	1	Block Assembly (to suit application)	To I.T.L. Specification
W822-01-07	2	Retaining Plate	To I.T.L. Specification
W828-02-06	3	Outer Insulation	To I.T.L. Specification
W828-02-07	4	Insulation Spacer	To I.T.L. Specification
W828-02-08	5	Insulation Spacer	To I.T.L. Specification
W828-02-09	6	Insulation Disc	To I.T.L. Specification
W828-02-10	7	Insulation Disc	To I.T.L. Specification
W828-02-12	8	Insulation Disc	To I.T.L. Specification
932-20-02	9	Spacer	To I.T.L. Specification

Notes

SPARE PARTS PRICE LIST

J11 AND J13 THERMOCOUPLE REFERENCING UNITS

<u>DESCRIPTION</u>	<u>PART NO:</u>
Block Assembly with one Measuring Module	X844-02-00
Fuse Link (Pack of 10)	935-12-22
Fuse Holder	935-11-11
Rocker Switch	935-27-06B
Lamp (RED) 240V	935-34-23B
Lamp (RED) 110V	935-34-19B
PCB Assembly	W844-05-00
Plug	935-16-37
