

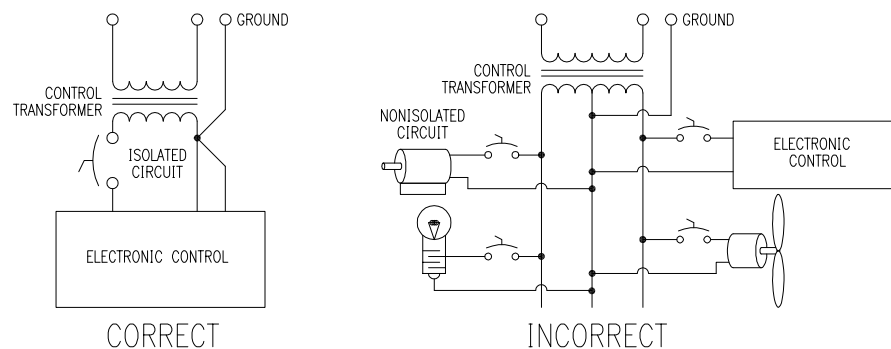
PROPER INSTALLATION OF ELECTRONIC EQUIPMENT IN AN INDUSTRIAL ENVIRONMENT

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 SAFE WIRING PRACTICES, BUT IT DOES NOT DEAL WITH PROCEDURES USED FOR ELECTRONIC CONTROL INSTALLATION. USE THE FOLLOWING PROCEDURES FOR ELECTRONIC EQUIPMENT INSTALLATION. THESE PROCEDURES DO NOT OVERRIDE ANY RULES BY THE NEC, BUT ARE TO BE USED IN CONJUNCTION WITH THE NEC CODE. (SEE FRICK DOCUMENT #S90-400)

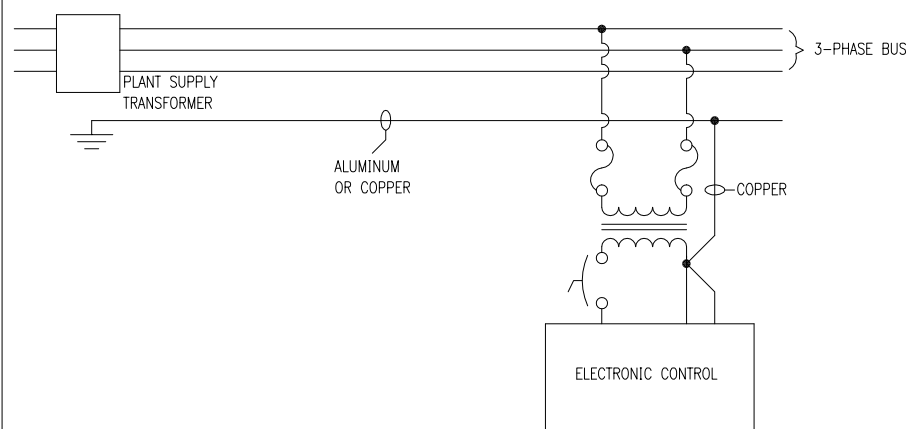
VOLTAGE SOURCE

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 GROUNDS 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. SEPERATE HIGH CURRENT, HIGH VOLTAGE WIRING INTO SEPERATE WIRE WAYS FROM AC CONTROL WIRING AND SENSOR WIRING.
- KEEP SEPERATE 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.
- NEVER ADD RELAYS, STARTERS, TIMERS, TRANSFORMERS, ETC. INSIDE AN ELECTRONIC CONTROL PANEL WITHOUT FIRST CONTACTING THE MANUFACTURER.

