

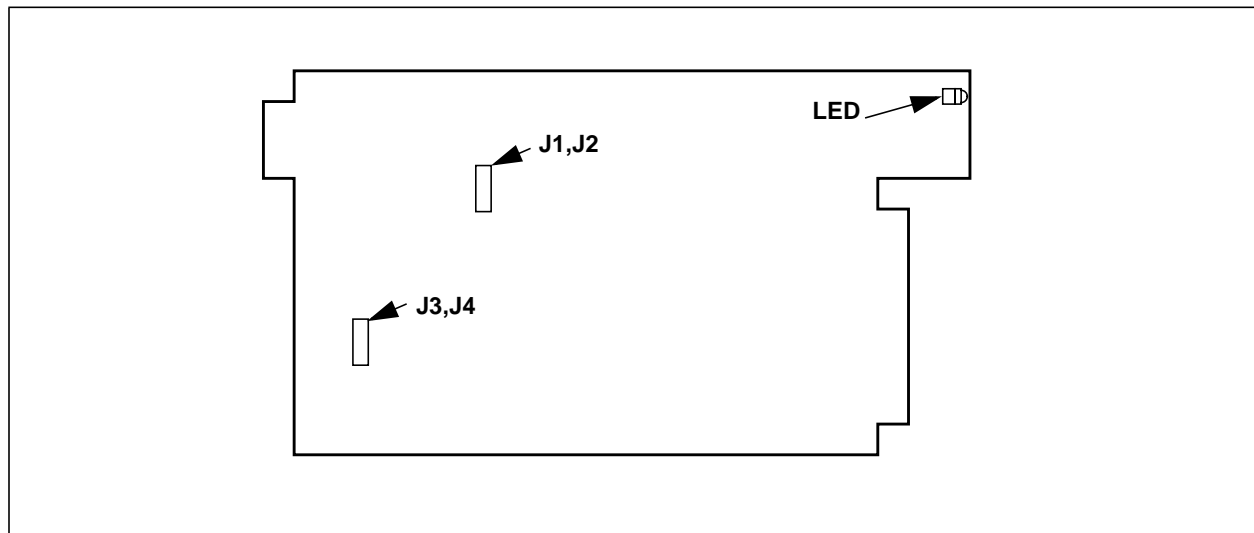
Table 3-39 shows the nomenclature and the hexadecimal ranges for the QAV card output data. Note that bits 14 and 15 are set by QAV card microcomputer; therefore, the positive range to negative transitions occurs in 14 bits.

**Table 3-39. QAV Card Output Data Ranges**

Data Classification	Output Data Hexadecimal Code
Zero Input	C000
Positive Range	C001 to CFFF
Positive Full Scale	D000
Positive Overrange	D001 to DFFF
Negative Overrange	E001 to EFFF
Negative Full Scale	F000
Negative Range	F001 to FFFF
Out of Range Offset	8000 to BFFF
Card Hardware Trouble	0000 to 7FFF

### 3-8.5. Controls and Indicators (Level 6 and earlier)

The (Level 6 and earlier) QAV components are shown in [Figure 3-62](#).



**Figure 3-62. QAV Card Components (Level 6 and earlier)**

#### Light Emitting Diodes (LED)

The QAV card has one LED which is used to indicate power “on”.

## Jumpers

Table 3-40 lists the jumper numbers, locations and functions of the jumpers used on the QAV card.

**Table 3-40. QAV Card Jumpers, Locations and Functions (Level 6 and earlier)**

<b>Jumper Number</b>	<b>Function (Jumper in Place)</b>
J1	For future use
J2	ORs signal IMOK (P13) to W274-2 Inverter
J3 <sup>1,2</sup>	Installed for 50 Hz systems
J4 <sup>1,2</sup>	Installed for 60 Hz systems
J5 <sup>1</sup>	For future use
J6 <sup>3</sup>	For future use
<sup>1</sup> Jumpers J3, J4 and J5 are not used on QAV cards with prefixes lower than 5. <sup>2</sup> The QAV card operates on its own time base when jumpers J3 or J4 are not inserted. <sup>3</sup> Jumper J6 is not shown on cards with prefixes lower than 5.	

