DBK9   8-Channel RTD Card

Reference Notes:

o Chapter 2 includes pinouts for P1, P2, P3, and P4. Refer to pinouts applicable to your system, as needed.

o   In regard to calculating system power requirements, refer to *DBK Basics* located near the front of this manual.

Overview

Temperatures sensed by RTDs are attached to the LogBook or the Daq Device through the DBK9 RTD expansion card.

Up to eight RTDs can attach to each DBK9 and up to 8 DBK9s can attach to the LogBook or the Daq Device for measuring a maximum of 256 temperatures. The DBK9 card supports 3- or 4-wire RTDs and operates by reading 3 voltages and using them in the following equation:

$$\textbf{RTD = [Va - Vd - 2(Va - Vb) Rsense] / Vd} \qquad \text{(Result in Ohms)}$$

Where: Rsense = 100 Ω (a constant derived from the actual hardware)

The result of this equation is converted into a temperature via software (using a complex formula and lookup tables). The DBK9 features an on-board Programmable Gain Amplifier for measuring 100 Ω, 500 Ω, or 1000 Ω type RTDs. For each RTD, the DBK9 can measure temperatures in a range of -200 to +850°C.

DBK9 Block Diagram
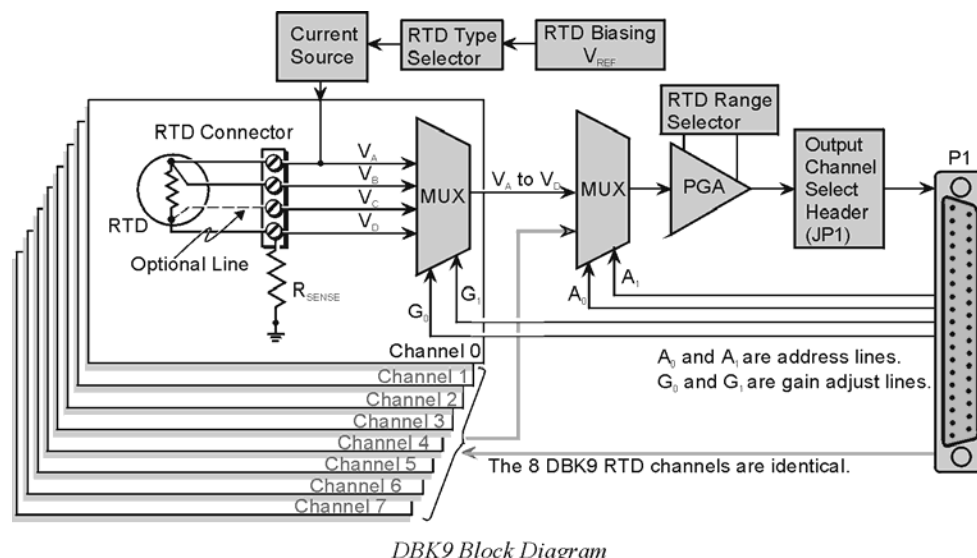
Hardware Setup

Card Connection

The DBK9 is equipped with screw terminals for the connection of 3-wire or 4-wire RTDs as shown in the figure.
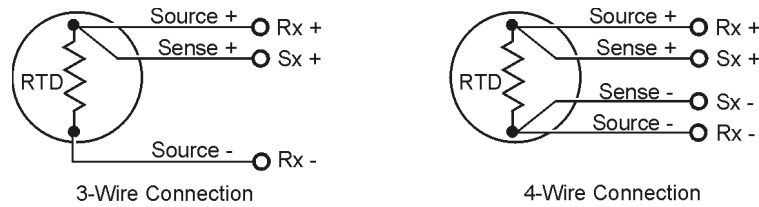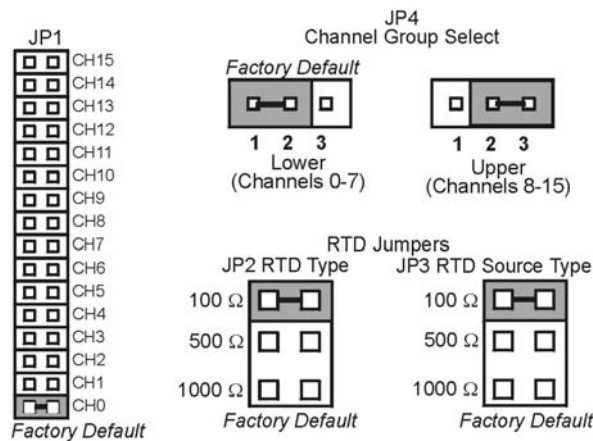

RTD Connections for the DBK9

Card Configuration

Factory Defaults: **JP2** RTD Type: 100ohm

JP3 RTD Source Type: 100 ohm

Two aspects of card configuration are the channel address and the RTD type.

