Gardner Denver

CQGF3409
Version: 02
November 29, 2018

Medical Scroll Compressor

Meditrol-Plus Control System

USER'S MANUAL

WARNING – PROHIBITION – MANDATORY LABEL INFORMATION

Gardner Denver Scroll compressors are the result of advanced engineering and skilled manufacturing. To be assured of receiving maximum service from this machine, the owner must exercise care in its operation and maintenance. This book is written to give the operator and maintenance department essential information for day-to-day operation, maintenance and adjustment. Careful adherence to these instructions will result in economical operation and minimum downtime.

Boxed text formats are used, within this manual, to alert users of the following conditions:

Safety Labels are used, within this manual and affixed to the appropriate areas of the compressor package, to alert users of the following conditions:

⚠ DANGER

Indicates a hazard with a high level of risk, which if not avoided, WILL result in death or serious injury.

Equipment Starts Automatically

Health Hazard – Explosive Release of Pressure

Cutting of Finger or Hand Hazard – Rotating Impeller Blade

High Voltage – Hazard of Shock, Burn, or Death Present until Electrical Power is Removed

Cutting of Finger or Hand Hazard – Rotating Fan Blade

Entanglement of Fingers or Hand/Rotating Shaft

⚠ WARNING

Indicates a hazard with a medium level of risk which, if not avoided, <u>COULD</u> result in death or serious injury.

Asphyxiation Hazard – Poisonous Fumes or Toxic Gases in Compressed Air

⚠ CAUTION

Indicates a hazard with a low level of risk which, if not avoided, <u>MAY</u> result in a minor or moderate injury.

Burn Hazard – Hot surface

PROHIBITION/MANDATORY ACTION REQUIREMENTS

Do not Operate Compressor with Guard Removed

Lockout Electrical Equipment in De-Energized State

Do Not Lift Equipment with Hook – No Lift Point

Loud Noise Hazard – Wear Ear Protection

Handle Package at Forklift Points Only

Read the Operator's Manual Before Proceeding with Task

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious. Some general safety precautions are given below:

Failure to observe these notices will result in injury to or death of personnel.

- **Keep fingers and clothing away from rotating fan, drive coupling/belting, etc.**
- **Disconnect the compressor unit from its power source, lockout and tagout before working on the unit – this machine is automatically controlled and may start at any time.**
- **Do not loosen or remove the belt covers, or break any connections, etc., in the compressor air system until the unit is shut down and the air pressure has been relieved.**
- **Electrical shock can and may be fatal.**
- **Perform all wiring in accordance with the National Electrical Code (NFPA-70) and any applicable local electrical codes. Wiring and electrical service must be performed only by qualified electricians.**
- **Open main disconnect switch, lockout and tagout and check for voltage before working on the control.**

Failure to observe these notices could result in damage to equipment.

- **Stop the unit if any repairs or adjustments on or around the compressor are required.**
- **Do not use the air discharge from this unit for breathing unless used in accordance with NFPA99 compliant Level 1 Medical Air Supply and Filtration Systems.**
- **An Excess Flow Valve should be on all compressed air supply hoses exceeding 1/2 inch inside diameter (OSHA Regulation, Section 1926.302).**
- **Do not exceed the rated maximum pressure values shown on the nameplate.**
- **Do not operate unit if safety devices are not operating properly. Check periodically. Never bypass safety devices.**

TABLE OF CONTENTS

SECTION 1
REVISION HISTORY

Version	Date	Notes
00	February 29, 2016	First release
01	December 8, 2016	Added panel wiring diagrams to Appendix A

SECTION 2
GENERAL INFO – Meditrol-Plus Control

The Meditrol-Plus control system employs a PLC (programmable logic controller) as the central processor for system operations and functions. The operator interface is a color touchscreen HMI (Human Machine Interface) that displays system information, allows for setup and configuration, and is used to operate the equipment package. The PLC and HMI communicate via Ethernet IP through a switch installed in the control cabinet. The controller provides for external Ethernet connectivity to a Building Automation System and direct Web-Server access.

2.1 Compliance

The Meditrol-Plus control panel and system operations comply with the following agencies and standards:

- ✓ NFPA-99 Level 1 Medical
- ✓ UL-508a
- ✓ cULus

2.2 Features

- ✓ PLC controlled
- ✓ Low voltage 24VDC operation with redundant 24VDC power supplies
- ✓ Redundant 120VAC transformers for Desiccant Dryer Control
- ✓ Analog inputs to support analog pressure transducers, PT1000 RTDs, dew point transducer, and CO transmitter
- ✓ Secured Data (SD) Card slot
- ✓ 5.7” (640x480) full color TFT LCD with LED back light
- ✓ Touch screen
- ✓ Easy to use, intuitive screen navigation and menu structure
- ✓ Three level password protection scheme

3.1 Home Screen

The *Home* screen is the primary source of basic system status and operation. It includes system discharge pressure, system state, dew point, CO monitor level, total system hours, and the lead alternation timer. An annotated image of the *Home* screen is shown below in Figure 3-1.

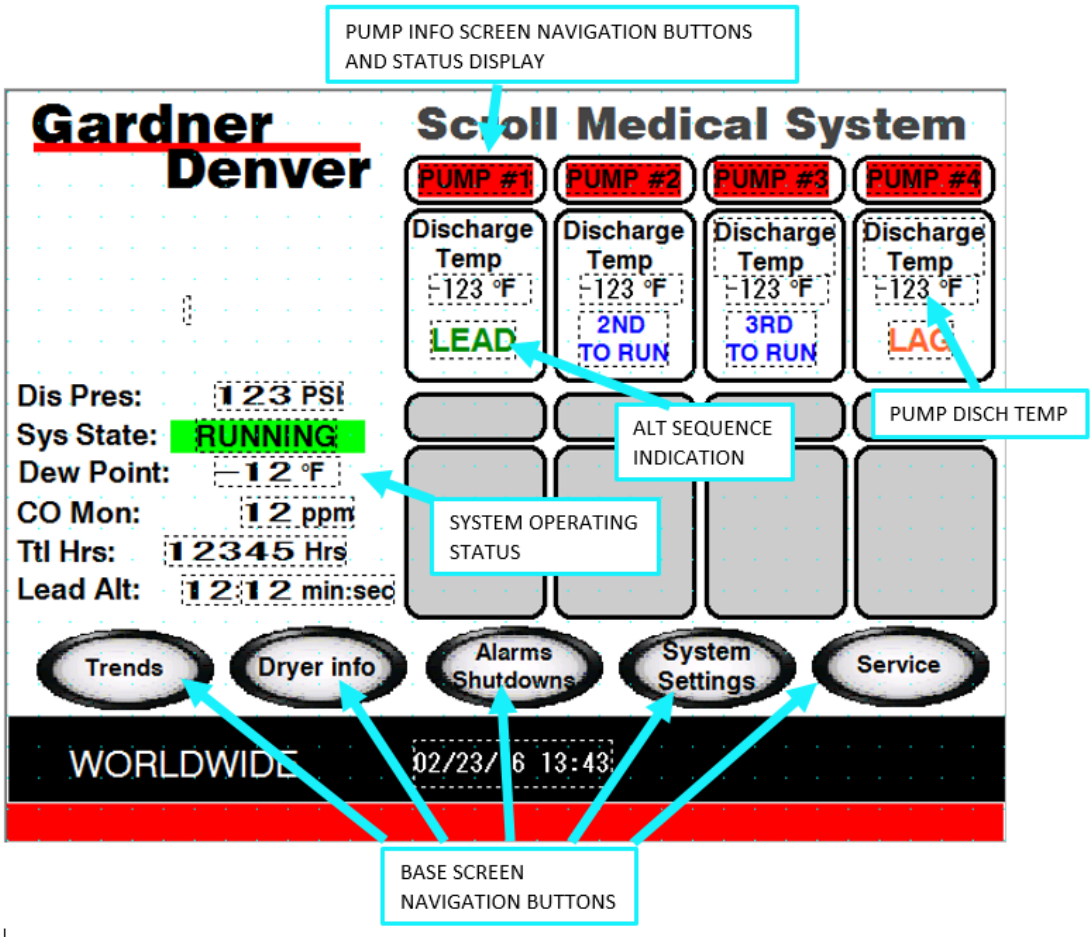


Figure 3-1: Home Screen

From the Home screen the user can use the Navigational Buttons found towards the bottom of the screen to access the *Trends, Dryer Info, Alarms/Shutdowns, System Settings*, and *Service* screens. Each of these screens functionalities are detailed in the sections below. Additionally from the home Screen the user can access individual pump screens for each Scroll pump. The individual pump screens provide operational information for each pump in the system. An example of the individual pump screen is shown in the figure below. It provides the user with the status of the pump, its order in the running sequence, discharge air temperature, run hours, and maintenance status.

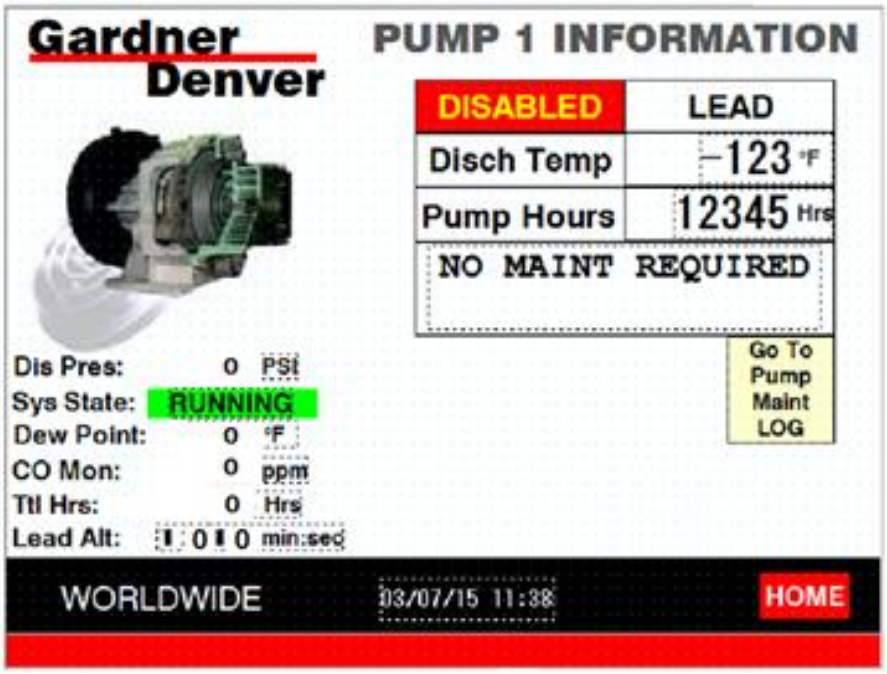


Figure 3-2: Pump Info Screen

3.2 Trends

Selecting the *Trends* button from the *Home* screen will navigate to the *Trends Screen*. This screen allows the user to see historical analog sensor data in a graphical format. You must first select the preferred Time Period for the trended data. Then select the select the sensor data you wish to view.

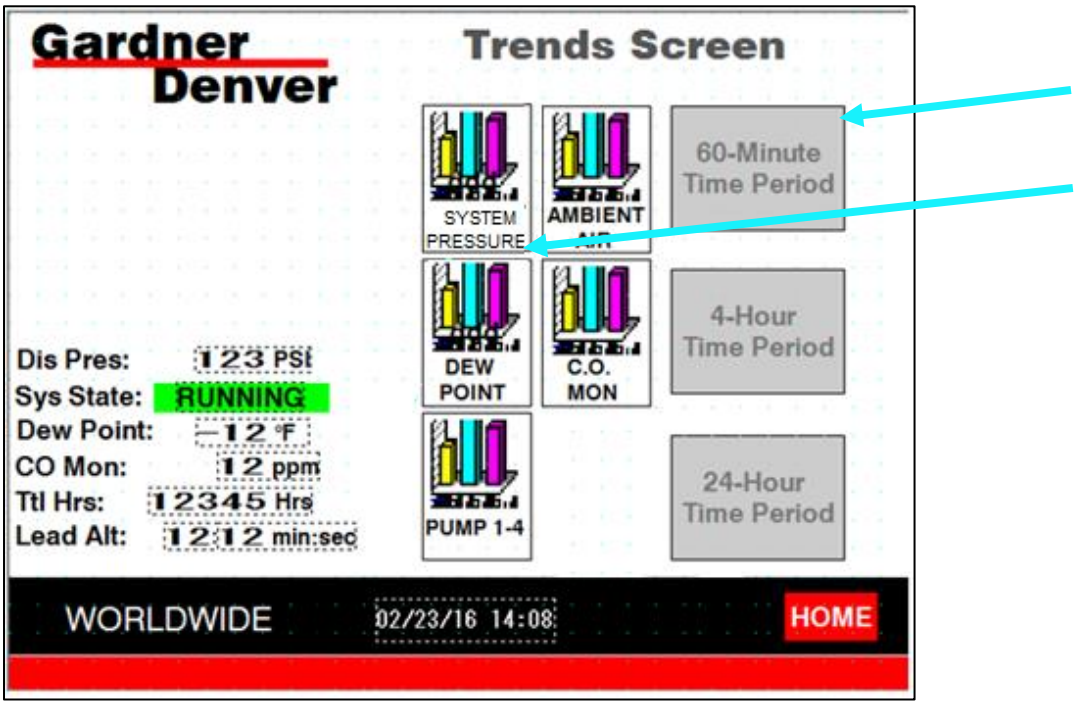


Figure 3-3: Trend Screen

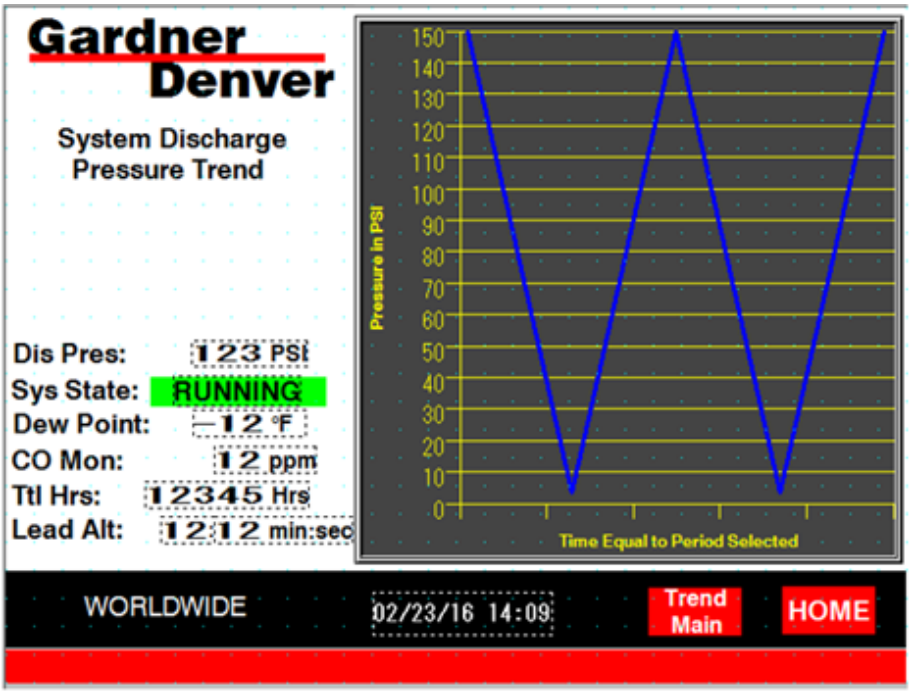


Figure 3-4: Pressure Trend Screen

3.3 Dryer Info

Selecting the *Dryer Info* button from the *Home* screen will navigate to the *Dryer Info Screen*. Here the user can select which dryer to activate by selecting the colored status indicator at the center of the dryer image. Selecting this indicator opens the *Dryer Operation* window where the user can Enable/Disable the dryer and Enable/Disable the purge saver mode for that dryer. With the purge saver mode disabled the dryer will continue to run its timed purge cycles independent of the dew point reading. With the Purge saver mode enabled the dryer will stop purging when the dew point drops below the *Purge Saver Activation* level and continue to purge when the dew point surpasses the *Purge Saver Deactivation* level. The purge saver activation/deactivation set points are found on the *System Settings Screen*, **Section 3.5.**

NOTE: On Medical Scroll systems utilizing a remote dryer module there is an additional dryer A/B selection switch that must be operated to select the desired dryer in conjunction with the dryer A/B settings on the HMI.

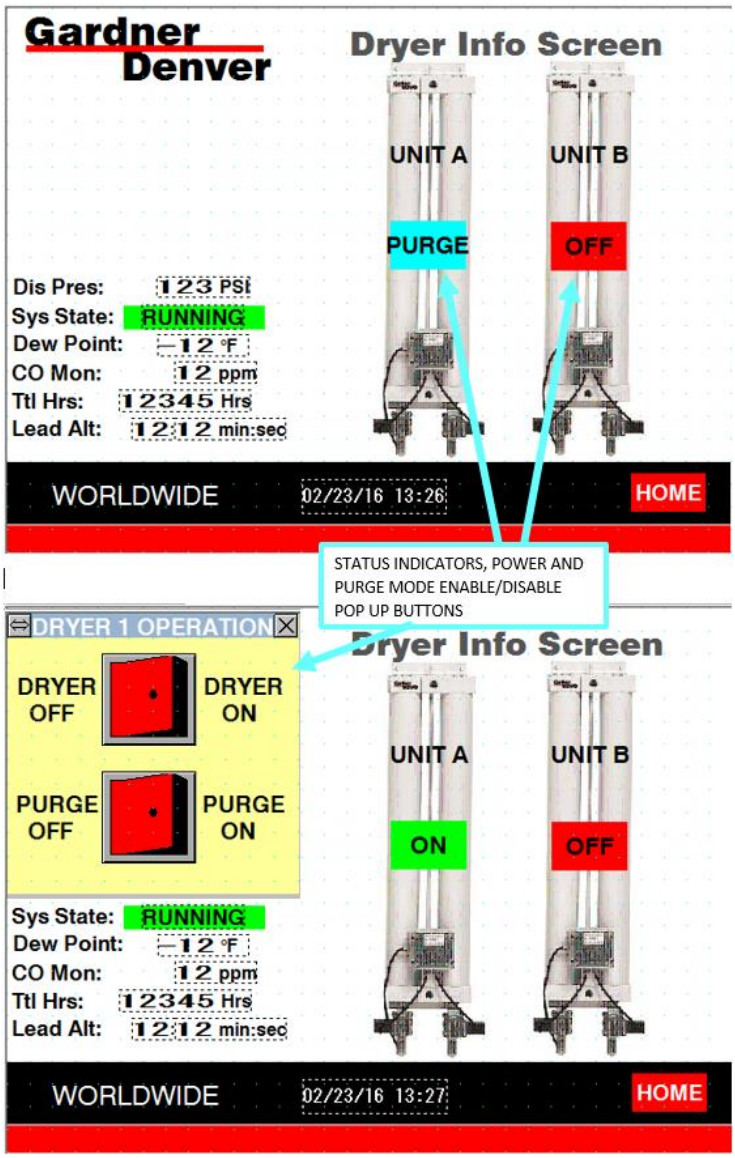


Figure 3-5: Dryer Screens

3.4 Alarms/Shutdowns

Selecting the *Alarms/Shutdowns* button from the *Home* screen will navigate to the *Alarm* Screen. Here the user can see the most current active alarm/shutdown. The screen provides the following information about the alarm:

- Condition: *"Alarm", "Alert", "Mnt Req"*
- Alarm Number
- Device: *"Pump", "Monitor", "Transformer", "Power Supply", "Pressure", "Ambient"*
- Description: The cause of the alarm
- Status: Displays if the device in alarm is "Shutdown" or "Active"
- Discharge Pressure at time of alarm
- Ambient Temp at time of alarm
- Dew Point at time of alarm
- CO Level at time of alarm
- Pump Discharge Temp at time of alarm

The *Ackn. & Silence* button will quiet the audible alarm horn. Once the condition causing the alarm is cleared, the *Reset* button must be pressed to re-active the device in alarm. All alarms are recorded with a time and date in the alarm log, to view this press the *Alarm LOG* button.

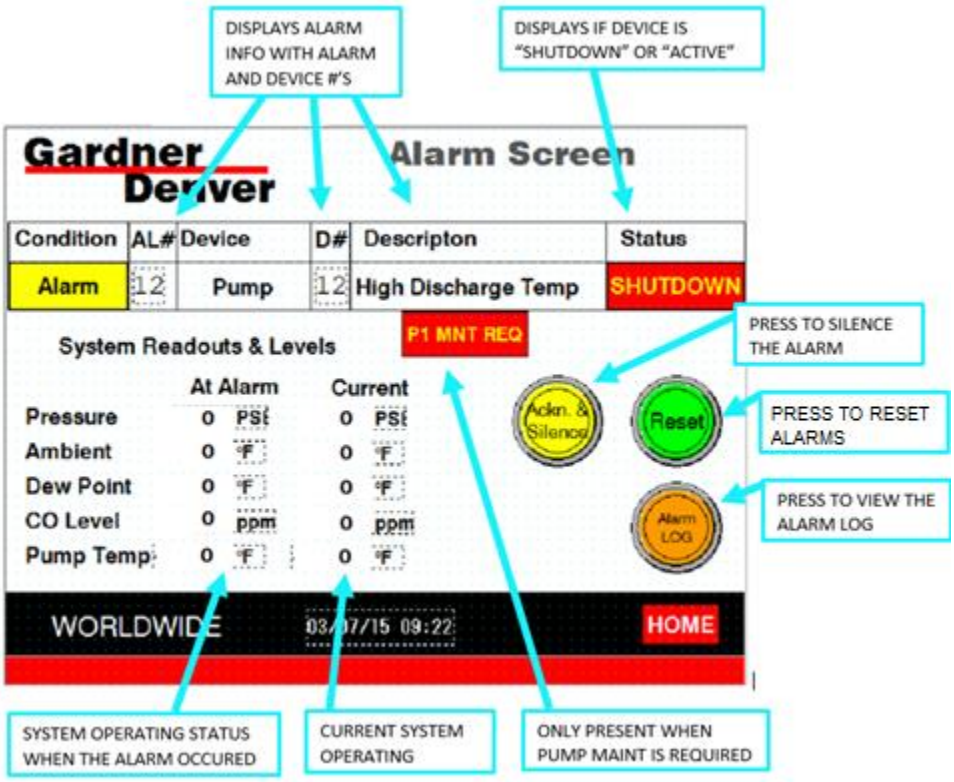


Figure 3-6: Alarm Screen

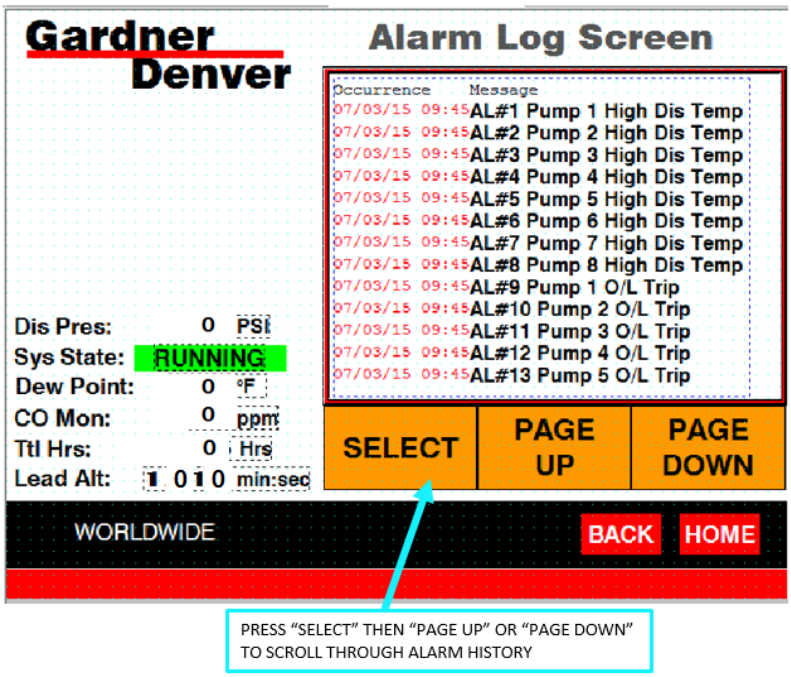


Figure 3-7: Alarm Log

3.5 System Settings

From the *Home* screen the *Systems Settings* screen can be accessed by clicking on the System Settings button in the navigational banner. After pressing the button, the user will be prompted for a Password to login. There is a three tiered accessibility level structure: MAINTENANCE, DISTRIBUTOR, and FACTORY. Each level has its own associated password that will provide different amounts of Read/Write access. Enter the password (407) as shown in the figures below.

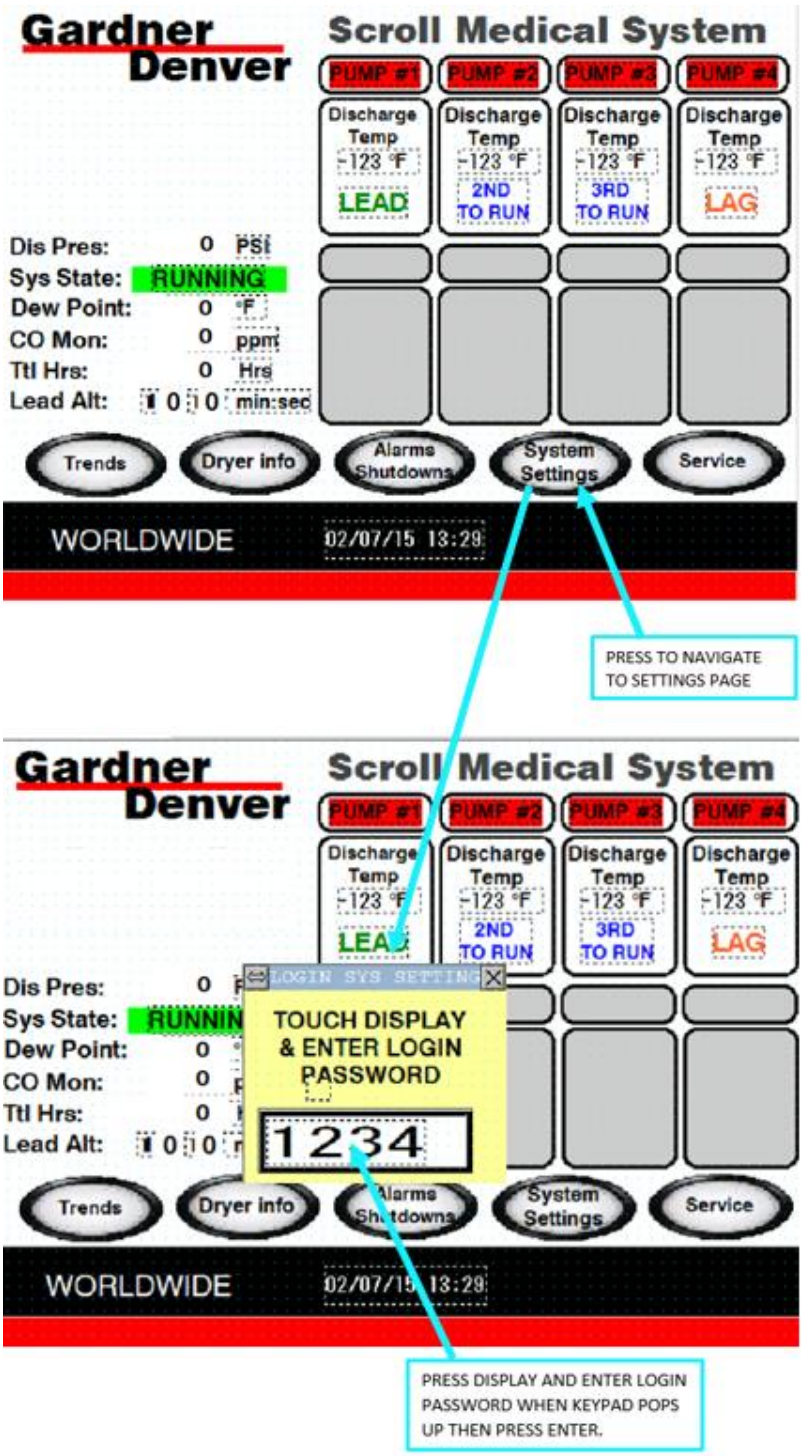


Figure 3-8: System Settings Access

After successfully entering the password you will be granted access to the System Setting screens. The system settings screen contains all of the parameters used to configure the operation of the medical scroll system. Depending on the accessibility level, all or some of the settings below will be displayed. For detailed description of each parameter see the sections 3.5.1 – 3.5.8 below.

NOTE: When altering system settings the LOAD button must be pressed for the changes to take effect.

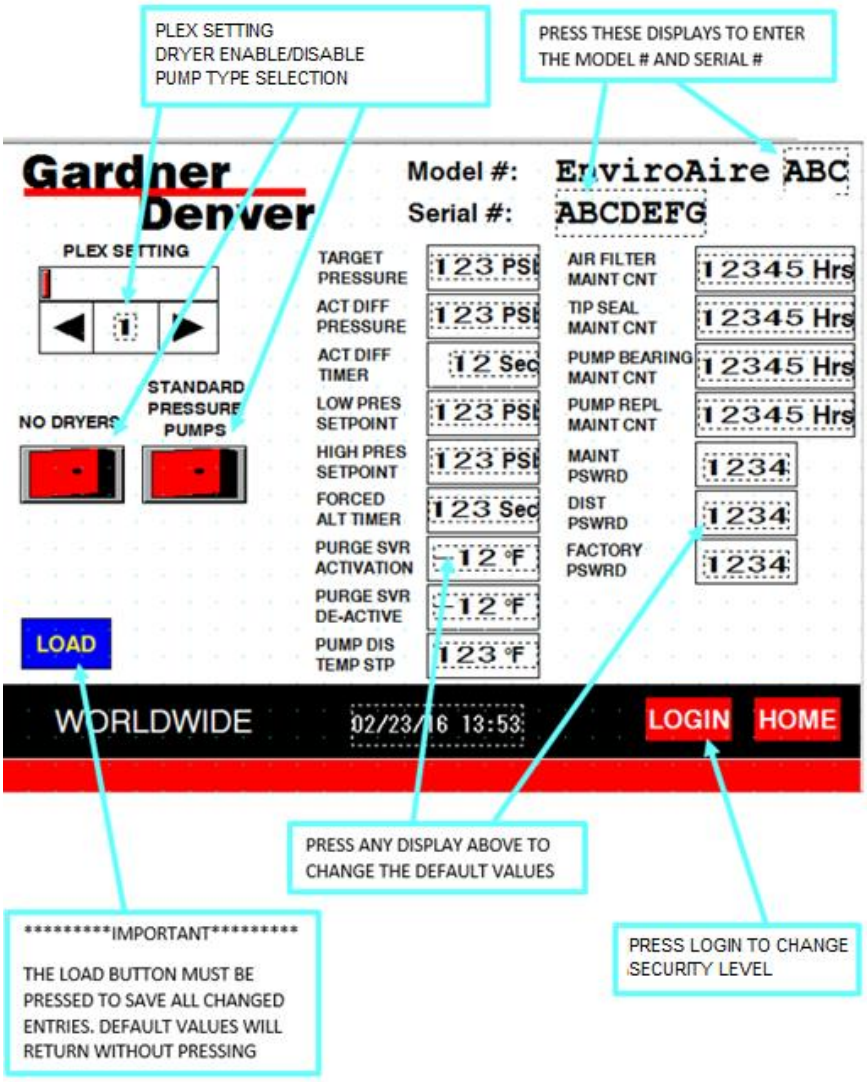


Figure 3-9: System Settings Access

3.5.1 Pump Type

This parameter allows the user to configure the Pump Type of the unit, Standard (116psi) or High Pressure (140psi). This parameter is used in software to determine specific operating limitations and is essential to proper functionality of the unit.

3.5.2 Target Pressure

The target pressure sets the discharge pressure which the system will attempt to produce and maintain. The *Activation Differential Pressure* set point value is subtracted from the target pressure to determine the Activation Pressure of the lead pump. The *(Activation Differential Pressure)*x2 is subtracted from the target pressure to determine the Activation Pressure of the second to run pump. Each additional decrease of the *Activation Pressure Delta* from the Target Pressure will cause an additional pump to activate. Once the system reaches the target pressure, it will stop all running pumps in the system and cycle the lead pump. The target pressure is limited to 116psi for a system comprised of standard pressure pumps and 140psi for a high pressure system.

3.5.3 Activation Differential Pressure

This setting represents the pressure band for which the software uses to determine the activation of the pumps in the system. As the system discharge pressure drops from the target pressure by multiples of the *Activation Differential Pressure* additional pumps will be activated.