### 3-8.6. Controls and Indicators (Level 8 and later)

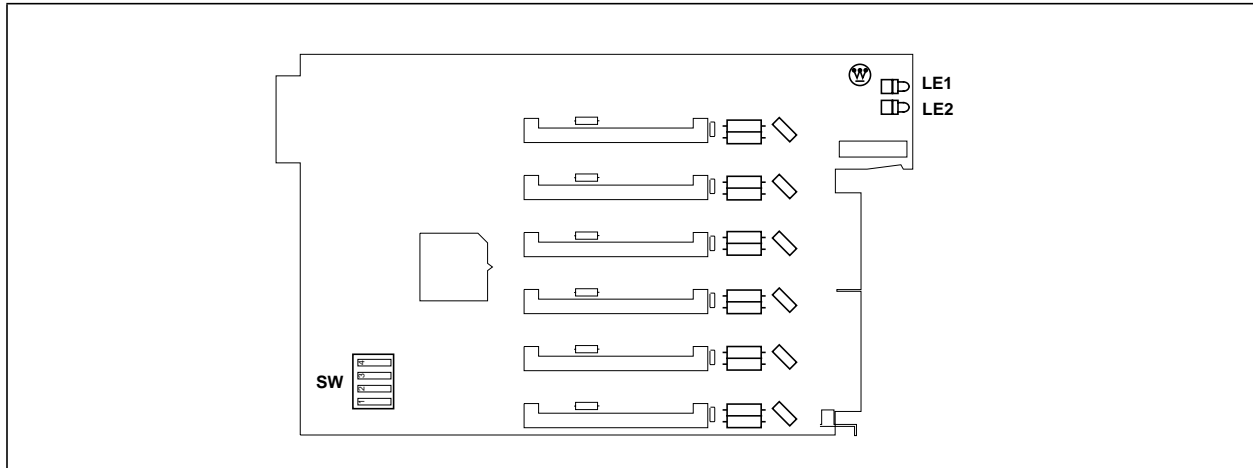


Figure 3-63. QAV Card Components (Level 8 and later)

#### Switches

The (Level 8 and later) QAV card uses a four-position DIP switch (see [Figure 3-63](#) for the location of the switch). The definitions of the switches are as follows:

Table 3-41. QAV Jumper Configuration

Configuration	SW1	SW2	SW3	SW4
50Hz operation	X	ON	OFF	X
60Hz operation	X	OFF	ON	X
No QTB <sup>1</sup>	X	ON	ON	X

<sup>1</sup>The QTB card is necessary in installations where large variations of the power line frequency exist to provide for large normal mode rejection.

X = Reserved (Don't Care)

#### Notes

Any other switch combination is not valid and the QAV card will not operate.

The QAV also has several factory preset jumpers. Changing these jumpers will affect calibration, therefore, no changes are recommended.

## LEDs

The QAV card has two LED's (see [Figure 3-63](#)). LE1 indicates that power is applied to the board. LE2 is used during the initial calibration of the board.

For on-line applications, LE2 will illuminate for about 1/2 second during power-up and will remain off thereafter. Should this LED remain on or flash, return the board to Westinghouse for repair.

### Notes

Before returning the board for repair, check the following:

1. Ensure that the DIOB power supplies are in tolerance.
2. Ensure that the DIP switch is set according to the valid configurations in the previous tables.

## Thermocouple Information

Table 3-42 shows the standard WDPF thermocouple coefficient definitions. Coefficients may also be user-defined. For additional information on selecting these coefficients, refer to the CI record field discussion in “Record Types User’s Guide” (U0-0131).

