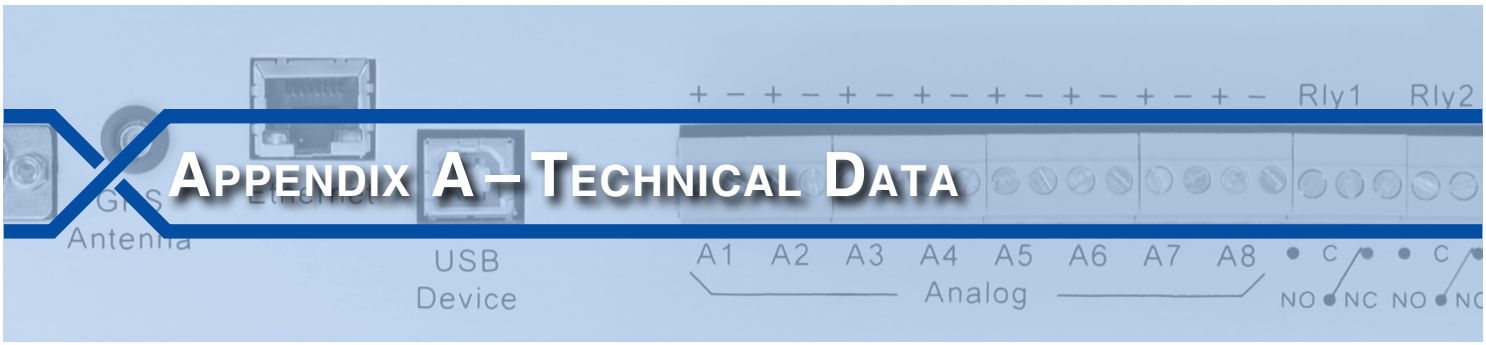

APPENDIX A – TECHNICAL DATA

SPECIFICATIONS

Physical
Size (with mounting brackets)
Length: 10.4″
Height: 9.0″
Depth: 3.2″

Weight
3.2 lb.

Environmental
Storage
Temperature: -50 °C to 85 °C
Humidity: 0 to 95 %, non-condensing

Operating
Temperature: -40 °C to 72 °C
Humidity: 0 to 95 %, non-condensing

Mounting
Shelf or backboard, includes mounting brackets

Construction
Chassis
Fully enclosed, anodized aluminum

Externally accessible keypad, LEDs and connectors

Electrical
All components mounted on conformal coated, internal PCBs

Power
Voltage
Range: 9 to 36 Vdc

Consumption
Maximum: 3 W

Isolation
Power
Minimum: 3800 Vdc from B and N terminals to chassis and inputs

Digital Inputs
Minimum: 3800 Vdc to any terminal

Analog Inputs
Minimum: 3800 Vdc to any terminal

Input to Adjacent Input
Digital: minimum 3800 Vdc

Analog: minimum 3200 Vdc

Ethernet Port
Minimum: 3800 Vdc to any terminal

USB Host and Device Ports
Minimum: 3800 Vdc to any terminal

Alarms
Quantity: 20 total, appropriate for crossing applications, user-defined

Types: Set, Cleared and periodic Health Check

Alarms (continued)
Definitions
User-assigned inputs and input states qualify each Alarm

Transmission
Sent to KCS message processing server via KCS VPN or LAN

Operating Modes
Automatic: messages sent via VPN or LAN using DNS or fixed IP Addressing

Maintainer Mode: disables Alarm transmission while crossing is being tested or repaired

Validation Time
As defined by Alarm Configuration Table, 0 to 99,999 seconds

Capacities
Inputs
Digital: 32, all optically isolated

Analog: 8, voltage or current (optional)

Virtual: 8, user-assigned

Timer: 16, user-assigned

Train Speed Monitor: 4, user-assigned

Outputs
Relay: 2, form C, rated for 2 A at 24 Vdc or 1 A at 125 Vac, maximum switching capacity of 125 VA or 60 W, service life 1 million electrical (typical)