3.5.4 Activation Differential Timer

This value sets the amount of time, in seconds, the controller will wait before starting another compressor when the system pressure drops below the activation pressure.

3.5.5 Low Pressure Set Point

This value sets the pressure limit for the Low Pressure Alarm. If the discharge pressure drops below this value the unit will alarm the user.

3.5.6 High Pressure Set Point

This value sets the pressure limit for the High Pressure Alarm. If the discharge pressure rises above this value the unit will alarm the user.

3.5.7 Forced Alternation Timer

This value sets the maximum amount of time a compressor will continuously run as the lead compressor. After this timer expires, the controller will reassign the lead compressor role to the next enabled compressor. The intent of the Forced Alternation Timer is to equalize the run hours of the pumps in the system.

3.5.8 Purge Saver Activation

This value sets the activation point for the dryer purge saver mode. If the Purge Saver mode is enabled from the Dryer Info screen, when the dew point drops below the Purge Saver Activation level the dryer will stop purging until the dew point surpasses the Purge Saver Deactivation set point.

3.5.9 Purge Saver Deactivation

This value sets the deactivation point for the dryer purge saver mode. If the Purge Saver mode is enabled from the Dryer Info screen, when the dew point drops below the Purge Saver Activation level the dryer will stop purging until the dew point surpasses the Purge Saver Deactivation set point.

3.5.10 Pump Discharge Temp Set Point

This value sets the temperature threshold at which the controller will shut down individual pumps on a high discharge temperature fault. Immediate action should be taken if this fault occurs.

3.5.11 Air Filter Maintenance Counter

This value sets the number of hours for the inlet air filter replacement interval. When this timer expires the unit will alarm the user so the service can be completed and acknowledged from the Pump Maintenance Info screen. See section **3.6 Service**.

3.5.12 Tip Seal Maintenance Counter

This value sets the number of hours for the tip seal replacement interval. When this timer expires the unit will alarm the user so the service can be completed and acknowledged from the Pump Maintenance Info screen. See section **3.6 Service**.

3.5.13 Pump Bearing Maintenance Counter

This value sets the number of hours for the pump bearing maintenance interval. When this timer expires the unit will alarm the user so the service can be completed and acknowledged from the Pump Maintenance Info screen. See section **3.6 Service**.

3.5.14 Pump Replacement Maintenance Counter

This value sets the number of hours for the scroll pump replacement interval. When this timer expires the unit will alarm the user so the service can be completed and acknowledged from the Pump Maintenance Info screen. See section **3.6 Service**.

3.6 Service

From the *Home* screen the *Service* screen can be accessed by clicking on the service button in the navigational banner. The *Service* screen provides the user with useful system information including the discharge pressure, system state, dew point, CO monitor level, total system hours, lead alternation countdown timer, and the ambient air temperature. It also allows the user to change the contrast of the HMI and set the current Date & Time. Lastly it will navigate the user to the pump maintenance screens by selecting the *Pump # Maint. Info* button as displayed below.

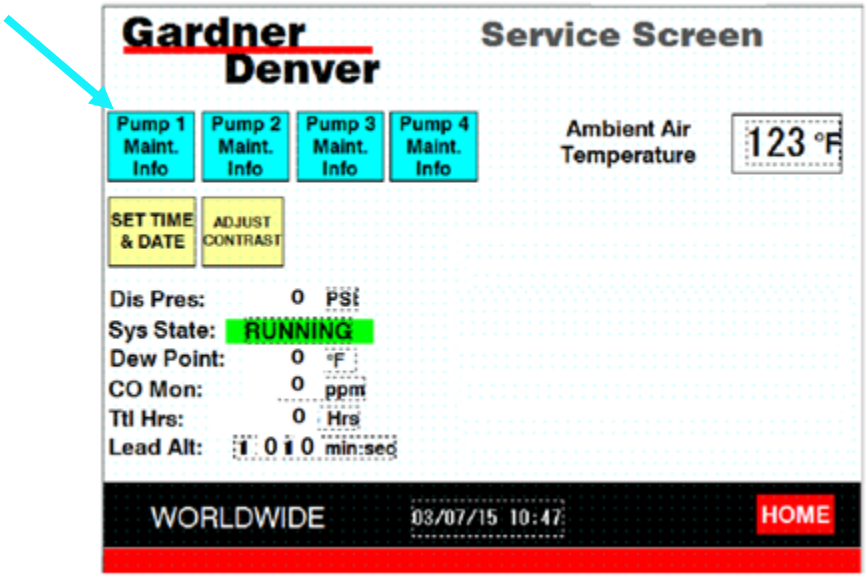


Figure 3-10: Service Screen

After selecting the *Pump # Maint. Info* button, select the *Go To Pump Maint. LOG* button as displayed below.

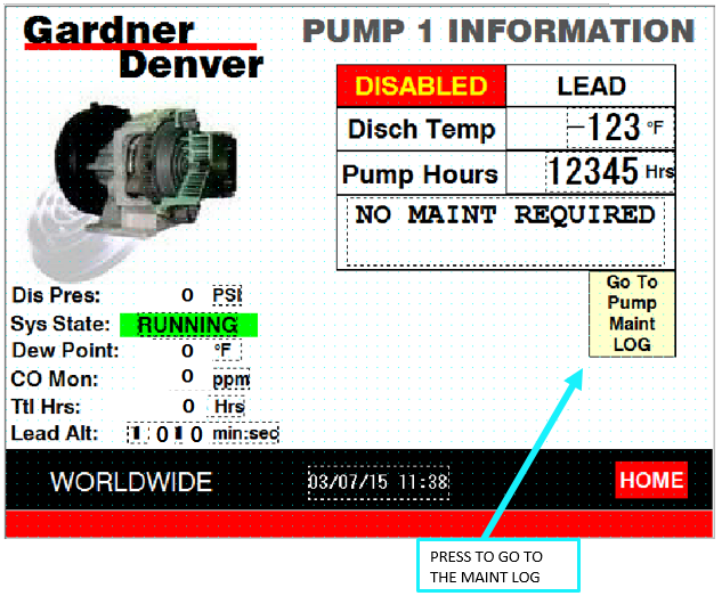


Figure 3-11: Pump Screen

This will open up the Pump Maintenance Log window, seen below. It provides the date and time of notifications as well as the date and time of the services completed. When a service has been completed you simply select that line from the maintenance log and press the *Service Complete* button. This will record the date and time of the completed service. You will then need to select the *Reset PM Notice* button which will remove the alarm from the Alarm screen and reset the maintenance timer. When you select the *Reset PM Notice* button you will be prompted for the maintenance password, enter the password (407) and press reset to successfully complete the process. See the figures below.

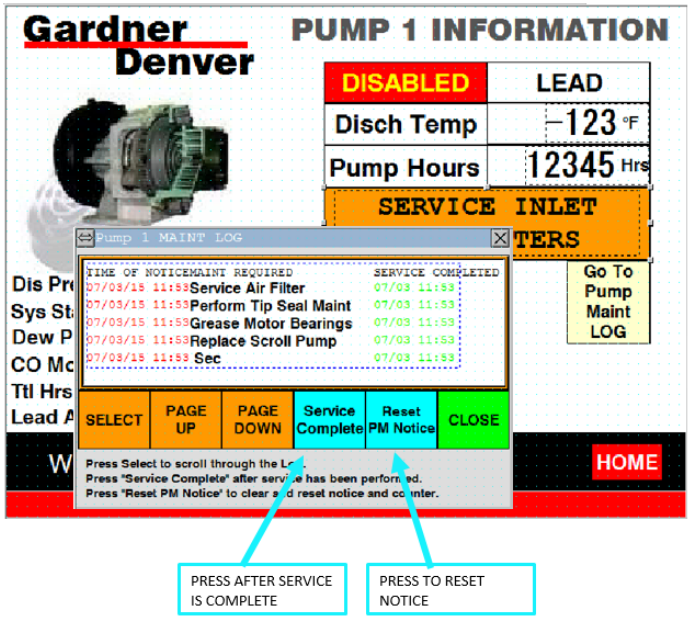


Figure 3-12: Service Complete & Timer Reset

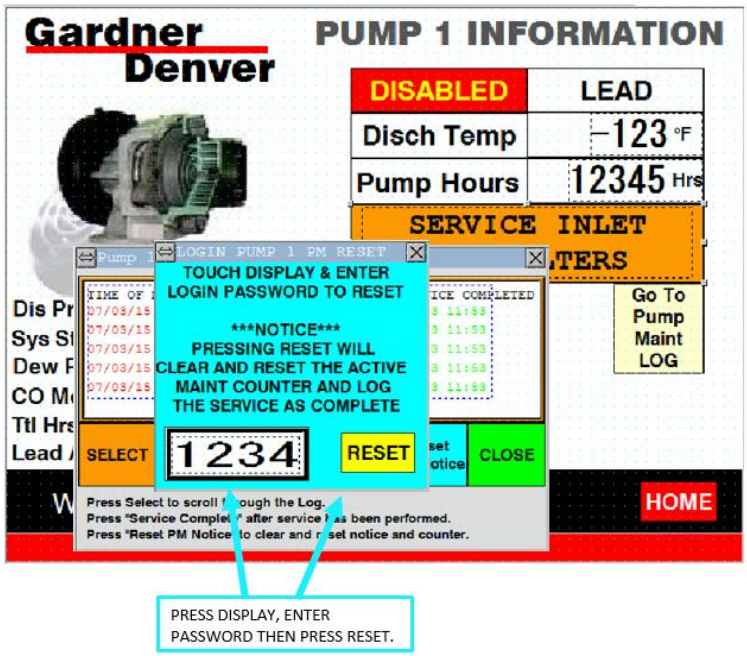


Figure 3-13: Maintenance Reset Confirmation

SECTION 4
Start-Up Guide

This start-up guide assumes the compressor package has been properly connected to an electrical supply conforming to all National and Local electrical codes.

4.1 Start-Up

When energizing the control panel for the first time ensure the Test/Off/Auto Switches are in the **Off** position. When power is first applied to the panel the home screen will be displayed and there will be active alarms including the Low Discharge Pressure, and possibly the High CO and High Dew Point. Press the acknowledge alarm button from the panel door or alarm screen to silence the alarm horn. See Figure 4-1 below for the layout of the push buttons on the Meditrol-Plus panel.

Each motor in the system MUST be jogged to ensure proper Scroll Pump rotation. Extended and even brief rotation in the incorrect direction can cause catastrophic damage to the scroll pumps. Using the Test/Off/Auto switches, jog each motor individually using the Test position. Verify correct rotation.

After the proper pump rotation has been verified, each Test/Off/Auto switch can be placed in the Auto position to start the automatic sequencing of the pumps.

Automatic starting of the compressor can cause injury or death

Once the compressor package has built up the system pressure the user should navigate to the alarm screen and press the RESET button to ensure all alarms have cleared and the system status has changed to GOOD. See section 3.4.

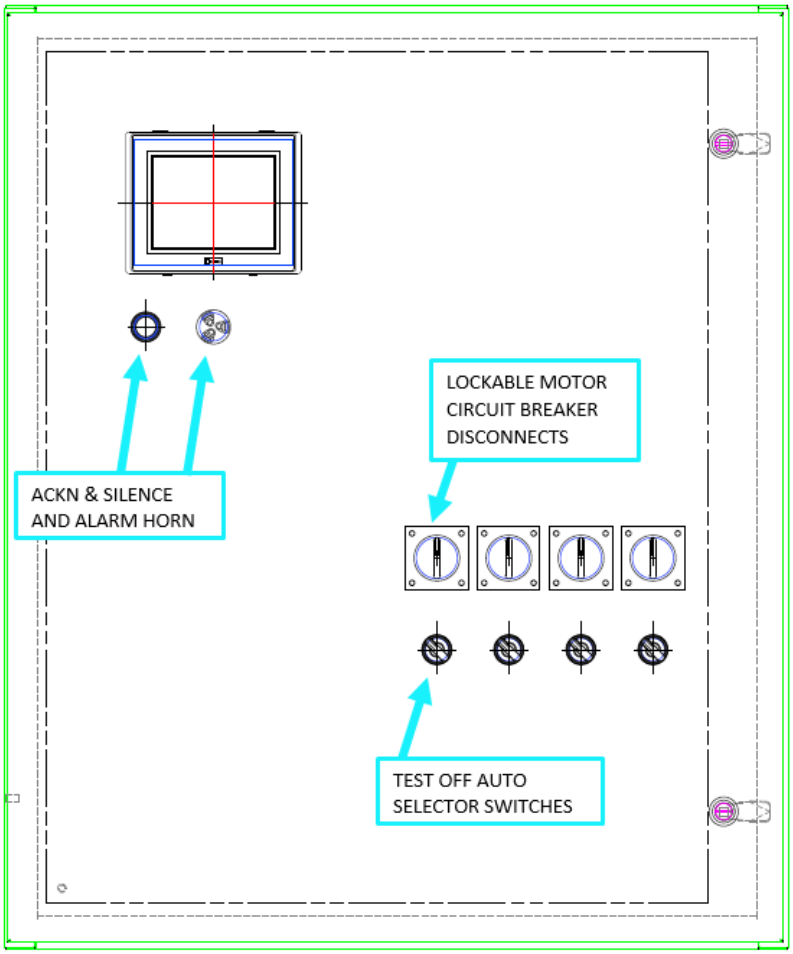


Figure 4-1: Meditrol-Plus Panel

4.2 Dew Point Transmitter

The dew point transmitter is a sensing device that provides the PLC with an analog 4-20 mA signal. The PLC monitors the Dew Point level and will alarm the user if the Dew Point exceeds +35˚F per NFPA99. Additionally if the PLC determines the Dew Point reading is out of range or has become damaged/disconnected it will display a *Dew Point Monitor Malfunction* on the home screen. Contact Gardner Denver customer service if this malfunction occurs. The dew point transmitter has a calibration interval of 2 years. Contact Gardner Denver customer service when the calibration interval has expired.

4.3 CO Transmitter

The CO transmitter is a sensing device that provides the PLC with an analog 4-20 mA signal. The PLC monitors the CO level and will alarm the user if the Dew Point exceeds 10 ppm per NFPA99. Additionally if the PLC determines the CO reading is out of range or has become damaged/disconnected it will display a *CO Monitor Malfunction* on the home screen. Verify the sensor calibration if this malfunction occurs. If the CO transmitter has become damaged or unresponsive contact Gardner Denver customer service. The CO transmitter has a calibration interval of 30 days. Verify and re-calibrate the sensor if necessary by completing the steps below.

4.3.1 CO Transmitter Calibration

The CO transmitter uses a conveniently located set of two test terminals which provide a mV reading that corresponds to the 4-20 mA output. A reading of 40mV on the test terminals corresponds to a 4 mA or 0 ppm reading, and 200 mV corresponds to 20 mA or 300 ppm. This feature offers a quick and easy way to verify zero readings and gas response without having to disconnect wires and place current meters in line with the transmitter.

3.3.1.1 0 ppm Point Adjustment

Using a DC voltmeter set to the mV range, place the voltmeter's leads in the 40–200 mV test terminals on the transmitter pc board. Flow impurity free air (zero air) into the sensing inlet using a calibration adapter and a 0.5 lpm fixed flow regulator, and allow the mV reading to stabilize. The reading should be approximately **40 mV**. If the mV reading is not 40 mV, then the zero must be adjusted. To adjust the ZERO to 4mA (40 mV on the test terminals), slowly adjust the zero potentiometer on the transmitter board (see figure 4-1) until a reading of 40 mV on the test terminals is achieved. This procedure will set the current output from the transmitter to 4 mA (zero). Contact Gardner Denver customer service for ordering zero gas as needed.

3.3.1.2 20 ppm Point Adjustment

Using a DC voltmeter set to the mV range, place the voltmeter's leads in the 40–200 mV test terminals on the transmitter pc board. Attach the calibration adapter to the sensing inlet. Flow 20 ppm calibration gas at 0.5 lpm. Allow the gas to flow across the sensor for at least 2 minutes or until the transmitter signal is stable, then check to see that the mV reading is at **50.6 mV**. If the mV reading is not correct, adjust the Span potentiometer slowly until a reading of 50.6 mV is obtained. After the span adjustment is complete, remove the calibration gas, re-attach the supply air, and allow the transmitter current output to return to 40 mV (zero). Contact Gardner Denver customer service for ordering 20 ppm calibration gas as needed.

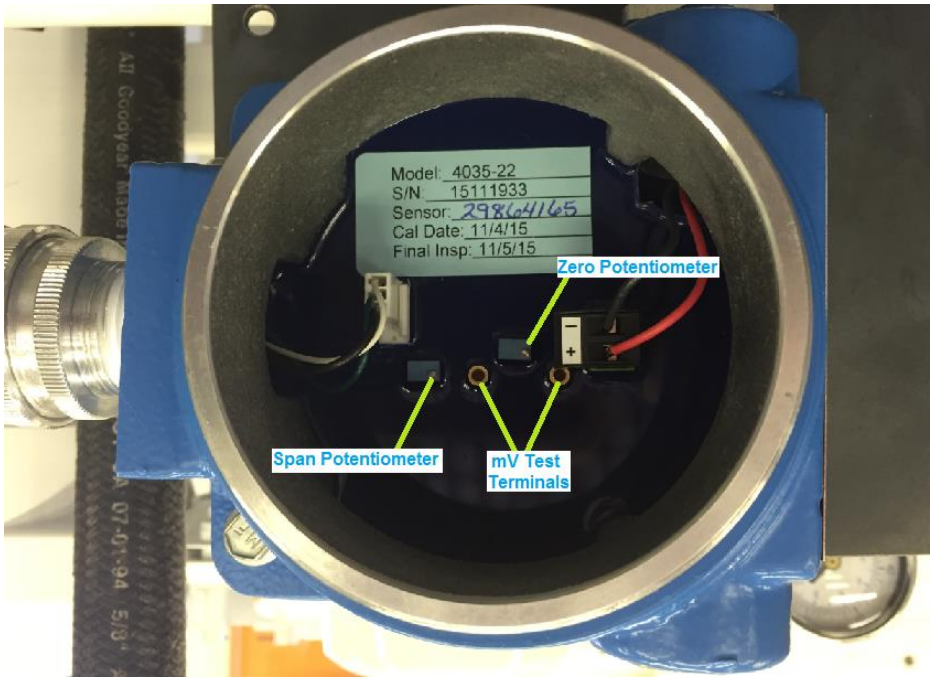


Figure 4-2: CO Transmitter Calibration

SECTION 5
MODBUS COMMUNICATION

The Meditrol Plus Controller supports remote monitoring via Modbus TCP/IP. The controller acts as a Modbus slave which can be polled for information by accessing the Modbus registers detailed in the tables below. To communicate with the controller over Modbus TCP/IP, the IP address of the controller must be configured correctly (see section **5.2**) and a connection to the Ethernet switch in the control panel must be established.

NOTE: For more information on Modbus messaging over TCP/IP, refer to www.modbus.org/specs.php

5.1 Modbus Address Map

Counter Values - Function 04 Read Input Registers	
Description	**Modbus Address (Decimal)**
Alt Timer Current Value	300501
P1 Daily Acc Hrs Value	300506
P2 Daily Acc Hrs Value	300507
P3 Daily Acc Hrs Value	300508
P4 Daily Acc Hrs Value	300509
P1 ETM Value	300521
P2 ETM Value	300522
P3 ETM Value	300523
P4 ETM Value	300524
Pump 1 PM Hour Counter Value	300651
Pump 2 PM Hour Counter Value	300652
Pump 3 PM Hour Counter Value	300653
Pump 4 PM Hour Counter Value	300654
PUMP1 AIR FILTER MAINT CNT CURRENT VALUE	300671
PUMP1 TIP SEAL MAINT CNT CURRETN VALUE	300672
PUMP1 GREASE PUMP BEARING MAINT CNT CURRETN VALUE	300673
PUMP1 REPLACE PUMP MAINT CNT CURRENT VALUE	300674
PUMP2 AIR FILTER MAINT CNT CURRENT VALUE	300676
PUMP2 TIP SEAL MAINT CNT CURRETN VALUE	300677
PUMP2 GREASE PUMP BEARING MAINT CNT CURRETN VALUE	300678
PUMP2 REPLACE PUMP MAINT CNT CURRENT VALUE	300679
PUMP3 AIR FILTER MAINT CNT CURRENT VALUE	300681
PUMP3 TIP SEAL MAINT CNT CURRETN VALUE	300682
PUMP3 GREASE PUMP BEARING MAINT CNT CURRETN VALUE	300683
PUMP3 REPLACE PUMP MAINT CNT CURRENT VALUE	300684
PUMP4 AIR FILTER MAINT CNT CURRENT VALUE	300686
PUMP4 TIP SEAL MAINT CNT CURRETN VALUE	300687
PUMP4 GREASE PUMP BEARING MAINT CNT CURRETN VALUE	300688
PUMP4 REPLACE PUMP MAINT CNT CURRENT VALUE	300689

Data Registers - Function 03 Read Holding Registers	
Description	**Modbus Address (Decimal)**
Pump #1 PT1000 RTD Input	400047
Pump #2 PT1000 RTD Input	400048
Pump #3 PT1000 RTD Input	400049
Pump #4 PT1000 RTD Input	400050
Current value of SEQO	400066
Alternating Timer Min	400068
Alt Timer in Sec	400069
DAILY TTL RUN HOURS	400094
Dryer Purge Saver Set Point	400123
Dryer Fixed Mode Set Point	400124
Purge Saver Max Setting	400125
Purge Min Setpoint	400145
Display the configured number of pumps	400147
System Total Run Hours	400154
System Status	400156
Lead Differential Calculation	400159
Pres Setpoint A Cut In	400163
Pres Setpoint D Cut In	400165
Pres Setpoint C Cut In	400168
Pres Setpoint B Cut In	400174
Pres Setpoint A Cut Out	400177
Pres Setpoint D Cut Out	400179
Pres Setpoint C Cut Out	400182
Pres Setpoint B Cut Out	400188
LOW PRES RANGE LIMIT	400191
HIGH PRES RANGE LIMIT	400192
Alarm Condition Indication	400271
Alarm Number	400272
Device in Alarm	400273
Device Number	400274
Alarm Description	400275
Alarm Status	400276
Pressure at Alarm	400277
Ambient Air at Alarm	400278
Dew Point at Alarm	400279
CO at Alarm	400280
Pump Discharge Temp at Alarm	400281
Current Pump Dicharge Temp	400282
Air Filter Maint Counter setting	400381
Tip Seal Maint Counter Setting	400382
Motor Bearing Maint Countr Setting	400383

Pump Replacment Maint Counter Seting	400384
Differential Pressure X2	400461
Differential Pressure X3	400463
Differential Pressure X4	400465
Differential Pressure X5	400467
Differential Pressure X6	400469
Differential Pressure X7	400471
DISPLAY PRESSURE	400904
CO LEVEL GATEWAY	400911
DEW POINT LEVEL DISPLAY	400916
UNIT SERIAL NUMBER	402002
UNIT MODEL NUMBER	402004
Forced ALtenation Timer	402008
Activation Differential Pressure	402038
Activation Differential Timer	402039
Lag Pressure Cut In	402040
Lag Pressure Cut Out	402041

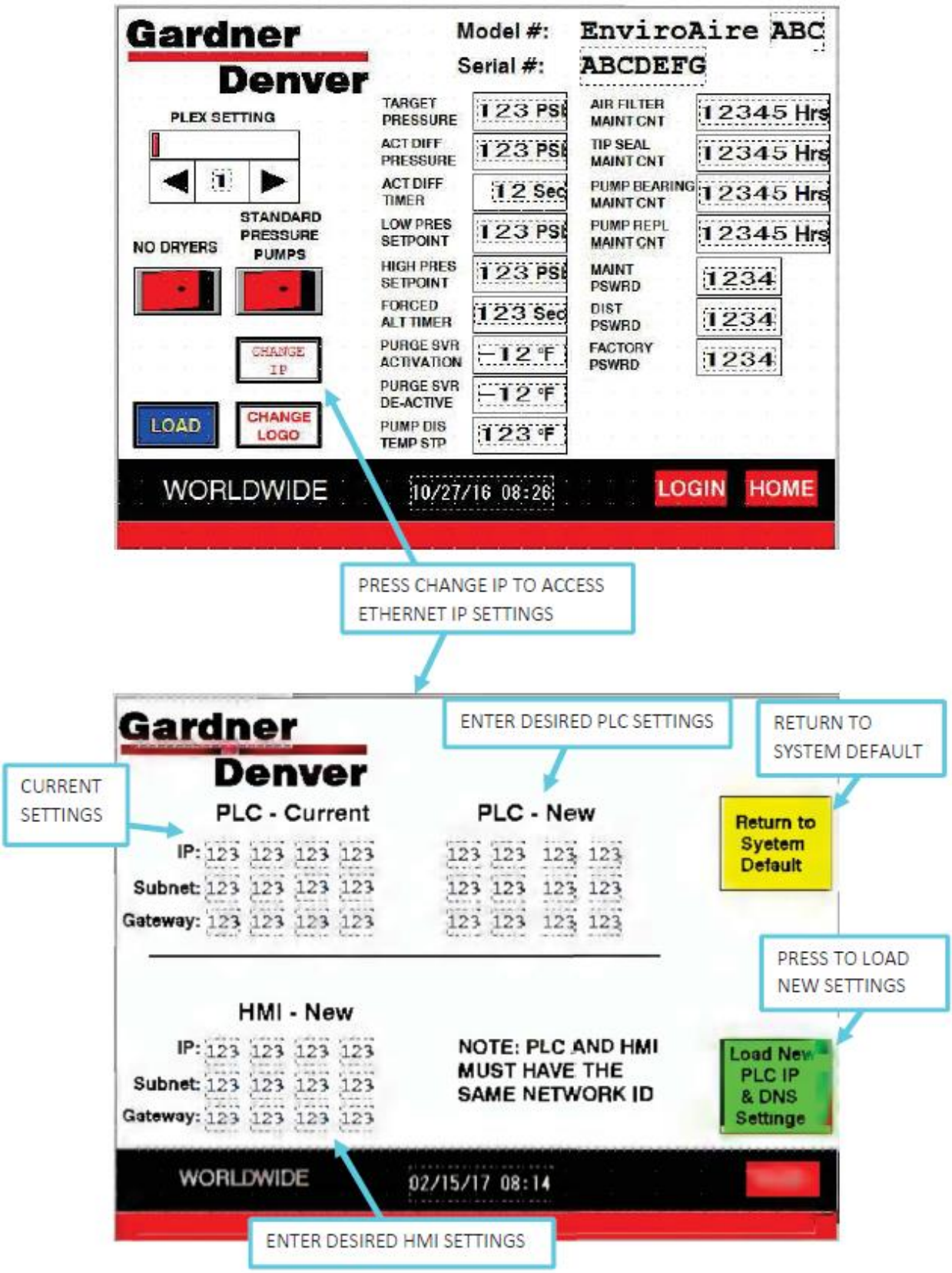
Discrete Inputs – Function 02 Read Input Status	
Description	**Modbus Address (Decimal)**
Motor #1 CB Aux Contacts	100001
Motor #2 CB Aux Contacts	100002
Motor #3 CB Aux Contacts	100003
Motor #4 CB Aux Contacts	100004
Silence Horn Push Button	100006
Xfrm Switching Relay Contact	100007
Power Supply Switching Relay Contact	100008
Pump #1 Selector Switch in Auto	100025
Pump #1 Selector Switch in Test	100026
Pump #2 Selector Switch in Auto	100027
Pump #2 Selector Switch in Test	100028
Pump #3 Selector Switch in Auto	100029
Pump #3 Selector Switch in Test	100030
Pump #4 Selector SI32witch in Auto	100031
Pump #4 Selector Switch in Test	100032
Backup Pressure Switch	100033
Motor #1 MC Aux Contacts	100034
Motor #2 MC Aux Contacts	100035
Motor #3 MC Aux Contacts	100036
Motor #4 MC Aux Contacts	100037

Discrete Outputs - Function 01 Read Coil Status	
Description	**Modbus Address (Decimal)**
Motor #1 Contactor Coil	000025
Motor #2 Contactor Coil	000026
Motor #3 Contactor Coil	000027
Motor #4 Contactor Coil	000028
Audible Alarm	000029
Lag Unit in Use Alarm Relay	000030
High Dew Point Alarm Relay	000031
High Disch Temperature Alarm Relay	000032
Backup Pressure Switch Alarm Relay	000033
High CO Alarm Relay	000034
Motor CB Trip Alarm Relay	000035
System General Fault Alarm Relay	000036
Desiccant Dryer Unit#1 Power	000037
Desiccant Dryer Unit #2 Power	000038

5.2 IP Address Adjustment

To adjust the IP address of the controller for connection to via Modbus TCP/IP navigate to the System Settings Screen and login at the MAINTENANCE (407) access level. Select the CHANGE IP key, which opens the IP Adjustment window. Here you can adjust the IP address of the PLC and HMI to communicate with your internal network.

IMPORTANT NOTE: THE NETWORK ID OF THE PLC AND HMI MUST BE THE SAME. IF THEY ARE NOT MATCHING, COMMUNICATION BETWEEN THEM WILL BE BROKEN. IF THIS OCCURS CONTACT GARDNER DENVER TECH SUPPORT.


