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DISCLAIMER

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2. ECN Category (mark one)  
- Supplemental  
- Direct Revision  
- Change ECN  
- Temporary  
- Standby  
- Supersede  
- Cancel/void  

3. Originator's Name, Organization, MSIN, and Telephone No.  
KE WALTER, FFTF, N2-05, 376-0638

4. Date  
5/4/95

5. Project Title/No./Work Order No.  
FFTF

4717/23J/400

7. Approval Designator  
NA

8. Document Numbers Changed by this ECN (includes sheet no. and rev.)  
WHC-SD-FF-CSWD-055, REV 0  
WHC-SD-FF-CSWD-056, REV 0

9. Related ECN No(s).  
NA

10. Related PO No.  
NA

11a. Modification Work  
[] Yes (fill out Blk. 11b)  
[X] No (NA Blks. 11b, 11c, 11d)

11b. Work Package No.  
NA

11c. Modification Work Complete  
NA

11d. Restored to Original Condition (Temp. or Standby ECN only)  
NA

12. Description of Change  
Revision 1 documents are complete replacements for revision 0 documents referenced in block 8.

13a. Justification (mark one)  
- Criteria Change  
- Design Improvement  
- Environmental  
- Facility Deactivation  
- As-Found  
- Facilitate Const  
- Const. Error/Omission  
- Design Error/Omission

13b. Justification Details  
Logic software design changes were required to allow automatic starting of a compressor that had not been previously started.

14. Distribution (include name, MSIN, and no. of copies)  
KE WALTER, N2-05 [1]  
NC HOITINK, N2-05 [1]  
CENTRAL FILES, L8-04 [2]  
OSTI (2), L8-07

RELEASE STAMP  
OFFICIAL RELEASE  
BY WHG  
DATE JUN 08 1995  
Status 43
## Engineering Change Notice

### 1. ECN (use no. from pg. 1)

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### 18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

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### 19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

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A-7900-013-3 (06/92) GEF096
UNREVIEWED SAFETY QUESTION SCREENING FORM

REFERENCE ITEM # ECN 622377

TITLE AIR COMPRESSOR CONTROL LOGIC SOFTWARE REVISION 1

QUESTIONS

Does the referenced item:

A. Make PROPOSED CHANGES to the facility or procedures which differ from conditions described in the AUTHORIZATION BASIS?

<table>
<thead>
<tr>
<th>N/A</th>
<th>NO</th>
<th>X</th>
<th>Yes/Maybe</th>
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Basis: This ECN makes no physical changes to installed operating plant equipment or procedures. Support Document changes made by this ECN depict a change in only one logic function of the air compressor control panel Programmable Logic Controllers.

B. Describe an event or condition (DISCOVERY) which differs from those described in the AUTHORIZATION BASIS?

<table>
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<th>N/A</th>
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Basis:

C. Describe tests or experiments which differ from those described in the AUTHORIZATION BASIS?

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</table>

Basis:

NOTE: This form is not to be used for PHYSICAL PLANT MODIFICATIONS.

QUSQE #1 KE Walter (print name)

Signature

Date 5/4/95

QUSQE #2 M. J. CONTI (print name)

Signature

Date 5/4/95
RELEASE AUTHORIZATION

Document Number: WHC-SD-FF-CSWD-056, Rev. 1

Document Title: R-189 (C-620) AIR COMPRESSOR CONTROL LOGIC SOFTWARE DOCUMENTATION

Release Date: 6/2/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Chris Willingham

C. Willingham 6/2/95

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A-6001-400.2 (09/94) MEF256
SUPPORTING DOCUMENT

1. Total Pages 1

2. Title
R-189 (C-620-C) AIR COMPRESSOR CONTROL LOGIC,
COMPUTER SOFTWARE DESCRIPTION

3. Number
WHC-SD--FF-CSWD-056

4. Rev No.
1

5. Key Words
R-189, C620-C, PLC, SOFTWARE

6. Author
Name: KE WALTER

7. Abstract
The purpose of this document is to provide an updated Computer Software Description
for the software to be used on R-189 (C-620-C) air compressor programmable
controllers.

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United States Government or any agency thereof.