Event Storage
Standard: 230,924 records

Maximum: 2,943,436 records

Liquid Crystal Display
Characters: 80 total on 4 lines

Viewing Area: 2.8″ by .8″

Front Panel Keypad
Quantity: 20 keys

Physical Inputs
Input Impedance
Digital: minimum 10 KOhms, optically isolated

Analog: minimum 10 MOhms

Range
Digital Input-On: 9 to 36 Vdc

Digital Input-Off: 0 to 1 Vdc

Analog DC Voltage: 3 scales, ±25.5 Vdc, +51.1 Vdc, ±255 Vdc

Analog AC Voltage: 2 scales, 25.5 Vac, 255 Vac

Analog Current: 2 scales, ±25.5 Adc, 25.5 Aac

Event Validation Times
Digital: .01 to 327.67 seconds, compatible with fixed rate flashing circuits

Analog: fast and slow filter settings

Analog Limit Values
Voltage
High and Low Limits: in multiples of .1 V or 1 V

Current
High and Low Limits: in multiples of .1 A

Analog Input Accuracy
Typical Voltage: ±.15 V or ±1.5 V

Typical Current: ±.2 A

Virtual Inputs
Definitions
Any logical association shared by 1 to 4 variables (i.e., Digital, Analog or other Virtual Inputs)

Assigned by defining the state of the Virtual Input for each combination of variable states

Alarm Usage
Can be used to Set or Clear an Alarm as defined within the Alarm Configuration Table

Recording Usage
Creates standard Event Records

Relay can be controlled by each Virtual Input

Timer Inputs
Programming
Any input can be assigned as a trigger or terminating source

On or Off events can be assigned as a trigger or terminating source

Limit Values
High and Low Limits: in multiples of .1 seconds

Range: 0.0 to 999.9 seconds

Reporting
Measured Time is reported in each Timer Input Event Record

Violation of Limit Values are also reported

Temperature Sensing
Usage: measures and reports internal temperature of Reporter

High and Low Limits: -67 °F to 257 °F

Train Speed Monitor
Operation
Reports excessive train speed

Logs standard Event Record

Sensors
Digital Inputs: 2 required

Distance: 50′ to 5280′

Limit Values
5 to 180 mph

Memory

Type

Non-volatile, Event Records and Setup Database are stored in flash memory chip

Newest data over-writes oldest data, 129th day over-writes first day

Storage Longevity

Infinite with power off

Rated for 100,000 write operations

Ports

RS-232

Quantity: 1, for use with a PC

Terminal Emulation: ANSI

Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 115,200

Bit Format: 8-N-1

USB Host

Compatible with any FAT-32 formatted flash drive

Can create a text file of Event Record data from any time span

Can be used to update firmware

USB Device

Eliminates need for serial comm port

Data transfer rates of 4.71 Mbps

Ethernet

Type: 10/100 Base-T, typically connected to cellular modem or directly to LAN

Protocols: HTTP-Get, TCP/IP, Telnet, SNTP-Unicast, SNTP-Multicast

User Interface: provides remote or local access via TCP/IP connection

Settings: user-assignable IP Address, port, subnet mask, dual IP Addresses for time server

Connectors

Power

Detachable, screw-down, 4-position, 12 to 22 AWG

Dual B and N terminals

Digital Inputs

Detachable, screw-down, 10-position, 12 to 22 AWG

Connectors (continued)

Analog Inputs

Detachable, screw-down, 8-position, 12 to 22 AWG

Relay

Detachable, screw-down, 3-position, 12 to 22 AWG

Normally open, normally closed and common terminals

Terminal Port

DE-9 male, configured as modified DCE

Can also serve as Terminal Port to alternate device

USB Host Port

USB Type A female

USB Device Port

USB Type B female

Ethernet Port

RJ-45 female

Indicators

LCD Panel

Includes LED back lighting for enhanced visibility

Displays numerous command menus for configuring the Reporter and retrieving data

Front Panel LEDs (3)

Active Alarm: red, illuminates when one or more Alarms are active

Message Sent: green, illuminates for 5 seconds when message is sent

Terminal: green, flashes with send and receive data

Ethernet Port LEDs (2)

Green: link established

Yellow: data activity

Controls

Keypad

Located on front panel, below LCD

Keys: 0-9, Browse, Alpha, Setup, Esc/Maintainer Mode, Enter, Save/., left, right, up, down/-