Gardner
Denver
Model #:
EnviroAire ABC
Serial #:
ABCDEFG
PLEX SETTING
1
STANDARD PRESSURE PUMPS
NO DRYERS
CHANGE IP
LOAD
CHANGE LOGO
TARGET PRESSURE
123 PSI
ACT DIFF PRESSURE
123 PSI
ACT DIFF TIMER
12 Sec
LOW PRES SETPOINT
123 PSI
HIGH PRES SETPOINT
123 PSI
FORCED ALT TIMER
123 Sec
PURGE SVR ACTIVATION
-12 °F
PURGE SVR DE-ACTIVE
-12 °F
PUMP DIS TEMP STP
123 °F
AIR FILTER MAINT CNT
12345 Hrs
TIP SEAL MAINT CNT
12345 Hrs
PUMP BEARING MAINT CNT
12345 Hrs
PUMP REPL MAINT CNT
12345 Hrs
MAINT PSWRD
1234
DIST PSWRD
1234
FACTORY PSWRD
1234
WORLDWIDE
10/27/16 08:26
LOGIN
HOME
PRESS CHANGE IP TO ACCESS ETHERNET IP SETTINGS
Gardner
Denver
ENTER DESIRED PLC SETTINGS
RETURN TO SYSTEM DEFAULT
CURRENT SETTINGS
PLC - Current
PLC - New
IP: 123 123 123 123
Subnet: 123 123 123 123
Gateway: 123 123 123 123
123 123 123 123
123 123 123 123
123 123 123 123
Return to Syetem Default
PRESS TO LOAD NEW SETTINGS
HMI - New
IP: 123 123 123 123
Subnet: 123 123 123 123
Gateway: 123 123 123 123
NOTE: PLC AND HMI MUST HAVE THE SAME NETWORK ID
Load New PLC IP & DNS Settinge
WORLDWIDE
02/15/17 08:14
ENTER DESIRED HMI SETTINGS

Appendix A – Wiring Diagrams

A.1 DUPLEX 3 PHASE

Gardner Denver

MEDICAL SCROLL DUPLEX

DUPLEX MOTOR- DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 3Ø 50/60Hz	3	10.6	23.7	40
	5	16.7	35.9	60
	7.5	24.2	50.9	85
	10	30.8	64.1	110
230V 3Ø 50/60Hz	3	9.6	21.7	35
	5	15.2	32.9	55
	7.5	22	46.5	80
	10	28	58.5	100
460V 3Ø 60Hz	3	4.8	12.1	20
	5	7.6	17.7	30
	7.5	11	24.5	40
	10	14	30.5	50
575V 3Ø 60Hz	3	3.9	10.3	15
	5	6.1	14.7	25
	7.5	9	20.5	35
	10	11	24.5	40
380V/400V 3Ø 50/60Hz	3	6.1	14.7	25
	5	9.7	21.9	35
	7.5	14	30.5	50
	10	18	38.5	65

WIRE TYPE TABLE		
ALL FIELD WIRING CONDUCTORS: • USE COPPER ONLY • RATED AT 75°C		
VOLTAGE	GAUGE	COLOR
208–480VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

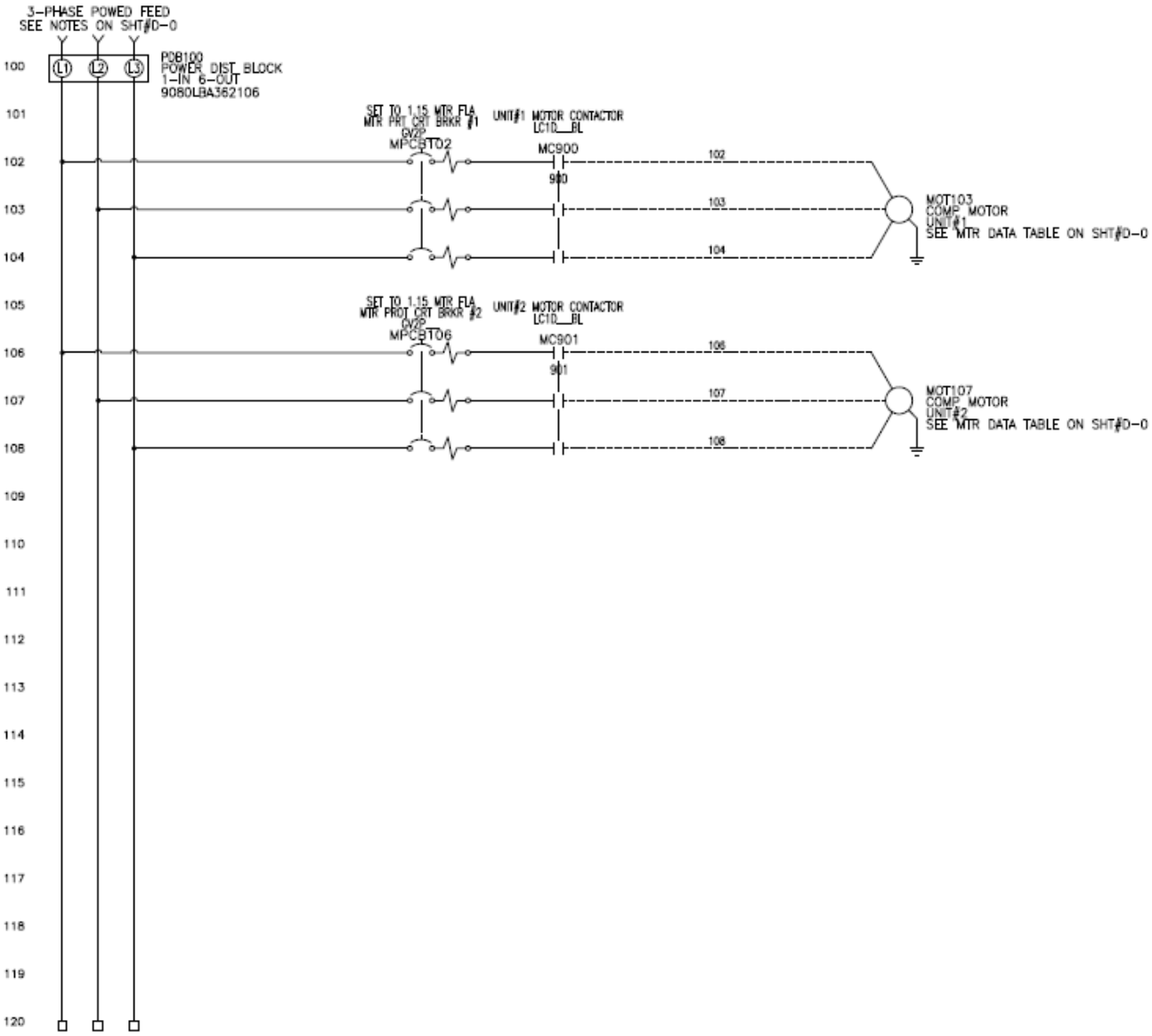
SYMBOL LEGEND	
———	FACTORY WIRING
– – – –	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

1. RECOMMENDED TIGHTENING TORQUES FOR WIRE TERMINALS:
   200–460 VOLT POWER — 35 POUND INCHES
   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
2. PANEL GROUND MUST BE CONNECTED TO EARTH GROUND
3. ALL WIRES MUST BE LABELED ON BOTH ENDS
4. TRANSFORMER IS SIZED FOR LOADS SHOWN ON DRAWING ONLY. DO NOT CONNECT ANY OTHER DEVICES
5. INSTALLER TO PROVIDE DISCONNECTS WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY, SEE RECOMMENDED BREAKER SIZE IN "DATA TABLE 1"
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

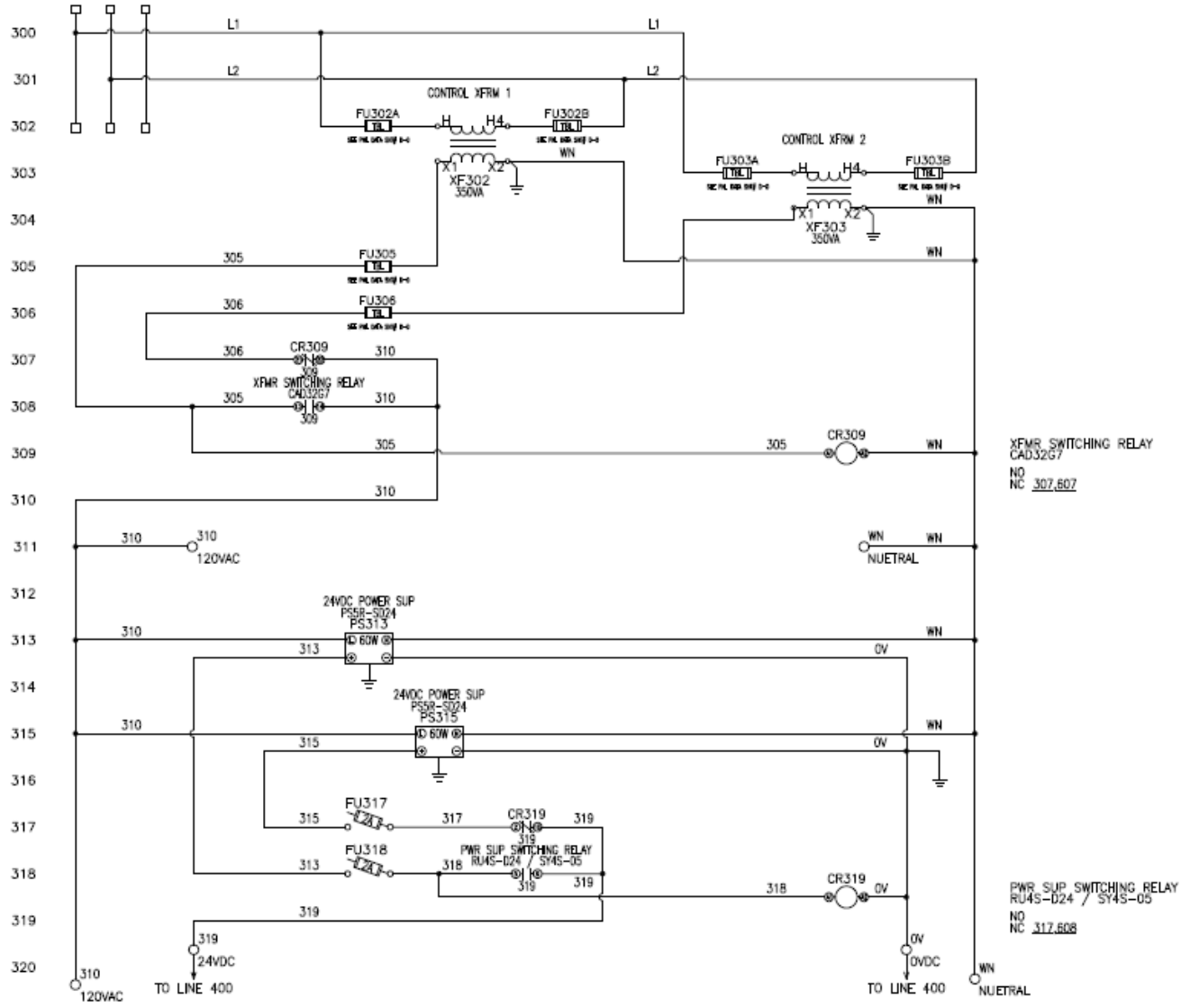
300SMD546 - A
(Ref. Drawing)

A.1 DUPLEX 3 PHASE



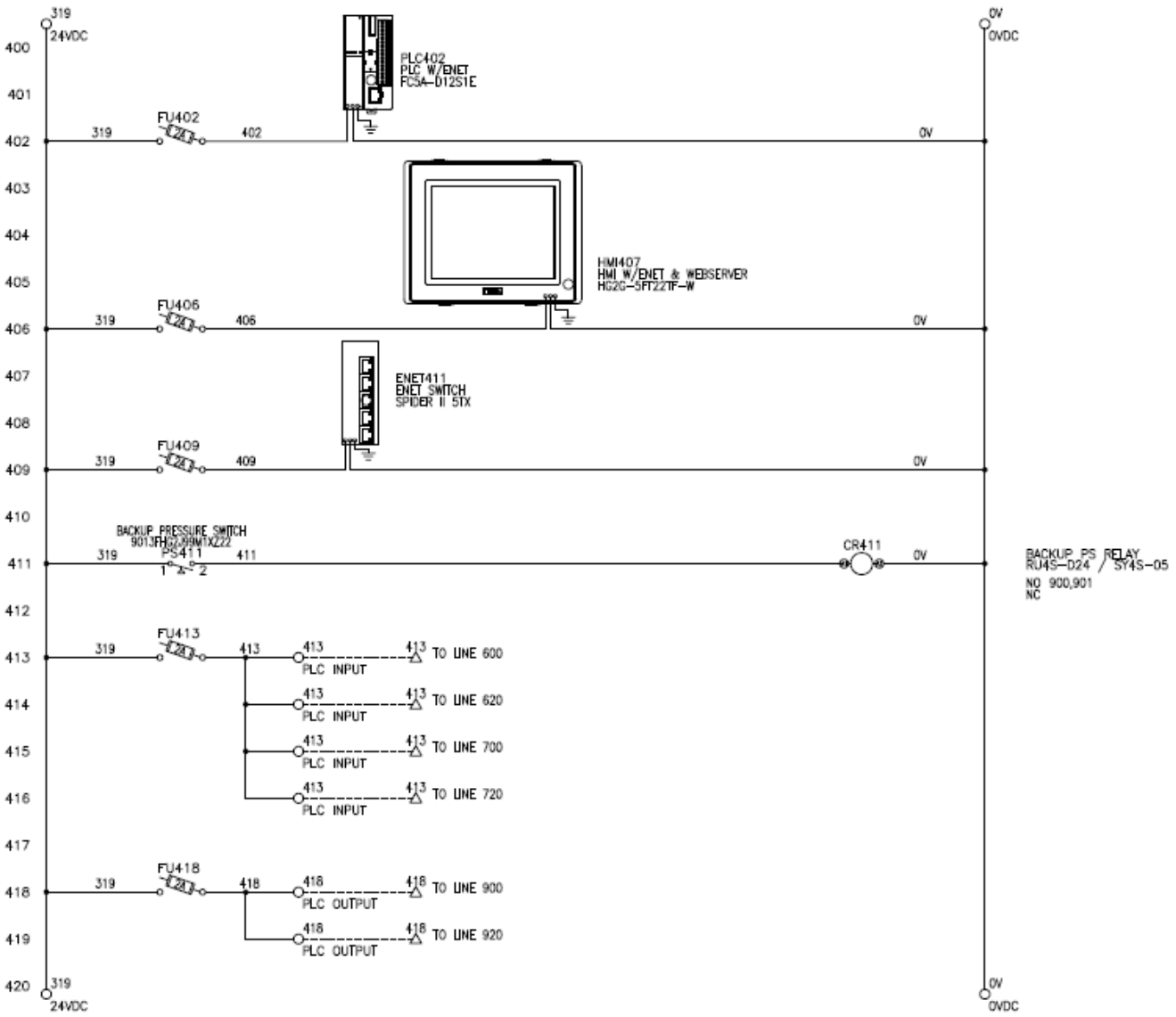
300SMD546 - A
(Ref. Drawing)
Sheet 2

A.1 DUPLEX 3 PHASE



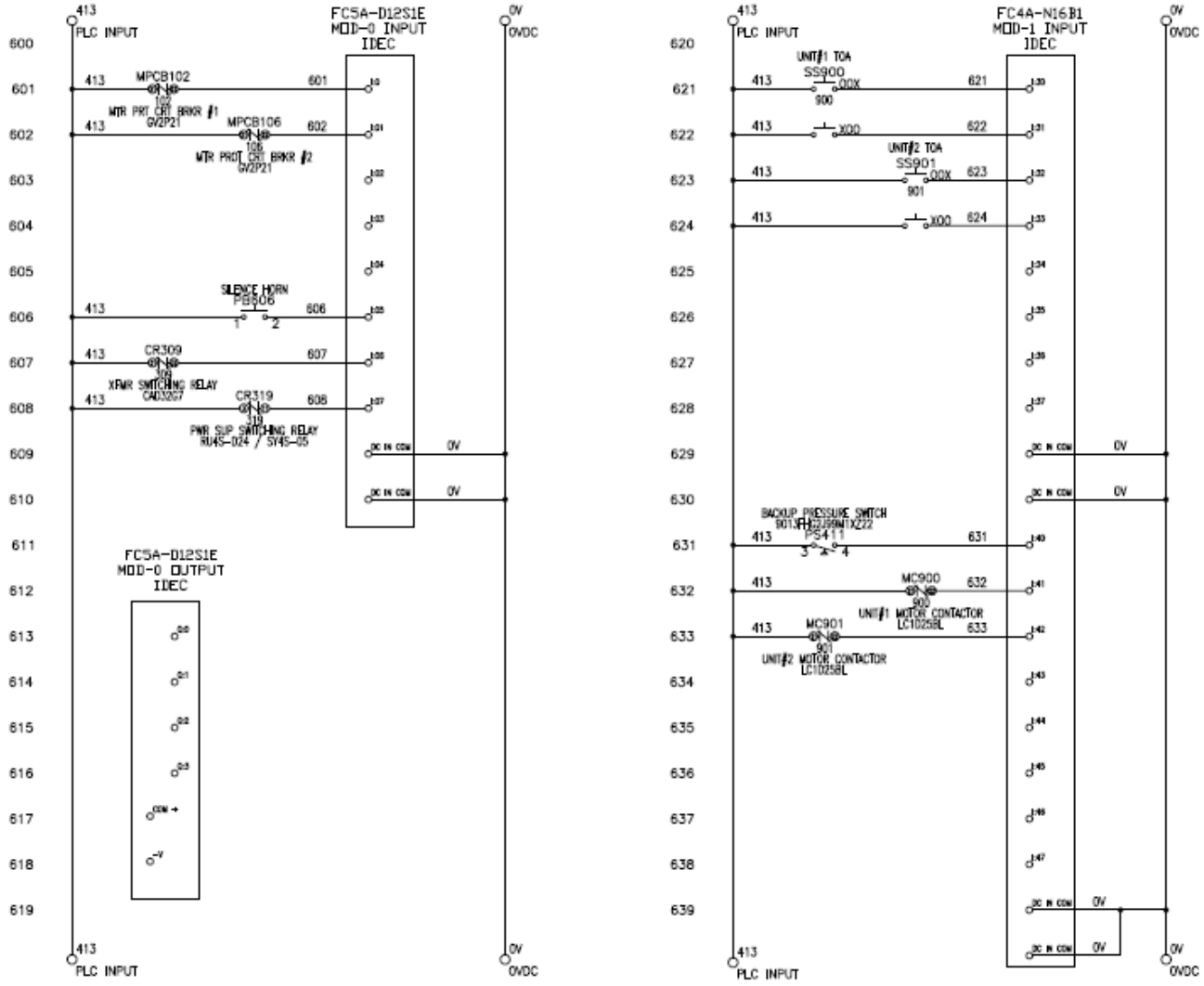
300SMD546 - A
(Ref. Drawing)
Sheet 4

A.1 DUPLEX 3 PHASE



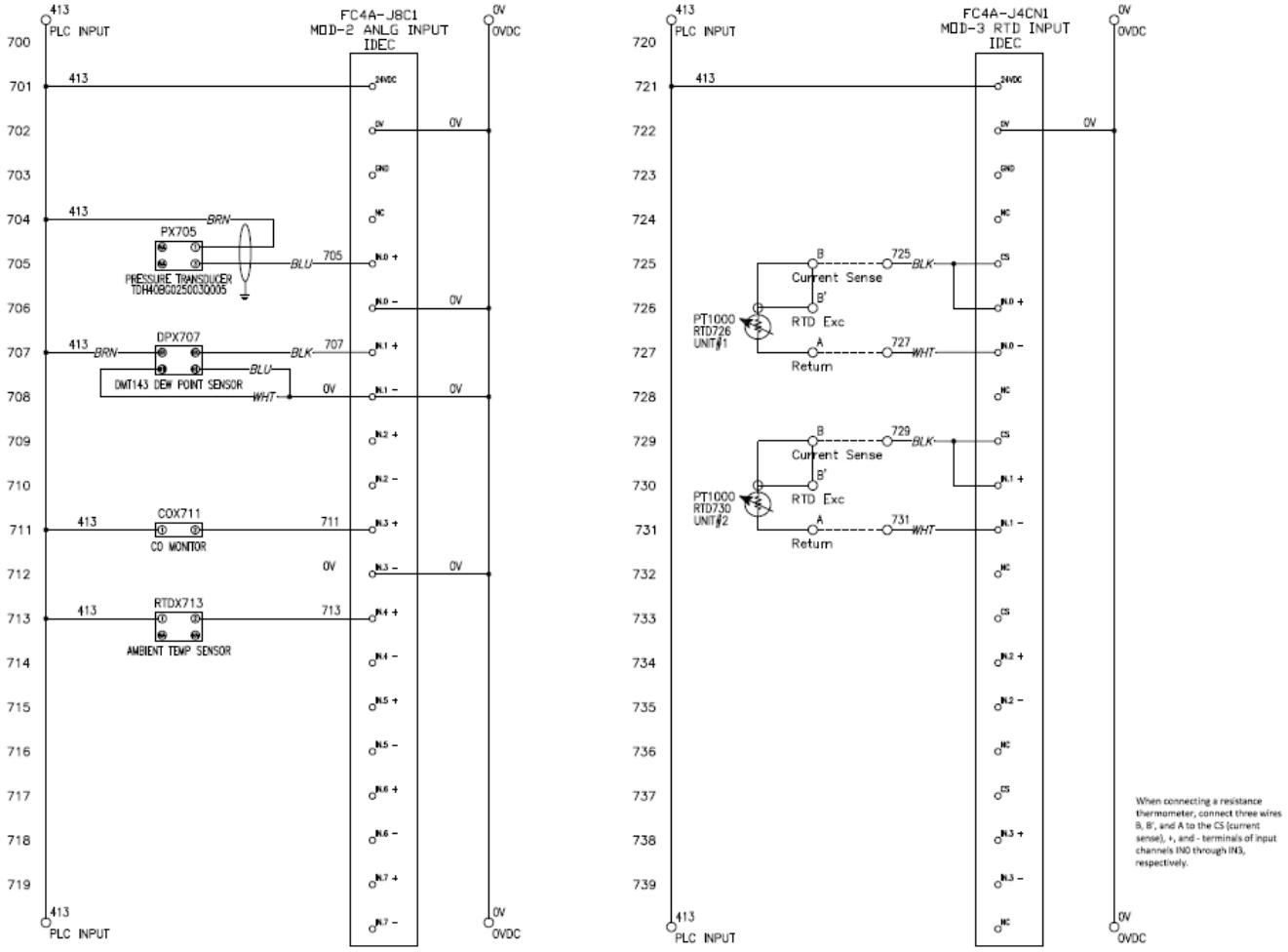
300SMD546 - A
(Ref. Drawing)
Sheet 5

A.1 DUPLEX 3 PHASE



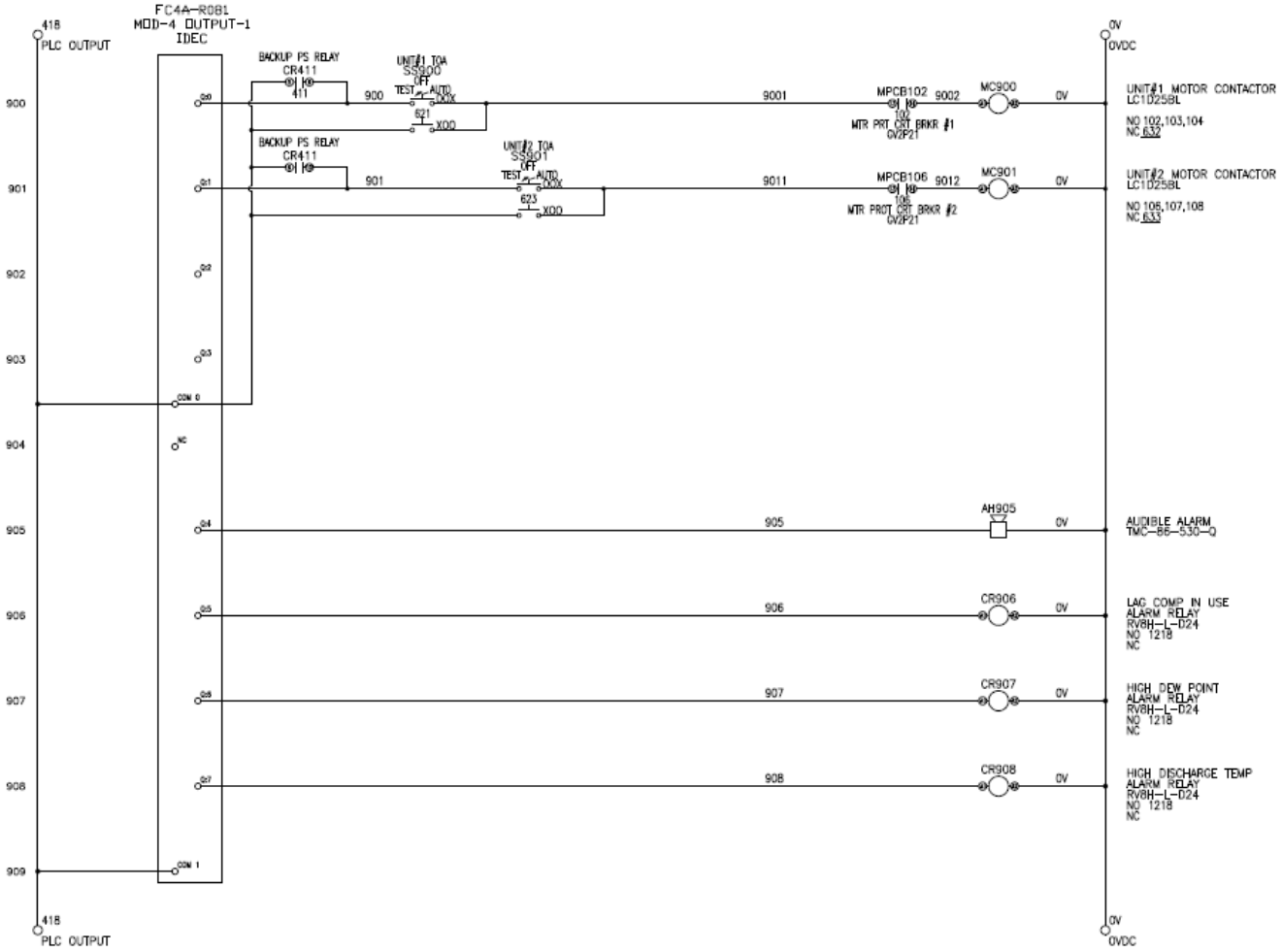
300SMD546 - A
(Ref. Drawing)
Sheet 7

A.1 DUPLEX 3 PHASE



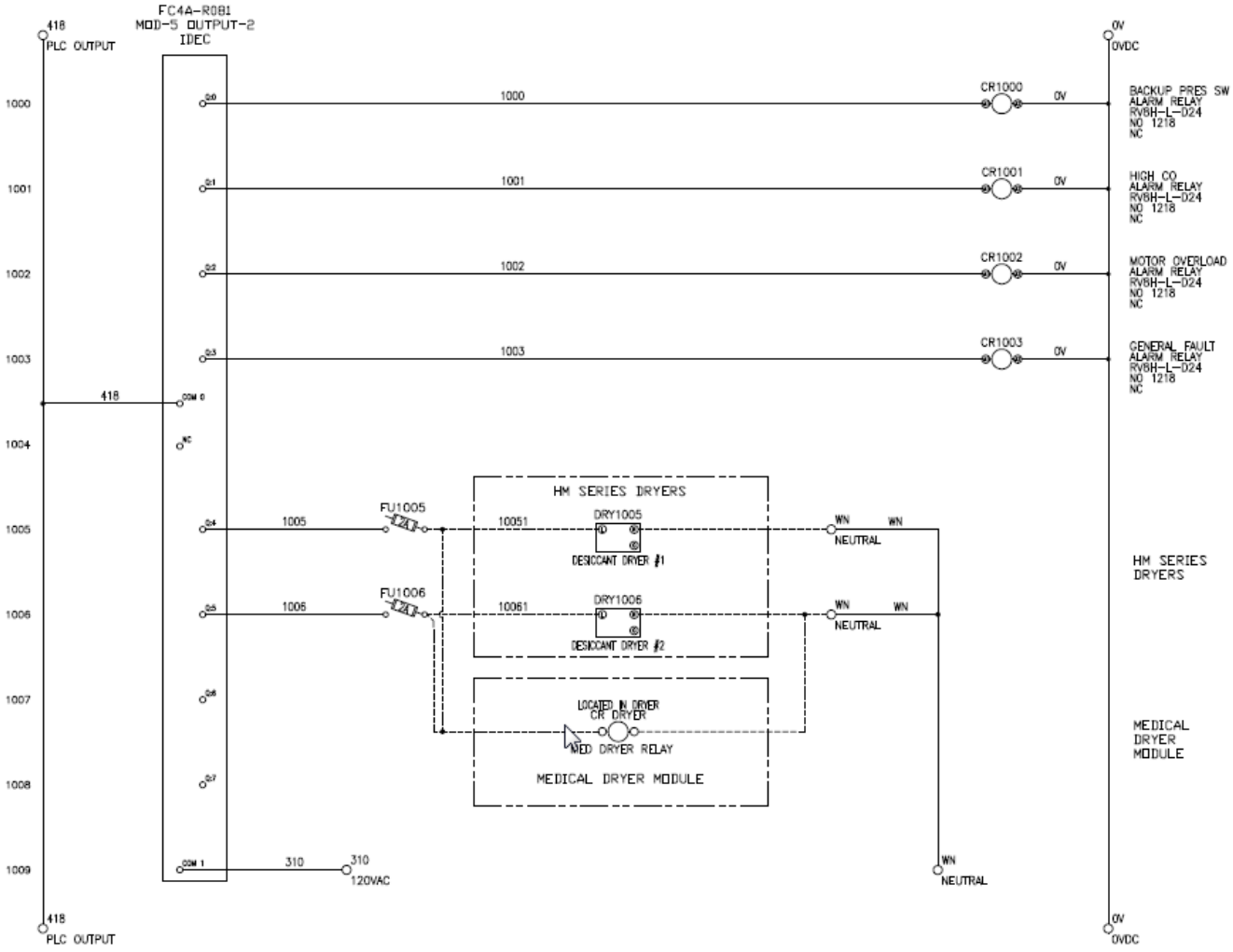
300SMD546 - A
(Ref. Drawing)
Sheet 8

A.1 DUPLEX 3 PHASE



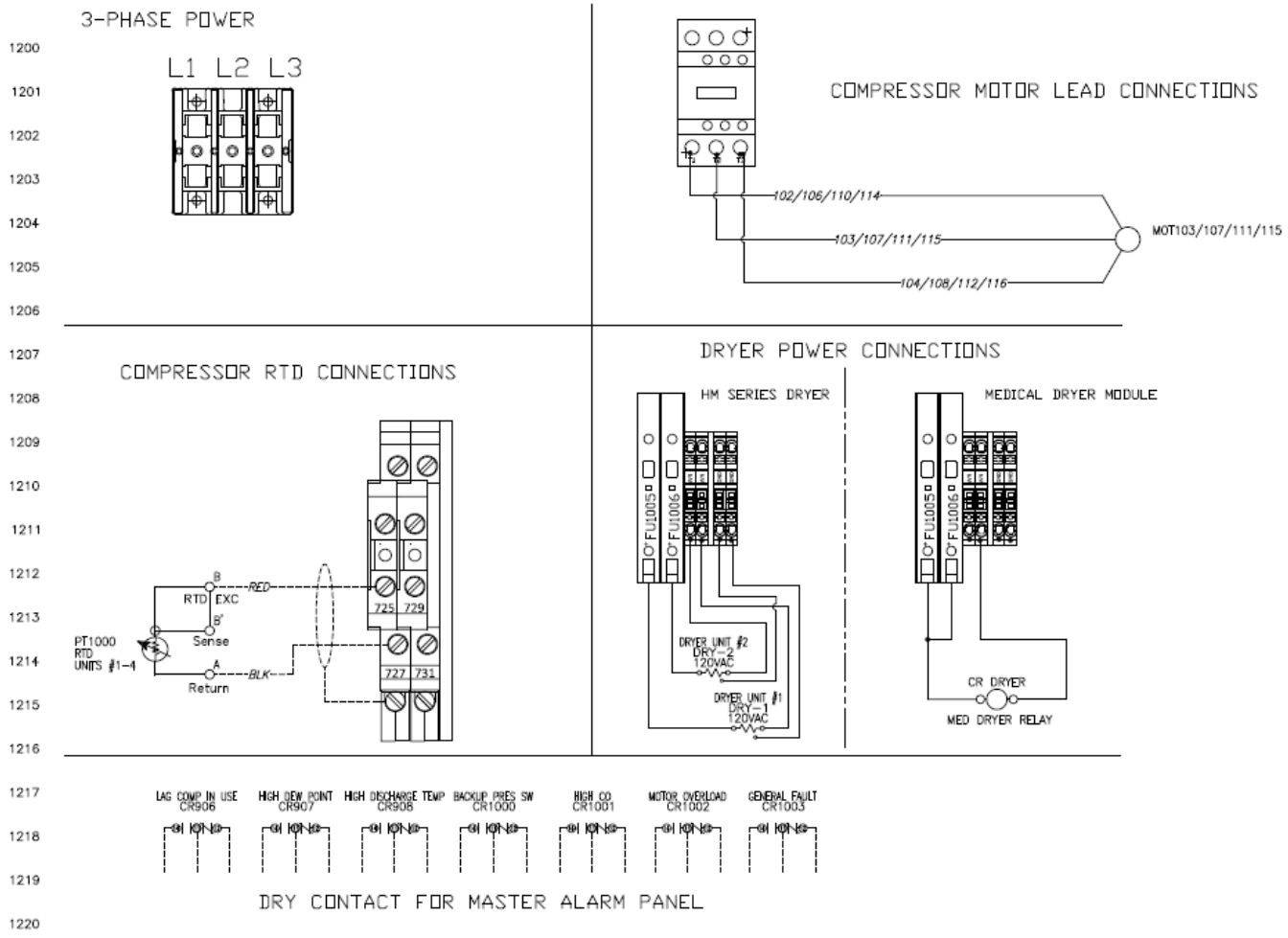
300SMD546 - A
(Ref. Drawing)
Sheet 10

A.1 DUPLEX 3 PHASE



300SMD546 - A
(Ref. Drawing)
Sheet 11

A.1 DUPLEX 3 PHASE



300SMD546 - A
(Ref. Drawing)
Sheet 13

A.2 DUPLEX 1 PHASE

Gardner Denver

MEDICAL SCROLL DUPLEX

DUPLEX MOTOR - DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 1PH 50/60Hz	5	30.8	64.1	110
	7.5	44	90.5	155
230V 1PH 50/60Hz	5	28	58.5	100
	7.5	40	82.5	140

FUSE TABLE - CONTROL TRANSFORMERS 350VA			
FUSE TAG	TYPE	208V	230V
FU302 A&B	FNQR	8	7
FU303 A&B	FNQR	8	7
FU305	FNM	5	5
FU306	FNM	5	5
FU317	3AG	2	2
FU318	3AG	2	2
FU402	3AG	2	2
FU406	3AG	2	2
FU409	3AG	2	2
FU413	3AG	2	2
FU410	3AG	2	2
FU1005	3AG	2	2
FU1006	3AG	2	2

WIRE TYPE TABLE

ALL FIELD WIRING CONDUCTORS:
- USE COPPER ONLY
- RATED AT 75°C

VOLTAGE	GAUGE	COLOR
208-230VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

