

| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE |         |       |          | UNLESS OTHERWISE SPECIFIED TOLERANCES PER QAP 18 |         |       |          |
|--|---------|-------|----------|--|---------|-------|----------|
| DEC 2PL  | DEC 3PL | FRACT | ANGLE    | DEC 2PL  | DEC 3PL | FRACT | ANGLE    |
| DR   | B. HESS |       | 06-27-07 | DR   | B. HESS |       | 06-27-07 |
| CHK  | J. LONG |       | 07-20-07 | CHK  | J. LONG |       | 07-20-07 |
| APPD   | B. HESS |       | 07-20-07 | APPD   | B. HESS |       | 07-20-07 |
| CODE   |         |       |          | CODE   |         |       |          |

|  |                              |                           |                 |
|--|------------------------------|---------------------------|-----------------|
| TITLE<br><b>QLX-NET COMMUNICATIONS OVERVIEW &amp; WIRING DETAILS</b> |                              |                           |                 |
| SIZE<br><b>D</b>   | CAGE CODE<br><b>23587</b>    | DWG NO<br><b>643D0022</b> | REV<br><b>A</b> |
| SCALE<br><b>NONE</b>   | SHEET <b>01</b> OF <b>04</b> |                           | YORK ORD NO     |

| REVISIONS |     |                               |          |
|-----------|-----|-------------------------------|----------|
| REV       | ECN | DESCRIPTION                   | DATE     |
| A         |     | ADDED EVAP ZONES 16-30 WIRING | 02/21/08 |
|           |     |                               |          |
|           |     |                               |          |

|           |      |     |     |
|-----------|------|-----|-----|
| PURCHASER | DATE | DR  | APP |
|           |      | ESH | JML |