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)

WIRING BETWEEN POINT A	WIRING BETWEEN 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	ICTD Temp Sensors	8761	22	2,000	2-wire w/shield
Control Panel	RTD Temp Sensors	8772	20	1,000	3-wire w/shield
Control Panel	Press. Transducers	9365	18	250	3-wire w/shield
		9366	16	350	3-wire w/shield
		9367	14	500	3-wire w/shield
Control Panel	Intec 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 Vari-Level	8760	18	2,000	2-wire w/shield
Control Panel	Parker Level Controller	8760	18	2,000	2-wire w/shield
Control Panel	Manning NH3 Sensor	8770	18	1,500	3-wire w/shield
Control Panel	Manning ATMOS NH3 Sensor	8618	16	1,500	3-wire w/shield
Control Panel	AC Control Devices	-	14	**	Multi-strand
Control Panel/HUB	*Quantum "LX"	-	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	9463	20	8,000	A-B DH+ (blue hose)
Main Cntrl Panel	Rmt Cntrl Panel(s)	9463	20	8,000	A-B DH+ (blue hose)
Control Panel	Computer Interface	-	24	300	SHIELDED CAT-5E
Main Cntrl Panel	Rmt Cntrl Panel(s)	-	24	300	SHIELDED CAT-5E

ADDITIONAL WIRING FOR OPTO-22 COMPUTER CONTROL SYSTEM

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

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)

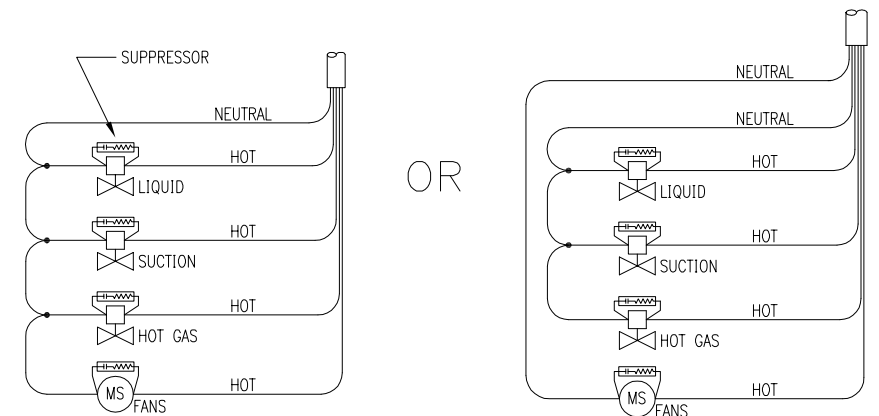
EXTREME TEMPERATURE APPLICATIONS (BELDEN: -66°F - 312°F)
(ALPHA: -52°F - 207°F)

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

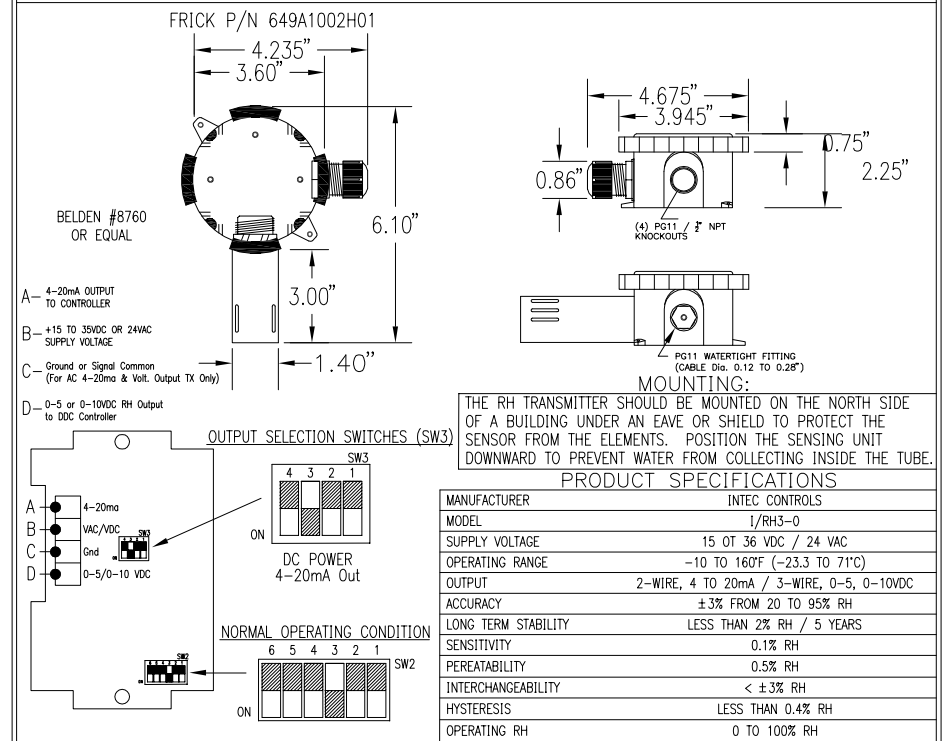
- * NOTE: TOTAL DISTANCE FROM THE MAIN CONTROL PANEL TO THE LAST COMPRESSOR MICROPROCESSOR IN THE PARALLEL "DAISY-CHAIN" COMMUNICATION NETWORK SHOULD NOT EXCEED 2,000 FEET.
- ** NOTE: THE MAXIMUM DISTANCE THE CONTROL WIRE CAN BE RUN IS DIRECTLY DEPENDANT UPON THE GAUGE OF THE WIRE USED. INSTALLING WIRE WITH A LOWER GAUGE WILL ALLOW THE MAXIMUM DISTANCE OF THE CONTROL WIRE RUN TO INCREASE. ALWAYS CHECK WITH LOCAL CODES FOR CONTROL WIRING.
- *** NOTE: THE WIRE TYPE REQUIRED BETWEEN THE MAIN CONTROL PANEL AND THE REMOTE CONTROL PANEL(S) ON THE OPTO-22 CONTROL SYSTEM IS DEPENDANT 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