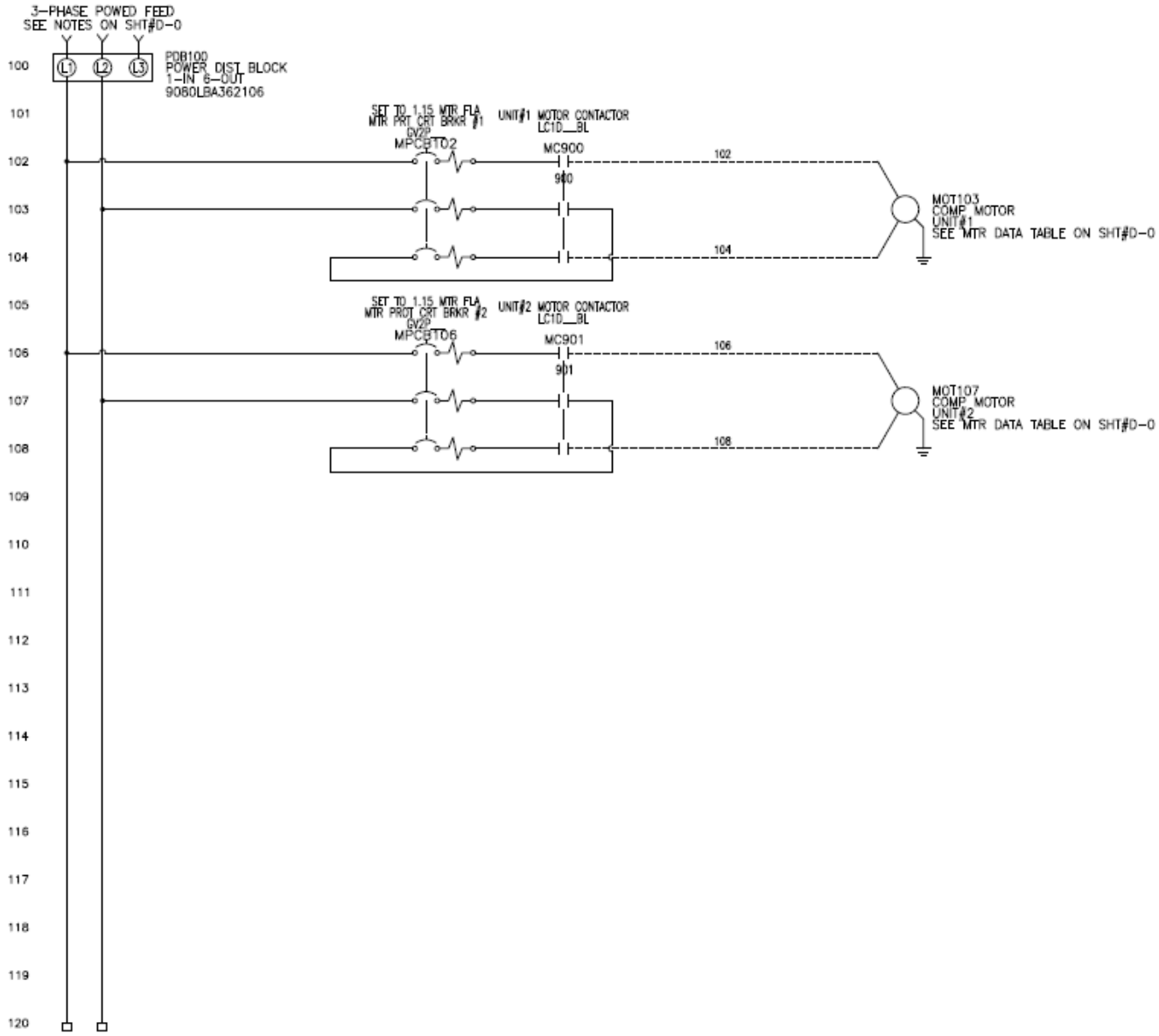
SYMBOL LEGEND	
———	FACTORY WIRING
- - - -	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

1. RECOMMENDED TIGHTENING TORQUES FOR WIRE TERMINALS:
   200-460 VOLT POWER — 35 POUND INCHES
   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
2. PANEL GROUND MUST BE CONNECTED TO EARTH GROUND
3. ALL WIRES MUST BE LABELED ON BOTH ENDS
4. TRANSFORMER IS SIZED FOR LOADS SHOWN ON DRAWING ONLY. DO NOT CONNECT ANY OTHER DEVICES
5. INSTALLER TO PROVIDE DISCONNECTS WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY, SEE RECOMMENDED BREAKER SIZE IN "DATA TABLE 1"
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

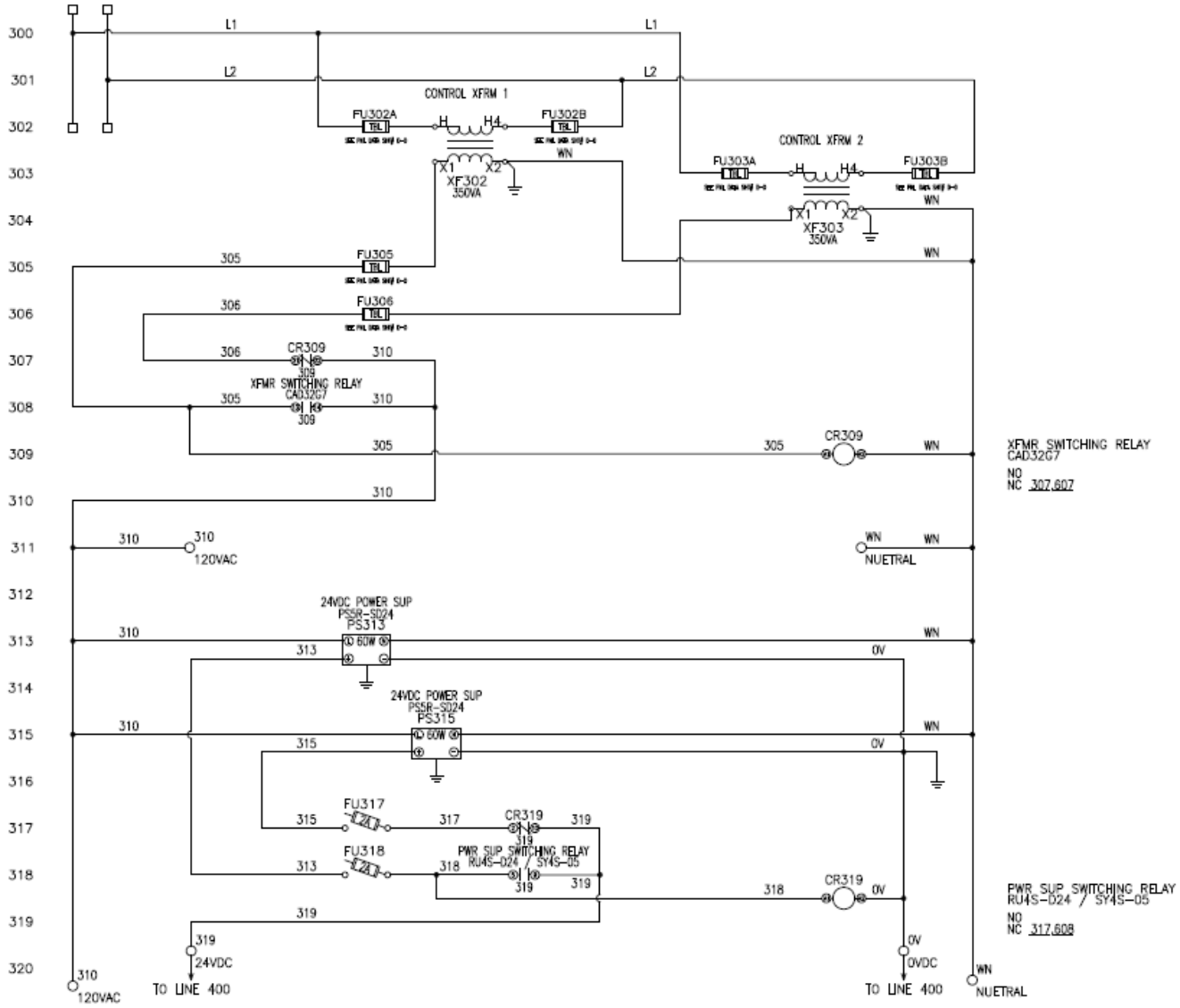
301SMD546 - A
(Ref. Drawing)

A.2 DUPLEX 1 PHASE



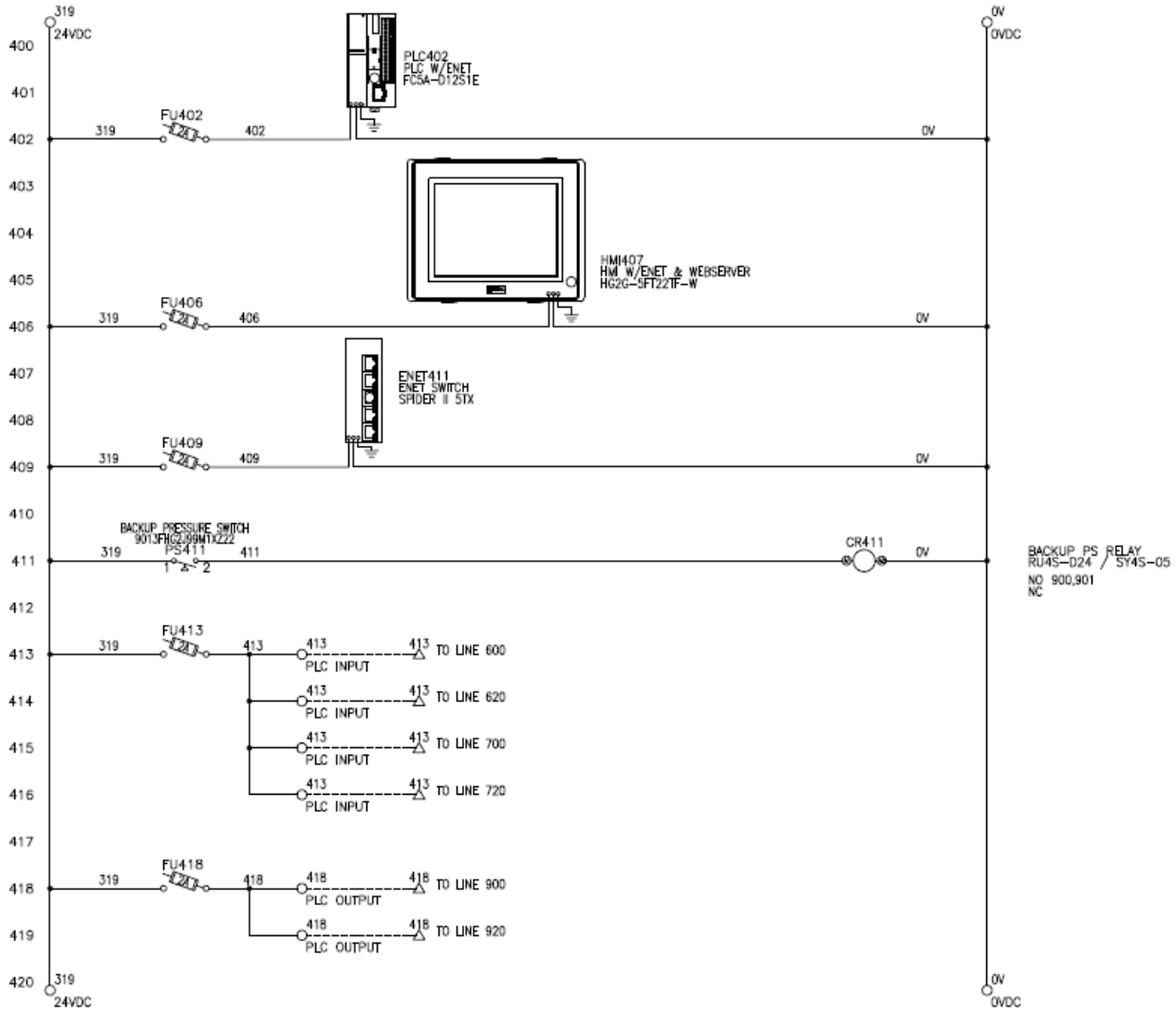
301SMD546 - A
(Ref. Drawing)
Sheet 2

A.2 DUPLEX 1 PHASE



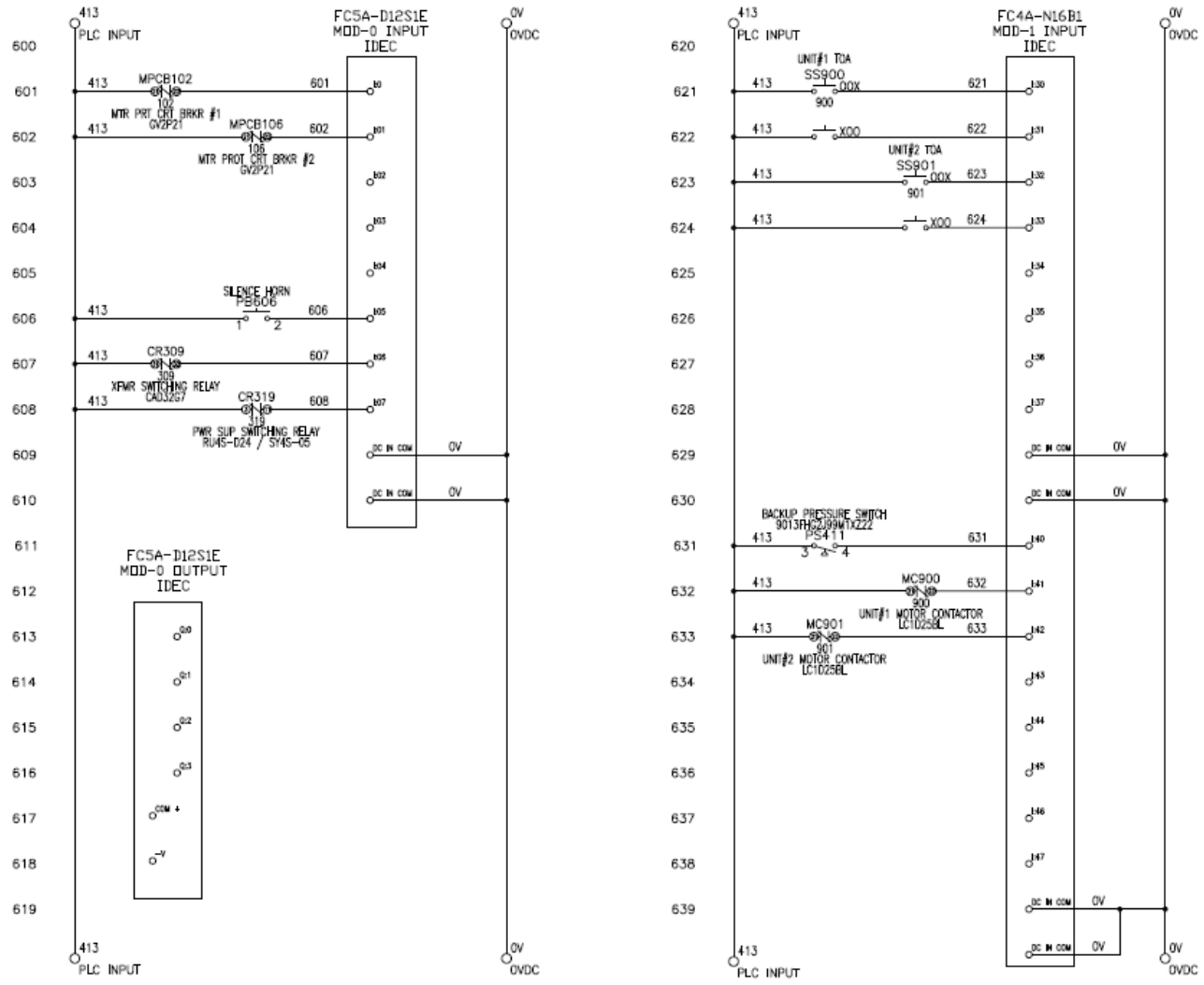
301SMD546 - A
(Ref. Drawing)
Sheet 4

A.2 DUPLEX 1 PHASE



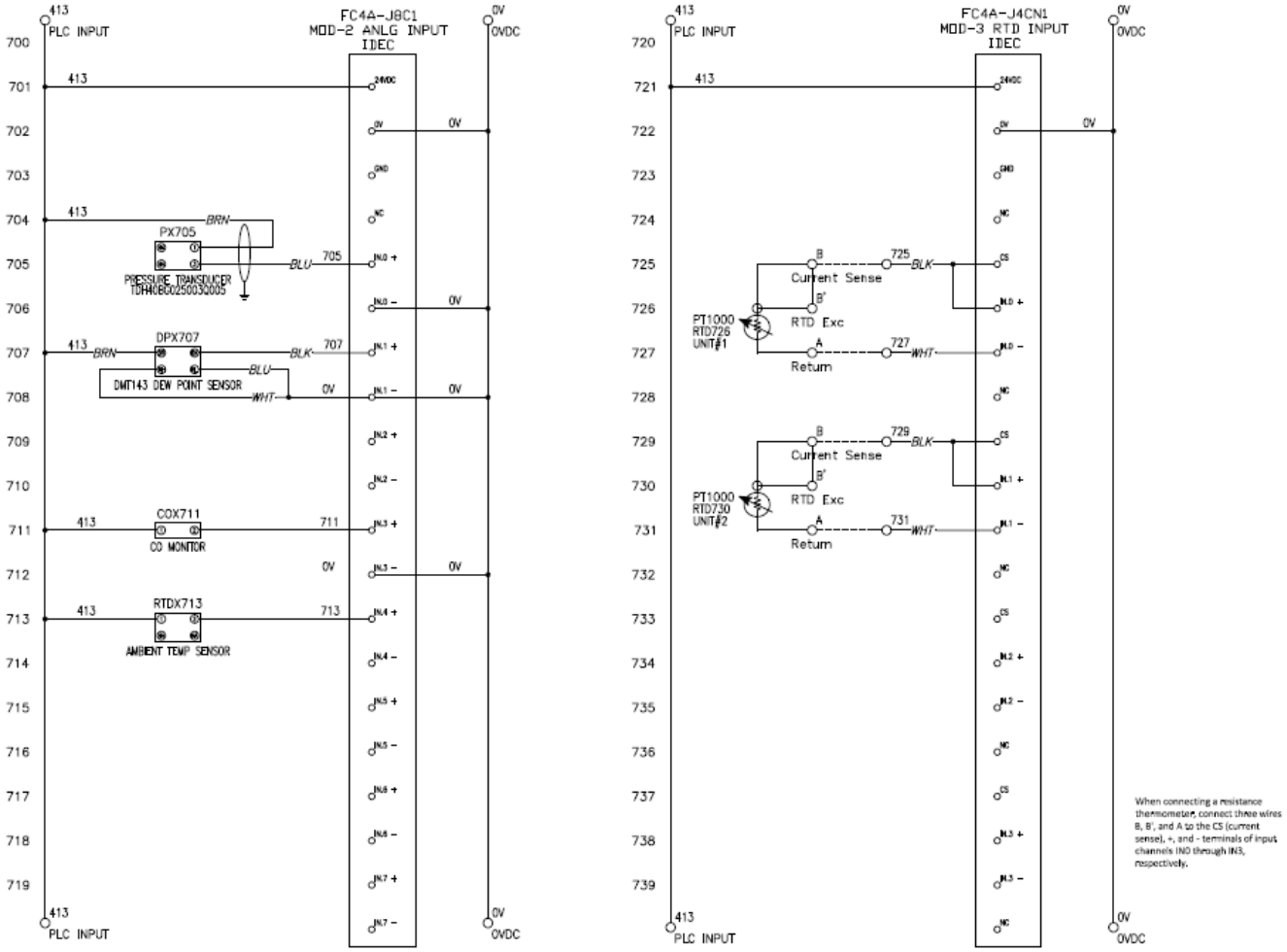
301SMD546 - A
(Ref. Drawing)
Sheet 5

A.2 DUPLEX 1 PHASE



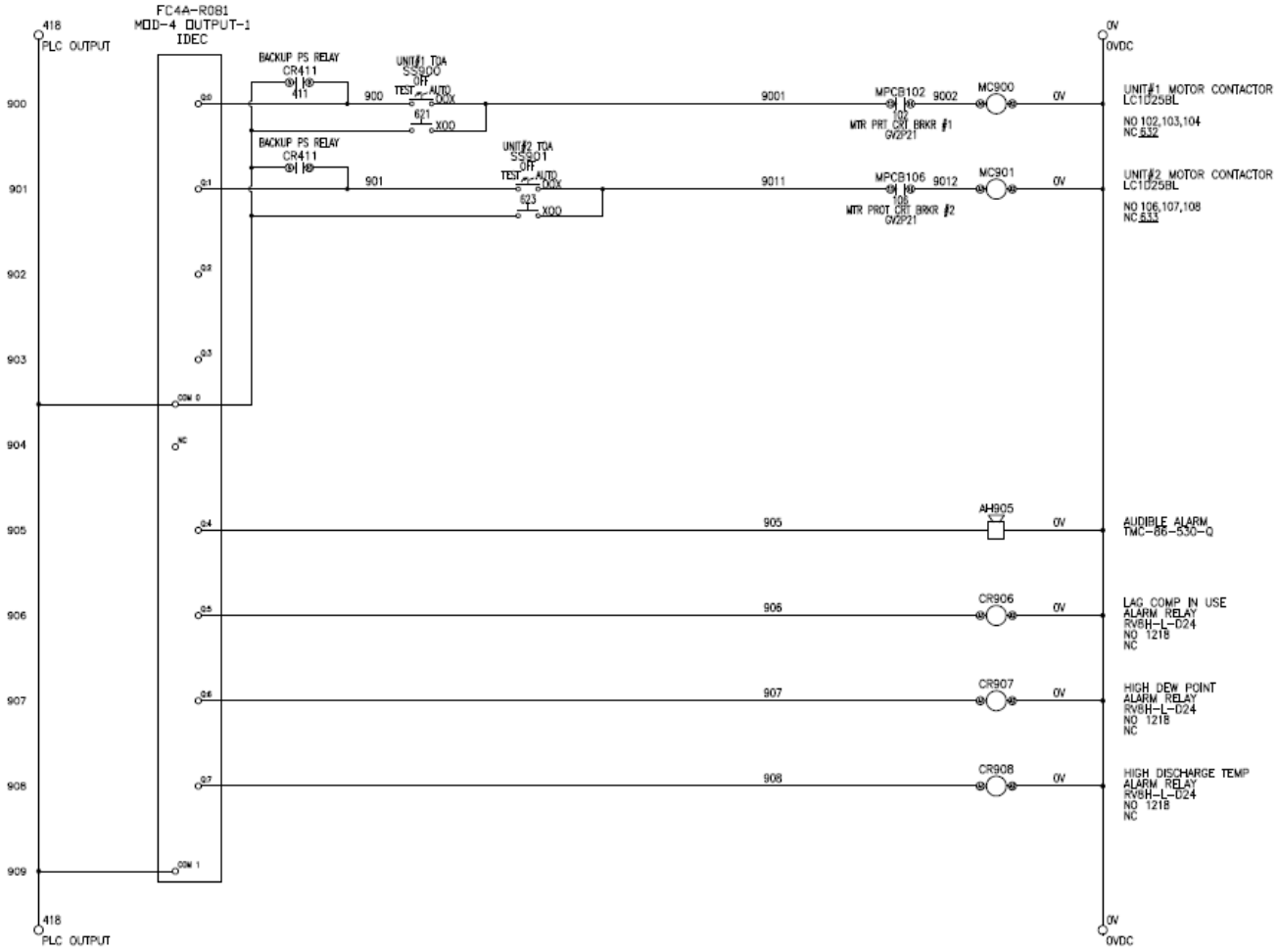
301SMD546 - A
(Ref. Drawing)
Sheet 7

A.2 DUPLEX 1 PHASE



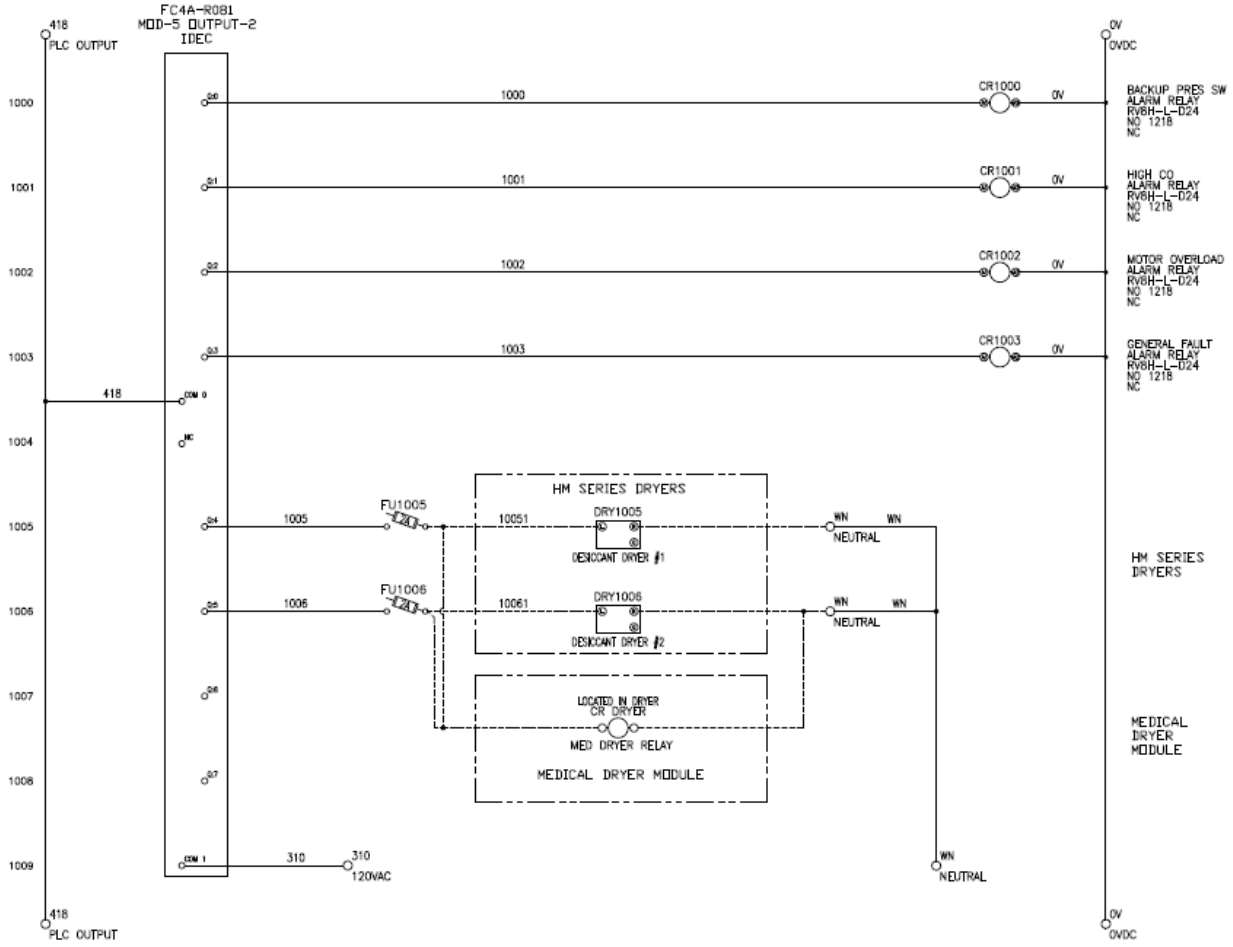
301SMD546 - A
(Ref. Drawing)
Sheet 8

A.2 DUPLEX 1 PHASE



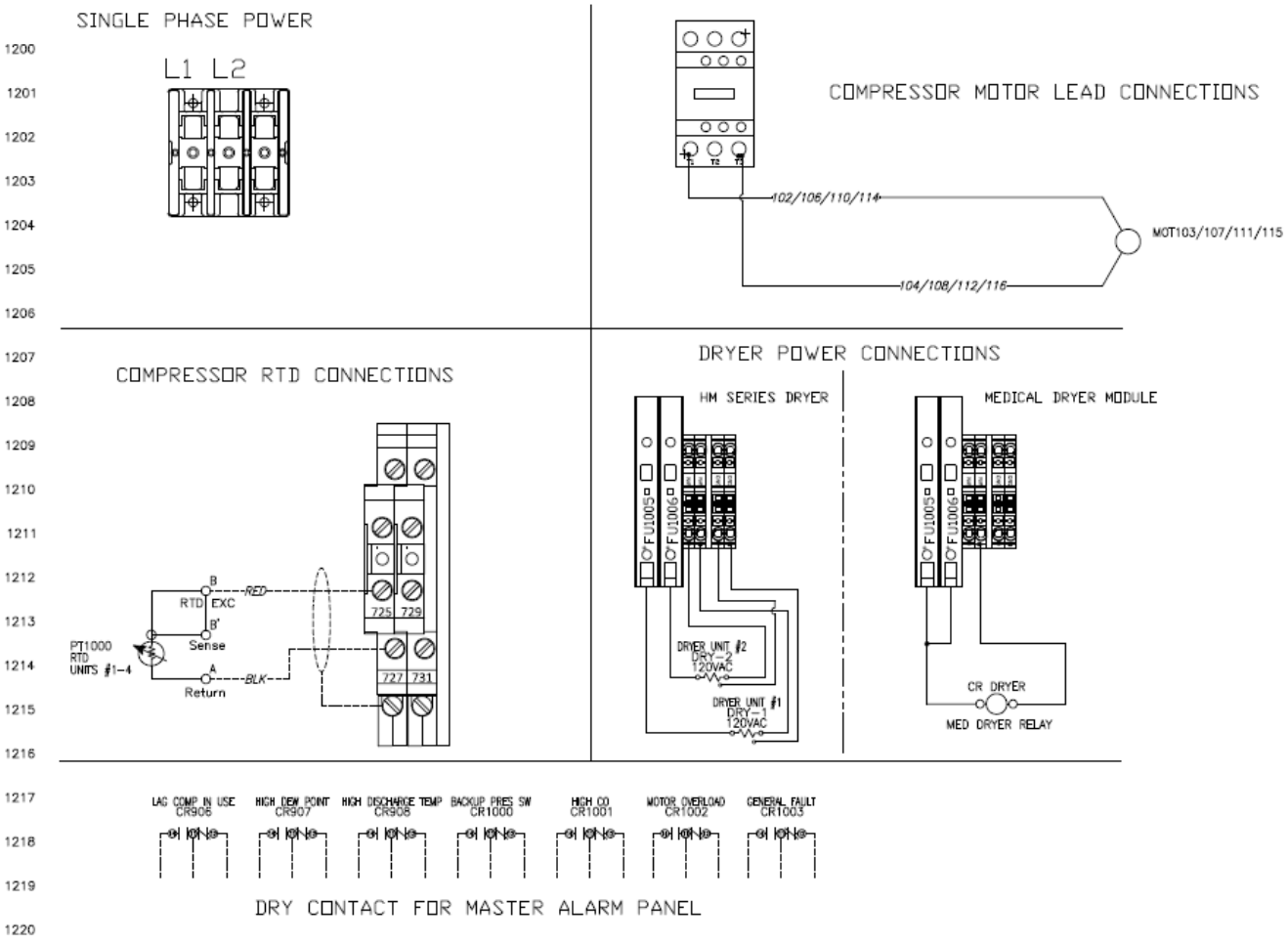
301SMD546 - A
(Ref. Drawing)
Sheet 10

A.2 DUPLEX 1 PHASE



301SMD546 - A
(Ref. Drawing)
Sheet 11

A.2 DUPLEX 1 PHASE



301SMD546 - A
(Ref. Drawing)
Sheet 13

A.3 TRIPLEX 3 PHASE

Gardner Denver

MEDICAL SCROLL TRI-PLEX

TRIPLEX MOTOR- DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 3ø 50/60Hz	5	16.7	52.6	80
	7.5	24.3	75.1	110
	10	30.8	94.9	140
230V 3ø 50/60Hz	5	15.3	48.1	70
	7.5	22	68.5	100
	10	28	86.5	130
460V 3ø 60Hz	5	7.6	25.3	35
	7.5	11	35.5	50
	10	14	44.5	65
575V 3ø 60Hz	5	6.1	20.8	30
	7.5	9	29.5	45
	10	11	35.5	50
380V/400V 3ø 50/60Hz	5	9.1	31.6	45
	7.5	14	44.5	65
	10	18	56.5	85

FUSE TABLE - CONTROL TRANSFORMERS 500VA						
FUSE TAG	TYPE	208V	230V	380V	460V	575V
FU302 A&B	FNQR	8	7	4	3	3
FU303 A&B	FNQR	8	7	4	3	3
FU305	FNM	5	5	5	5	5
FU306	FNM	5	5	5	5	5
FU317	3AG	2	2	2	2	2
FU318	3AG	2	2	2	2	2
FU402	3AG	2	2	2	2	2
FU406	3AG	2	2	2	2	2
FU409	3AG	2	2	2	2	2
FU413	3AG	2	2	2	2	2
FU418	3AG	2	2	2	2	2
FU1005	3AG	2	2	2	2	2
FU1006	3AG	2	2	2	2	2