A-6400-073 (11/91) (EF) WEF124

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MASTER
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(1) Document Number
WHC-SD-FF-CSWD-056

KE WALTER NC HOITINK 5/18/95
COMPUTER SOFTWARE DESCRIPTION

Document No. WHC-SD-FF-CSWD-056

1. Impact Level: NA
2. Software Name: R-189 (C-620-C) AIR COMPRESSOR CONTROL LOGIC
3. Requirements Documents:
   - WHC-S-1081 Specification for Replacement Control Panels for FFTF Plant Air Compressors.
   - H-4-302182, Electrical Elementary Wiring Schematic.
   - H-4-302183, Electrical Logic Diagram.
   Design Description Document: (Same as #3 above)
   User Document: Operation Procedures for operation of R-189:

4. Software Custodian: Kenneth E. Walter
   Custodian Organization: FFTF ASEE
   Software Location: FFTF Engineering & FFTF SOM

5. Interfaces:
   Hardware Platform: GE Programmable Logic Controller (PLC), Series 90-30
   Operating System: Development - Any Dos platform, with DOS 3.1 or later.
   System - Embedded in EEPROM within the PLC *
   Development Tools: GE-Fanuc Logicmaster 90-30/205 Serial Software Package
   Libraries: Not Applicable *

6. Number of Source Files: Not Applicable *
7. Approximate Lines of Code: Not Applicable *
8. Data on Source Files: Not Applicable *

* A GE PLC, Series 90-30, installed as part of C-620-C, controls the R-189 Air Compressor. The PLC is programmed using the GE-Fanuc Logicmaster 90-30/205 Serial Software Package.

The GE-Fanuc Logicmaster 90-30/205 Serial Software Package provides for:
   - Offline PLC software development & modification
   - Storage of PLC software programs on disk, as "folders"
   - Loading of the software into the PLC
   - Program Documentation

The Logicmaster Folder which contains the programming for the C-620-C is designated "AC_R189".
Program: AC_R189

---

**PLC PROGRAM ENVIRONMENT**

|-----------------|-----------------|------------------------|-------------------|---------------------|

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**ANALOG INPUT (%AI): 64**

**ANALOG OUTPUT (%AQ): 32**

**PROGRAM SIZE (BYTES): 1184**

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Program: AC_R189

C:\PCTERM\AC_R189
BLOCK: _MAIN

BLOCK SIZE (BYTES): 1174
DECLARATIONS (ENTRIES): 158

HIGHEST REFERENCE USED

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C:\PCTERM\AC_R189
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<td>%M0030</td>
<td>UV TRIP</td>
<td></td>
</tr>
<tr>
<td>%M0031</td>
<td>UNDER VOLTAGE TRIP OK</td>
<td></td>
</tr>
<tr>
<td>%M0032</td>
<td>COMMON ALARM PART 1</td>
<td></td>
</tr>
<tr>
<td>%M0033</td>
<td>COMMON ALARM</td>
<td></td>
</tr>
<tr>
<td>%M0034</td>
<td>COMMON ALARM LATCH</td>
<td></td>
</tr>
<tr>
<td>%M0035</td>
<td>AIR PRESSUR HIGH</td>
<td></td>
</tr>
<tr>
<td>%M0036</td>
<td>AIR PRESSUR LOW</td>
<td></td>
</tr>
<tr>
<td>%M0037</td>
<td>AIR PRESSUR LOW LOW</td>
<td></td>
</tr>
<tr>
<td>%M0038</td>
<td>AIR PRESSUR LOW LOW LOW</td>
<td></td>
</tr>
<tr>
<td>%M0039</td>
<td>PRESSUR BELOW MODE SP</td>
<td></td>
</tr>
<tr>
<td>%M0040</td>
<td>DELETED ON REV. 1</td>
<td></td>
</tr>
<tr>
<td>%M0041</td>
<td>COMPRSR OFF DELAY</td>
<td></td>
</tr>
<tr>
<td>%M0042</td>
<td>RUNNING UNLOADED TIMER</td>
<td></td>
</tr>
<tr>
<td>%M0043</td>
<td>VIBRATN ALARM</td>
<td></td>
</tr>
<tr>
<td>%M0044</td>
<td>ELECT FAULT</td>
<td></td>
</tr>
<tr>
<td>%M0045</td>
<td>HIGH DISCHRG AIR TEMP</td>
<td></td>
</tr>
<tr>
<td>%M0046</td>
<td>R1 COMMON ALARM ONESHOT</td>
<td></td>
</tr>
<tr>
<td>%M0047</td>
<td>R2 COMMON ALARM ONESHOT</td>
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</tr>
<tr>
<td>%M0048</td>
<td>R189 COMMON ALARM ONESHOT</td>
<td></td>
</tr>
<tr>
<td>%M0049</td>
<td>COMMON ALARM ONESHOT LATCH</td>
<td></td>
</tr>
<tr>
<td>%M0050</td>
<td>COMMON ALARM REFFLASH TIMER</td>
<td></td>
</tr>
<tr>
<td>%M0051</td>
<td>TIMER RESET (OS)</td>
<td></td>
</tr>
</tbody>
</table>
%M0052 PRESS BELOW SP (OS)
%M0053 RUNNING CONTACT DELAY TIMER
%M0054 ALARM LATCH
%M0055 ALARM LATCH
%M0100 C-187 CONTROL SWITCH LATCH
%R0001 TIMER
%R0002 TIMER
%R0003 TIMER
%R0004 TIMER
%R0005 TIMER
%R0006 TIMER
%R0007 TIMER
%R0008 TIMER
%R0009 TIMER
%R0010 TIMER
%R0011 TIMER
%R0012 TIMER
%R0013 TIMER
%R0014 TIMER
%R0015 TIMER
%R0016 TIMER
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%R0032 TIMER
%R0033 TIMER
%R0034 TIMER
%R0035 TIMER
%R0036 TIMER
%R0037 TIMER
%R0038 TIMER
%R0039 TIMER
%R0040 TIMER
%R0041 TIMER
%R0042 TIMER
%R0043 TIMER
%R0044 TIMER
%R0045 TIMER
%R0046 TIMER
%R0047 TIMER
%R0048 TIMER
FFTF AIR COMPRESSOR CONTROL LOGIC C-620C (R189)
REVISION 1 BY KEW 2/14/95 NOVA CONTRACT WST-XXV-002736