PURCHASER		NOTICE TO PURCHASER REFER TO CONTRACT FOR MATERIAL TO BE SUPPLIED BY FRICK COMPANY. THE AMOUNT OF SUCH MATERIAL IS NOT INCREASED BY ANYTHING SHOWN UPON THIS DRAWING.	
FRICK ORD NO.	PURCH ORD NO.	York International Refrigeration - Frick Waynesboro, PA 17268	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE		TITLE PROPER INSTALLATION ELECTRONIC EQUIPMENT IN AN INDUSTRIAL ENVIRONMENT	
DEC SPL ± .06	DEC SPL ± .031	FRACT 1/32	ANGLE ± 1/2
DR BS HESS	29 JUN 00	SIZE D	CASE CODE 23587
CHK JM LONG	29 JUN 00	DWG NO. 649D4743	REV D
APPD AA IZER	29 JUN 00	SCALE N/A	SHEET 1 OF 2

PROPER INSTALLATION OF ELECTRONIC EQUIPMENT IN AN INDUSTRIAL ENVIRONMENT

TEMPERATURE SENSORS

ICTD TEMPERATURE WELL ASSEMBLY
FRICK P/N 639A0151G03

DIN CONNECTOR W/ M3 SCREW
1/2" NPT
SILICONE GASKET
3/4" NPT
WELL ELEMENT 639A0151G01
TEMPERATURE SENSOR 639A0151H01

PIN CODE
1 = + SUPPLY
2 = SIGNAL

NOTE:
REMOVE THE SHORTING JUMPER BETWEEN TERMINALS 1 AND 2 PRIOR TO WIRING.

TEMPERATURE WORKING RANGE - -55°C. TO 150°C.

ICTD TEMPERATURE SENSOR AD 590
FRICK P/N 640A0035H21 (STAINLESS STEEL) - IN WELL
FRICK P/N 640A0035H21 (STAINLESS STEEL) - OPEN ENVD

24 30 1
#22 AWG STRANDED COPPER WIRE
WHITE WIRE - POSITIVE
BLACK WIRE - NEGATIVE
HIGH ACCURACY PROBE 640A0035H22
0.300
0.315

ICTD TEMPERATURE SENSOR WITH STRAIN RELIEF
FRICK P/N 649A1006G01

24 30 1/2" NPT 0.625
#22 AWG STRANDED COPPER WIRE
WHITE WIRE - POSITIVE
BLACK WIRE - NEGATIVE
STRAIN, LOCKNUT, AND SEAL WASHER
FRICK PART # 649D4628G01
FRICK PART # 640A0035H21 (STAINLESS STEEL)
0.310 0.938