LCD Contrast Adjust

Single-turn pot., accessible from front panel

Internal Clock

Accuracy

Typical: ±8 seconds per month (3 ppm) when not synchronized

Volatility: maintains accuracy for minimum of 30 days with loss of power

Resolution: .01 seconds for all Event Records

Sync

SNTP-Unicast: via primary or secondary time servers, once per day at 00:05:00

SNTP-Multicast: per time server schedule

Operation

Time Zones: selectable from 7 different North American settings

Daylight Saving Time: enable or disable automatic adjustment

Leap Year: automatically adjusted

Password Protection

Administrative Level

Access: unrestricted to all functions

Length: 8 characters

Restricted Level

Access: modifications restricted to site-specific parameters of Setup Database, unrestricted viewing of all data and Setup Database parameters

Length: 8 characters

Passcode

Access: limited modifications to Setup Database via front panel

Length: 8 digits

MICRO-AIDE reserves the right to make changes, at its sole discretion, to any specification listed herein.

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Transfer Rates

Table 14 on page 108 lists typical bit transfer rates for each of the CAR-40AK's user-accessible ports. In each case the same 20,000 Event Records with no-detail formatting were either dumped to a PC file or saved directly to a flash drive. The times listed are normalized relative to 1,000 Event Records. If speed is a concern, using the USB Device Port is highly recommended.

Port	Time to transfer 1,000 Event Records (sec)	Actual transfer rate (bps)	Relative speed compared to 38,400
Terminal Port (38,400)	19.0	38,396	Used as reference
Terminal Port (115,200)	6.4	114,845	3.0 times faster
USB Host	2.8	n/a	6.7 times faster
Ethernet Port	.2	4,704,075	122.5 times faster
USB Device Port	.2	4,714,063	122.8 times faster

Table 14: Bit Transfer Rates by Port

TERMINAL PORT CABLE

The following cable is included with every CAR-40AK.

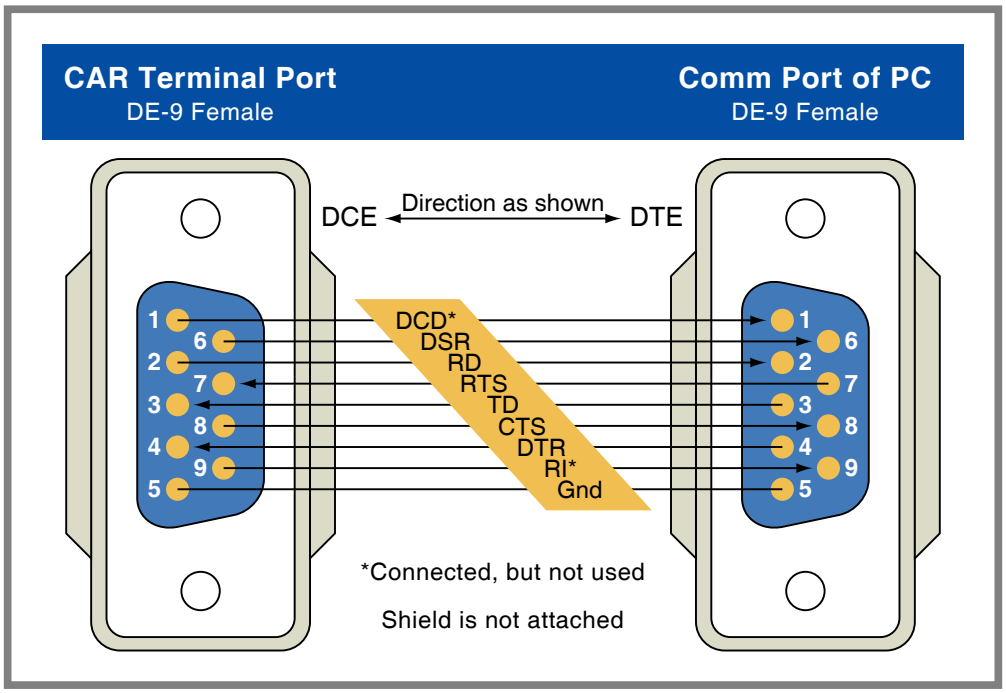

Figure 10: Terminal Port Cable - Wiring Diagram

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