WIRE TYPE TABLE		
ALL FIELD WIRING CONDUCTORS * USE COPPER ONLY + RATED AT 75°C		
VOLTAGE	GAUGE	COLOR
208–480VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

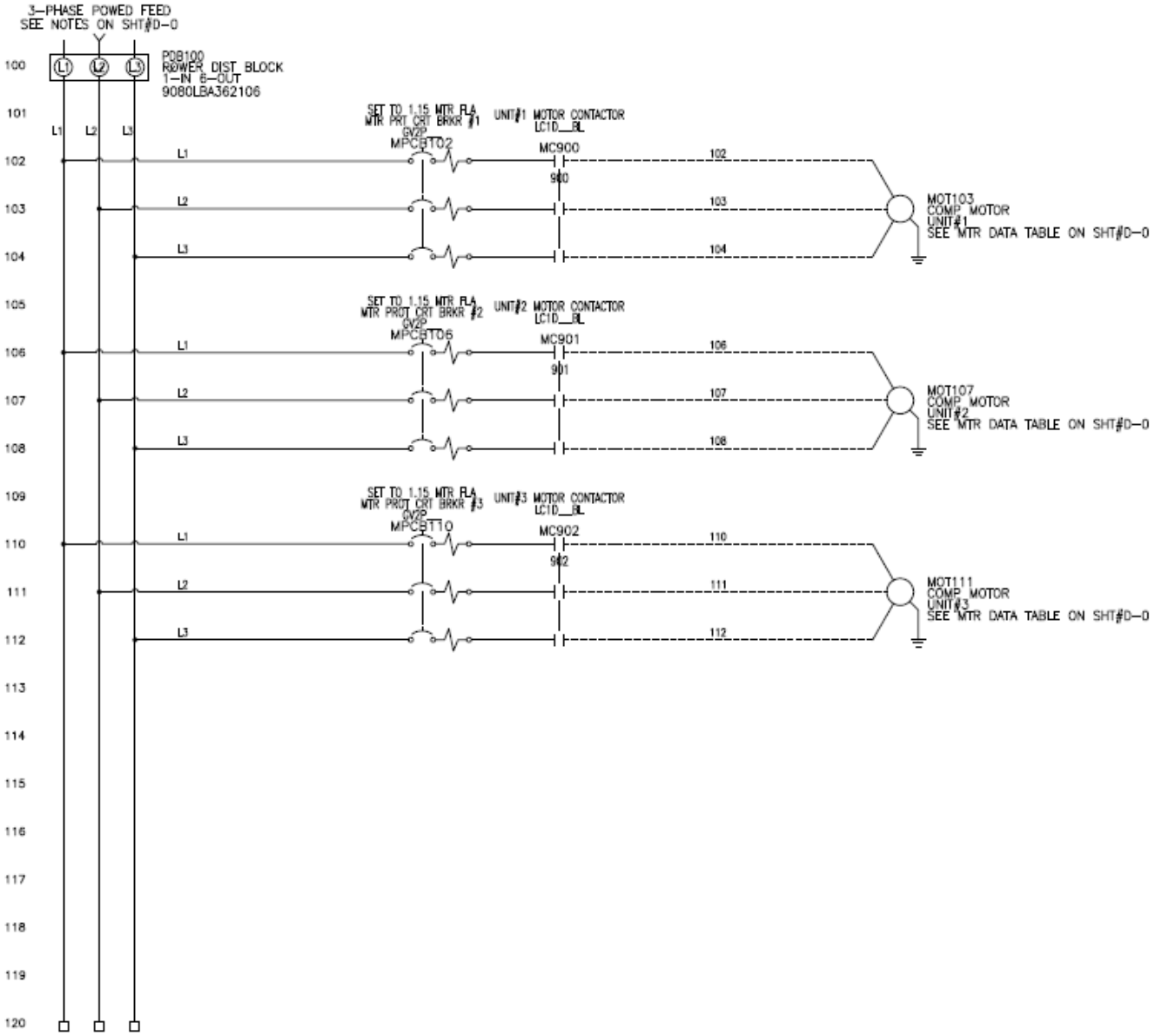
SYMBOL LEGEND	
———	FACTORY WIRING
- - - - - -	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

1. RECOMMENDED TIGHTENING TORQUES FOR WIRE TERMINALS:
   200–460 VOLT POWER — 35 POUND INCHES
   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
2. PANEL GROUND MUST BE CONNECTED TO EARTH GROUND
3. ALL WIRES MUST BE LABELED ON BOTH ENDS
4. TRANSFORMER IS SIZED FOR LOADS SHOWN ON DRAWING ONLY. DO NOT CONNECT ANY OTHER DEVICES
5. INSTALLER TO PROVIDE DISCONNECTS WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY, SEE RECOMMENDED BREAKER SIZE IN "DATA TABLE 1"
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

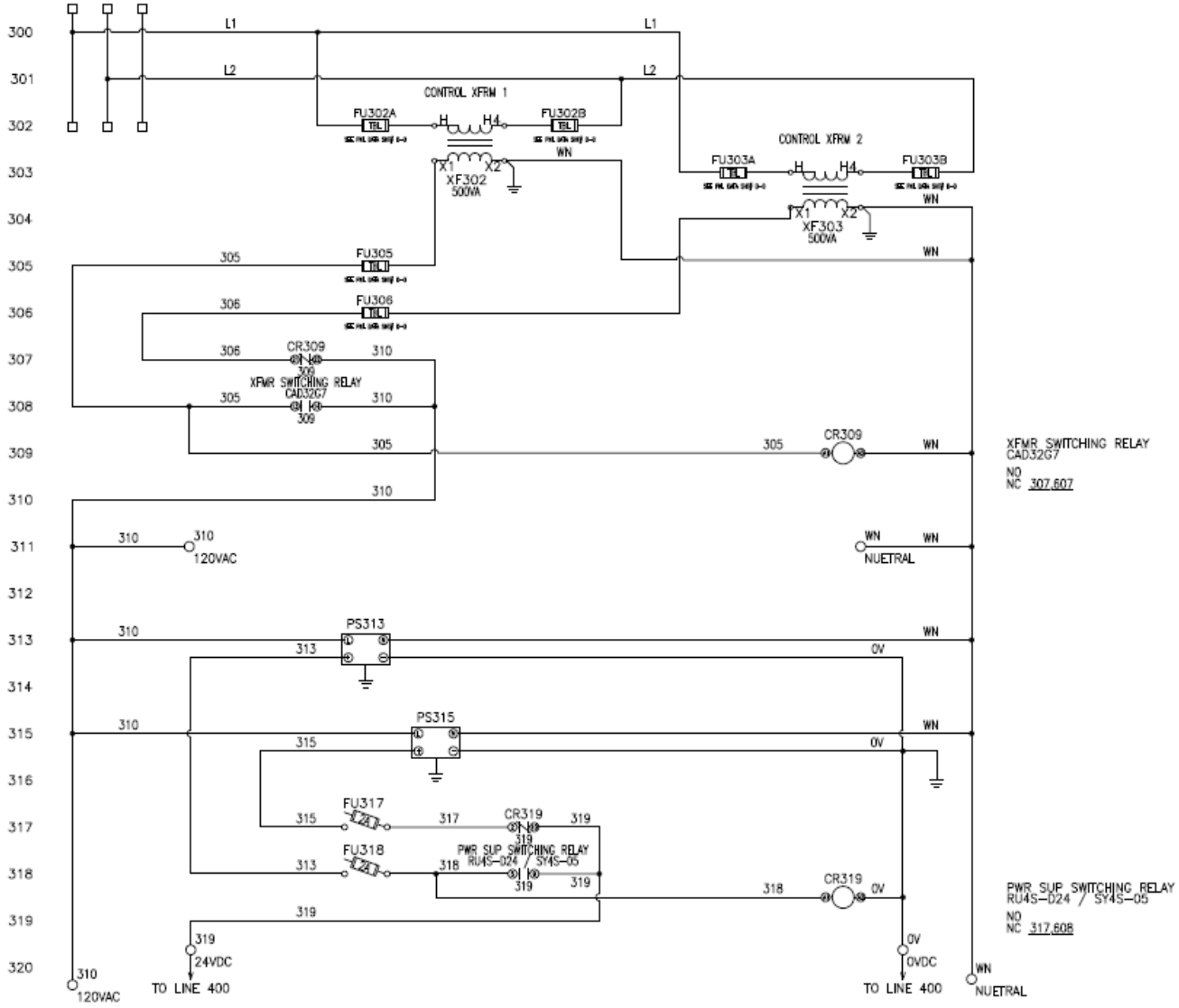
300SMT546 - A
(Ref. Drawing)

A.3 TRIPLEX 3 PHASE



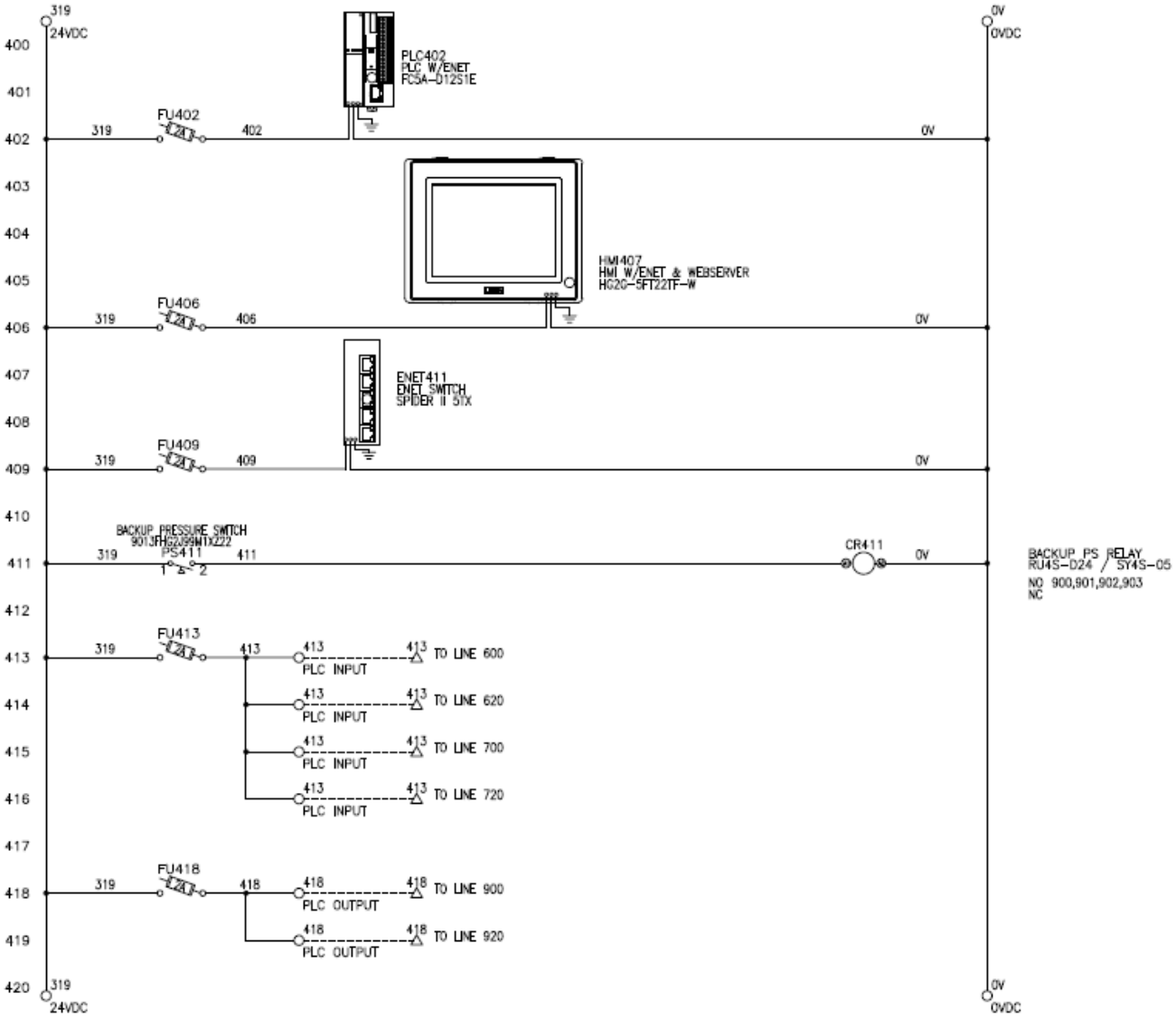
300SMT546 - A
(Ref. Drawing)
Sheet 2

A.3 TRIPLEX 3 PHASE



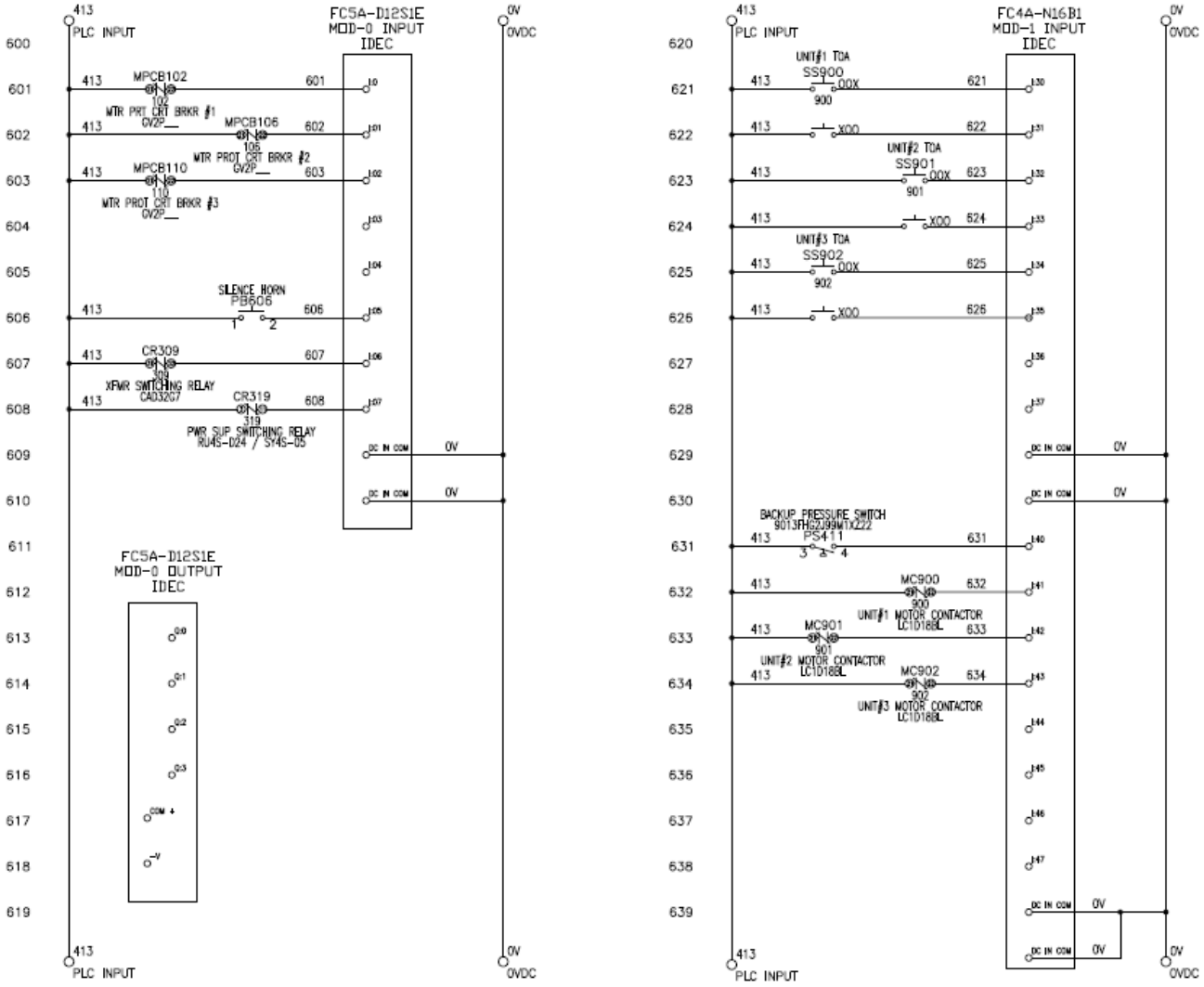
300SMT546 - A
(Ref. Drawing)
Sheet 4

A.3 TRIPLEX 3 PHASE



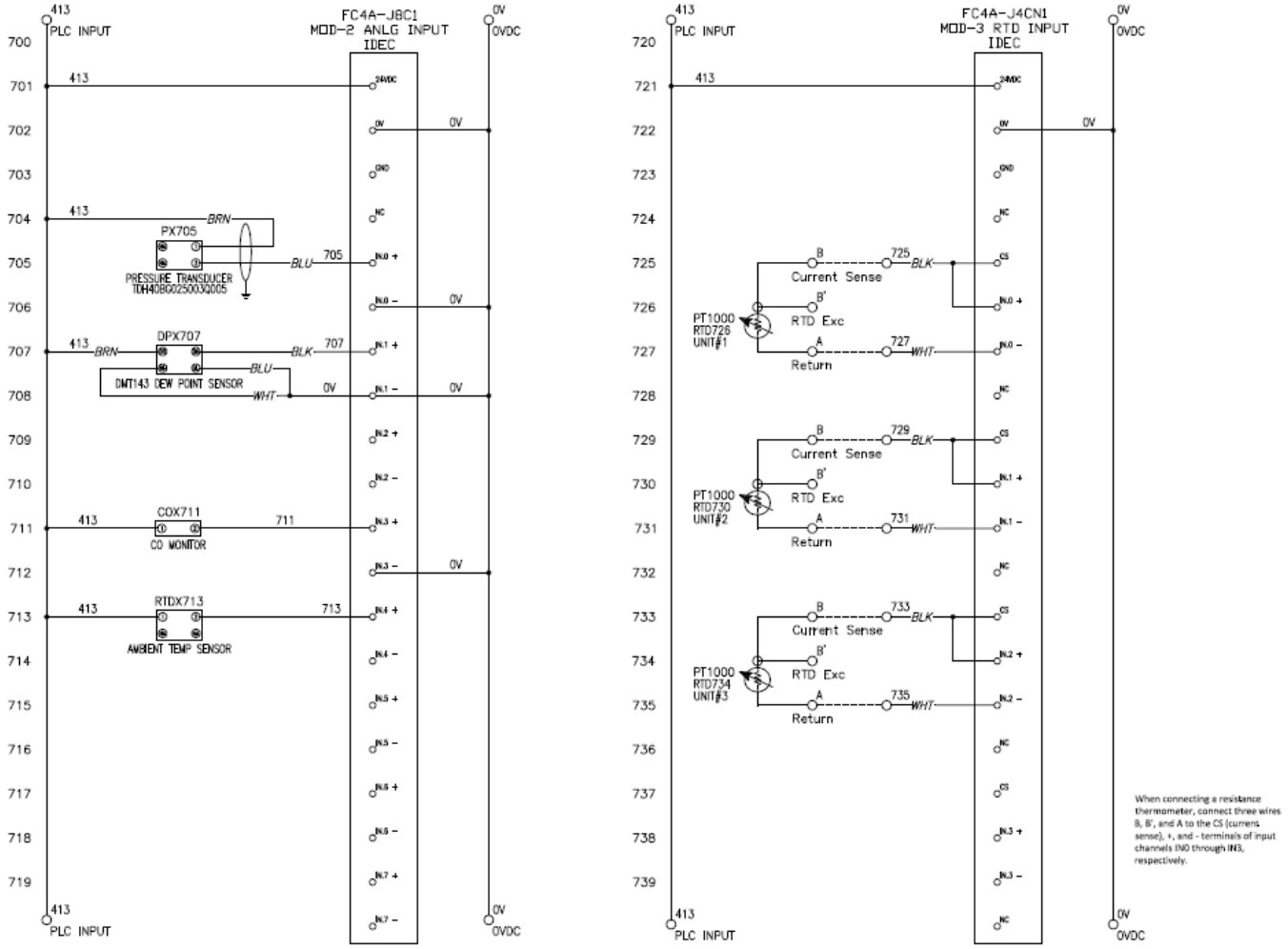
300SMT546 - A
(Ref. Drawing)
Sheet 5

A.3 TRIPLEX 3 PHASE



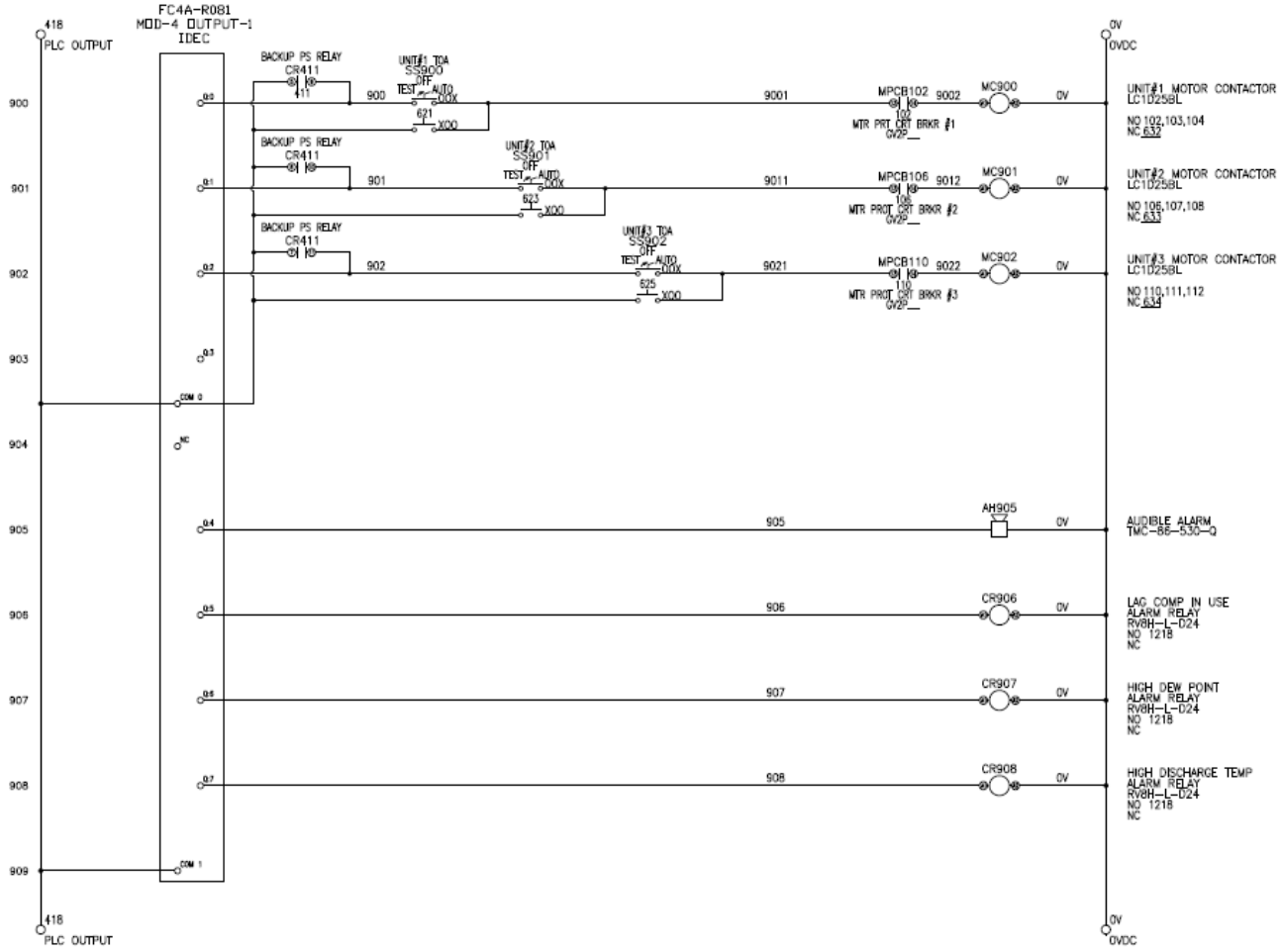
300SMT546 - A
(Ref. Drawing)
Sheet 7

A.3 TRIPLEX 3 PHASE



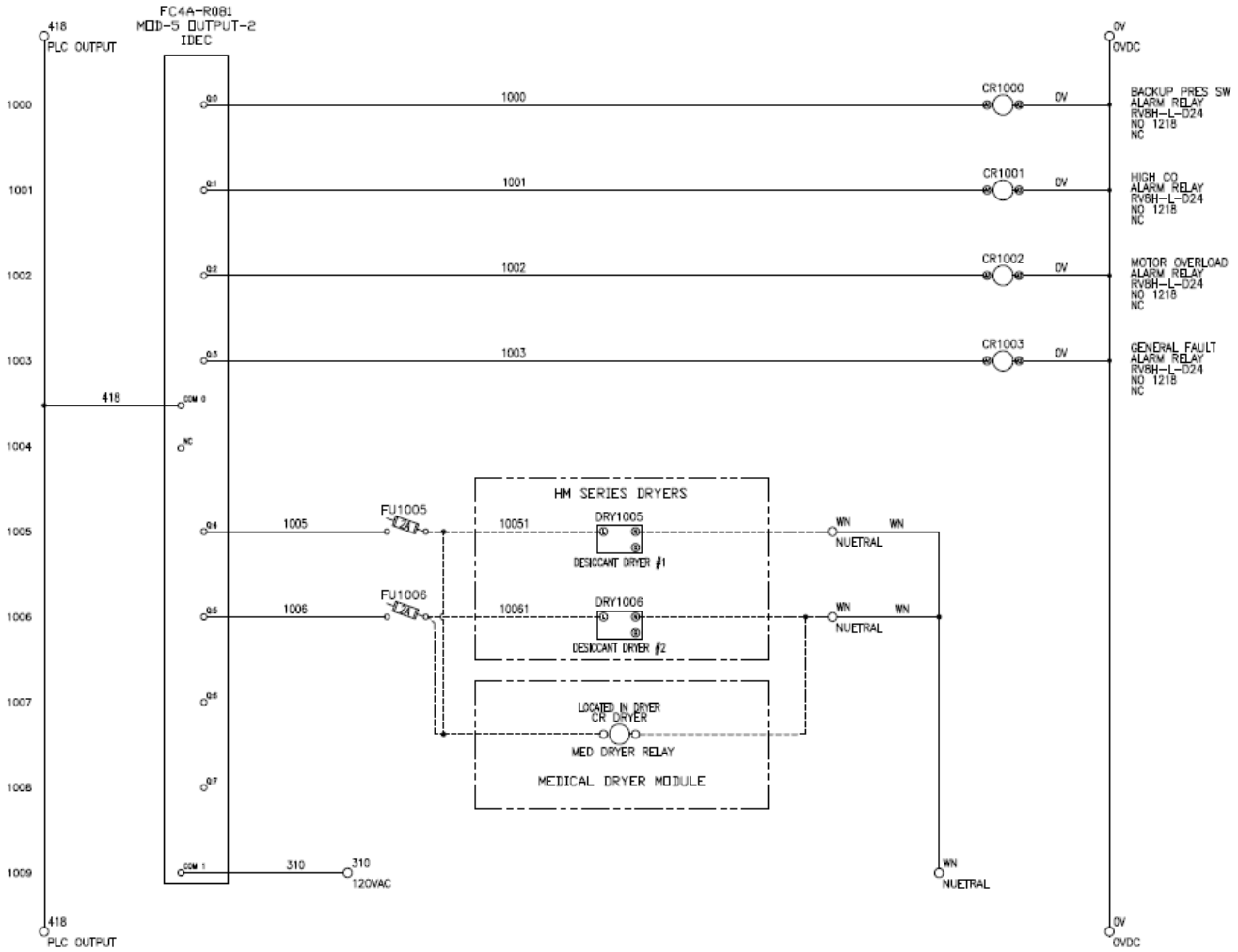
300SMT546 - A
(Ref. Drawing)
Sheet 8

A.3 TRIPLEX 3 PHASE



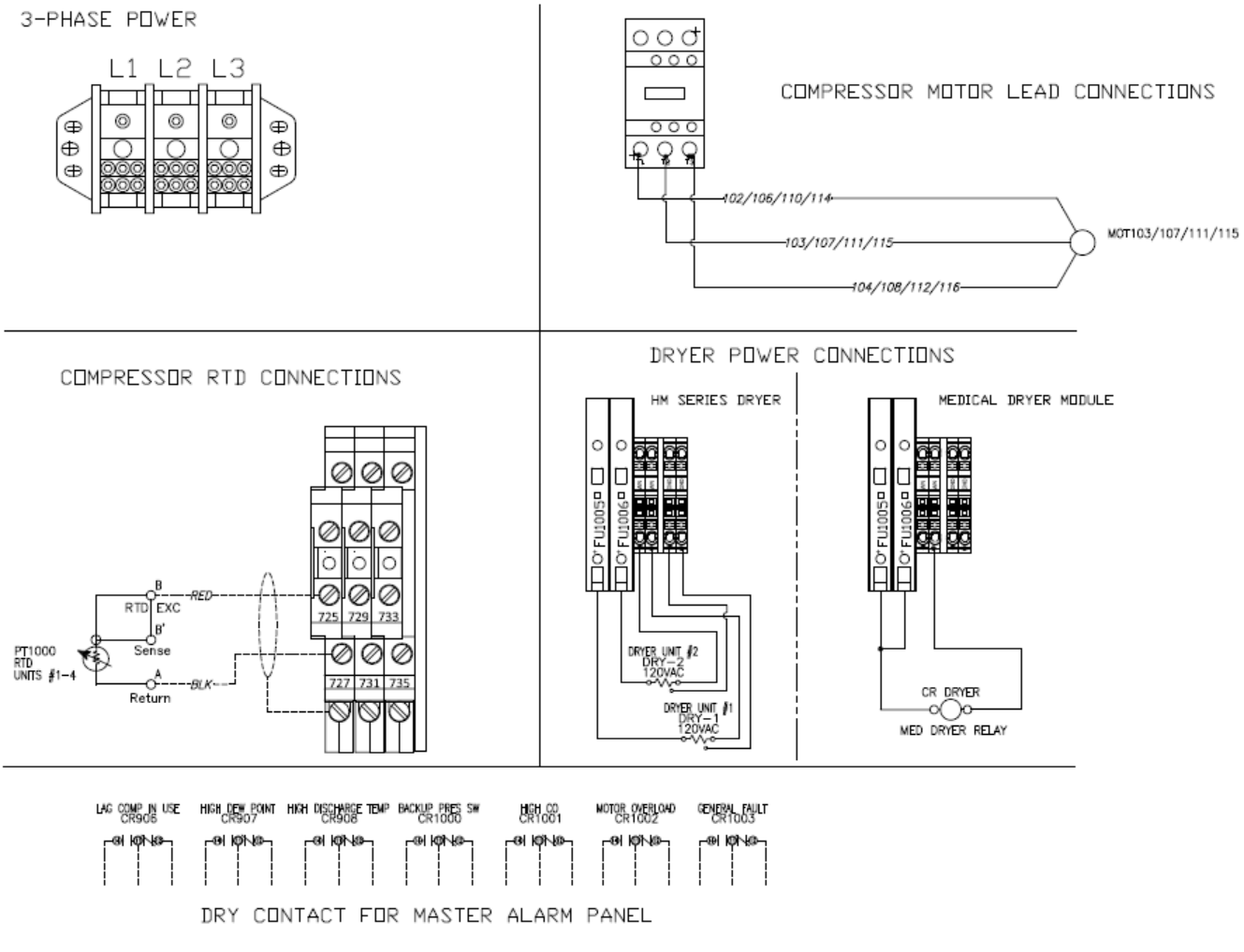
300SMT546 - A
(Ref. Drawing)
Sheet 10

A.3 TRIPLEX 3 PHASE



300SMT546 - A
(Ref. Drawing)
Sheet 11

A.3 TRIPLEX 3 PHASE



300SMT546 - A
(Ref. Drawing)
Sheet 13

A.4 TRIPLEX 1 PHASE

Gardner Denver

MEDICAL SCROLL TRI-PLEX

TRIPLEX MOTOR - DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 1PH 50/60Hz	5	30.8	94.9	140
	7.5	44	134.5	200
230V 1PH 50/60Hz	5	28	86.5	130
	7.5	40	122.5	180

FUSE TABLE - CONTROL TRANSFORMERS 500VA			
FUSE TAG	TYPE	208V	230V
FU302 A&B	FNQR	8	7
FU303 A&B	FNQR	8	7
FU305	FNM	5	5
FU306	FNM	5	5
FU317	3AG	2	2
FU318	3AG	2	2
FU402	3AG	2	2
FU406	3AG	2	2
FU409	3AG	2	2
FU413	3AG	2	2
FU418	3AG	2	2
FU1005	3AG	2	2
FU1006	3AG	2	2