IDENTIFIER TABLE

<table>
<thead>
<tr>
<th>IDENTIFIER</th>
<th>IDENTIFIER TYPE</th>
<th>IDENTIFIER DESCRIPTION</th>
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<tbody>
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<td>PROGRAM NAME</td>
<td></td>
</tr>
</tbody>
</table>

[ BLOCK DECLARATIONS ]

[ START OF PROGRAM LOGIC ]

(****************************************************************************)
(* ALARM DELAY TIMERS *)
(****************************************************************************)

<< RUNG 5 STEP #0002 >>

Program: AC_R189 C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 9 STEP #0014 >>

DISCHRG PRESSUR NOT HIGH %10067

/\ TMR 0.01s PV

CONST +00002

TIMER %R0013

<< RUNG 10 STEP #0017 >>

AIR TEMP NOT HIGH %10040

/\ TMR 0.01s PV

CONST +00002

TIMER %R0016

<< RUNG 11 STEP #0020 >>

OIL TEMP NOT HIGH %10039

/\ TMR 0.01s PV

CONST +00002

TIMER %R0019

Program: AC_R189  C:\PCTERM\AC_R189  Block: _MAIN
**RUNG 12 STEP #0023**

```
<table>
<thead>
<tr>
<th>NO</th>
<th>VIBRATN</th>
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<tbody>
<tr>
<td></td>
<td>%I0066</td>
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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
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<td>0.10s</td>
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</table>

<table>
<thead>
<tr>
<th>CONST</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0002</td>
<td></td>
</tr>
</tbody>
</table>

| TIMER | %R0037 |
```

**RUNG 13 STEP #0026**

```
<table>
<thead>
<tr>
<th>NO</th>
<th>ELECT FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%I0003</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>TMR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.10s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONST</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0002</td>
<td></td>
</tr>
</tbody>
</table>

| TIMER | %R0040 |
```

**RUNG 14 STEP #0029**

```
<table>
<thead>
<tr>
<th>DISCHRG TEMP NOT HIGH</th>
<th>AIR TEMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>%I0068</td>
<td>%M0045</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>TMR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.10s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONST</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0002</td>
<td></td>
</tr>
</tbody>
</table>

| TIMER | %R0043 |
```

(**************************************************************************)

(* ALARM CONDITION OR ALARM TEST LATCH *)