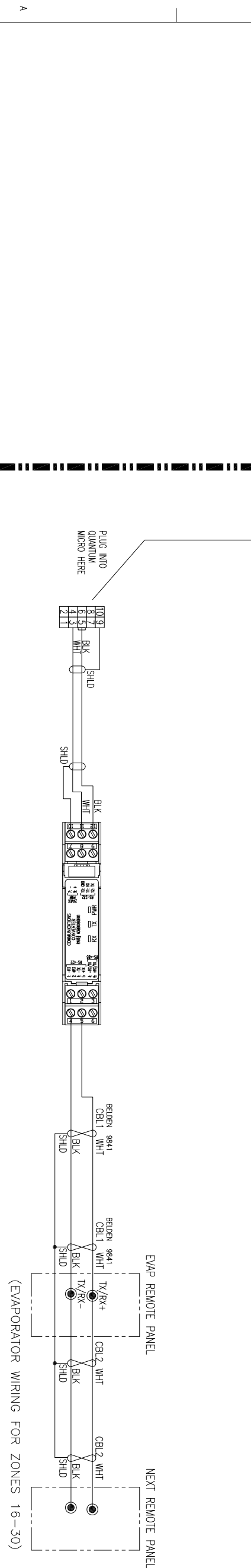
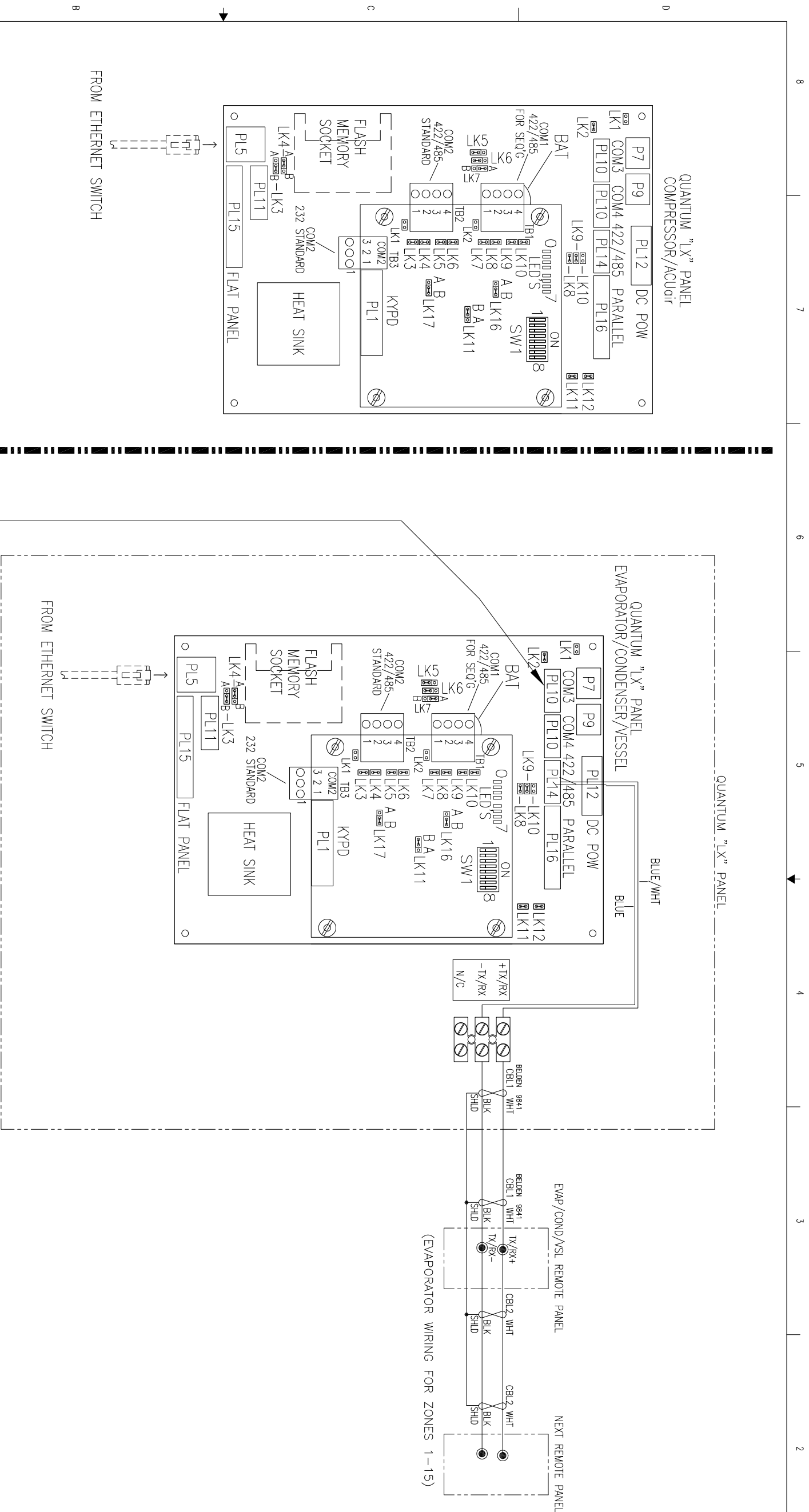
  

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**JOHNSON CONTROLS** **Frick** 100 CV AVE P.O. BOX 997 Waynesboro, PA 17268



|   |  |  |  |   |  |  |  |
|---|--|--|--|---|--|--|--|
|   |  | UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>DO NOT SCALE |  | <b>TITLE</b><br>QLX-NET COMMUNICATIONS OVERVIEW<br>& WIRING DETAILS |  | THIS DRAWING AND THE SUBJECT MATTER IT CONTAINS, ARE PROPERTY OF<br>FRICK-A JOHNSON CONTROLS COMPANY. IT MAY NOT BE USED, NOR<br>COPIED FOR DISTRIBUTION, BEYOND THE REQUIREMENTS OF THE PROJECT<br>REFERENCED ON THIS DRAWING.<br>© COPYRIGHT 06-27-07,FRICK/JCI, ALL RIGHTS RESERVED |  |
| UNLESS OTHERWISE SPECIFIED<br>TOLERANCES PER QAP 18 |  | DEC 2PL<br>$\pm 0.01$  |  | DEC 3PL<br>$\pm 0.005$  |  | FRACT<br>$\pm 1/64$  |  |
| DR B. HESS  |  | 06-27-07   |  | PURCHASER   |  | NOTICE TO PURCHASER<br>REFER TO CONTRACT FOR MATERIAL<br>TO BE SUPPLIED BY YORK/JCI.<br>THE AMOUNT OF SUCH MATERIAL IS<br>NOT INCREASED BY ANYTHING<br>SHOWN UPON THIS DRAWING.  |  |
| CHK J. LONG   |  | 07-20-07   |  | CAGE CODE<br>23587  |  | DWG NO<br>643D0022   |  |
| APPD B. HESS  |  | 07-20-07   |  | REV<br>A  |  | 100 CV AVE<br>P.O. BOX 997<br>Waynesboro, PA 17268   |  |
| CODE  |  | SCALE NONE   |  | SHEET 02 OF 04  |  | YORR ORD NO  |  |