WIRE TYPE TABLE

ALL FIELD WIRING CONDUCTORS
* USE COPPER ONLY
+ RATED AT 75°C

VOLTAGE	GAUGE	COLOR
208–230VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

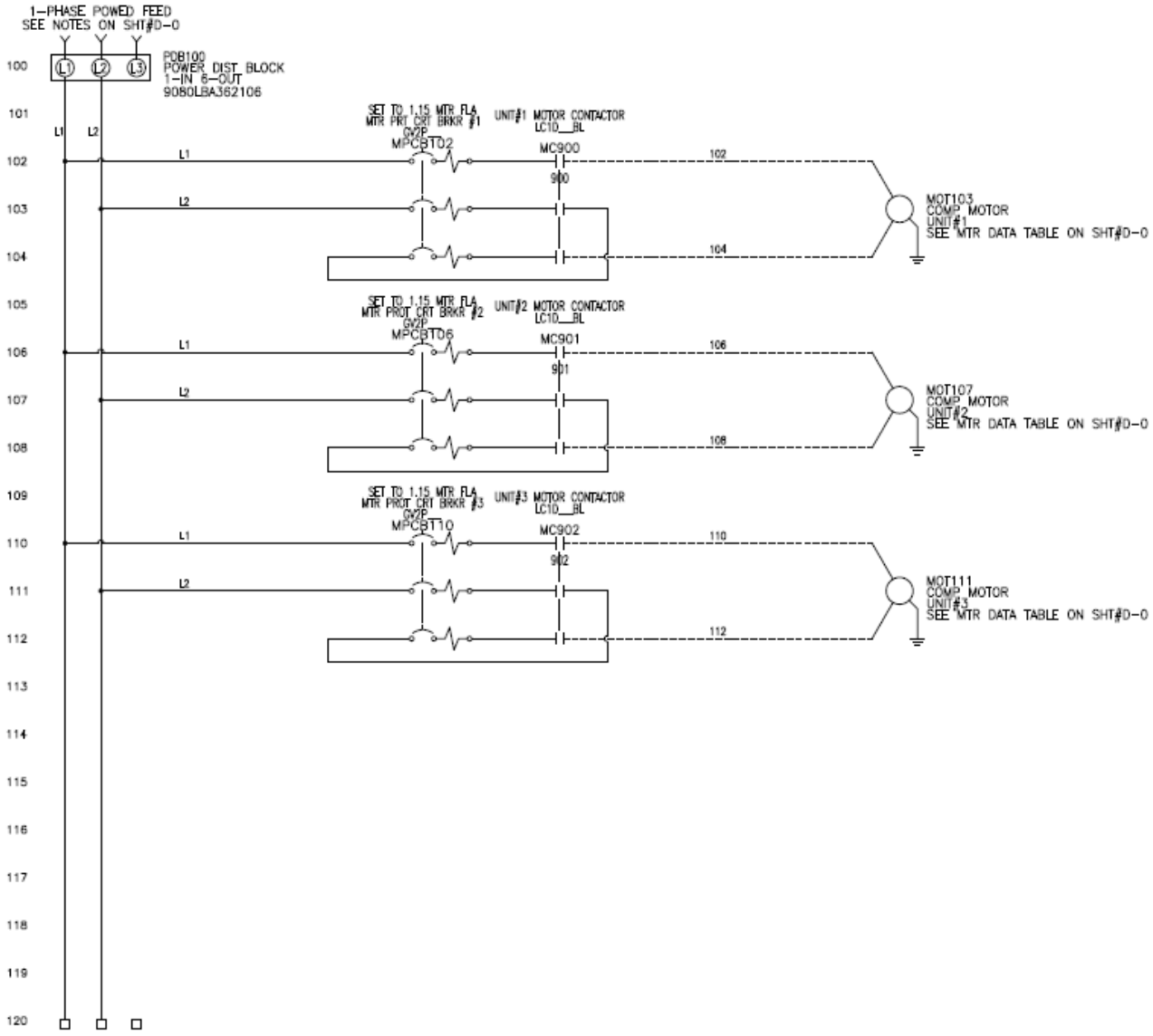
SYMBOL LEGEND	
———	FACTORY WIRING
- - - - -	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

1. RECOMMENDED TIGHTENING TORQUES FOR WIRE TERMINALS:
   200–460 VOLT POWER — 35 POUND INCHES
   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
2. PANEL GROUND MUST BE CONNECTED TO EARTH GROUND
3. ALL WIRES MUST BE LABELED ON BOTH ENDS
4. TRANSFORMER IS SIZED FOR LOADS SHOWN ON DRAWING ONLY. DO NOT CONNECT ANY OTHER DEVICES
5. INSTALLER TO PROVIDE DISCONNECTS WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY, SEE RECOMMENDED BREAKER SIZE IN "DATA TABLE 1"
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

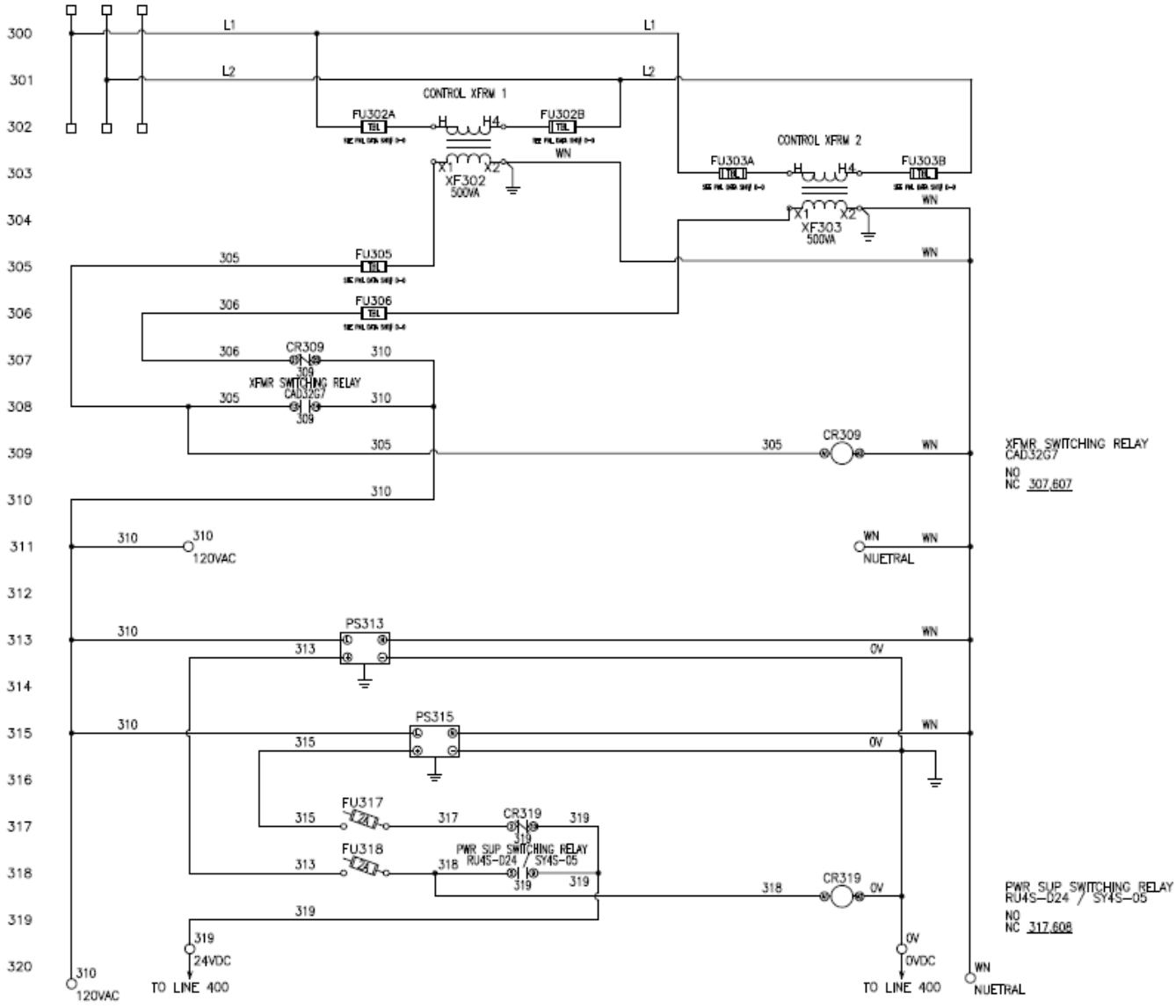
301SMT546 - A
(Ref. Drawing)

A.4 TRIPLEX 1 PHASE



301SMT546 - A
(Ref. Drawing)
Sheet 2

A.4 TRIPLEX 1 PHASE



301SMT546 - A
(Ref. Drawing)
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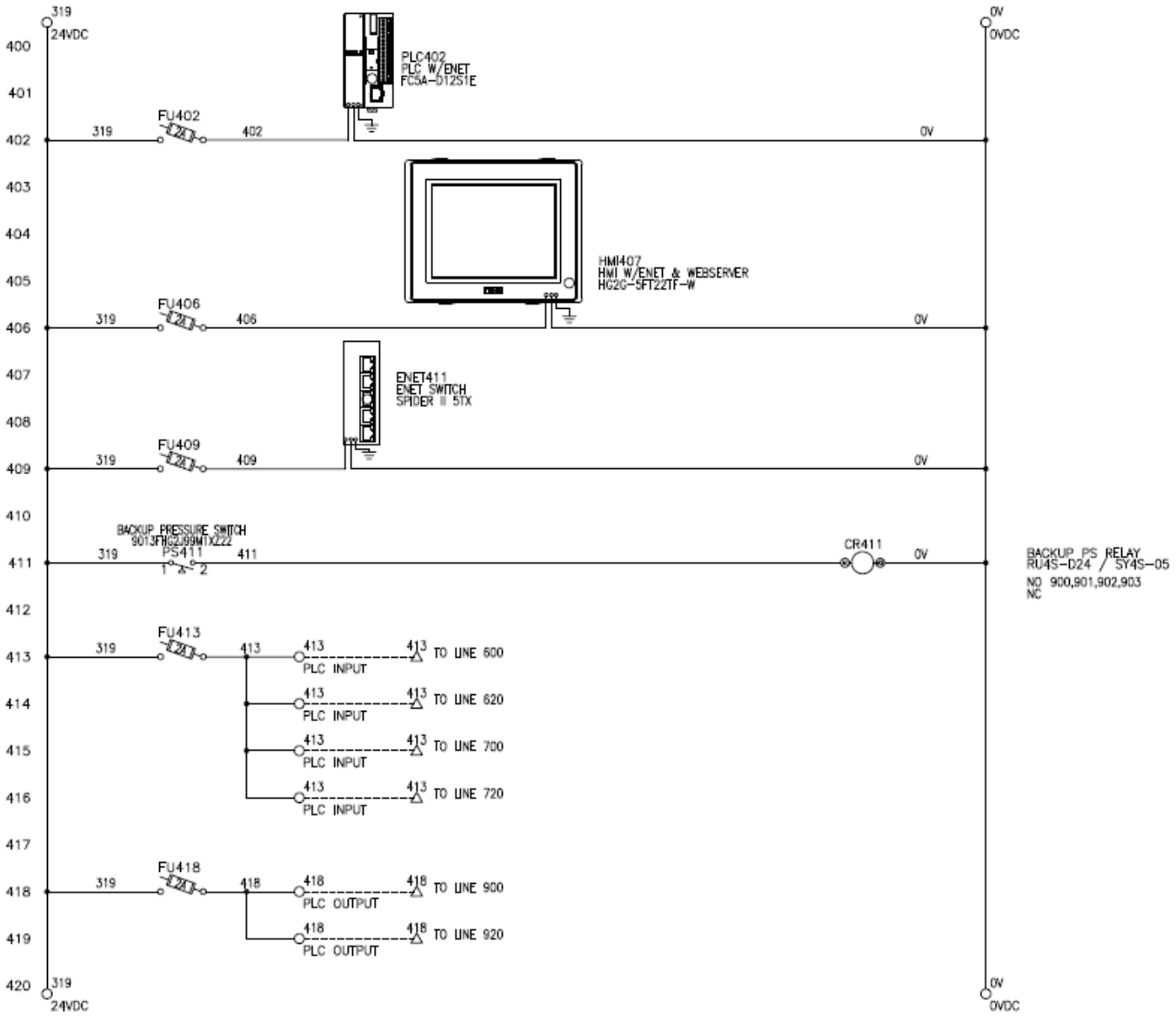
A.4 TRIPLEX 1 PHASE



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(Ref. Drawing)
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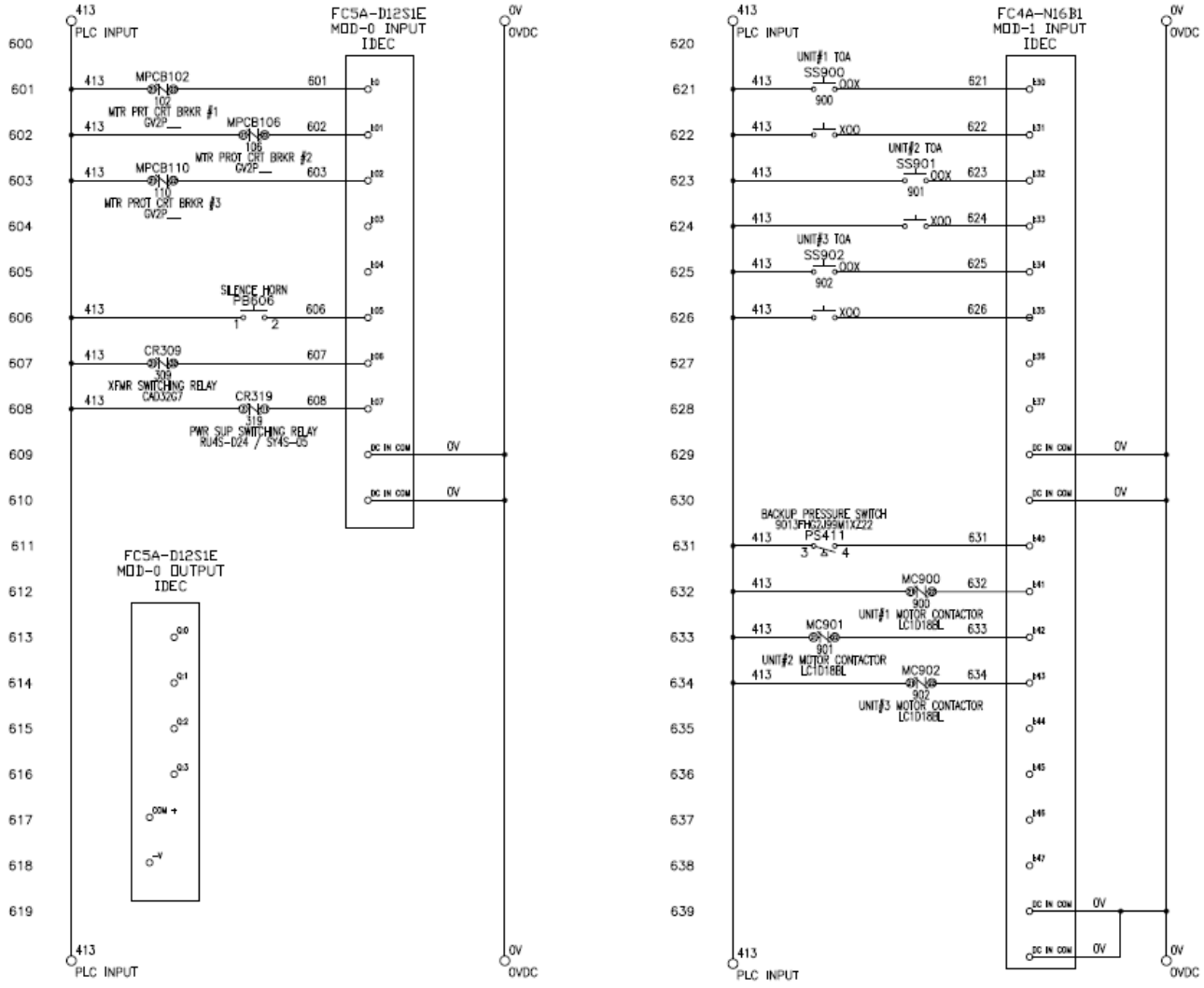
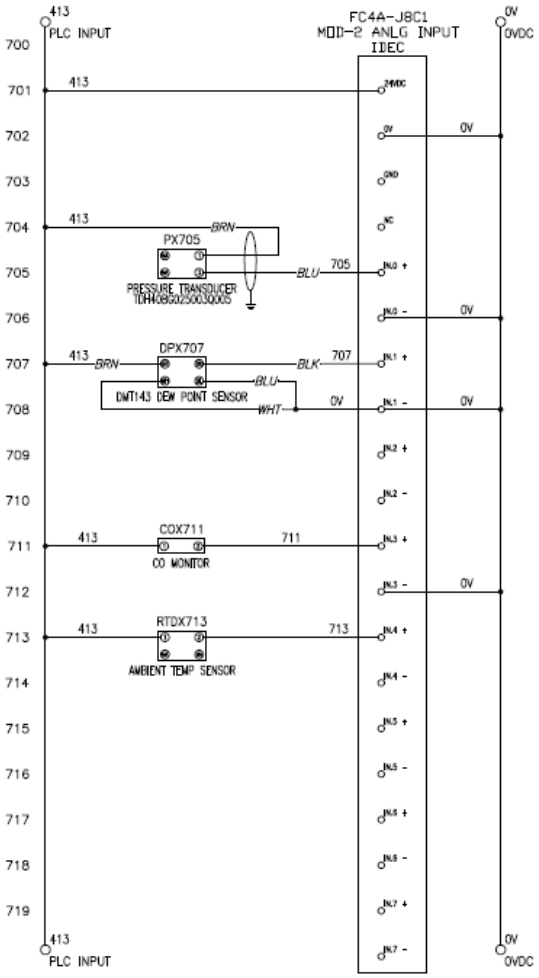
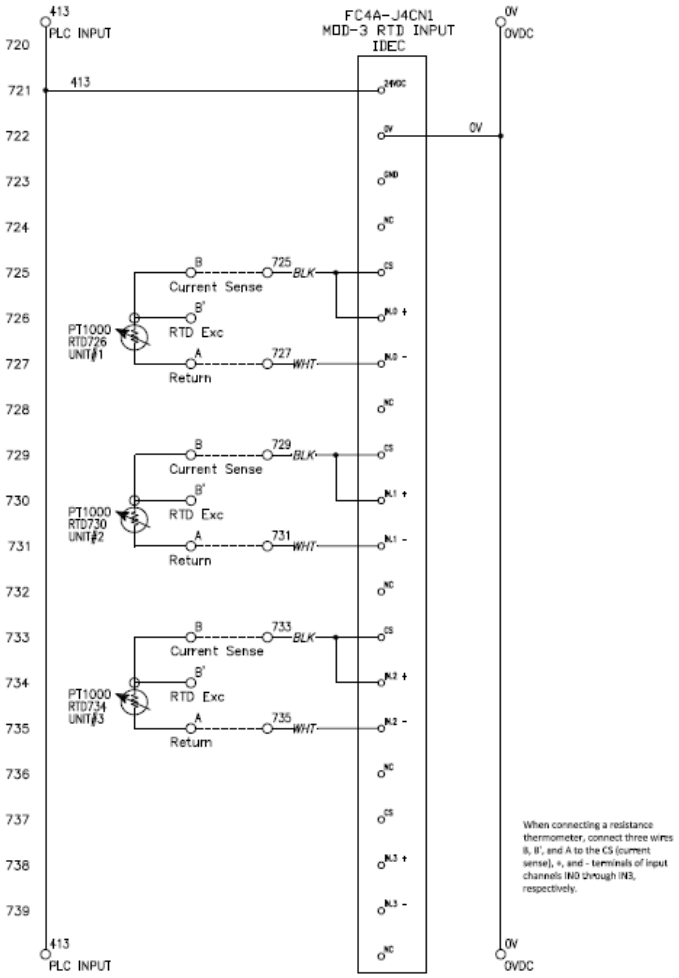
A.4 TRIPLEX 1 PHASE



301SMT546 - A
(Ref. Drawing)
Sheet 7

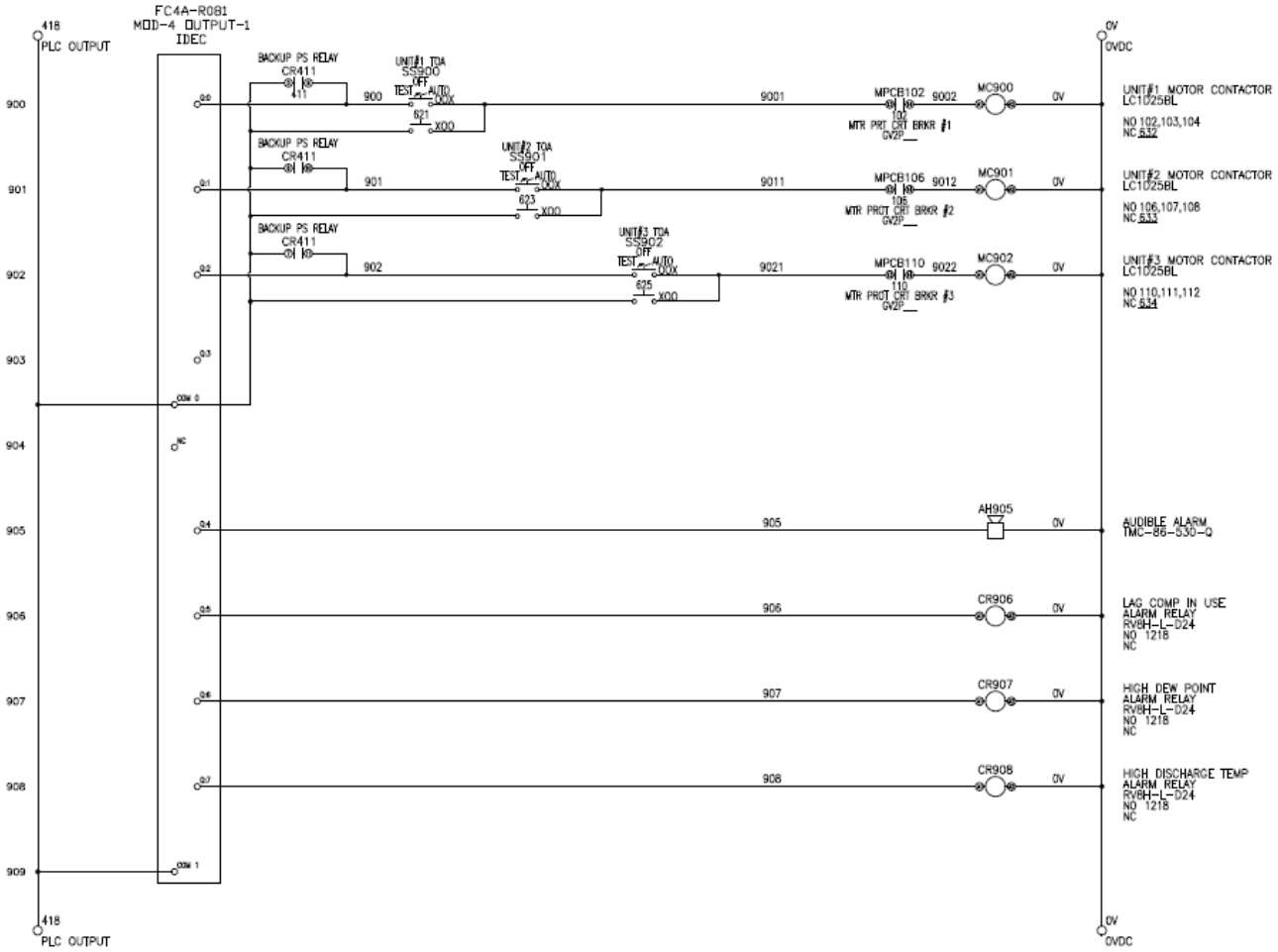
A.4 TRIPLEX 1 PHASE





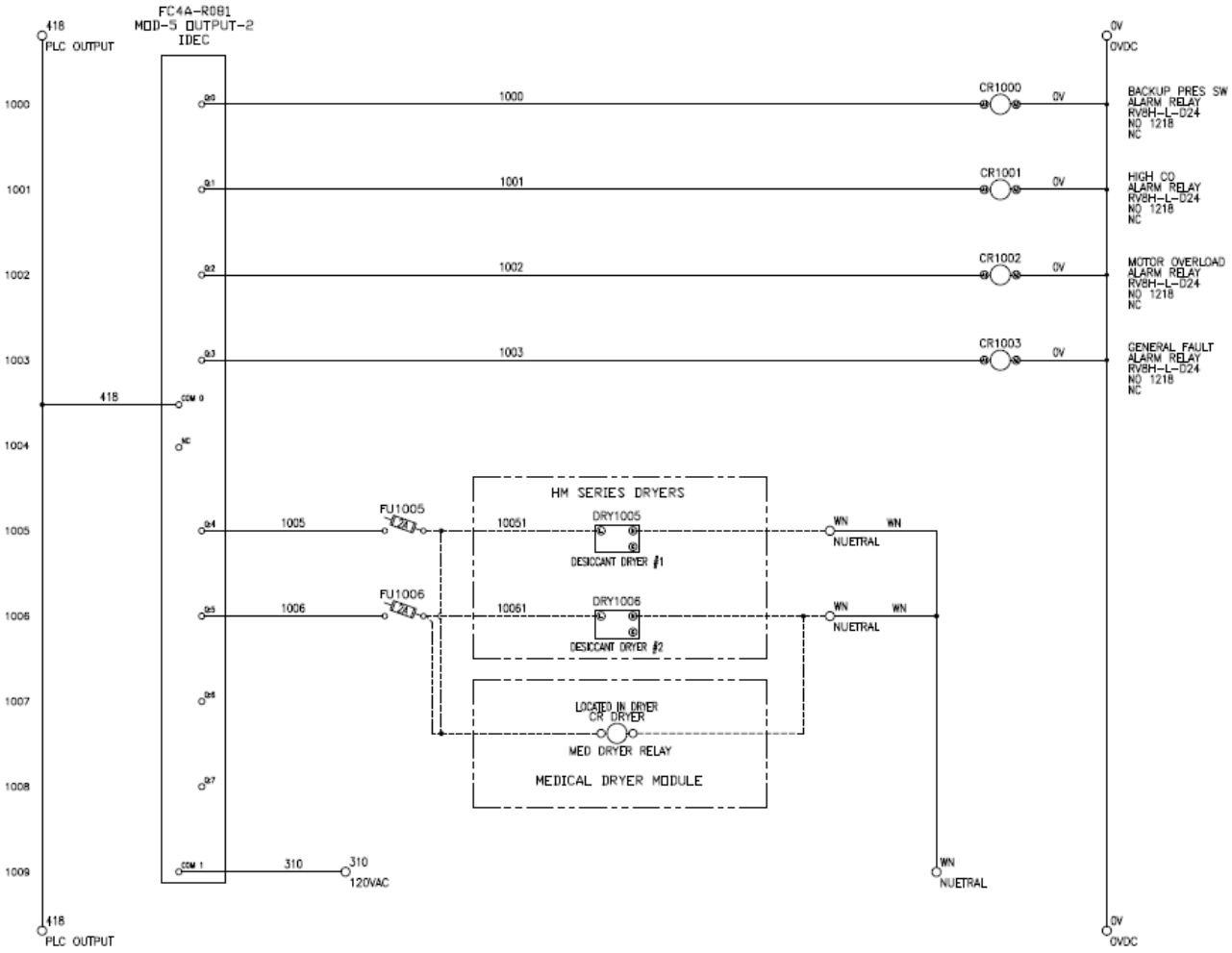
301SMT546 - A
(Ref. Drawing)
Sheet 8

A.4 TRIPLEX 1 PHASE



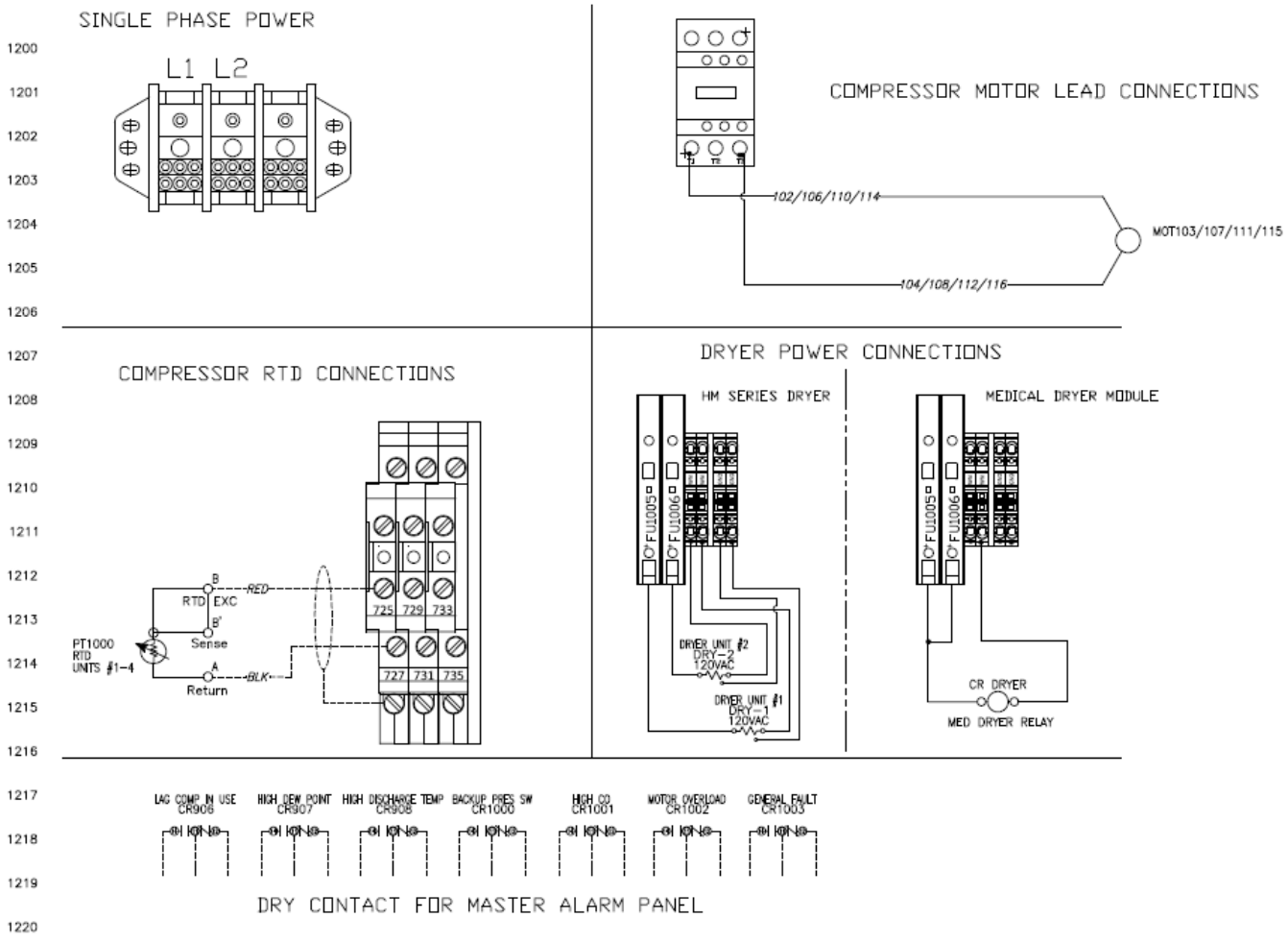
301SMT546 - A
(Ref. Drawing)
Sheet 10

A.4 TRIPLEX 1 PHASE



301SMT546 - A
(Ref. Drawing)
Sheet 11

A.4 TRIPLEX 1 PHASE



301SMT546 - A
(Ref. Drawing)
Sheet 13

A.5 QUADRAPLEX 3 PHASE

Gardner Denver

MEDICAL SCROLL QUAD-PLEX

QUADPLEX MOTOR- DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 3ϕ 50/60Hz	5	16.7	69.3	95
	7.5	24.2	99.3	135
	10	30.8	125.7	170
230V 3ϕ 50/60Hz	5	15.2	63.3	85
	7.5	22	90.5	125
	10	28	114.5	155
460V 3ϕ 60Hz	5	7.6	32.9	45
	7.5	11	46.5	65
	10	14	58.5	80
575V 3ϕ 60Hz	5	6.1	26.9	35
	7.5	9	38.5	50
	10	11	46.5	65
380V/400V 3ϕ 50/60Hz	5	9.7	41.3	55
	7.5	14	58.5	80
	10	18	74.5	100