**Table 3-42. QAV Thermocouple Coefficient Definitions (WDPF System)**

Thermocouple Type	Coefficients			
B 70% Platinum + 30% Rhodium or 94% Platinum + 6% Rhodium 427-1093°C 800-2000°F	C0 = 0.3516470E + 03	C1 = 0.6138849E + 03	C2 = -0.1539774E + 03	C3 = 0.3359373E + 02 C4 = -0.4051826E + 01 C5 = 0.2003933E + 00
E Chromel/Constantan -18-982°C 0-1800°F	C0 = 0.3167283E + 02	C1 = 0.3030628E + 02	C2 = -0.3344949E + 00	C3 = 0.6849588E - 02 C4 = -0.6975349E - 04 C5 = 0.2923653E - 06
J Iron/Constantan -96-760°C -140-1400°F	C0 = 0.3112531E + 02	C1 = 0.3607027E + 02	C2 = -0.4288617E + 00	C3 = 0.2261382E - 01 C4 = -0.5174379E - 03 C5 = 0.3972783E - 05
K Chromel/Alumel -18-1093°C 0-2000°F (The upper range may be extended to 2500 with less accuracy)	C0 = 0.3034473E + 02	C1 = 0.4403191E + 02	C2 = 0.1615839E + 00	C3 = -0.1616257E - 01 C4 = 0.4401109E - 03 C5 = -0.3599650E - 05
R Platinum + 13% Rhodium 260-1093°C 500-2000°F	C0 = 0.8362848E + 02	C1 = 0.2273716E + 03	C2 = -0.1248286E + 02	C3 = 0.1206254E + 01 C4 = -0.7422128E - 01 C5 = 0.1899300E - 02
S Platinum + 10% Rhodium 399-1093°C 750-2000°F	C0 = 0.1180344E + 03	C1 = 0.1985918E + 03	C2 = -0.1973096E - 01	C3 = -0.5009329E + 00 C4 = 0.4110488E - 01 C5 = -0.1155794E - 02
T Copper/Constantan 46-399°C -50-750°F	C0 = 0.3189224E + 02	C1 = 0.4669328E + 02	C2 = -0.1325739E + 01	C3 = 0.6962067E - 01 C4 = -0.2327808E - 02 C5 = 0.3330646E - 04

When selecting a Q-card or Ovation I/O module for a thermocouple, you need to select the proper card/group number to ensure an accurate reading. The information shown below provides the millivolt (MV) to temperature range for 20, 50, and 100 mv cards.

This range limitation exists for Ovation I/O modules 1C31113G01/1C31116G04, 1C31113G02/1C31116G04, and 1C31113G03/1C31116G04 as well as Q-Line I/O cards: QAI, QAV, and QAX.

Note that for a low millivolt reading, you could use a G01, G02 or G03 card, but better accuracy is obtained by using a G01, the group that provides a better fit. Do not use lower millivolt cards for the higher temperature (millivolt) readings.

The coefficients listed in [Table 3-42](#) are the recommended coefficients for the ranges shown for WDPF systems.

The coefficients listed in [Table 3-43](#) are the recommended coefficients for the ranges shown for Ovation systems.

**Table 3-43. QAV Thermocouple Coefficient Definitions (Ovation System)**

Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>B or TB</b>	400 to 1100 Degrees C 800 to 2000 Degrees F	0.000 to 13.814 (0 to 1820) 0.006 to 13.814 (0 to 3308)	20 mv card 20 mv card
<b>Fahrenheit</b> COEF_1 = 3.5164700E+02 COEF_2 = 6.1388490E+05 COEF_3 = -1.5397740E+08 COEF_4 = 3.3593730E+10 COEF_5 = -4.0518260E+12 COEF_6 = 2.0039330E+14  COEF_7 = -2.0E-06 COEF_8 = 0.0		<b>Centigrade</b> COEF_1 = 1.7758167E+02 COEF_2 = 3.4104717E+05 COEF_3 = -8.5543000E+07 COEF_4 = -8.5543000E+07 COEF_5 = -8.5543000E+07 COEF_6 = 1.1132961E+14  COEF_7 = -2.0E-06 COEF_8 = 0.0	
Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>E or TE</b>	-18 to 286 Degrees C 0 to 550 Degrees F -18 to 661 Degrees C 0 to 1200 Degrees F -18 to 1000 Degrees C 0 to 1832 Degrees F	-9.835 to 19.945 (-270 to 286) -9.835 to 19.945 (-450 to 548) -9.835 to 49.992 (-270 to 661) -9.835 to 49.956 (-450 to 1221) -9.835 to 76.358 (-270 to 1000) -9.835 to 76.358 (-450 to 1832)	20 mv card 20 mv card 50 mv card 50 mv card 100 mv card 100 mv card
<b>Fahrenheit</b> COEF_1 = 3.1672830E+01 COEF_2 = 3.0306280E+04 COEF_3 = -3.3449490E+05 COEF_4 = 6.8495880E+06 COEF_5 = -6.9753490E+07 COEF_6 = 2.923653E+08  COEF_7 = -1.0939E-03 COEF_8 = 3.365E-05		<b>Centigrade</b> COEF_1 = -1.8176111E-01 COEF_2 = 1.6836822E+04 COEF_3 = -1.8583050E+05 COEF_4 = 3.8053267E+06 COEF_5 = -3.8751939E+07 COEF_6 = 1.6242517E+08  COEF_7 = -1.71E-05 COEF_8 = 6.057E-05	

