AIRTEMP INC.

MECHANICAL CONTRACTORS
11 WALLACE AVE.
S. PORTLAND ME 04106
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A COMFORT SYSTEMS USA COMPANY
QUALITY PEOPLE – BUILDING SOLUTIONS

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/16/13

SUBMITTAL

JOB: EYECARE MEDICAL GROUP ADDITION
DATE: 11/20/13
LOCATION: 53 SEWALL ST. PORTLAND MAINE
MECHANICAL CONTRACTOR: AIRTEMP INC.
ENGINEER: ALLIED ENGINEERING
AIRTEMP JOB NUMBER: 515
*****

Submittal

Trane U

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Inspections Division
Approved with Conditions

Date: 12/16/13

Engineer: Allied Engineering Inc

Date: November 18, 2013

Prepared For:
Airtemp Incorporated
11 Wallace Avenue
South Portland, ME 04106
Customer P.O. Number: 14347
Customer Project Number:

Job Name:
Eyecare Medical Group
53 Sewall Street
Portland, ME 04102
Job Number: A223355

Trane is pleased to provide the enclosed submittal for your review and approval.

AIR COOLED CHILLER

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Dan Broderick
Trane U.S. Inc. dba Trane
860 Spring Street, Unit #1
Westbrook, ME 04092-3824
Phone: (207) 828-1777
Fax: (207) 828-1511
E-Mail: djbroderick@trane.com

Qty	Description	Tag
	Air Cooled Chiller	
1	Trane Model CGAM080F 80 Ton Air-Cooled Chiller	AC

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Tag Data - Air-Cooled Scroll (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	ACC-2	1	CGAM080F - 80 Ton	CGAM080F2**2AXD2A1A1A1AXXA1D1A4D1X-C-X

Product Data - Air-Cooled Scroll

Item: A1 Qty: 1 Tag(s): ACC-2

Air-Cooled Scroll Packaged Chiller
80 nominal tons
460 volt 3 phases 60 hertz
High efficiency/performance
Full factory refrigerant charge (HFC-410A)
With freeze protection (External T-STAT control)
Refrigerant isolation valves (discharge valve)
UL listed to US and Canadian safety std
ASHRAE 90.1 all versions compliant
AHRI certified
Factory installed flow switch - set point 15 cm/sec
Standard cooling (42 to 65F/5.5 to 18C)
Grooved pipe connection
Factory insulation - all cold parts
Performance based on propylene glycol – 30%
Wide ambient (0 to 125F/-18 to 52C)
Lanced aluminum fins
Across the line starter/direct on line
Single point power connection
Circuit breaker-high fault rated control panel
Enclosure type UL 1995 rated for outdoor applications
BACnet interface
High A short circuit rating
With water strainer factory installed
Comprehensive acoustic package
Architectural louvered panels
5 year parts warranty (whole unit)
1st year labor warranty
Startup Included - Trane Service must start equipment for warranty to be honored

Mechanical Specifications - Air-Cooled Scroll
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General
Units are constructed of a galvanized steel frame with galvanized steel panels and access do are finished with a powder-coated paint. All paint meets the requirement for outdoor equipme other Federal Government Agencies. This paint finish is durable enough to withstand a 1000- spray application in accordance with standard ASTMB117.

Each unit ships with full operating charges of refrigerant and oil.

Compressor and Motor
The unit is equipped with four hermetic, direct-drive, 3600 rpm 60 Hzsuction gas-cooled scroll compressors. The simple design has only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency. Overload protection is internal to the compressors. The compressor includes: centrifugal oil pump, oil level sight glass and oil charging valve. Each compressor will have compressor heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Unit-Mounted Starter
The control panel is designed per UL 1995. The starter is in an across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor and control panel. Typically, Trane scroll compressors are up to full speed in one second when started across-the-line.

A factory-installed, factory-wired 820 VA control power transformer provides all unit control power (120 Vac secondary) and Trane CH530 module power (24 Vac secondary).