RTD TEMPERATURE SENSOR

RED
BLACK
WHITE
3 CONDUCTOR
TEFLON WIRE
ADHESIVE BACKED
PLASTIC MOUNTING CLIP
SPRING
300 SERIES
STAINLESS STEEL
25"

RTD TEMPERATURE TRANSMITTER

WHITE
BLACK
ADHESIVE BACKED
2-WIRE RTD
2-WIRE RTD

RTD TEMP SENSOR P/N 649A0236H50

OPERATING TEMPERATURE	-50 TO 375°F
OPERATING HUMIDITY	0 TO 100% RH, NON-CONDENSING
MAX CURRENT	<5mA
REFERENCE RESISTANCE	100 OHMS
RESPONSE TIME	25 SEC WITH AIRFLOW OF 1 METER/SEC

RTD TEMP TRANSMITTER P/N 649A0236H51

OPERATING TEMPERATURE	-50 TO 375°F
OPERATING HUMIDITY	0 TO 100% RH, NON-CONDENSING
MAX CURRENT	<5mA
REFERENCE RESISTANCE	100 OHMS
RESPONSE TIME	25 SEC WITH AIRFLOW OF 1 METER/SEC

TYPICAL TEMPERATURE SENSOR HOUSING METHODS

2" X 4" JUNCTION BOX
CONDUIT
BELDEN #8761 OR EQUAL
BLACK
WHITE
SHIELD (CUT OFF & TAPE)
THE CABLE SHIELD TO EARTH GROUND IN CONTROL PANEL

CONDUIT
CHASE LIQUIDTITE CORD CONNECTOR
SHIELD (CUT OFF & TAPE)
BLACK
WHITE
THE CABLE SHIELD TO EARTH GROUND IN CONTROL PANEL

TEMPERATURE SENSOR MOUNTING

TEMPERATURE PROBE SHOULD BE LOCATED IN AREA WHERE RETURNING AIR WILL BE MOST PREVALENT. PROBE SHALL BE GROUNDED TO CONDUIT AT PROBE END.

TYPICAL TEMPERATURE SENSOR LOCATION FOR EVAPORATOR CONTROL

PENTHOUSE AIR UNIT
RETURN AIR
1" TEMP PROBE
SUPPLY AIR
EMPIRATOR / COOLER
SUPPLY AIR
1" TEMP PROBE

TYPICAL TEMPERATURE SENSOR LOCATION FOR OUTSIDE AIR MONITORING

MOUNT UNDERNEATH A CONDENSER AND/OR AWAY FROM DIRECT SUN LIGHT

CONDENSER
2" X 4" OUTDOOR JUNCTION BOX
FRICK SUPPLIED TEMPERATURE PROBE WITH STRAIN RELIEF
RTV OR OTHER SEALANT
ROOF TOP
CONDUIT

TYPICAL TEMPERATURE SENSOR LOCATION FOR UNDERFLOOR MONITORING

FINISHED FLOOR
FOOTER
JUNCTION BOX
COLUMN
INSULATION
DIRT
SUBFLOOR
COVER
WELL

1. SLAB AND FOOTING CONDITIONS MAY VARY. CONSULT WITH STRUCTURAL DRAWINGS FOR ACTUAL CONDITIONS AND SENSOR LOCATIONS.
2. THE TEMPERATURE PROBE SHOULD BE BURIED TWO INCHES IN THE DIRT.

PRESSURE SENSORS

PRESSURE RANGES & PART NUMBERS

0 - 50 PSIA P/N 913A0110H03
0 - 100 PSIA P/N 913A0110H04
0 - 200 PSIA P/N 913A0124H01
0 - 300 PSIA P/N 913A0110H05
0 - 500 PSIA P/N 913A0124H02

PHYSICAL

BURST PRESSURE	2X FOR 0-100, 0-200, 0-300
MATERIAL IN CONTACT WITH MEDIA	DIN 17440-1.4404 (ANSI 316L)
SHOCK RESISTANCE	500g/ 1ms
VIBRATION RESISTANCE	20g's AT 25 TO 2000HZ (IEC 68-2-6)
WEIGHT	0.6lbs (9.6oz)
ENCLOSURE	IP67 (IEC 529)