8 7 6 5 4 3 2 1

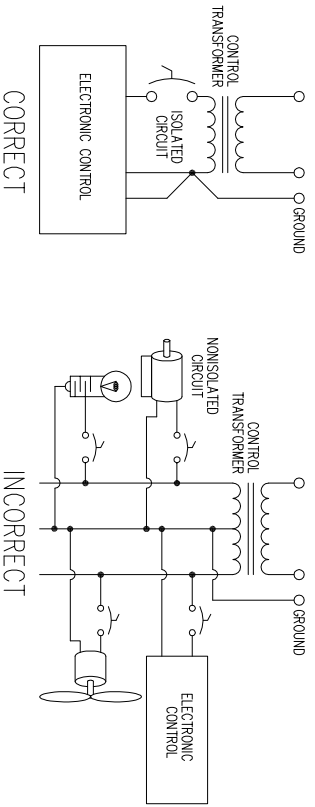
# PROPER INSTALLATION OF ELECTRONIC EQUIPMENT IN AN INDUSTRIAL ENVIRONMENT

## IMPORTANT

ALL ELECTRONIC EQUIPMENT IS SENSITIVE INSTRUMENTATION AND CAREFUL ATTENTION IS REQUIRED DURING THE INSTALLATION PROCESS. THERE ARE A FEW BASICS THAT IF FOLLOWED WILL RESULT IN A trouble-free installation. THE NATIONAL ELECTRIC CODE (NEC) IS A GUIDELINE FOR INSTALLATION PRACTICES, BUT INSTANCES NON-DETAILED WITH PROCEDURES FOR ELECTRONIC EQUIPMENT FROM THESE PROCEDURES DO NOT OVERRIDE ANY RULES BY THE NEC. ALWAYS TAKE THESE PROCEDURES INTO CONSIDERATION WITH THE NEC CODE. (SEE FRICK DOCUMENT #S90-400)

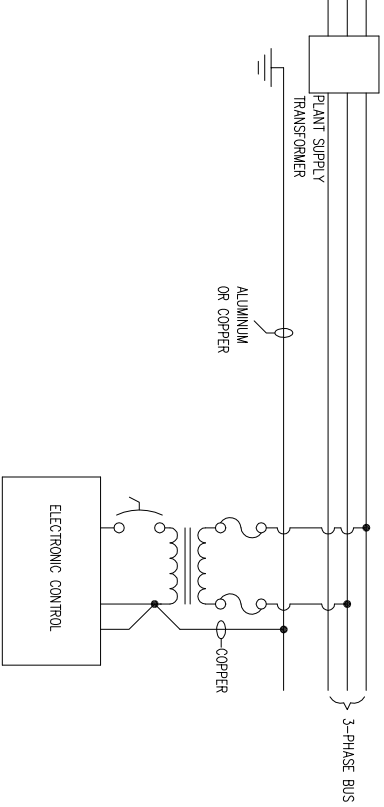
## VOLTAGE SOURCE

USE A U.L. LISTED CONTROL TRANSFORMER WITH A U.L. LISTED DISCONNECT TO ISOLATE THE ELECTRONIC CONTROL PANEL FROM OTHER EQUIPMENT IN THE PLANT THAT GENERATE ELECTROMAGNETIC INTERFERENCE