Table 3-43. QAV Thermocouple Coefficient Definitions (Ovation System) (Cont'd)

Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>J or TJ</b>	-18 to 365 Degrees C	-8.096 to 19.971 (-210 to 366)	20 mv card
	-140 to 700 Degrees F	-8.137 to 19.977 (-350 to 691)	20 mv card
	-18 to 760 Degrees C	-8.096 to 42.922 (-210 to 760)	50 mv card
	-140 to 1400 Degrees F	-8.137 to 42.922 (-350 to 1400)	50 mv card
<b>Fahrenheit</b> COEF_1 = 3.112531E+01 COEF_2 = 3.6070270E+04 COEF_3 = -4.2886170E+05 COEF_4 = 2.2613820E+07 COEF_5 = -5.1743790E+08 COEF_6 = 3.9727830E+09  COEF_7 = -9.256E-04 COEF_8 = 2.862E-05		<b>Centigrade</b> COEF_1 = -4.8593889E-01 COEF_2 = 2.0039039E+04 COEF_3 = -2.3825650E+05 COEF_4 = 1.2563233E+07 COEF_5 = -2.8746550E+08 COEF_6 = 2.2071017E+09  COEF_7 = -9.76E-06 COEF_8 = 5.1516E-05	
Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>K or TK</b>	-18 to 480 Degrees C	-6.458 to 19.959 (-270 to 484)	20 mv card
	0 to 900 Degrees F	6.456 to 19.978 (-450 to 904)	20 mv card
	-18 to 1230 Degrees C	6.458 to 49.988 (-270 to 1232)	50 mv card
	0 to 2250 Degrees F	6.456 to 49.996 (-450 to 2250)	50 mv card
	-18 to 1370 Degrees C	-6.458 to 54.875 (-270 to 1372)	100 mv card
	0 to 2500 Degrees F	-6.456 to 54.845 (-450 to 2500)	100 mv card
<b>Fahrenheit</b> COEF_1 = 3.0344730E+01 COEF_2 = 4.4031910E+04 COEF_3 = 1.615839E+05 COEF_4 = -1.616257E+07 COEF_5 = 4.4011090E+08 COEF_6 = -3.599650E+09  COEF_7 = -7.259E-04 COEF_8 = 2.243E-05		<b>Centigrade</b> COEF_1 = -9.1959444E-01 COEF_2 = 2.4462172E+04 COEF_3 = 8.9768833E+04 COEF_4 = -8.9792056E+06 COEF_5 = 2.4450606E+08 COEF_6 = -1.9998056E+09  COEF_7 = -8.14E-06 COEF_8 = 4.0374E-05	



Table 3-43. QAV Thermocouple Coefficient Definitions (Ovation System) (Cont'd)

Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>R or TR</b>	260 to 1100 Degrees C 500 to 2000 Degrees F	0.000 to 19.998 (0 to 1684) 0.089 to 19.997 (0 to 3063)	20 mv card 20 mv card
<b>Fahrenheit</b> COEF_1 = 8.3628480E+01 COEF_2 = 2.2737160E+05 COEF_3 = -1.2482860E+07 COEF_4 = 1.2062540E+09 COEF_5 = -7.4221280E+10 COEF_6 = 1.89930000E+12  COEF_7 = -1.084E-04 COEF_8 = 3.24E-06		<b>Centigrade</b> COEF_1 = 2.8682489E+01 COEF_2 = 1.2631756E+05 COEF_3 = -6.9349222E+06 COEF_4 = 6.7014111E+08 COEF_5 = -4.1234044E+10 COEF_6 = 1.0551667E+12  COEF_7 = 4.72E-06 COEF_8 = 5.832E-06	
Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>S or TS</b>	400 to 1100 Degrees C 750 to 2000 Degrees F	0.000 to 18.698 (0 to 1768) -0.092 to 18.696 (0 to 3214)	20 mv card 20 mv card
<b>Fahrenheit</b> COEF_1 = 1.1803440E+02 COEF_2 = 1.9859180E+05 COEF_3 = -1.9730960E+04 COEF_4 = -5.0093290E+08 COEF_5 = 4.1104880E+10 COEF_6 = -1.1557940E+12  COEF_7 = -1.0847E-04 COEF_8 = 3.26E-06		<b>Centigrade</b> COEF_1 = 4.7796889E+01 COEF_2 = 1.1032878E+05 COEF_3 = -1.0961644E+04 COEF_4 = -2.7829606E+08 COEF_5 = 2.2836044E+10 COEF_6 = -6.4210778E+11  COEF_7 = -4.15E-06 COEF_8 = 5.868E-06	
Thermocouple Type	Standard Temperature Range	Actual range in MV / TEMP	Best Fit
<b>T or TT</b>	-46 to 400 Degrees C -50 to 750 Degrees F	-6.258 to 19.945 (-270 to 385) -6.254 to 19.979 (-450 to 726)	20 mv card 20 mv card
<b>Fahrenheit</b> COEF_1 = 3.1892240E+01 COEF_2 = 4.6693280E+04 COEF_3 = -1.3257390E+06 COEF_4 = 6.9620670E+07 COEF_5 = -2.3278080E+09 COEF_6 = 3.3306460E+10  COEF_7 = -7.3333E-04 COEF_8 = 2.243E-05		<b>Centigrade</b> COEF_1 = -5.9866667E+02 COEF_2 = 2.5940711E+04 COEF_3 = -7.3652167E+05 COEF_4 = 3.8678150E+-7 COEF_5 = -1.2932267E+09 COEF_6 = 1.8503589E+10  COEF_7 = -1.55700E-05 COEF_8 = 4.0374E-05	