ELECTRICAL

OUTPUT	5 ± 0.1 VDC AT 77°F (25°C)
EXCITATION VOLTAGE	9 TO 30VDC
SUPPLY CURRENT (NOMINAL)	<5mA
OUTPUT CURRENT (NOMINAL)	SOURCE = 0.5mA
REVERSE POLARITY PROTECTION	YES ON POWER INPUT & OUTPUT SHORT CIRCUIT PROTECTION
INSULATION RESISTANCE	>100 MEGOHMS AT 500VDC
RFI PROTECTION	TYPICALLY LESS THAN 1% FULL SCALE OUTPUT ERROR OVER THE FREQUENCY RANGE FROM 26 MHZ TO 1 GHZ AT FIELD STRENGTHS UP TO 10 VOLTS/METER

PERFORMANCE

MAXIMUM OPERATING PRESSURE	120PSIG FOR 0-50PSIG; 400PSIG FOR 0-100 & 0-200 600PSIG FOR 0-300PSIG; 800PSIG FOR 0-500
NON-LINEARITY	±0.2% FS; HYSTERESIS AND REPEATABILITY - ±0.1%
OPERATING TEMPERATURE RANGE	-40°F TO 185°F (-40°C TO 85°C)
COMPENSATED TEMPERATURE RANGE	LP: -30°C TO +40°C; HP: 0 TO +80°C
STORAGE TEMPERATURE	-50°C TO +85°C
THERMAL EFFECT ON ZERO	LESS THAN ±0.1% FS/10k (typ.) LESS THAN ±0.2% FS/10k (max)
THERMAL EFFECT ON SPAN	LESS THAN ±0.1% FS/10k (max.) LESS THAN ±0.2% FS/10k (max.)
RESPONSE TIME	<4ms

NOTES

NOTE 1: SOLID STATE SENSORS MUST BE ISOLATED FROM STAINLESS STEEL DIAPHRAGM TO PREVENT THERMAL RESPONSE TO REFRIGERANT FLASHING.
NOTE 2: RADIO FREQUENCY INTERFERENCE PROTECTION MUST BE PROVIDED.
NOTE 3: ANY DEVIATION TO THESE SPECIFICATIONS REQUIRES APPROVAL FROM FRICK ENGINEERING.
NOTE 4: DRAIN WIRE IS GROUNDED AT TRANSDUCER CAN, DO NOT GROUND AT CONTROL PANEL.
NOTE 5: IF TRANSDUCER IS TO BE USED TO MONITOR PUMP PRESSURE, INSTALL A SNUBBER P/N 531A0042H01

DANFOSS TYPE AKS 32

PIN CODE
1 = + SUPPLY
2 = DC COMMON
3 = SIGNAL
4 = GROUND

PRESSURE SENSOR MOUNTING

MOUNTING:
THE PRESSURE TRANSDUCER SHOULD BE MOUNTED ON THE TOP OF THE PIPE. AN ISOLATION VALVE SHOULD ALWAYS BE INSTALLED TO ACCOMMODATE TRANSDUCER REPLACEMENT. IF YOU ARE MONITORING A PUMPED LIQUID PRESSURE USE A SNUBBER.

TRANSUCER
BELDEN# 9367
SNUBBER
FRICK PART # 531A0042H01
ISOLATION VALVE

YORK Refrigeration

PROPER INSTALLATION ELECTRONIC EQUIPMENT IN AN INDUSTRIAL ENVIRONMENT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE

UNLESS OTHERWISE SPECIFIED TOLERANCES PER ASME Y14.5

DEC SPL ± .06	DEC SPL ± .031	FRACT ± 1/32	ANGLE ± 1/2
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DR BS HESS 29 JUN 00
CHK JM LONG 29 JUN 00
APPD AA IZER 29 JUN 00

SIZE D CASE CODE 23587 DWG NO 649D4743 REV D

SCALE N/A SHEET 2 OF 2

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Waynesboro, PA 17268