## GROUNDING

GROUNDING IS THE MOST IMPORTANT FACTOR FOR SUCCESSFUL OPERATION AND ALSO THE MOST OVERLOOKED. DO NOT USE RIGID CONDUIT AS A CONDUCTOR DUE TO THE SENSITIVITY OF THE EQUIPMENT. COPPER GROUND WIRE ARE REQUIRED (NOTE: ALUMINUM MAY BE USED FOR THE LARGE THREE-PHASE GROUND WIRE) THE GROUND WIRE MUST BE THE SAME SIZE AS THE SUPPLY WIRES OR ONE SIZE SMALLER AS A MINIMUM. THE THREE PHASE WIRE BROUGHT INTO THE PLANT MUST ALSO HAVE A GROUND WIRE A GOOD GROUND CIRCUIT MUST BE CONTINUOUS FROM THE PLANT SOURCE TRANSFORMER TO THE ELECTRONIC CONTROL PANEL FOR PROPER OPERATION.



## WIRING PRACTICES

IN ORDER TO MINIMIZE THE RISK OF FUNCTIONAL PROBLEMS, IT IS ESSENTIAL THAT THE FOLLOWING GUIDELINES ARE FOLLOWED WHEN RUNNING CONDUIT AND CONTROL WIRING TO THE ELECTRONIC CONTROL PANEL.

-DO NOT MIX WIRES OF DIFFERENT VOLTAGES IN CONDUIT. DIVIDERS MUST BE USED IN WIRE WAY SYSTEMS (CONDUIT TRAYS) TO SEPARATE UNLIKE VOLTAGES. SEPARATE HIGH CURRENT HIGH VOLTAGE WIRING INTO SEPARATE WIRE WAYS FROM AC CONTROL WIRING AND SENSOR WIRING.

-KEEP SEPARATE AC AND DC/ANALOG WIRING.

-NEVER RUN WIRES THROUGH AN ELECTRONIC PANEL THAT DO NOT RELATE TO THE FUNCTION OF THE PANEL. ELECTRONIC CONTROL PANELS SHOULD NEVER BE USED AS A JUNCTION BOX.

## WIRING RECOMMENDATIONS

THE FOLLOWING IS A LIST OF TYPICAL WIRE TYPES USED AND THE MAXIMUM DISTANCES THEY ARE CAPABLE OF HANDLING WITHIN THE GIVEN TEMPERATURE RANGES.

\*NORMAL TEMPERATURE APPLICATIONS (-4°F - 144°F)\*

| POINT A           | POINT B                 | BELDEN WIRE #                                   | AWG | MAXIMUM DISTANCE (FT) | DESCRIPTION        |
|-------------------|-------------------------|---|-----|-----------------------|--------------------|
| Control Panel     | *Micro(s) w/RS-422      | 9829  | 24  | 2,000                 | 2-pair w/shield(s) |
| Control Panel     | *Quantum RS-422         | 9829  | 24  | 2,000                 | 2-pair w/shield(s) |
| Control Panel     | *Quantum RS-485         | 9841  | 24  | 2,000                 | 1-pair w/shield    |
| Control Panel     | ICID Temp Sensors       | 8761  | 22  | 2,000                 | 2-wire w/shield    |
| Control Panel     | RID Temp Sensors        | 8772  | 20  | 1,000                 | 3-wire w/shield    |
| Control Panel     | Press. Transducers      | 9365  | 18  | 250                   | 3-wire w/shield    |
| Control Panel     |                         | 9366  | 16  | 350                   | 3-wire w/shield    |
| Control Panel     | Inlec Humidity Sensor   | 8760  | 18  | 2,000                 | 2-wire w/shield    |
| Control Panel     | TCS Temp Transmitter    | 8760  | 18  | 2,000                 | 2-wire w/shield    |
| Control Panel     | Hansen Vort-Level       | 8760  | 18  | 2,000                 | 2-wire w/shield    |
| Control Panel     | Parker Level Controller | 8760  | 18  | 2,000                 | 2-wire w/shield    |
| Control Panel     | Morning NH3 Sensor      | 8770  | 18  | 1,500                 | 3-wire w/shield    |
| Control Panel     | Morning AMOS NH3 Sensor | 8618  | 16  | 1,500                 | 3-wire w/shield    |
| Control Panel     | AC Control Devices      | -   | 14  | **                    | Multi-strand       |
| Control Panel/HUB | *Quantum "Tx"           | -   | 24  | 300                   | SHIELDED CAT-5E    |
| Control Panel     | All Other Devices       | Consult Manufacturer for Wiring Recommendations |     |                       |                    |