A molded case high interrupting capacity circuit breaker, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Power Connection
Power connections include main three-phase power and one separate 120V, 15 amp customer provided single phase power connection is required to power the heaters (if used for freeze protection).

Short circuit current rating of 65 kA is provided.

Evaporator
Braze plate evaporator is made of stainless steel with copper as the braze material. It is designed to withstand a refrigerant side working pressure of 430 psig (29.6 bars) and a waterside working pressure of 150 psig (10.5 bars). Evaporator is tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure. It has one water pass. A water strainer and a flow switch are factory installed.

Immersion heaters protect the evaporator to an ambient of -20°F (-29°C).

Condenser
Air-cooled condenser coils have lanced aluminum fins mechanically bonded to internally-finned copper tubing.

The condenser coil has an integral subcooling circuit. The maximum allowable working pressure of the condenser is 650 psig (44.8 bars). Condensers are factory proof and leak tested at 715 psig (49.3 bars).

Direct-drive vertical discharge condenser fans are balanced and individually protected. Three-phase condenser fan motors with permanently lubricated ball bearings and external thermal overload protection are provided.

A variable speed drive on the first fan of each circuit allows the unit to start and operate with ambient temperatures between 0.0 F and 125.0 F.

Refrigerant Circuits
The unit has dual refrigerant circuits. Each refrigerant circuit has Trane scroll compressors piped in parallel with a passive oil management system. A passive oil management system maintains proper oil levels within compressors and has no moving parts. Each refrigerant circuit includes filter drier, electronic expansion valve, liquid line and discharge service valves. Capacity modulation is achieved by turning compressors on and off. The unit has four capacity stages.

Unit Controls
The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a

pre-wired control power transformer, and will turn on and off compressors to meet the load. M
chilled water reset based on return water is standard. The unit comes with a factory installed

The Trane CH530 microprocessor automatically acts to prevent unit shutdown due to abnorm
associated with low evaporator refrigerant temperature and high condensing temperature. If a
condition continues and the protective limit is reached, the machine will shut down.

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The panel includes machine protection for the following conditions: low evaporator refrigerant
pressure, high condenser refrigerant pressure, critical sensor or detection circuit faults, lost c
modules, phase loss, phase reversal, over temperature protection, external and local emerge
evaporator water flow.

When a fault is detected, the control system conducts more than 100 diagnostic checks and displays results. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message.

Data contained in available reports includes: water and air temperatures, refrigerant pressures and temperatures, flow switch status, EXV position, and compressor starts and run-time. All necessary settings and setpoints are programmed into the microprocessor-based controller via the operator interface. The controller is capable of receiving signals simultaneously from a variety of control sources, in any combination, and priority order of control sources can be programmed.

Communications
BACNet Interface allows the user to easily interface using BACNet MS/TP via a single twisted-pair wiring to a factory-installed and tested communication board.

Comprehensive Acoustic Package
Acoustical treatment for compressors is factory installed.

Architectural Louvered Panels
Louvered panels cover the complete condensing coil and service area beneath the condenser.

Performance Data - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): ACC-2

Eyecare Medical Group
Portland ME
(B16)Daniel Broderick

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Tag	ACC-2
Model Number	CGAM 80
Quantity	1
Product Version	154
Unit nominal tonnage	80 tons
Unit type	High efficiency

General Information

Sound attenuator package	Comprehensive package	IPLV	15.6 EER
Refrigerant	R410A	NPLV	15.7 EER
Capacity	76.30 tons	Sound power level	91 dBA
Full load efficiency	10.2 EER	Sound pressure level *	64 dBA

Note: * At 30 feet in free field.