FUSE TABLE - CONTROL TRANSFORMERS 500VA						
FUSE TAG	TYPE	208V	230V	380V	460V	575V
FU302 A&	FNQR	6	5	5	5	4
FU303 A&	FNQR	6	5	5	5	4
FU305	FNM	7	7	7	7	7
FU306	FNM	7	7	7	7	7
FU317	3AG	2				
FU318	3AG	2				
FU402	3AG	2				
FU406	3AG	2				
FU409	3AG	2				
FU413	3AG	2				
FU418	3AG	2				
FU1005	3AG	2				
FU1006	3AG	2				

WIRE TYPE TABLE		
ALL FIELD WIRING CONDUCTORS + USE COPPER ONLY + RATED AT 75°C		
VOLTAGE	GAUGE	COLOR
208–480VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

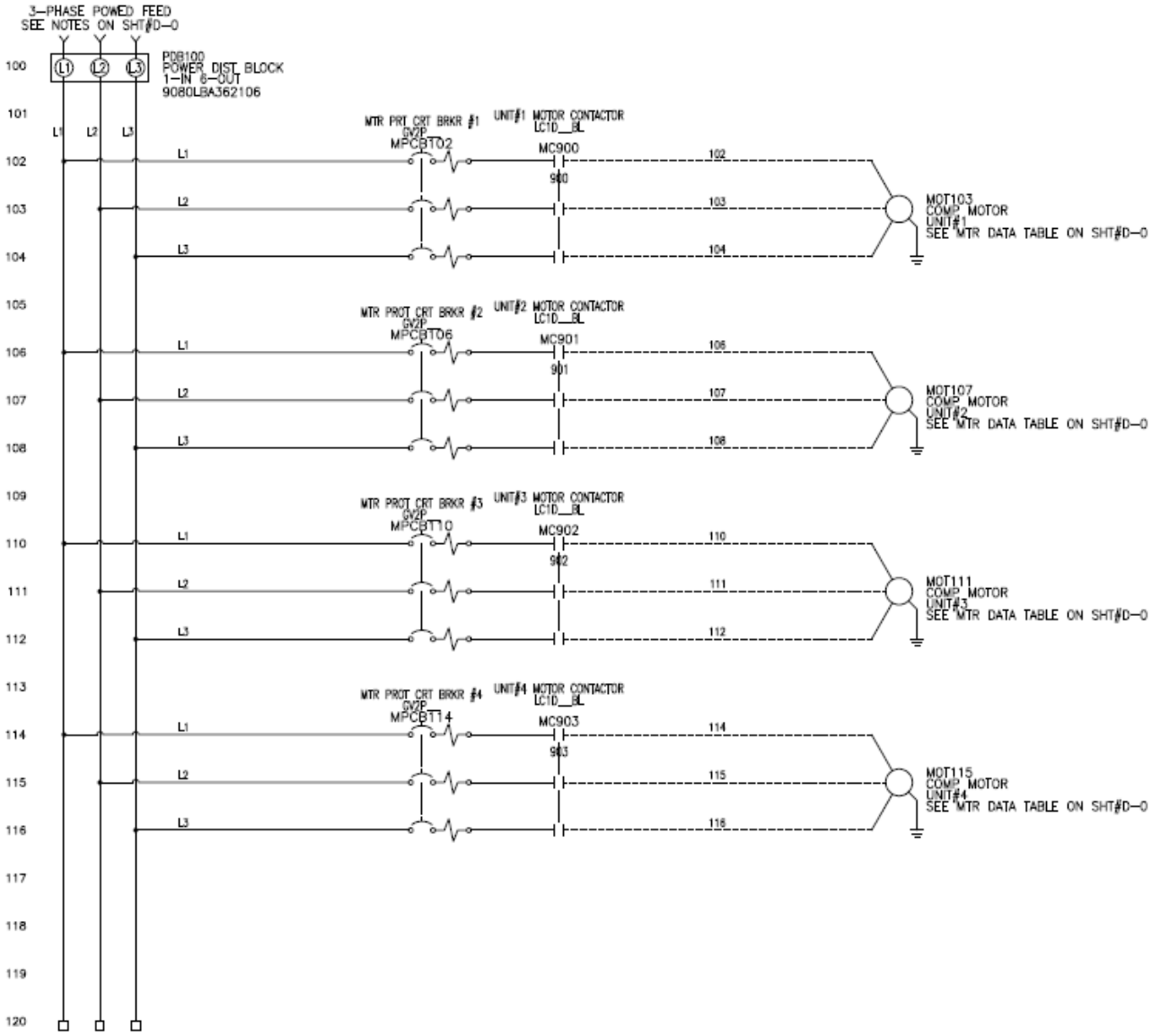
SYMBOL LEGEND	
———	FACTORY WIRING
- - - - -	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

1. RECOMMENDED TIGHTENING TORQUES FOR WIRE TERMINALS:
   200–460 VOLT POWER — 35 POUND INCHES
   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
2. PANEL GROUND MUST BE CONNECTED TO EARTH GROUND
3. ALL WIRES MUST BE LABELED ON BOTH ENDS
4. TRANSFORMER IS SIZED FOR LOADS SHOWN ON DRAWING ONLY. DO NOT CONNECT ANY OTHER DEVICES
5. INSTALLER TO PROVIDE DISCONNECTS WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY, SEE RECOMMENDED BREAKER SIZE IN "DATA TABLE 1"
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

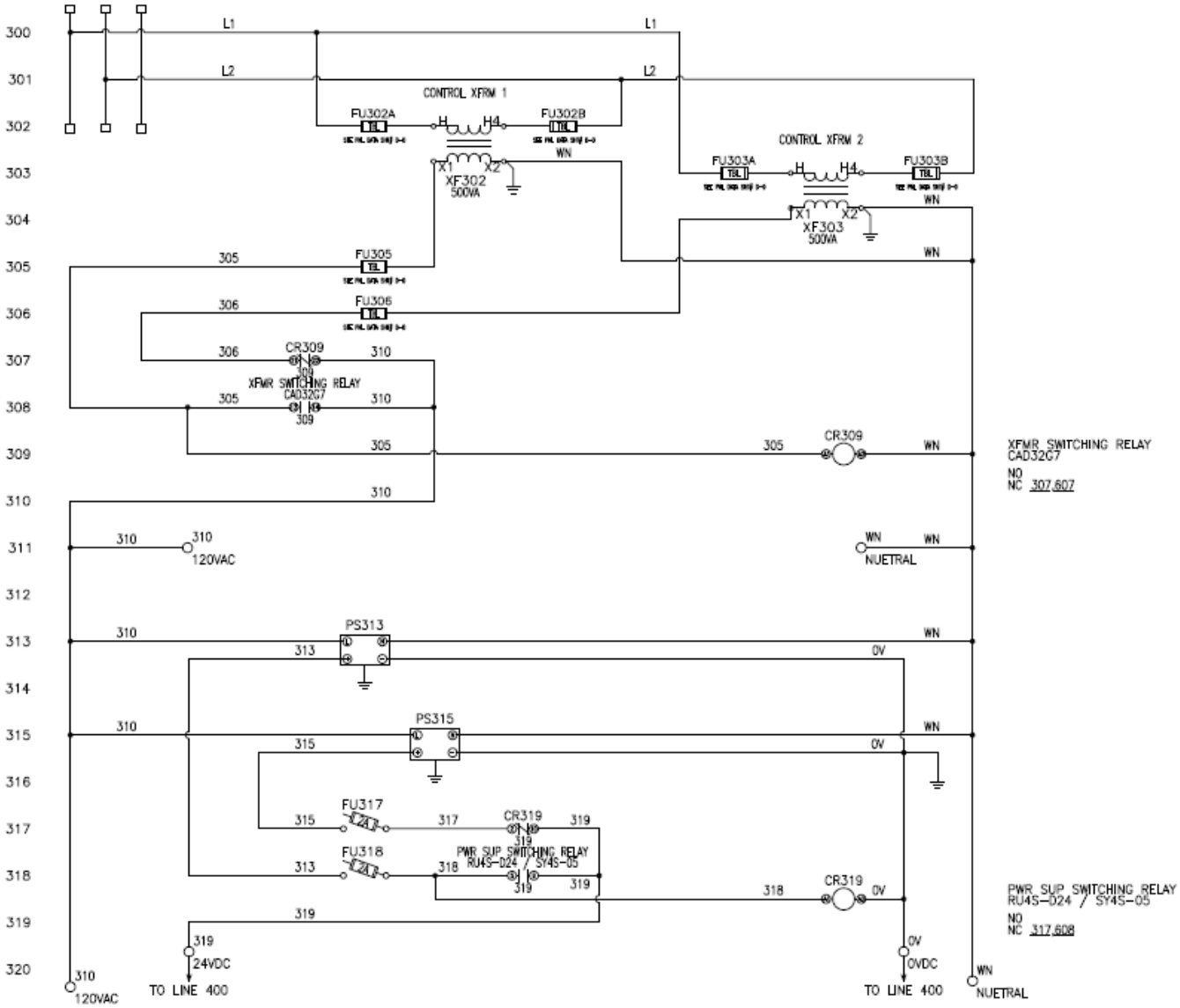
300SMQ546 - A
(Ref. Drawing)

A.5 QUADRAPLEX 3 PHASE



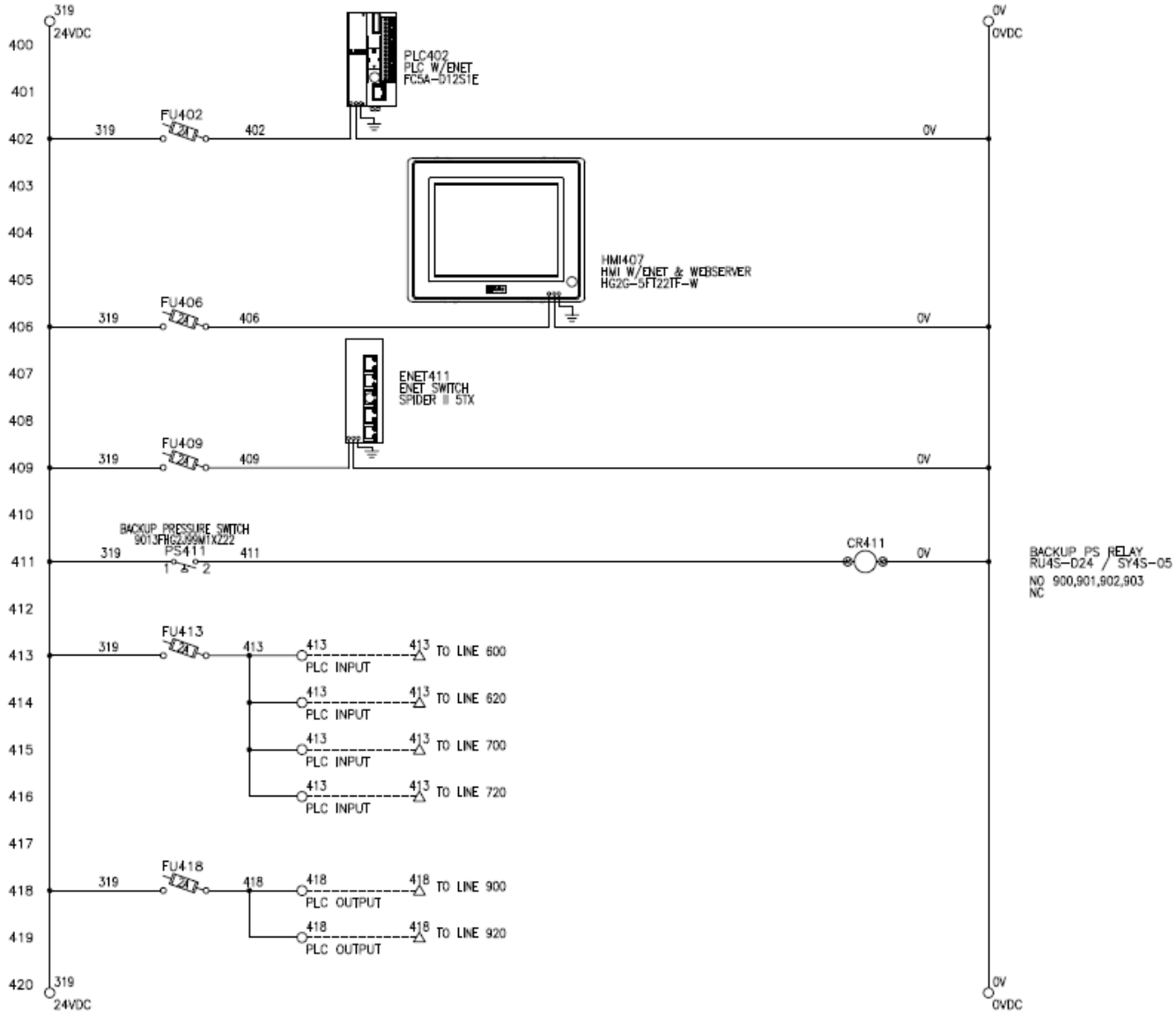
300SMQ546 - A
(Ref. Drawing)
Sheet 2

A.5 QUADRAPLEX 3 PHASE



300SMQ546 - A
(Ref. Drawing)
Sheet 4

A.5 QUADRAPLEX 3 PHASE



300SMQ546 - A
(Ref. Drawing)
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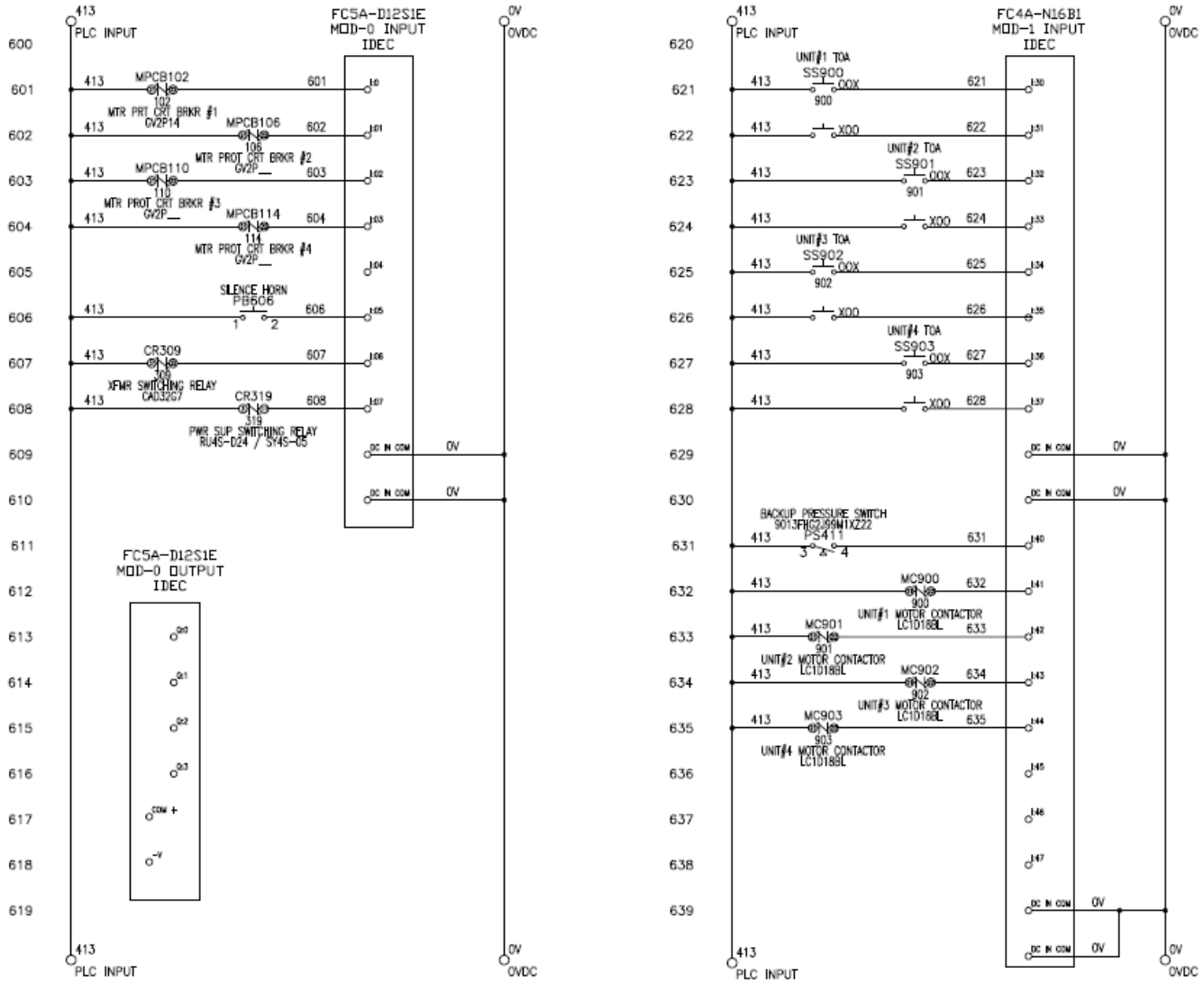
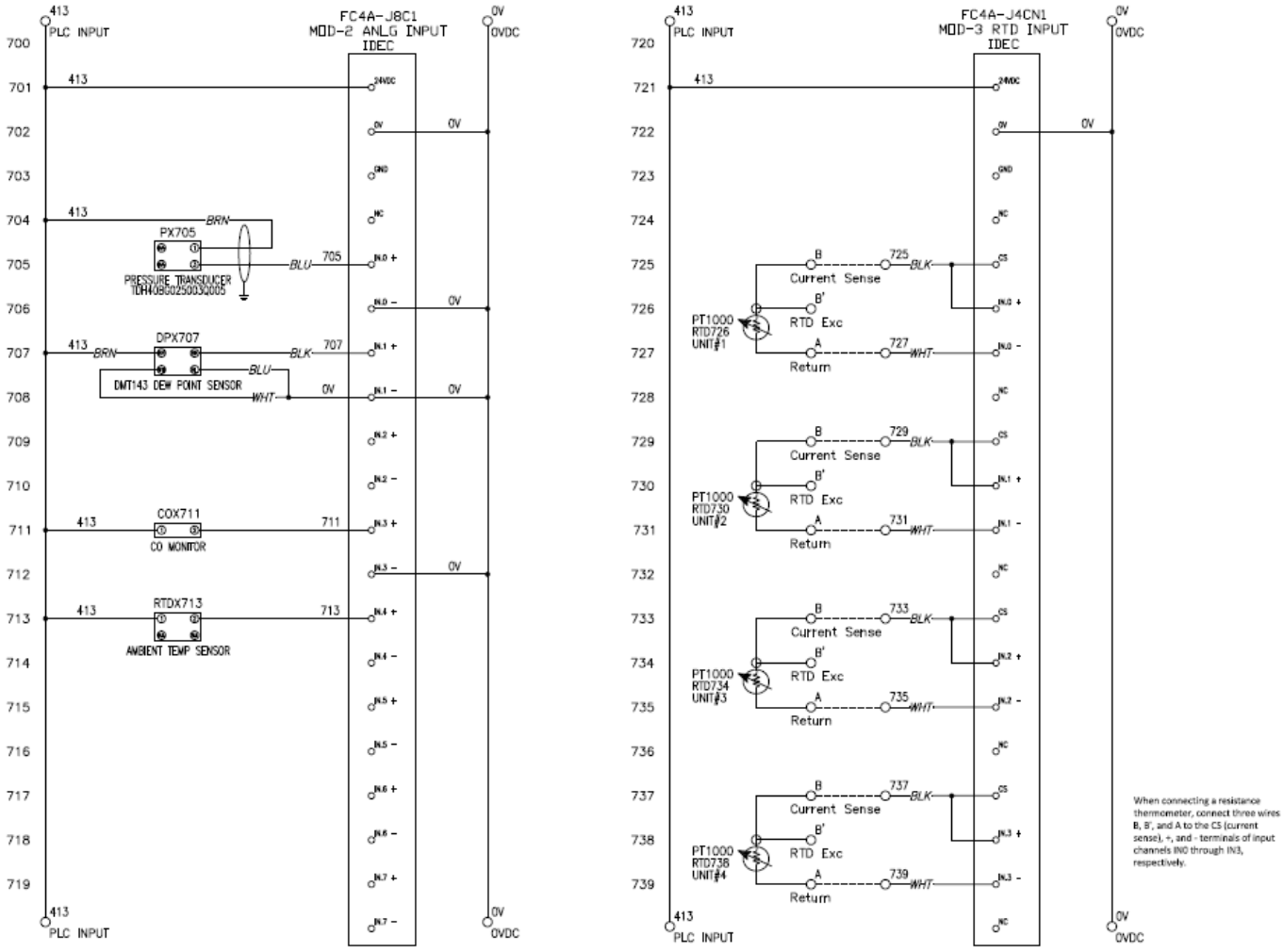
A.5 QUADRAPLEX 3 PHASE



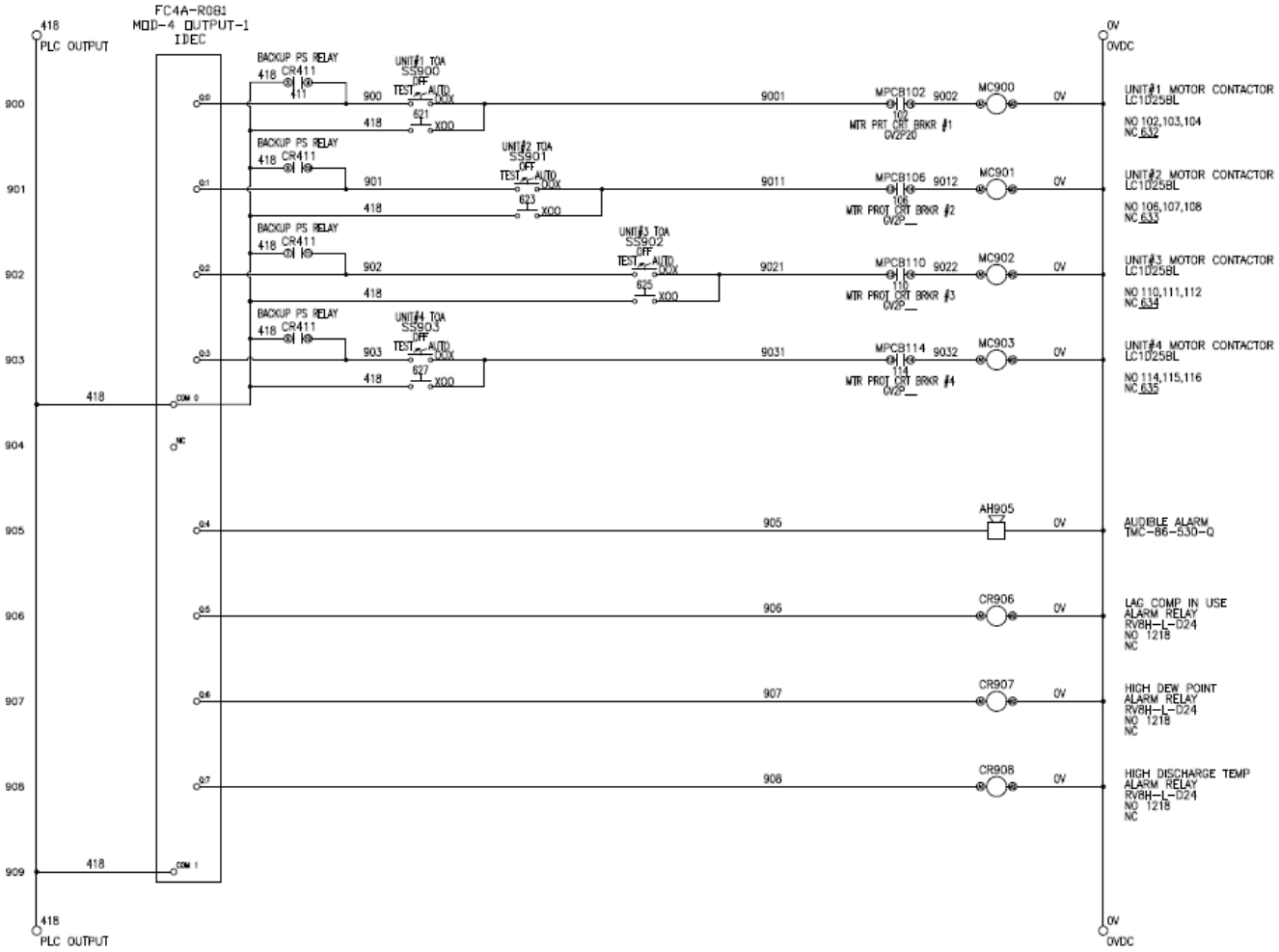
300SMQ546 - A
(Ref. Drawing)
Sheet 7

A.5 QUADRAPLEX 3 PHASE



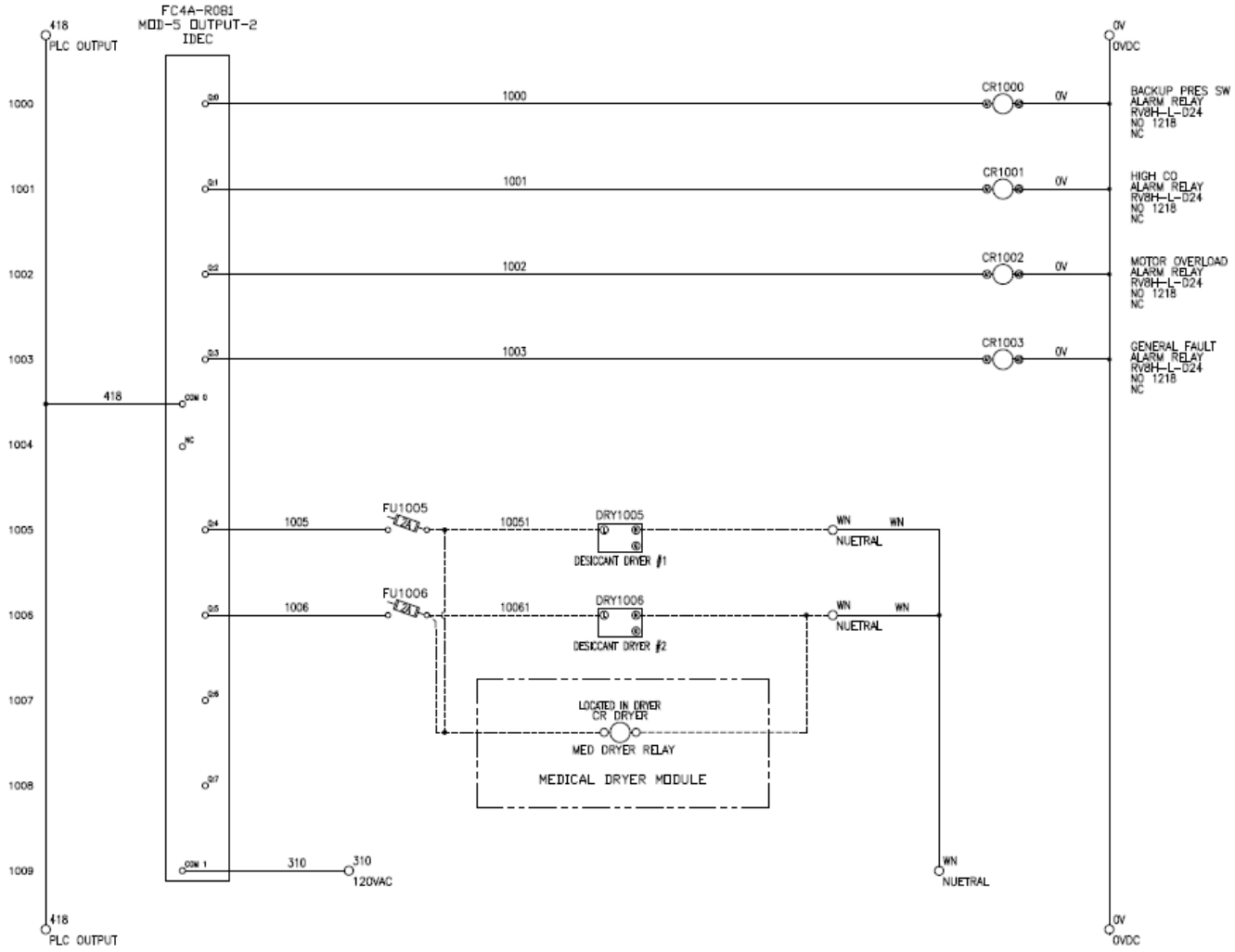
300SMQ546 - A
(Ref. Drawing)
Sheet 8

A.5 QUADRAPLEX 3 PHASE



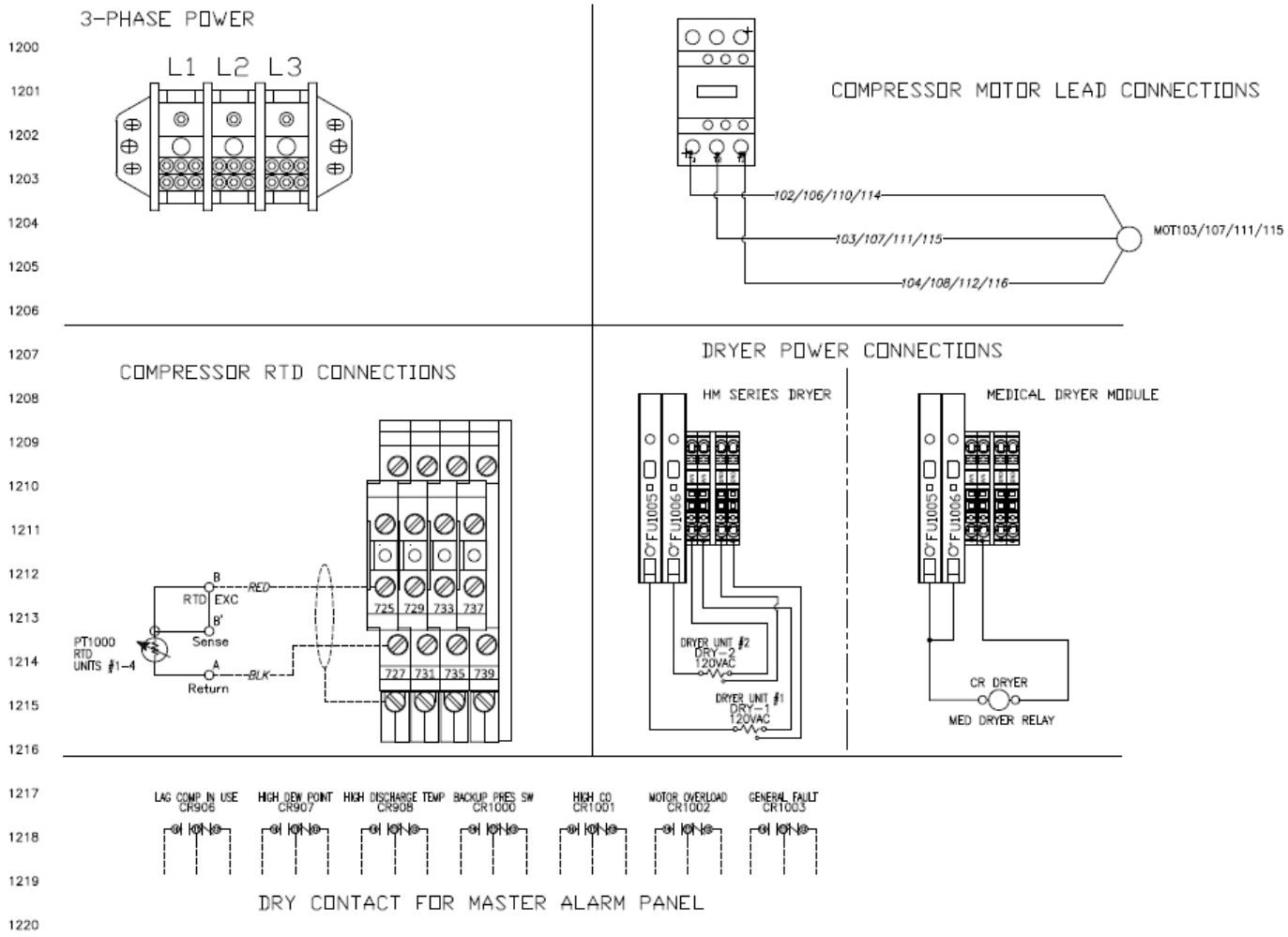
300SMQ546 - A
(Ref. Drawing)
Sheet 10

A.5 QUADRAPLEX 3 PHASE



300SMQ546 - A
(Ref. Drawing)
Sheet 11

A.5 QUADRAPLEX 3 PHASE



300SMQ546 - A
(Ref. Drawing)
Sheet 13

A.6 QUADRAPLEX 1 PHASE

Gardner Denver

MEDICAL SCROLL QUAD-PLEX

QUADPLEX MOTOR - DATA TABLE 1				
Voltage	HP	Largest Motor FLA	System FLA	Recom'd Breaker Size
208V 1PH 50/60Hz	5	30.8	125.7	170
	7.5	44	178.5	245
230V 1PH 50/60Hz	5	28	114.5	153
	7.5	40	162.5	220