Channel Address Jumpers

DBK9 Configuration

Channel Group Select (JP4)

One or two DBK9s may be connected to each channel (2×8 signals $\times$ 16 channels for a maximum of 256 inputs). Since this is a daisy-chain type of interface, each card must appear unique to the LogBook or the Daq Device. This is accomplished by setting the Channel Select jumper (JP1) and the Channel Group Select jumper (JP4) of each DBK9. JP4 selects either Upper (8-15) or Lower (0-7) channels.

> **No two cards in a system are to have the same channel settings.**

RTD Type Selection Jumpers (JP2 and JP3)

The DBK9 was designed to measure 100 Ohm, 500 Ohm, and 1000 Ohm RTDs (all 8 RTDs must be the same type for each DBK9). The different RTD types can be selected by changing the RTD Type jumper (JP2) and the RTD Voltage Source jumper (JP3). The default settings are shown in the figure.

> **JP2 and JP3 <u>must</u> use the same setting.**

DBK9 Calibration

The DBK9 is default-calibrated for a 100 Ω RTD. To use the DBK9 with a 500 Ω or a 1000 Ω RTD, the user must calibrate the card as follows:

RTD Type	Required Resistor*
100 Ω	374 Ω, 1.0%
500 Ω	1870 Ω, 1.0%
1000 Ω	3740 Ω, 1.0%
* These resistors are theoretical values that correspond to 795°C.	

1. Purchase the resistors above for the given RTD type.

2. Measure the resistor with a reliable meter, and record the exact value.

3. Refer to the charts, and match up the proper temperature with the measured Resistance.

4. Connect the resistor to Channel 0 on the DBK9.

5. Run DaqCal from the Windows support for DBK9.

6. Adjust RP1 for the temperature that was found in the charts.

7. After the temperature is matched, the DBK9 is calibrated.

8. Repeat this procedure to use a different RTD type.

Note: Be sure JP2 & JP3 settings are correct for the RTD type that is being calibrated.
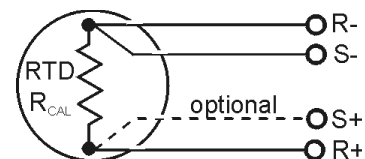
DBK9 Calibration Setup

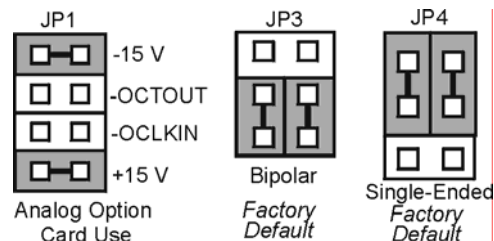## DaqBook/100 Series & /200 Series and DaqBoard [ISA type] Configuration

Use of the DBK9 expansion card with DaqBooks/100 Series & /200 Series and DaqBoards [ISA type] requires three jumper settings.

1. If not using auxiliary power, place the JP1 jumper in the expanded analog mode.

Note: This default position is necessary to power the interface circuitry of the DBK9 via the internal ±15 VDC power supply. If using auxiliary power cards DBK32A or DBK33, you must remove both JP1 jumpers. Refer to *Power Requirements* in the *DBK Basics* section and to the DBK32A and DBK33 sections of the manual for more information.

DaqBook/DaqBoard Jumpers for the DBK9

2. For DaqBook/100, DaqBook /112, and DaqBook /120 *only*, place the JP3 jumper in *Bipolar* mode.

3. For DaqBook/100, DaqBook /112, and DaqBook /120 *only*, place the JP4 jumper in *Single-Ended* Mode.

DaqBook/2000 Series & DaqBoard/2000 Series Configuration

No jumper configurations are required for these /2000 series devices.

Software Setup

Reference Notes:
- o **DaqView users** - Refer to chapter 2, *DBK Setup in DaqView*.
- o **LogView users** - Refer to the chapter 3, *DBK Setup in LogView*.

DBK9 – Specifications

Name/Function: 8-Channel RTD Measurement Card

Connector: DB37 male, mates with P1 pinout; screw terminals for signal connections

Configurations: 3-wire or 4-wire

Alpha: 0.00385

Inputs: 8 channels

Temperature Ranges: -200 to +850°C

RTD Excitation Current:

100 Ω	500 µA
500 Ω	227 µA
1000 Ω	160 µA

Accuracy: ±1.5°C (wide band)

Resolution: 0.3°C

Range and RTD Type Adjustments: Jumpers on circuit board