(**************************************************************************)
<< RUNG 16 STEP #0033 >>

AIR ALARM
COMP LOW OIL RESET
RUN PRESSUR PB
%M0001 %M0002 %I0036

<< RUNG 17 STEP #0039 >>

LOW OIL PRESSUR ALARM LATCH
ALARM TEST PB
%M0008

LOW OIL PRESSUR ALARM LATCH
ALARM TEST PB
%M0009
<< RUNG 20 STEP #0055 >>

HIGH ALARM
AIR RESET
PRESSUR PB
%MO005 %I0036

ALARM TEST PB
%I0034

<< RUNG 21 STEP #0060 >>

HIGH ALARM
AIR RESET
TEMP PB
%MO006 %I0036

ALARM TEST PB
%I0034

---

Program: AC_R189
C: \PCTERM\AC_R189
Block: _MAIN
<< RUNG 22 STEP #0065 >>

HIGH ALARM
OIL RESET
TEMP PB
%M0007 %I0036

<< RUNG 23 STEP #0070 >>

ALARM
ELECT RESET
FAULT PB
%M0044 %I0036

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 24 STEP #0075 >>

HIGH
DISCHRG ALARM
AIR TEMP
RESET
PB
%M0045 %I0036

ALARM
TEST PB
%M0034

HI DISH
AIR TEMP
ALARM
LATCH
%M0016

(*******************************************************************************)
(* ALARM ACKNOWLEDGE *)
(*******************************************************************************)

<< RUNG 26 STEP #0081 >>

LOW OIL
PRESSUR
ALARM
ALARMS
RESET
LATCH
ACK PB
PB
%M0008 %I0035 %I0036

LOW OIL
PRESSUR
ALARM
ACK
%M0017

Program: AC_R189
<< RUNG 27 STEP #0086 >>

LOW OIL
LEVEL
ALARM
ALARM
RESET
LATCH
ACK
PB
PB
%MO009 %I0035 %I0036

LOW OIL
LEVEL
ALARM
ACK
%MO018

<< RUNG 28 STEP #0091 >>

VIBRATN
ALARM
ALARM
RESET
LATCH
ACK
PB
PB
%MO010 %I0035 %I0036

VIBRATN
ALARM
ACK
%MO019

<< RUNG 29 STEP #0096 >>

HIGH
CND LVL
ALARM
ALARM
RESET
LATCH
ACK
PB
PB
%MO011 %I0035 %I0036

HIGH
CND LVL
ALARM
ACK
%MO020

Program: AC_R189  C:\PCTERM\AC_R189  Block: _MAIN
<< RUNG 37 STEP #0130 >>

ALARM
FLASH
ON
%MO026

TIMER
%RO025

(* ALARM LIGHTS *)

<< RUNG 39 STEP #0134 >>

LOW OIL LOW OIL
PRESSUR PRESSUR
ALARM ALARM
ACK LATCH
%MO017 %MO008

<< RUNG 40 STEP #0141 >>

LOW OIL LOW OIL
LEVEL LEVEL
ALARM ALARM
ACK LATCH
%MO018 %MO009

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 41 STEP #0148 >>

VIBRATN VIBRATN
ALARM ALARM
ACK LATCH
%M0019 %M0010

<< RUNG 42 STEP #0155 >>

HIGH HIGH
CND LVL CND LVL
ALARM ALARM
ACK LATCH
%M0020 %M0011

<< RUNG 43 STEP #0162 >>

HI AIR HI AIR
PRESSUR PRESSUR
ALARM ALARM
ACK LATCH
%M0021 %M0012

Program: AC_R189 C:\PCTERM\AC_R189 Block: _MAIN
<< RUNG 44 STEP #0169 >>

HI AIR   HI AIR
TEMP   TEMP
ALARM   ALARM
ACK   LATCH
%M0022   %M0013

<< RUNG 45 STEP #0176 >>

HI OIL   HI OIL
TEMP   TEMP
ALARM   ALARM
ACK   LATCH
%M0023   %M0014

<< RUNG 46 STEP #0183 >>

ELECT   ELECT
FAULT   FAULT
ALARM   ALARM
ACK   LATCH
%M0024   %M0015
<< RUNG 47 STEP #0190 >>

HI DISH HI DISH
AIRTEMP AIRTEMP
ALARM ALARM
ACK LATCH
%M0025 %M0016

ALARM
LIGHT
%M0025 %M0016 %M0026

( )