### ADDITIONAL WIRING FOR ALLEN-BRADLEY COMPUTER CONTROL SYSTEM

|                  |                    |      |    |       |                    |
|------------------|--------------------|------|----|-------|--------------------|
| Control Panel    | Computer Interface | 9269 | -  | 1,500 | RG-62A/U coax      |
| Control Panel    | Computer Interface | -    | 24 | 300   | SHIELDED CAT-5E    |
| Control Panel    | Rmt Cntrl Panel(s) | 9269 | -  | 1,500 | RG-62A/U coax      |
| Control Panel    | Computer Interface | 9841 | 24 | 1,500 | 1-pair w/shield    |
| Main Cntrl Panel | Rmt Cntrl Panel(s) | 9729 | 24 | 1,500 | 2-pair w/shield(s) |

### ADDITIONAL WIRING FOR PCS-PLUS (TEXT-BASED) COMPUTER CONTROL SYSTEM

|                  |                    |      |    |       |                    |
|------------------|--------------------|------|----|-------|--------------------|
| Control Panel    | Computer Interface | 9829 | 24 | 1,500 | 2-pair w/shield(s) |
| Main Cntrl Panel | Rmt Cntrl Panel(s) | 9829 | 24 | 1,500 | 2-pair w/shield(s) |

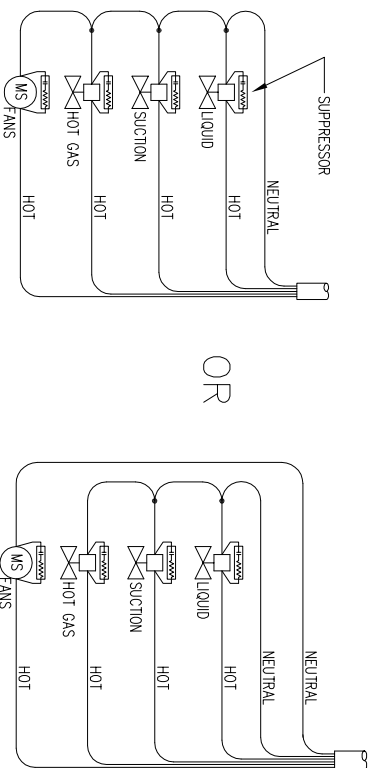
### \*EXTREME TEMPERATURE APPLICATIONS\* (BELDEN: -66°F - 312°F)

| WIRING BETWEEN POINT A | WIRING BETWEEN POINT B | BELDEN WIRE NUMBER | ALPHA WIRE NUMBER | AWG | MAXIMUM DISTANCE (FT) | DESCRIPTION     |
|------------------------|------------------------|--------------------|-------------------|-----|-----------------------|-----------------|
| Control Panel          | ICID Temp Sensors      | 83552              | 45192             | 22  | 2,000                 | 2-wire w/shield |
| Control Panel          | Press. Transducer      | 83653              | 45383             | 18  | 250                   | 3-wire w/shield |
| Control Panel          |                        | 83703              | 45363             | 16  | 350                   | 3-wire w/shield |
| Control Panel          |                        | -                  | 45450/3           | 14  | 500                   | 3-wire w/shield |
| Control Panel          | 4-20ma devices         | 83652              | 45382             | 18  | 2,000                 | 2-wire w/shield |