FUSE TABLE - CONTROL TRANSFORMERS 500VA			
FUSE TAG	TYPE	208V	230V
FU302 A&B	FNQR	6	5
FU303 A&B	FNQR	6	5
FU305	FNM	7	7
FU306	FNM	7	7
FU317	3AG	2	2
FU318	3AG	2	2
FU402	3AG	2	2
FU406	3AG	2	2
FU409	3AG	2	2
FU413	3AG	2	2
FU418	3AG	2	2
FU1005	3AG	2	2
FU1006	3AG	2	2

WIRE TYPE TABLE

ALL FIELD WIRING CONDUCTORS:
- USE COPPER ONLY
- RATED AT 75°C

VOLTAGE	GAUGE	COLOR
208–230VAC	VARIES	BLACK
120VAC	16AWG	RED
0VAC	16AWG	WHITE
24VDC	16AWG	BLUE
0VDC	16AWG	BLUE WITH WHITE STRIPE
GND	VARIES	GREEN
CUSTOMER SUPPLY	16AWG	YELLOW

SYMBOL LEGEND	
———	FACTORY WIRING
– – – –	FIELD WIRING
○	TERMINAL BLOCK
△	REFERENCE POINT
□	DEVICE TERMINAL

NOTES:

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   120 VOLT POWER, CONTROL AND LOW VOLTAGE — 15 POUND INCHES
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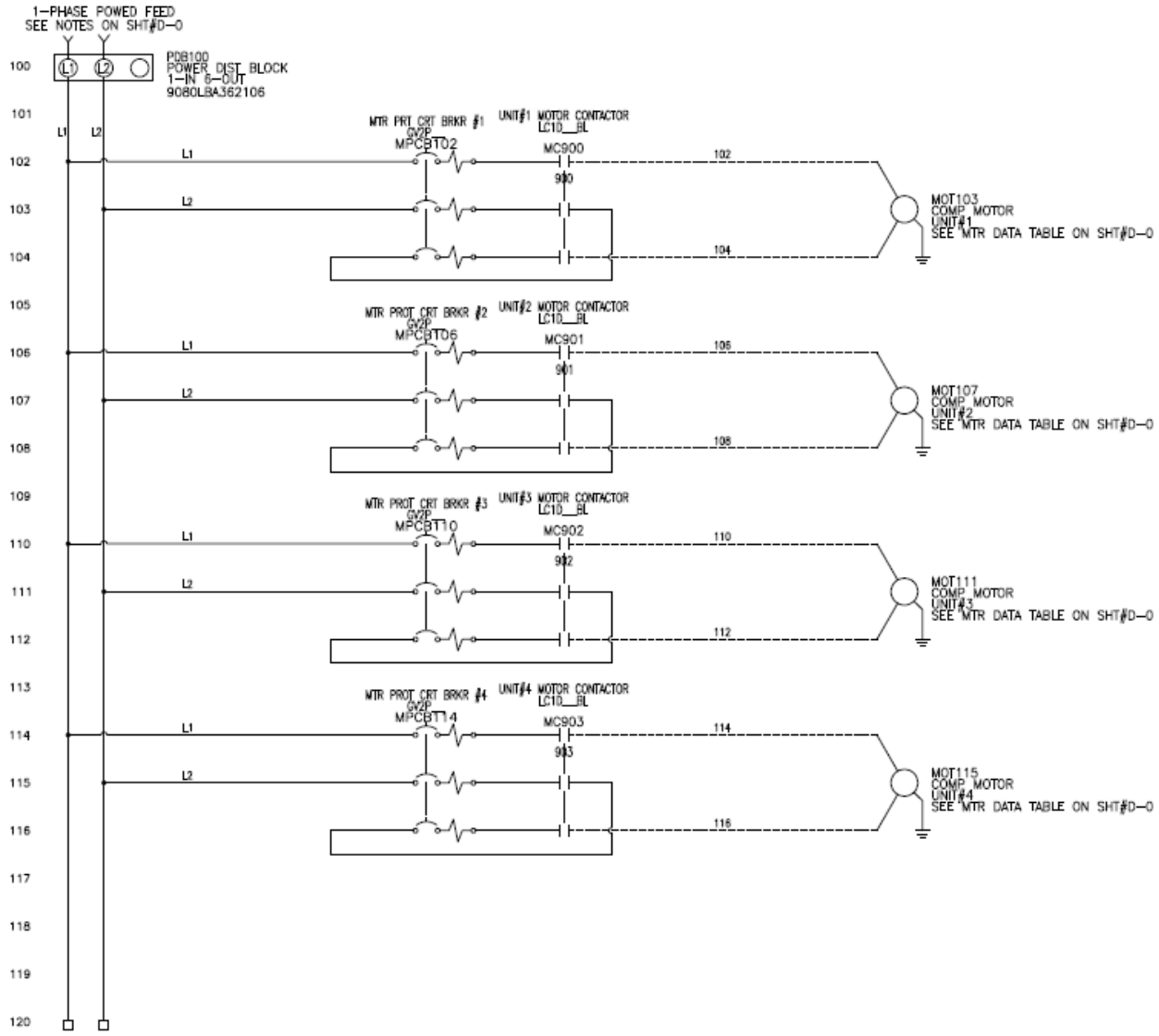
6. SHORT CIRCUIT CURRENT RATING: 5000A RMS SYMMETRICAL 600V MAX.

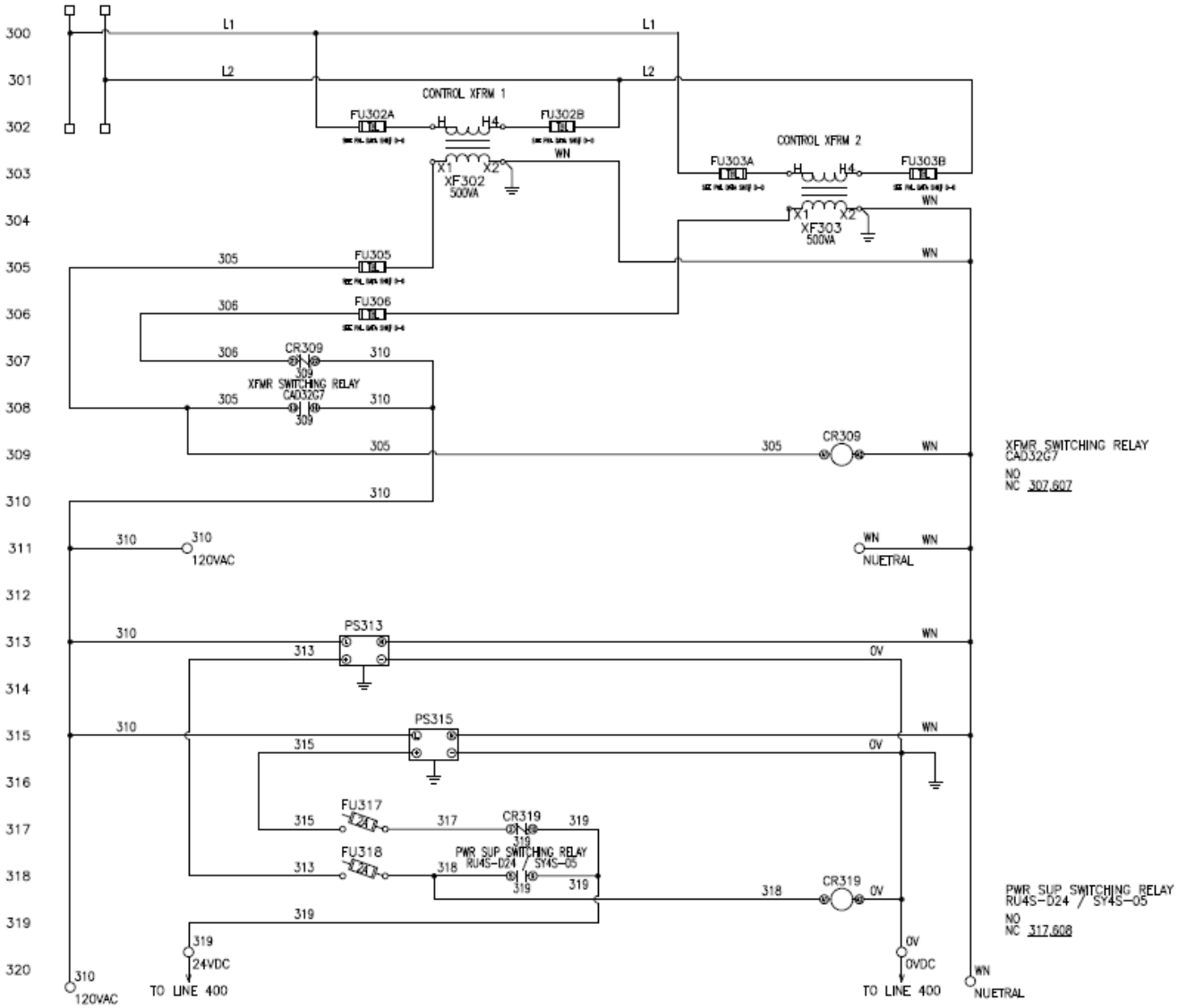
301SMQ546 - A
(Ref. Drawing)

A.6 QUADRAPLEX 1 PHASE



301SMQ546 - A
(Ref. Drawing)
Sheet 2

A.6 QUADRAPLEX 1 PHASE



301SMQ546 - A
(Ref. Drawing)
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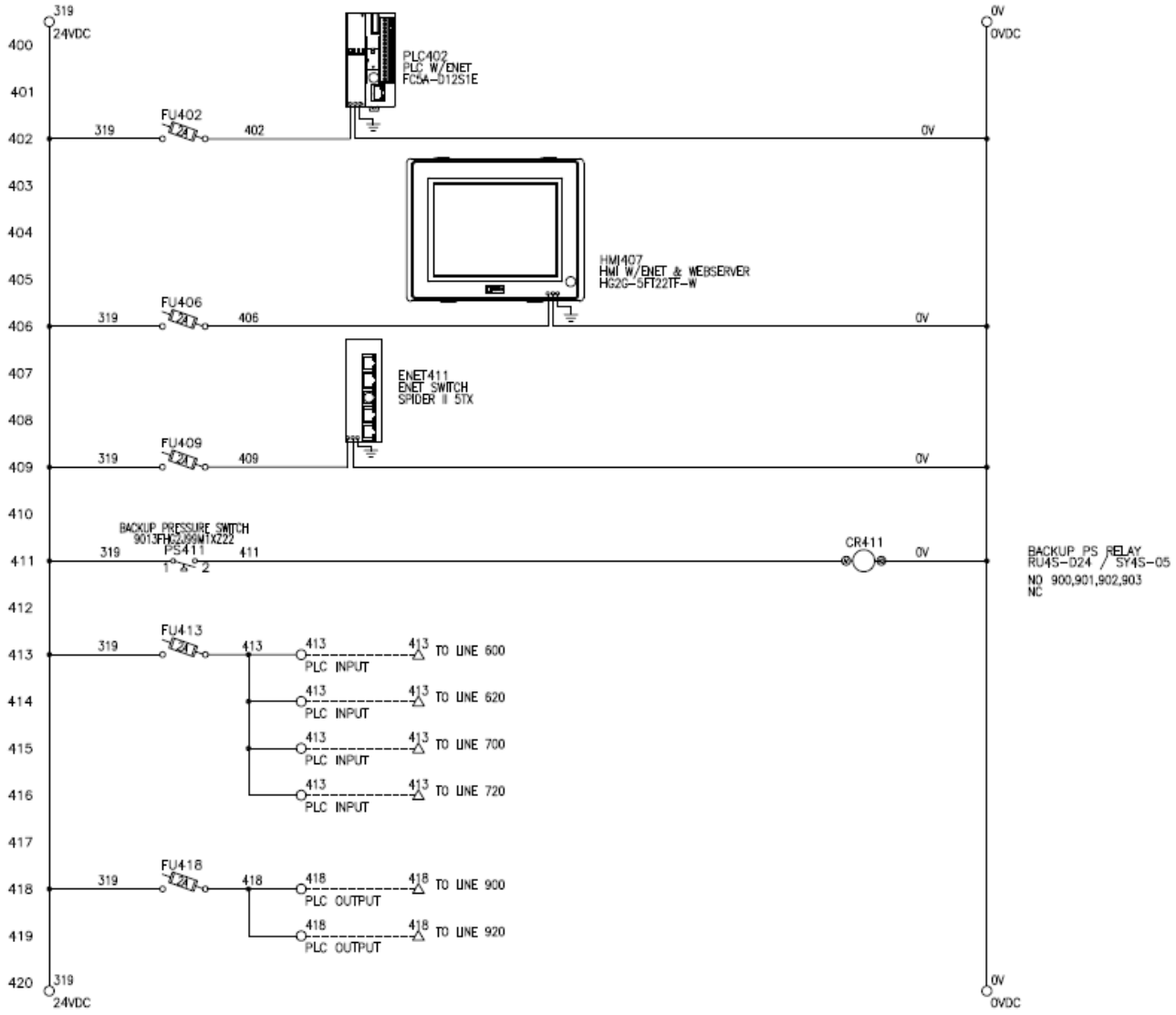
A.6 QUADRAPLEX 1 PHASE



301SMQ546 - A
(Ref. Drawing)
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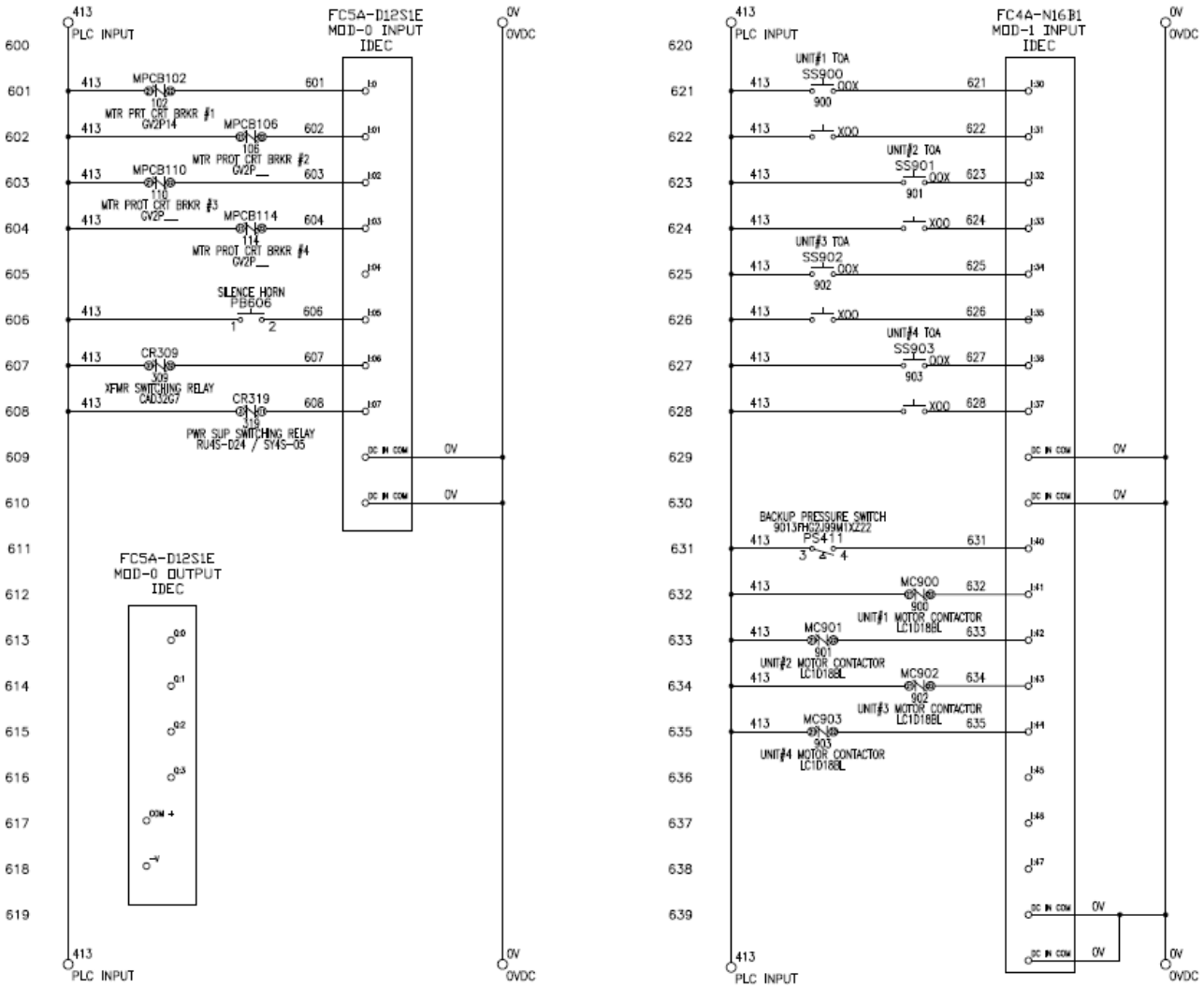

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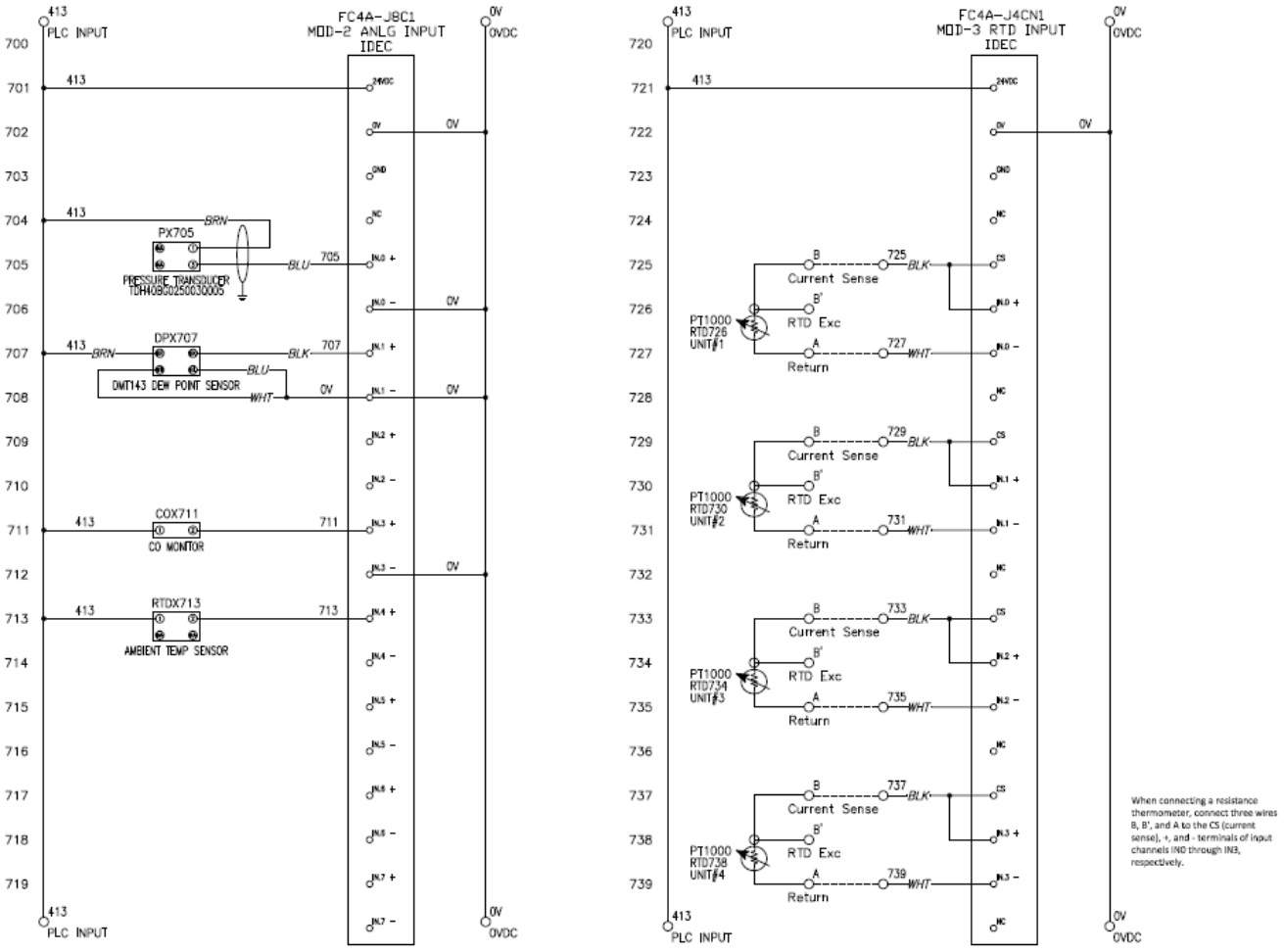
(Ref. Drawing)
Sheet 7

A.6 QUADRAPLEX 1 PHASE



301SMQ546 - A
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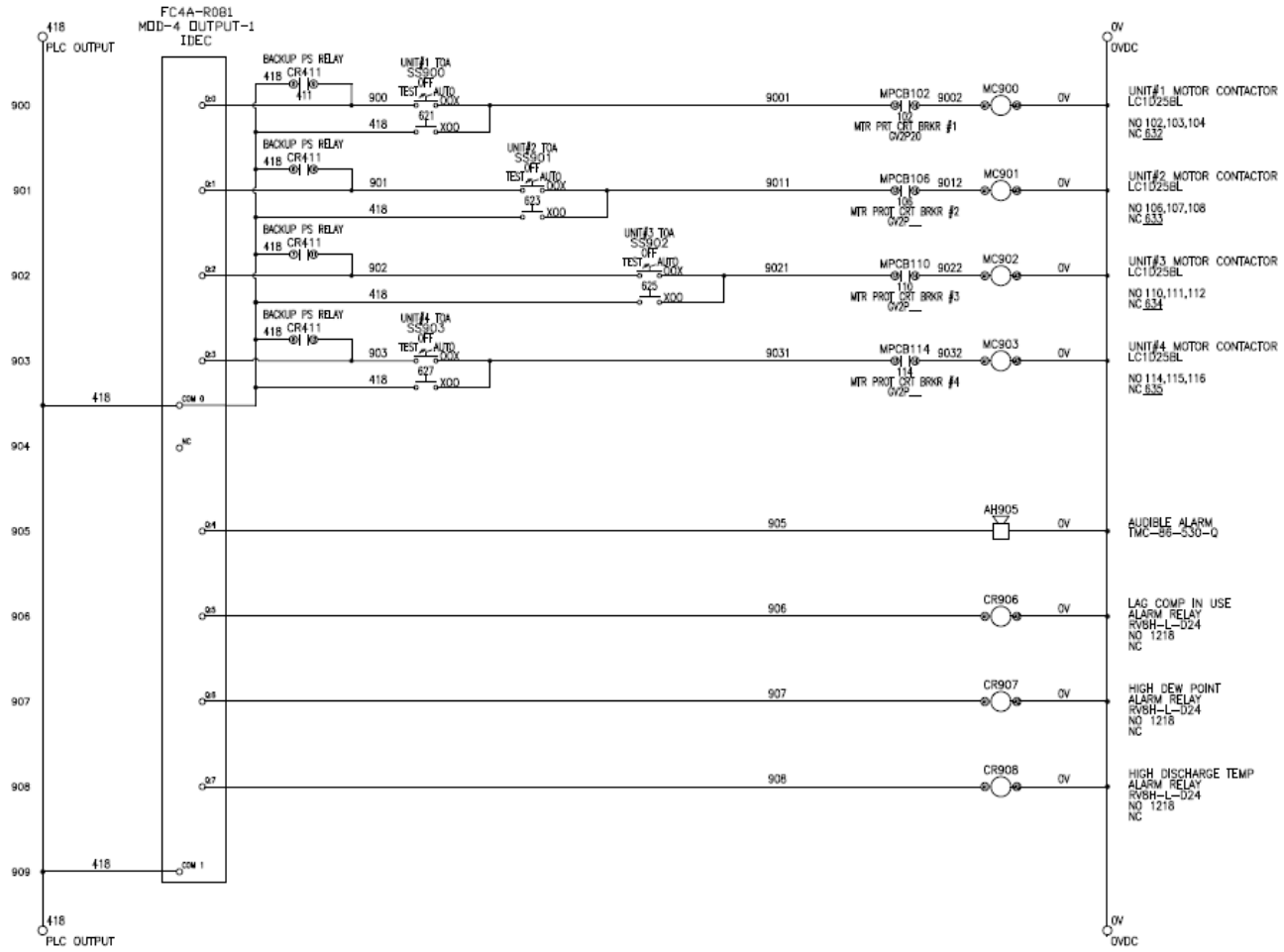

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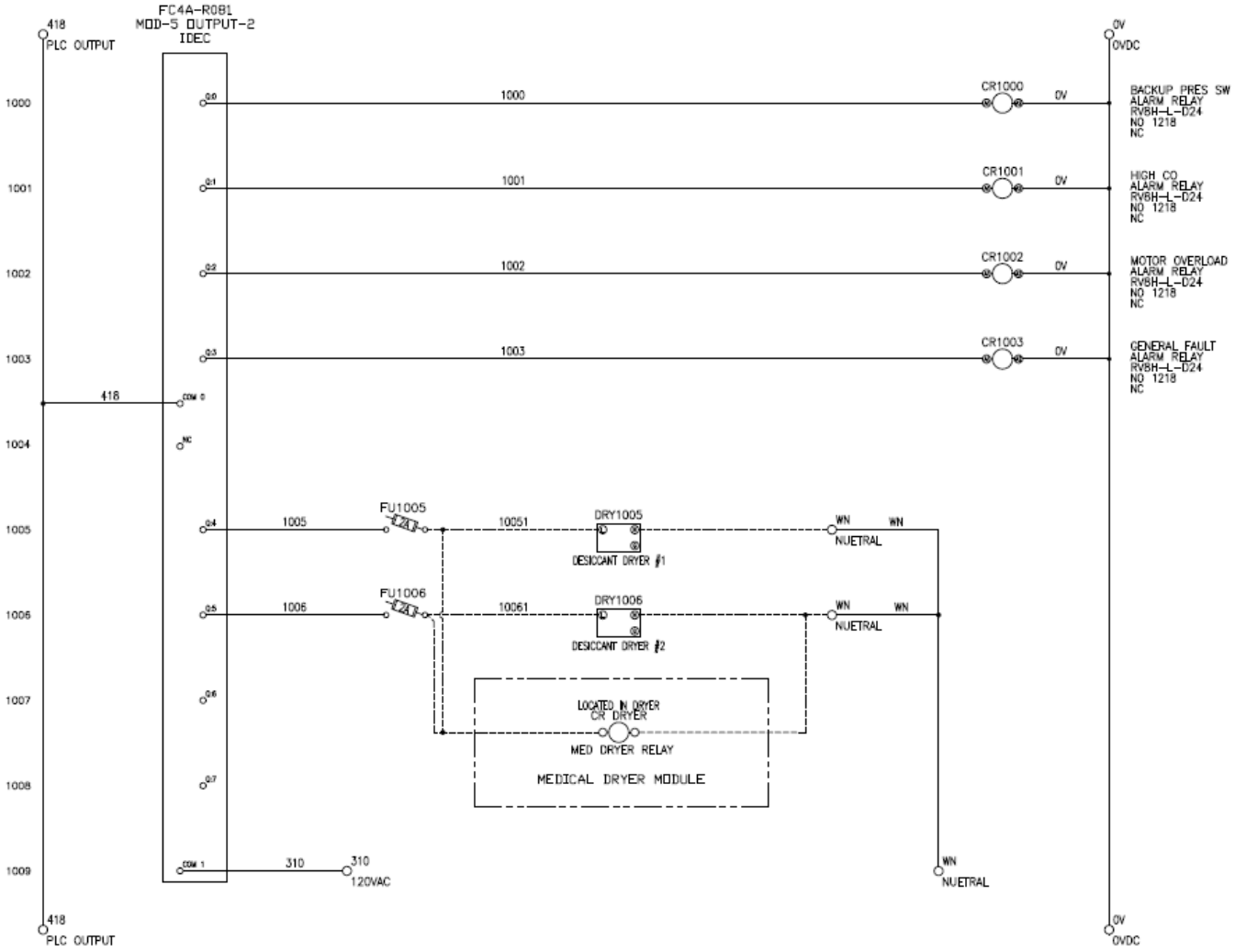

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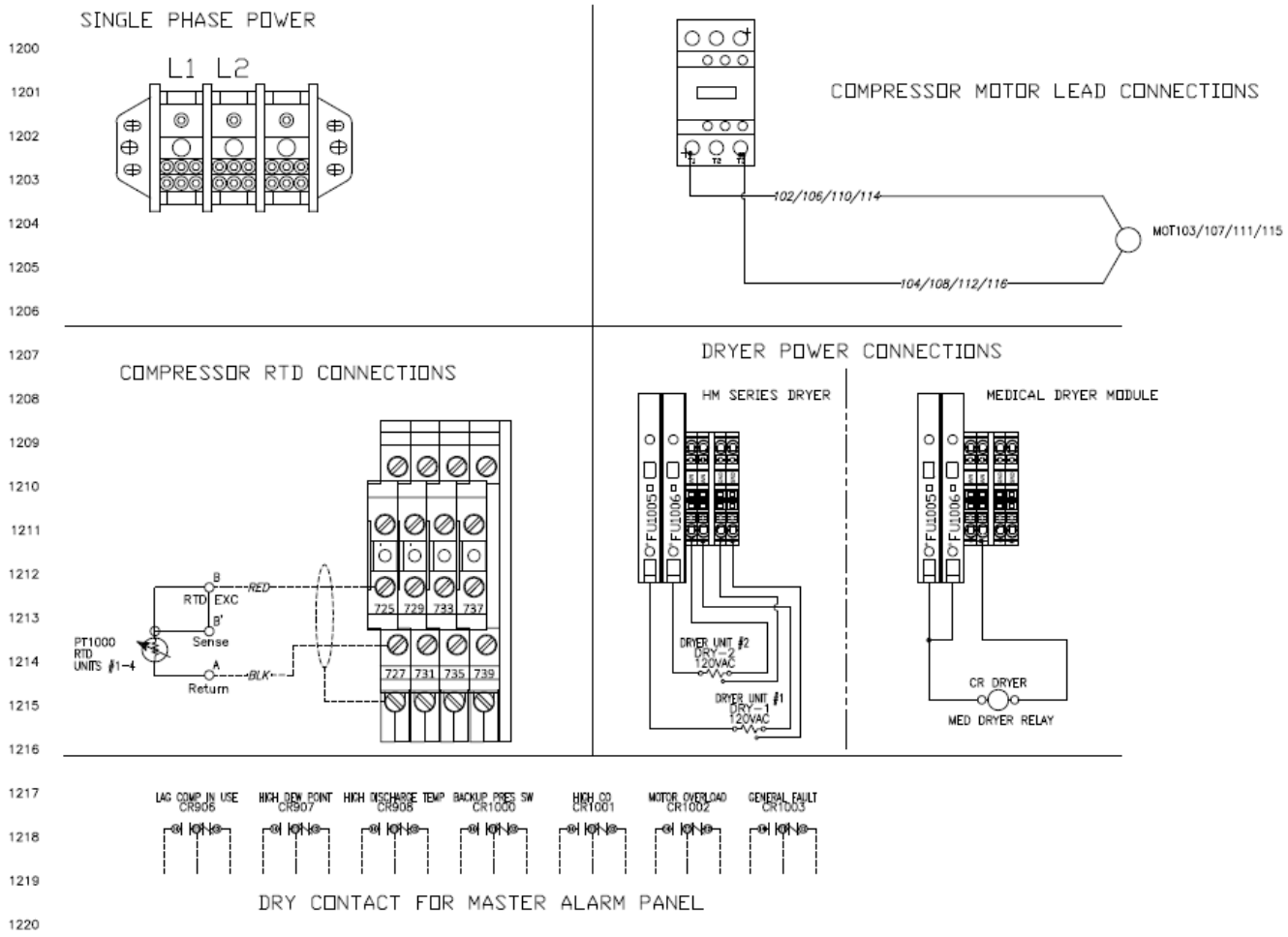
Sheet 11

A.6 QUADRAPLEX 1 PHASE



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(Ref. Drawing)
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