(*********************************************)
(* ALARM HORN *)
(*********************************************)

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 49 STEP #0198 >>

LOW OIL LOW OIL PRESSUR PRESSUR
ALARM ALARM ALARM
ACK LATCH PART 1
%M0017 %M0008

LOW OIL LOW OIL LEVEL LEVEL
ALARM ALARM ALARM
ACK LATCH
%M0018 %M0009

VIBRATN VIBRATN
ALARM ALARM ALARM
ACK LATCH
%M0019 %M0010

HIGH HIGH CND LVL CND LVL
ALARM ALARM ALARM
ACK LATCH
%M0020 %M0011

HI AIR HI AIR PRESSUR PRESSUR
ALARM ALARM ALARM
ACK LATCH
%M0021 %M0012

Program: AC_R189
Block: _MAIN

C:\PCTERM\AC_R189
<< RUNG 50 STEP #0213 >>

| HI AIR | HI AIR |
| TEMP  | TEMP  |
| ALARM | ALARM |
| ACK   | LATCH |
| %M0022 | %M0013 |
| ALARM | HORN |
| %Q0200 |

| HI OIL | HI OIL |
| TEMP  | TEMP  |
| ALARM | ALARM |
| ACK   | LATCH |
| %M0023 | %M0014 |

| ELECT | ELECT |
| FAULT | FAULT |
| ALARM | ALARM |
| ACK   | LATCH |
| %M0024 | %M0015 |

| HI DISH | HI DISH |
| AIRTEMP | AIRTEMP |
| ALARM  | ALARM  |
| ACK    | LATCH  |
| %M0025 | %M0016 |

| ALARM | HORN |
| PART 1 | |
| %M0028 |

<< RUNG 51 STEP #0226 >>

| UNDER |
| VOLTAGE |
| TRIP |
| %10001 |

| TMR |
| 0.10s |

| PV |
| +00005 |

| TIMER |
| %R0046 |

| UV TRIP |
| %M0030 |

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
FFTF AIR COMPRESSOR CONTROL LOGIC C-620C (R189)
REVISION 1 BY KEW 2/14/95 NOVA CONTRACT WST-XXV-002736

<< RUNG 52 STEP #0229 >>

UV TRIP
%M0030

<< RUNG 53 STEP #0231 >>

UNDER VOLTAGE TRIP
RESET
%M0029

<< RUNG 54 STEP #0237 >>

AIR COMP
START LOCAL SWITCH
%M008  %I0097

TMR
0.10s

CONST +00020

TIMER
%M0028

Program: AC_R189 C:\PCTERM\AC_R189 Block: _MAIN
<< RUNG 55 STEP #0240 >>

AIR
LOW OIL COMP
PRESSUR RUN
%M0002  %M0001

AIR
VIBRATN COMP
ALARM RUN
%M0043  %M0001

LOW OIL LEVEL
%M0003

HIGH CNDNSAT LEVEL
%M0004

HIGH AIR PRESSUR
%M0005

HIGH AIR TEMP
%M0006
<< RUNG 56 STEP #0250 >>

HIGH
OIL
TEMP
%MO007

ELECT
FAULT
%MO044

HIGH
DISCHRG
AIR
TEMP
%MO045

COMMON
ALARM
PART 1
%MO032

(*******)
(* COMMON ALARM FOR RETRANSMISSION/REFLASH *)
(*******)

<< RUNG 58 STEP #0256 >>

COMMON
ALARM
LATCH
%MO034

(S)
<< RUNG 59 STEP #0258 >>

UNDER_VOLTAGE UNDER
TRIP_VOLTAGE
LATCH_TRIP OK
%MO029 %MO031
\(+/\)

SHUTDWN
RESET
PB
%I0033

RESET
PB
%I0071

(********************************************)
(* COMPARE SIGNAL FROM PRESSURE TRANSMITTER TO SETPOINTS *)
(* NOTE: 27.3 COUNTS PER PSI *)
(********************************************)