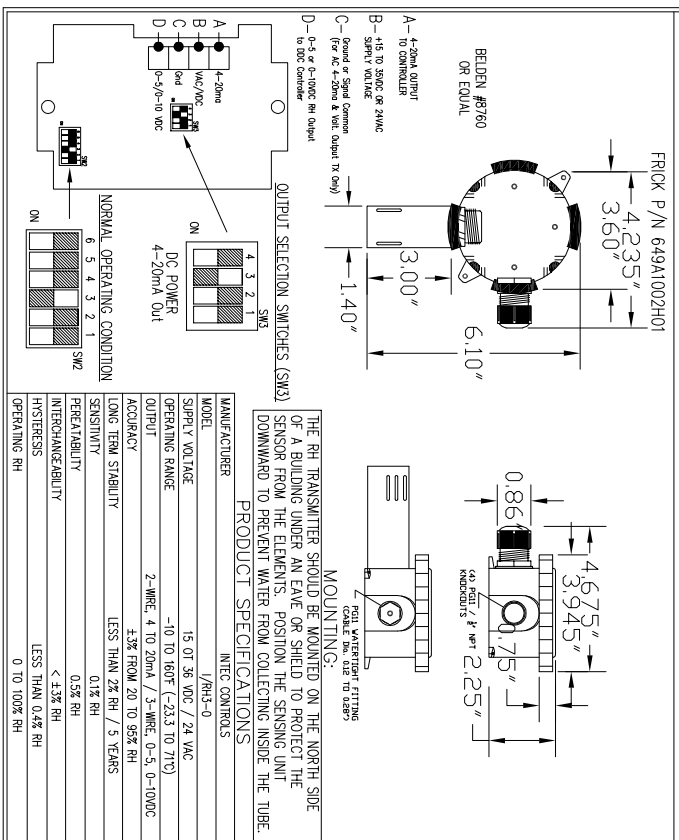
\*NOTE: TOTAL DISTANCE FROM THE MAIN CONTROL PANEL TO THE LAST COMPRESSOR MICROPROCESSOR IN THE PARALLEL DISTRIBUION NETWORK SHOULD NOT EXCEED 2000 FEET.  
 \*\*NOTE: THE MAXIMUM DISTANCE THE CONTROL WIRE CAN BE RUN IS DIRECTLY DEPENDENT UPON THE TEMPERATURE OF THE WIRE. ALWAYS CHECK WITH LOCAL CODES FOR CONTROL WIRING.  
 \*\*\*NOTE: THE WIRE TYPE REQUIRED BETWEEN THE MAIN CONTROL PANEL AND THE REMOTE CONTROL PANELS ON THE PCS-PLUS SYSTEM IS DEPENDENT UPON THE DESIGN OF THE SYSTEM.  
 CONSULT FRICK COMPANY FOR THE TYPE OF WIRE NEEDED.

## CONTROL GROUPS

WHEN RUNNING WIRES TO A CONTROL GROUP IT IS ACCEPTABLE TO RUN ONE NEUTRAL WIRE WHICH WILL BE SHARED BY ALL SOLENOIDS



## RELATIVE HUMIDITY TRANSMITTER



| PRODUCT SPECIFICATIONS |  |
|------------------------|--|
| MANUFACTURER           | INTEC CONTROLS                         |
| MODEL                  | I/RH3-0                                |
| SUPPLY VOLTAGE         | 15.0T 36 VDC / 24 VAC                  |
| OPERATING RANGE        | -10 TO 100% (-23.3 TO 212)             |
| OUTPUT                 | 2-WIRE 4 TO 20mA / 5-WIRE 0-5, 0-10VDC |
| ACCURACY               | ±3% FROM 20 TO 95% RH                  |
| LONG TERM STABILITY    | LESS THAN 2% RH / 5 YEARS              |
| SENSITIVITY            | 0.1% RH                                |
| INTERCHANGEABILITY     | < 1.5% RH                              |
| HYSTERESIS             | LESS THAN 0.4% RH                      |
| OPERATING RH           | 0 TO 100% RH                           |

## QLX-NET COMMUNICATIONS OVERVIEW & WIRING DETAILS

| DR      | CHK     | APPD    | DATE     |
|---------|---------|---------|----------|
| B. HESS | J. LONG | B. HESS | 06-27-07 |
|         |         |         | 07-20-07 |
|         |         |         | 07-20-07 |

| SIZE | CAGE CODE | DWG NO   |
|------|-----------|----------|
| D    | 23587     | 643D0022 |

SHEET 03 OF 04

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PURCHASER  
YORK ORD NO  
PURCH ORD NO

REV A

SCALE NONE

DR B. HESS

CHK J. LONG

APPD B. HESS

DATE 06-27-07

DATE 07-20-07

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