### 3-8.7. Installation Data Sheet

1 of 3

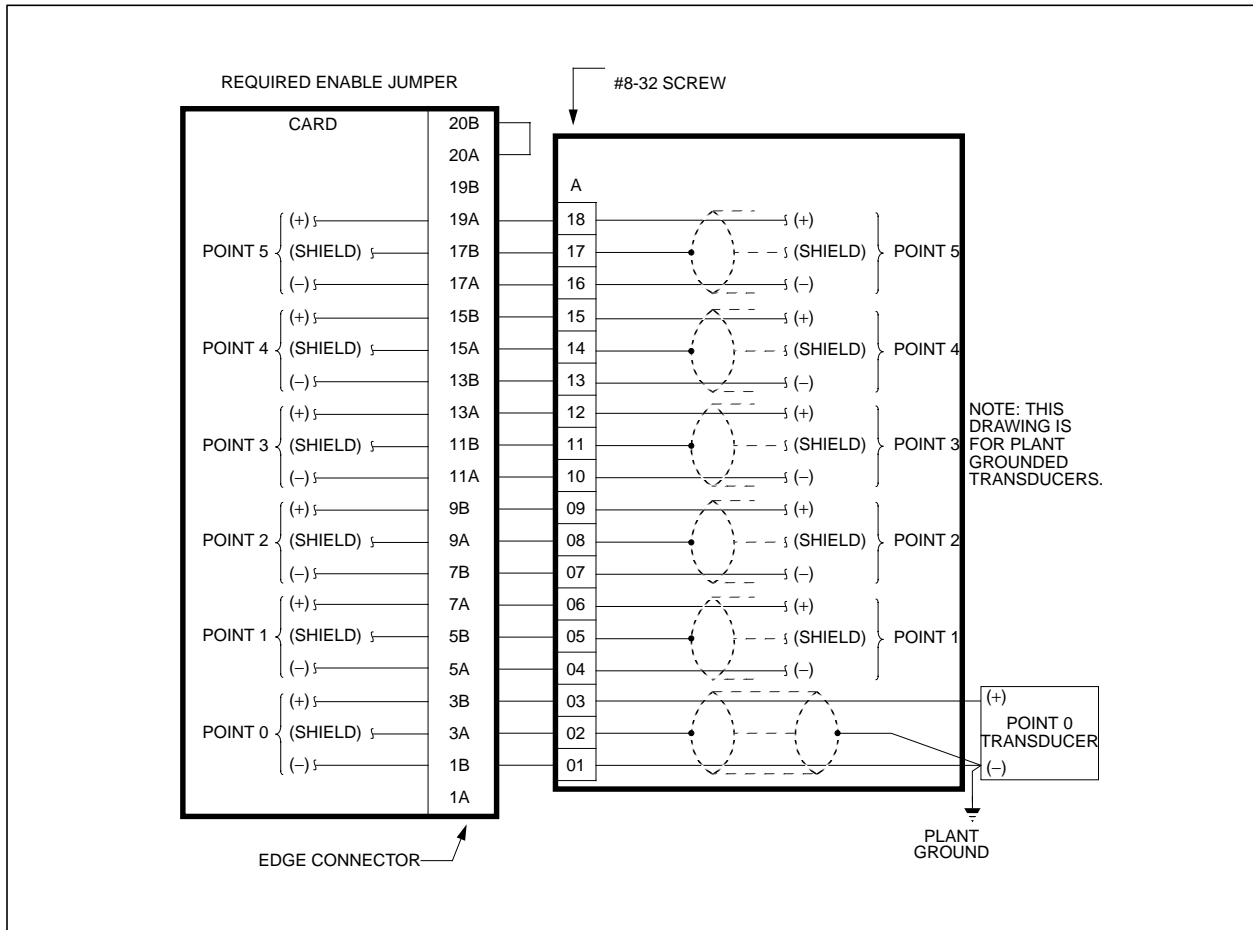
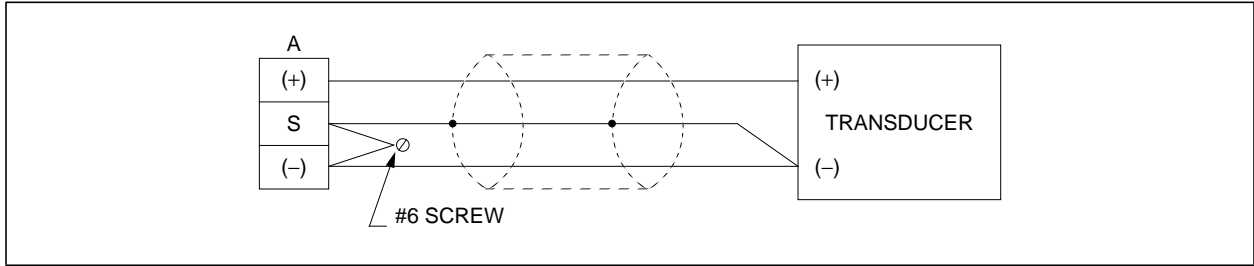


Figure 3-64. QAV Wiring Diagram (QAV Groups 1 through 5)

#### Installation Notes: QAV Groups 1 through 5 (Refer to [Figure 3-64](#))

1. If inputs are to be grounded at the system end, insert a #6 screw and nut in the hole located near the shield terminal on Terminal Block A. Then add two jumpers as shown below. Six holes, located next to terminals 2, 5, 8, 11, 14, & 17, have been drilled for this purpose.



2. If inputs are to be grounded at the signal source, ground both the (-) side of the signal and the cable shield as shown below.