<< RUNG 61 STEP #0264 >>

ALW_ON

GT_INT

PRESSUR
XMTR
%AI0033
I1 Q

CONST
+26667

AIR
PRESSUR
HIGH
%MO035

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 62 STEP #0267 >>

ALW ON

LT INT

PRESSUR XMTR %A10033

11 Q

CONST +24533

<< RUNG 63 STEP #0270 >>

ALW ON

LT INT

PRESSUR XMTR %A10033

11 Q

CONST +22400

<< RUNG 64 STEP #0273 >>

ALW ON

LT INT

PRESSUR XMTR %A10033

11 Q

CONST +20267

Program: AC_R189

C: \PCTERM\AC_R189

Block: _MAIN
<< RUNG 65 STEP #0276 >>

MODE AIR
TWO PRESSUR
SELECTD LOW LOW
%I0005 %MO037

MODE PRESSUR
THREE LOW LOW
SELECTD LOW
%I0006 %MO038

MODE MODE AIR
TWO THREE PRESSUR
SELECTD SELECTD LOW
%I0005 %I0006 %MO036

(* COMPRESSOR RUNNING LIGHTS *)
(* POWER AVAILABLE LIGHTS *)
(* THE FOLLOWING RUNG WAS ADDED TO ENERGIZE THE VIBRATION SWITCH RESET *)
<< RUNG 71  STEP #0293 >>

<table>
<thead>
<tr>
<th>AIR</th>
<th>COMP</th>
<th>AIR</th>
<th>RUN</th>
<th>COMP</th>
<th>COIL</th>
<th>RUN</th>
<th>COIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Q0161</td>
<td>%MO041</td>
<td>%Q0227</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*******************************************************************************)
(* 20 SECONDS AFTER COMPRESSOR STOPS, ENERGIZE SOLENOID TO ISOLATE COOLING *)
(* WATER *)
(*******************************************************************************)

<< RUNG 73  STEP #0297 >>

<table>
<thead>
<tr>
<th>AIR</th>
<th>COMP</th>
<th>AIR</th>
<th>RUN</th>
<th>COMP</th>
<th>COIL</th>
<th>RUN</th>
<th>COIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Q0161</td>
<td>%MO041</td>
<td>%Q0227</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>TMR</th>
<th>0.10s</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST</td>
<td>PV</td>
</tr>
</tbody>
</table>
+00200 |

** TIME **

%RO031

<< RUNG 74  STEP #0300 >>

<table>
<thead>
<tr>
<th>AIR</th>
<th>COMP</th>
<th>AIR</th>
<th>RUN</th>
<th>COMP</th>
<th>COIL</th>
<th>RUN</th>
<th>COIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Q0161</td>
<td>%MO044</td>
<td>%MO041</td>
<td>%Q0162</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

(*******************************************************************************)
(* CONTROL LOADING OF COMPRESSOR *)
(*******************************************************************************)

Program: AC_R189
<< RUNG 76  STEP #0304 >>

PRESSUR AIR  AIR
BELOW PRESSUR COMP
MODE SP HIGH RUN
%MO039  %MO035  %MO001

UNLOAD
SOLENOI D
%Q0164

(*******************************************************************************)
(* COIL TO INDICATE COMPRESSOR RUNNING UNLOADED FOR GREATER THAN 3 MINUTES *)
(*******************************************************************************)

<< RUNG 78  STEP #0310 >>

AIR UNLOAD
COMP SOLENOI
RUNNING D
%I0004  %Q0164

CONST +18000

TIMER %R0034

<< RUNG 79  STEP #0314 >>

AIR COMP
START SWITCH
%I0008

RESET PB
%I0071

TIMER
RESET (OS)
%MO051

Program: AC_R189  C:\PCTERM\AC_R189  Block: _MAIN
<< RUNG 80 STEP #0317 >>

PRESSUR
BELOW
MODE SP
%M0039

<< RUNG 81 STEP #0319 >>

AIR
COMP
RUN
COIL
%Q0161

ONDTR
0.10s
R

PRESS
BELOW
SP (OS)
%M0052

CONST
+00050
PV

TIMER
%R0052

(* CONTROL AIR COMPRESSOR *)

(~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~)

(~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~)