Evaporator Information

Evaporator application	Std cooling	Fouling factor	0.00010 hr-sq ft-deg F/Btu
Entering temperature	54.00 F	Saturated temperature-ckt 1	36.10 F
Leaving temperature	44.00 F	Saturated temperature-ckt 2	36.10 F
Fluid flow rate	192.60 gpm	Minimum flow rate	114.70 gpm
Pressure drop	17.80 ft H2O	Pressure drop at min flow rate	7.90 ft H2O
Total PD evap+strainer	21.20 ft H2O	Maximum flow rate	275.30 gpm
Evap fluid type	Propylene glycol	Pressure drop at max flow rate	42.20 ft H2O
Evap fluid freeze point	9.30 F	Freeze protection (factory inst)	Ext. t-stat control
Evap fluid concentration	30.00 %		

Condenser Information

Unit application	Wide ambient	Total fan FLA	20.20 A
Ambient air temperature	95.00 F	Total airflow	57024 cfm
Elevation	0.00 ft	Fin material	Lanced aluminum
Number of fans	6.00 Each	Saturated temperature-ckt 1	121.80 F
Fan motor power	7.20 kW	Saturated temperature-ckt 2	121.80 F

Compressor Information

			RLA	LRA
Number of compressors	4			
Number of circuits	2	Compressor A	33.00 A	215.00 A
Capacity steps	4	Compressor B	33.00 A	215.00 A
Total compressor power	81.80 kW	Compressor D	33.00 A	215.00 A
		Compressor E	33.00 A	215.00 A

11/18/2013 Product Version 154

Performance Data - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): ACC-2

Eyecare Medical Group
Portland ME
(B16)Daniel Broderick

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Tag	ACC-2
Model Number	CGAM 80
Quantity	1
Product Version	154
Unit nominal tonnage	80 tons
Unit type	High efficiency

Electrical Information

			MCA	MOP
Unit voltage	460 volt 3 phases			
Unit hertz	60 hertz	Single point power	162.20 A	175.00 A
Short circuit	High	Incoming power line connection	Single point	
Short circuit rating	65000.00 A	Starter type	Across the line	
Unit power	89.40 kW			

Note: Unit power includes: compressors, condenser fans, and control kW

Evaporator contains a glycol or other secondary coolants for freeze protection with a leaving chilled fluid temperature above 32°F and is certified in accordance with the AHRI Air-Cooled Water Chilling Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) when tested with water at Standard Rating Conditions. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Physical Information

Length	143.100 in	Water connections	4.000 in
Width	89.000 in	Refrigerant charge circuit 1	74.0 lb
Height	92.400 in	Refrigerant charge circuit 2	74.0 lb
Operating weight	5692.2 lb	Oil charge circuit 1	3.54 gal
Shipping weight	5607.3 lb	Oil charge circuit 2	3.54 gal

Information for LEED Projects

ASHRAE 90.1/CSA compliance	All versions	Full load efficiency	10.2 EER
Refrigerant charge circuit 1	74.0 lb	IPLV	15.6 EER
Refrigerant charge circuit 2	74.0 lb	Total compressor power	81.80 kW
Rated capacity (AHRI)	78.20 tons	Fan motor power	7.20 kW

Note: This product meets the minimum efficiency requirements of ASHRAE Standard 90.1 and CANS/CSA C743 for all versions (which are based on AHRI standard rating conditions) and, therefore, also meets the LEED "Minimum Energy Performance" prerequisite in the Energy and Atmosphere section. The efficiencies and power data listed above are at actual user-entered conditions. Refer to the product catalog for performance at AHRI standard rating conditions.

The LEED Green Building Rating System™, developed by the U.S. Green Building Council, provides independent, third-party verification that a building project meets green building and performance measures.

