DBK100™

In-Vehicle Thermocouple Measurement Pods

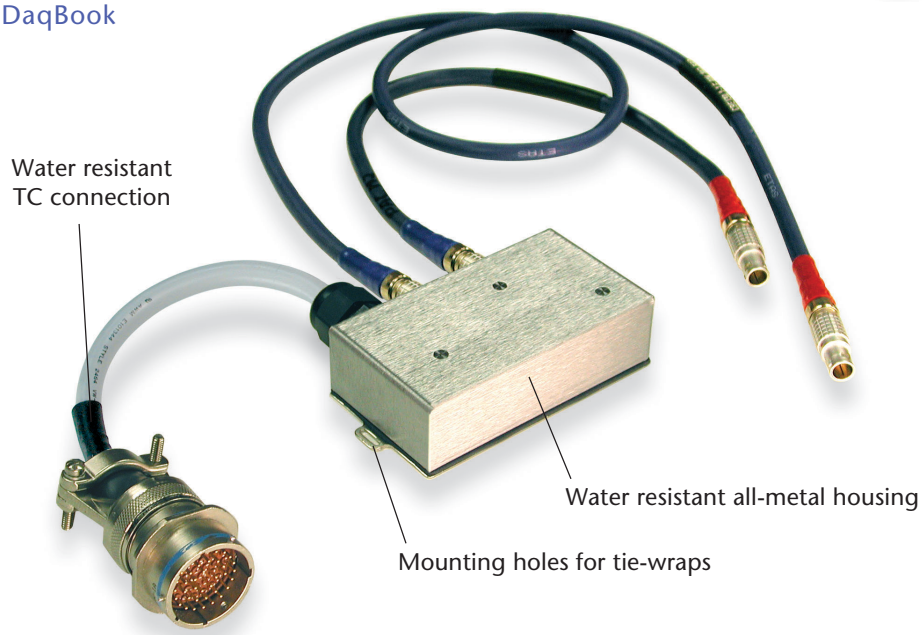
Compatibility: ✔ DaqBook

Features

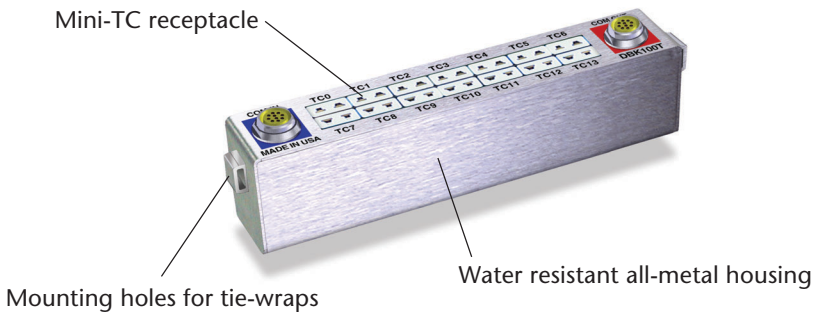
- **Measure vehicle engine temperatures with remote DBK100s**
- **One cable transmits up to 56 channels of TC measurements from the engine compartment to the data acquisition system**
- **Up to 896 TCs per system**

The DBK100™ provides thermocouple measurement capability for in-vehicle applications, and is particularly well suited for TC measurements in proximity to a vehicle engine. With operating temperature of -40˚ to +125˚C, and water resistant packaging and cabling, the DBK100 is ideally suited for applications where engine compartment temperature measurements are required. The DBK100 is housed in a rugged and water resistant, all-metal package designed specifically for harsh environments. TC and system connections to each DBK100 are water resistant, and are all accessible from one direction, enabling the DBK100 to be mounted and its I/O accessed without having to be removed.

Each DBK100 accepts 14 channel TC inputs, and up to four DBK100s can be daisy-chained for a total channel capacity of 56 channels per string of four DBK100s. Up to eight strings of four can be connected to one DBK101™ hub, for a total channel capacity of 448 TC channels per hub. The DBK101 hub attaches to a DaqBook/2000™ series A/D module, which can accept two DBK101 hubs, for a total system channel capacity of 896 channels per DaqBook/2000 system (see diagram).

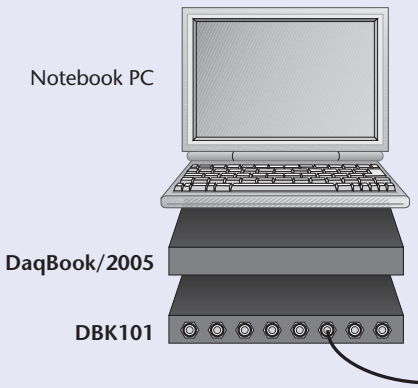


The DBK100/D is terminated in a Deutsch connector, enabling water-tight connections to a mating connector with up to 14 thermocouples. Custom pin-configurations are available to match with existing mating connectors.

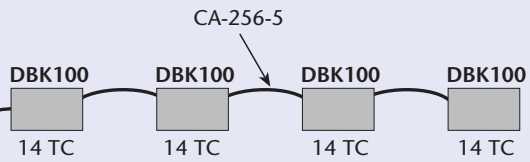


The DBK100/T is a 14-channel pod containing mini-TC connectors which accept industry standard mini-TC connectors.

Passenger Cabin or Trunk



Engine Compartment



Up to 8 strings of 4 DBK100 modules per string

Maximum Capacity

14 TCs per DBK100 pod
4 DBK100 pods per string (56 TCs)
8 Strings per DBK101 hub (448 TCs)
2 DBK101 hubs per DaqBook (896 TCs)

† CE pending

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DBK100™

Specifications & Ordering Information

The benefit of a DBK100 system is that for every 56 TC input channels, only a single cable is required back to the measurement equipment in the passenger cabin. Thus the length of the TC wire can be much shorter, and the number of long cables back to the passenger cabin is reduced by a factor of 56. Besides reducing the length of TC wire, this system substantially reduces the opening required between the engine compartment and the passenger compartment.