Program: AC_R189

C:\PCTERM\AC_R189

Block: _MAIN
<< RUNG 83 STEP #0325 >>

**AIR**

**COMP**

**PRESSURE CONTACT**

**RUNNING COMMON**

**VOLTAGE**

**AIR COMPRESSOR CONTROL LOGIC**

**REVISION 1 BY KEW 2/14/95 NOVA CONTRACT WST-XXV-002736**

*AIR AIR COMPRESSOR RUNNING UNDER COMMON VOLTAGE LOCAL AUTO BELOW DELAY UNLOADED ALARM TRIP RUN*  

**SWITCH**

**SWITCH**

**MODE SP TIMER**

**TIMER LATCH**

**LATCH**

**COIL**

**%I0097**

**%I0008**

**%M0039**

**%M0053**

**%M0042**

**%M0034**

**%M0029**

**%Q0161**

---

(* SET/RESET FUNCTION ADDED TO PREVENT MOTOR STARTER DROP OUT WHEN *)

(* CONTROLLING COMPRESSOR FROM C-187. 12/20/94 KEW *)

---

<< RUNG 85 STEP #0344 >>

**AIR**

**COMP**

**LOCAL START**

**SWITCH**

**SWITCH**

**SWITCH**

**SWITCH**

**%I0097**

**%I0008**

**%M0100**

**%I0071**

**%M0100**

---

Program: AC_R189  
C:\PCTERM\AC_R189  
Block: _MAIN
<< RUNG 86 STEP #0346 >>

AIR
COMP
RUN
SWITCH
%I0072

C-187
CONTROL
SWITCH
LATCH
%M0100

(******************************************************************************)
(* AFTERCOOLER HIGH CONDENSATE LEVEL ALARM *)
(* (OFF = ALARM) *)
(******************************************************************************)

<< RUNG 88 STEP #0349 >>

AFTRCLR
CNDNSAT
LEVEL
NOT HI
%I0070

AFTRCLR
CNDNSAT
LEVEL
NOT HI
%Q0261

(******************************************************************************)
(* LOW LOW LOW PRESSURE ALARM *)
(* (OFF = ALARM) *)
(******************************************************************************)

<< RUNG 91 STEP #0353 >>

R1 NO R2 NO AIR
LOW LOW LOW LOW PRESSUR
LOW LOW LOW LOW PRESSUR
%I0100 %I0101 %M0038

PRESSUR
NOT LOW
LOW LOW
ALARM

TMR
0.10s

0050

HPLSL
ON DEL.
TIMER
REV. 1
%R0055

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 93 STEP #0359 >>

RI
COMMON
ALARM
OFF
%M0098

<< RUNG 94 STEP #0361 >>

R2
COMMON
ALARM
OFF
%M0099

<< RUNG 95 STEP #0363 >>

ALARM
LATCH
%M0055

Program: AC_R189
C:\PCTERM\AC_R189
Block: MAIN
<< RUNG 96 STEP #0365 >>

R1
COMMON
ALARM
ONESHOT
%M0046

R2
COMMON
ALARM
ONESHOT
%M0047

R189
COMMON
ALARM
ONESHOT
%M0048

<< RUNG 97 STEP #0369 >>

COMMON
ALARM
ONESHOT
LATCH
%M0049

TMR (R)
0.10s

PV

CONST
+00002

TIMER
%M0049

Program: AC_R189
C:/PCTERM\AC_R189
Block: _MAIN
RI COMMON
COMMON ALARM
ONESHOT REFRESH
OFF LATCH TIMER

XI0098 %MOO49 %MOO50
<< RUNG 99 STEP #0377 >>

LOW OIL PRESSUR ALARM LATCH %MO008

LOW OIL LEVEL ALARM LATCH %MO009

VIBRATN ALARM LATCH %MO010

HIGH CND LVL ALARM LATCH %MO011

HI AIR PRESSUR ALARM LATCH %MO012

HI AIR TEMP ALARM LATCH %MO013

ALARM LATCH %MO054

Program: AC_R189
C:\PCTERM\AC_R189
Block: _MAIN
<< RUNG 100 STEP #0384 >>

<table>
<thead>
<tr>
<th>HI OIL TEMP ALARM LATCH</th>
<th>%MO014</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECT FAULT ALARM LATCH</td>
<td>%MO015</td>
</tr>
<tr>
<td>HI DISH AIRTEMP ALARM  LATCH</td>
<td>%MO016</td>
</tr>
<tr>
<td>ALARM LATCH</td>
<td>%MO054</td>
</tr>
</tbody>
</table>

<< RUNG 101 STEP #0389 >>

| COMMON ALARM REFLASH TIMER | NO COMMON ALARM | %Q0258 |

[END OF PROGRAM LOGIC]