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Unit Dimensions - Air-Cooled Scroll
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ISOMETRIC VIEW

BACK VIEW

TOP VIEW

RIGHT SIDE VIEW

FRONT VIEW

INLET/OUTLET WATER CONNECTION SIZE	4" (100mm)
BRAZE PLATE WATER VOLUME/STORAGE	7.0 GAL (26.5 LITERS)

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RIGHT SIDE VIEW

Unit Dimensions - Air-Cooled Scroll
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TOP VIEW
CONDENSER, CONTROL PANEL AND
VSD (WHEN ORDERED) REMOVED FOR CLARITY

Unit Dimensions - Air-Cooled Scroll
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FRONT VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY

Unit Dimensions - Air-Cooled Scroll
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BACK VIEW

Unit Dimensions - Air-Cooled Scroll
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ISOMETRIC VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY

Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
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UNIT CENTER OF GRAVITY

LIFTING WEIGHTS				
W1	W2	W3	W4	SHIPPING WEIGHT
1811.3 lb	1968.7 lb	832.0 lb	904.3 lb	5607.3 lb

SIDE VIEW

FRONT VIEW
CONTROL PANEL END

Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
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UNIT CLEARANCE

NO OBSTRUCTIONS ABOVE THE CONDENSER

TOP VIEW

FOR OBSTRUCTIONS OR MULTIPLE UNITS, REFER TO THE CLOSE SPACING BULLETIN.

Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
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ISOMETRIC VIEW

UNIT RIGGING

LIFTING A UNIT WITH EQUAL LENGTH STRAPS WILL NOT PRODUCE A LEVEL UNIT DURING THE LIFT BECAUSE THE CG WILL NOT BE AT THE MIDPOINT BETWEEN THE BASE LIFTING HOLES. THE FOLLOWING ADJUSTMENTS MUST BE MADE TO PRODUCE A LEVEL LIFT:

- SINGLE SPREADER BAR LIFTING METHOD
IF THE UNIT CG IS CLOSER TO THE CONTROL PANEL, THE STRAPS ON THE CONTROL PANEL SIDE OF THE SPREADER BAR MUST BE ADJUSTED TO BE SHORTER THAN THOSE ON THE OPPOSITE SIDE OF THE SPREADER BAR, ALLOWING THE SPREADER BAR TO MOVE TOWARD THE CONTROL PANEL AND OVER THE UNIT CG. SEVERAL ADJUSTMENTS OF THE STRAP LENGTH MAY BE REQUIRED TO PRODUCE A LEVEL UNIT DURING LIFT.

- H-TYPE SPREADER BAR LIFTING METHOD
IF THE STRAPS FROM THE H BAR TO THE UNIT BASE ARE THE SAME LENGTH, THE CRANE LIFTING POINT ON THE CENTER WEB OF THE H BAR MUST BE ADJUSTED TO PRODUCE A LEVEL UNIT LIFT.

⚠ WARNING

IMPROPER LIFTING AND MOVING!

USE SPREADER BAR AS SHOWN IN DIAGRAM. REFER TO INSTALLATION MANUAL OR NAMEPLATE FOR UNIT WEIGHT. REFER TO INSTALLATION INSTRUCTIONS LOCATED INSIDE CONTROL PANEL FOR FURTHER RIGGING INFORMATION.

OTHER LIFTING ARRANGEMENTS COULD RESULT IN DEATH, SERIOUS INJURY OR EQUIPMENT DAMAGE.

Accessory - Air-Cooled Scroll
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SHORT CIRCUIT RATING	65kA

CUSTOMER WIRE SELECTION TABLE			
POWER WIRE CONNECTION TO CIRCUIT BREAKER (1Q1)			
UNIT SIZE	UNIT EFF	VOLTAGE	CIR 1 & 2 (SINGLE POINT POWER) LUG WIRE SIZE RANGE (PER PHASE)
080	HIGH	460	(1 MAX Conductor per phase) 3/0-350MCM

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UNIT SIZE	MOUNTING LOCATIONS & POINT LOAD WEIGHTS								TOTAL OPERATING WEIGHT
	1	2	3	4	5	6	7	8	
080	1434.8 lb	1662.1 lb	774.3 lb	885.5 lb	395.7 lb	448.8 lb	N/A	N/A	5692.2 lb

MOUNTING HOLE DIAMETER 19mm

DIMENSIONS ARE REFERENCED FROM
THE END AND SIDE OF THE UNIT BASE

TOP VIEW

Field Wiring - Air-Cooled Scroll
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Field Wiring - Air-Cooled Scroll
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WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.

USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.

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Field Wiring - Air-Cooled Scroll
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1. SINGLE SOURCE POWER IS PROVIDED AS STANDARD ON THESE PRODUCTS, FIELD CONNECTIONS ARE MADE TO 1X1, OR 1Q2.
2. FOR VOLTAGES 200V/60HZ, 220V/50HZ, 380V/60HZ, 460V/60HZ, WIRE 26A SHALL BE CONNECTED TO H2. FOR VOLTAGES 230V/60HZ & 575V/60HZ, WIRE 26A SHALL BE CONNECT TO H3. 400V/50HZ UNIT IS FACTORY WIRED WITH 26A CONNECTED TO H3 - RECONNECT WIRE 26A TO H2 FOR 380V/50HZ, OR H4 FOR 415V/50HZ. H4 IS ONLY AVAILABLE WITH 400V/50HZ PANELS.
3. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP (PTYP=NONE). THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY (PTYP=DHHP).
4. CUSTOMER SUPPLIED POWER 115/60/1 OR 220/50/1 TO POWER RELAYS. MAX. FUSE SIZE IS 20 AMPS. GROUND ALL CUSTOMER SUPPLIED POWER SUPPLIES AS REQUIRED BY APPLICABLE CODES. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.
5. WIRED TO NEXT UNIT. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
6. WIRED TO TRACER OR OTHER TRANE REMOTE DEVICE. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
7. WIRED TO CUSTOMER CHILLED WATER SET POINT 2-10V OR 4-20mA.
8. WIRED TO CUSTOMER EXTERNAL DEMAND LIMIT 2-10V OR 4-20mA.
9. WIRED TO CUSTOMER 2-10V OR 4-20mA % CAPACITY ANNUNICIATOR.
10. WIRED TO TRACER OR OTHER REMOTE DEVICE.
11. REFER TO CGAM ELECTRICAL SCHEMATIC FOR SPECIFIC ELECTRICAL CONNECTION INFORMATION AND NOTES PERTAINING TO WIRING INSTALLATION.
12. ALL UNIT POWER WIRING MUST BE 600 VOLT COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE INSULATION RATING OF 90 DEGREE C. REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION DEVICE. PROVIDE AN EQUIPMENT GROUND IN ACCORDANCE WITH APPLICABLE ELECTRIC CODES. REFER TO WIRE RANGE TABLE FOR LUG SIZES.
13. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL REQUIREMENTS.
14. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. EXCEPT AS NOTED, ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG OR DIN RAIL MOUNTED SPRING FORCE TERMINALS.
15. UNIT PROVIDED DRY CONTACTS FOR THE CONDENSER/CHILLED WATER PUMP CONTROL. RELAYS ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR $\frac{1}{2}$ HP, 7.2 FLA AT 120 VOLTS 60 HZ, CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY 240 VOLTS.
16. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS RECOMMENDED.
17. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP. THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY. CUSTOMER SUPPLIED POWER 115V, 60Hz, 1PH.
18. CUSTOMER SUPPLIED 3 PHASE POWER.
19. OPTIONAL FIELD ASSIGNED PROGRAMMABLE RELAYS (STAT=PRLY). CLASS 1 FIELD WIRED MODULE, RELAY AT 120V: 7.2A RESISTIVE 2.88A PILOT DUTY, 1/2 HP 7.2FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
20. WIRED TO CUSTOMER 0-10 VDC PUMP SPEED SIGNAL.
21. WHEN FACTORY PROVIDED PUMP IS NOT SELECTED. CUSTOMER MUST SUPPLY SUITABLE PUMP SYSTEM. REFER TO PUMP MANUFACTURER FOR WIRING REQUIREMENTS.
22. THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVED THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.
23. 1A15, LCI MODULE USED WHEN (COMM = LCI).
24. 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).