The DBK100 supports any TC type attached to any channel. All linearization and cold-junction compensation is automatically corrected in the system, resulting in stable and accurate temperature measurements with typical accuracy of better than 2˚C.

Two versions of the DBK100 are available, differing by the way in which thermocouples are attached to the unit. With the DBK100/D™, up to 14 thermocouples are attached to a Deutsch connector, providing a water-tight connection between the thermocouples and the DBK100/D. Inside the Deutsch connector tethered to the DBK100/D is the cold juncion sensor, which is measured by the system and used to calculate the TC reading.

The DBK100/T™ accepts up to 14 thermocouples terminated with standard mini-TC connectors. As with the DBK100/D, the DBK100/T accepts any TC type connected to any channel. With both models, the included software driver automatically determines the temperature based on the user's input as to what TC type is attached to each channel.

Specifications

System Compatibility: Attaches to DaqBook/2000 Series; requires DBK101 hub.
System Cabling
Total cabling length for one string of DBK100s should not exceed 20 ft.
DBK100 to DBK100: CA-256-5, 5 ft.
DBK100 to DBK101: CA-257-5, 5 ft.
DBK101 to DaqBook: CA-255-2T , 2 in.; CA-255-4T, 4 in.
TC Connectors: 1 pigtail cable assembly to Deutsch MS3471L20-41P military style connector; CJC thermistor assembled onto connector
Inputs: 14 differential TC inputs, open TC detection per channel
TC Types: J, K, T, E, S, R, B, N28, N14
Dimensions
DBK100/D:
Pod: 102 mm W x 57 mm D x 30 mm H (4" x 2.25" x 1.18")
Deutsch Connector: 66.8 mm L x 31.8 mm diameter (2.63" x 1.25"); connected to DBK100/D via 8" cable
DBK100/T: 186 mm W x 44 mm D x 30 mm H (7.3" x 1.7" x 1.18")
DBK101: 285 mm W x 220 mm D x 45 mm H (11" x 8.5" x 1.75")
Weight
DBK100/D & DBK100/T: 0.36 kg (0.80 lbs.)
DBK101: 1.13 kg (2.5 lbs.)
Power Requirements
DBK100/D & DBK100/T: 10 mA from +15V, 10 mA from -15V, 300 mW total
DBK101: 40 mA from +15V, 40 mA from -15V, 300 mA from +5V, 2700 mW total
Input Impedance: 4M Ohm (differential) in parallel with 400 pF
Input Bandwidth: 1 kHz
Minimum Resolution: 0.1°C for all TC types

TC Accuracy* at Measurement Temperature in ˚C (±˚C)											
Type	Min	Max	-100	0	100	300	500	700	900	1100	1400
J	-200	760	1.2	1.0	1.0	1.2	1.4	1.4	—	—	—
K	-200	1200	1.4	1.2	1.2	1.4	1.6	1.6	1.8	2.0	—
T	-200	400	1.4	1.2	1.2	1.2	—	—	—	—	—
E	-270	650	1.2	1.0	1.0	1.0	1.2	—	—	—	—
S	-50	1768	—	4.6	3.6	3.0	3.0	2.8	3.0	3.2	3.2
R	-50	1768	—	4.6	3.2	3.0	2.8	2.8	2.6	2.8	3.0
B	50	1780	—	—	—	7.4	4.8	4.2	3.6	3.4	3.0
N28	-270	400	1.8	1.4	1.4	1.4	—	—	—	—	—
N14	0	1300	—	1.4	1.4	1.4	1.6	1.6	1.8	2.0	—

TC Accuracy*: Valid for one year 25°C ambient, see table above
Operating Temperature:
DBK100/D & DBK100/T: -40° to +125°C
DBK101: -30° to +70°C
Storage Temperature: -40° to +125°C
Relative Humidity: 0 to 95% non-condensing
DBK100/D & DBK100/T: Water resistant
Temperature Coefficient of Accuracy for Type T TC: ±0.05°C for every °C away from 25°C
Channel-to-Channel Crosstalk: -90 dB typ (0 to 100 Hz)
DC CMRR: -80 dB typ
AC CMRR: -80 dB typ (0 to 60 Hz)
Maximum Common Mode Voltage: ±5V**
Over-Voltage Protection: ±40V

Ordering Information

Description	Part No.
14-channel thermocouple input with Deutsch #AFD51-20-41PN1A connector	DBK100/D
14-channel thermocouple input with mini-TC connectors	DBK100/T
8-port hub for DBK100 (accepts up to 448 TC channels)	DBK101
Ethernet-based measurement module	DaqBook/2000 Series

Cables

Cable from DaqBook to DBK101 module; 2 in.	CA-255-2T
Cable from DaqBook to DBK101 module; 4 in.	CA-255-4T
Cable from DBK100 to DBK100, 5 ft.	CA-256-5
Cable from DBK100 to DBK 101 module, 5 ft.	CA-257-5
Cable from DBK100 to DBK 101 module, 10 ft.	CA-257-10

Note: Contact factory for information on other applicable cables.

DBK101

* Accuracy conditions:
- Exclusive of thermocouple errors
- Exclusive of noise
- VCM=0
- 25˚C ambient temperature, stabilized for 1 hour

** For applications where higher common-mode TC measurements are required, DaqBook systems offer high-isolation options up to 500V. These options would reside at the DaqBook, and require running the TC wire from the engine to the passenger compartment. DBK100/101 are not compatible with WBK40/41 or earlier model DaqBooks, such as DaqBook/2000A, /2000X, or /100 and /200 series.