

|          |          |                |       |           |
|----------|----------|----------------|-------|-----------|
| 50       | 001      | 99936766       | P     | 990       |
| REV. NO. | SHT. NO. | DRAWING NUMBER | INDEX | PLANT NO. |

AC MACHINES

|                    |  |                                                                   |
|--------------------|--|-------------------------------------------------------------------|
| CADD REF. CELL NO. |  |                                                                   |
| 003001             |  | 3 ϕ GENERATOR<br>WYE CONNECTED, RESISTANCE GROUNDED<br>SEE NOTE 1 |
| 003001A            |  | 3 ϕ GENERATOR<br>WYE CONNECTED                                    |
| 003001B            |  | 3 ϕ GENERATOR<br>DELTA CONNECTED, UNGROUNDED<br>SEE NOTE 1        |
| 003001C            |  | FIELD WINDING<br>SEE NOTE 1                                       |
| 003001D            |  | SYNCHRONOUS MOTOR<br>SEE NOTE 2                                   |
| 003001E            |  | SQUIRREL CAGE INDUCTION MOTOR<br>SEE NOTE 2                       |
| 003001F            |  | WOUND ROTOR INDUCTION MOTOR<br>SEE NOTE 2                         |

DC MACHINES

|        |  |                                                                                                 |
|--------|--|-------------------------------------------------------------------------------------------------|
| 003002 |  | "GEN" INSIDE CIRCLE : GENERATOR<br>"EXC" INSIDE CIRCLE : EXCITER<br>"MOT" INSIDE CIRCLE : MOTOR |
|--------|--|-------------------------------------------------------------------------------------------------|

BATTERIES

|         |  |                                 |
|---------|--|---------------------------------|
| 003002A |  | ONE CELL ( LONG LINE POSITIVE ) |
| 003002B |  | MULTICELL                       |

CONDUCTORS

|         |  |                                                                    |
|---------|--|--------------------------------------------------------------------|
| 003003  |  | CONDUCTOR                                                          |
| 003003A |  | CROSSING OF CONDUCTORS (NO JUNCTION)                               |
| 003003B |  | JUNCTION OF DIFFERENT SIZE CONDUCTORS                              |
| 003003C |  | JUNCTION OF CONDUCTORS                                             |
| 003003D |  | JUNCTION OF CONDUCTORS                                             |
| 003003E |  | JUNCTION OF CONDUCTORS<br>( ONLY IF REQUIRED BY SPACE LIMITATION ) |
| 003003F |  | CABLE TERMINATION ( POTHEAD )<br>( CABLE SIDE )                    |
| 003003G |  | DISCONNECTED CABLE                                                 |
| 003003H |  | FLEXIBLE CONNECTION                                                |
| 003003I |  | MAIN BUS CONNECTION                                                |

TRANSFORMERS

|                    |     |                                   |
|--------------------|-----|-----------------------------------|
| CADD REF. CELL NO. |     |                                   |
| 003004             |     | POWER OR DISTRIBUTION TRANSFORMER |
| 003004B            |     | AUTO TRANSFORMER                  |
| 003004D            |     | 3-WINDING TRANSFORMER             |
| 003004E            |     | STEP-VOLTAGE REGULATOR            |
|                    | LTC | LOAD TAP CHANGER                  |

CURRENT TRANSFORMERS

|         |  |                                                    |
|---------|--|----------------------------------------------------|
| 003005  |  | CURRENT TRANSFORMER ( CT )                         |
| 003005A |  | BUSHING CT ( BCT )                                 |
| 003005B |  | 3 CT'S<br>TO PHASE DEVICES AND<br>RESIDUAL DEVICES |
| 003005C |  | WYE CONNECTION AND GROUNDING                       |

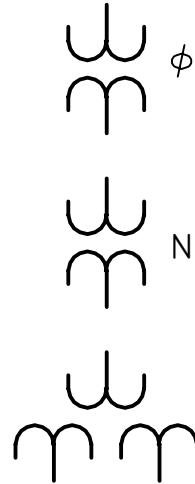
DOUBLE SECONDARY CT'S ( DSCT )

| ONE LINE DIAGRAM | THREE LINE DIAGRAM |
|------------------|--------------------|
|                  |                    |
|                  |                    |
|                  |                    |

POTENTIAL TRANSFORMERS

|  |                                                                             |  |
|--|-----------------------------------------------------------------------------|--|
|  |                                                                             |  |
|  | POTENTIAL TRANSFORMER ( PT )                                                |  |
|  | 2 PT'S WITH PRIMARIES AND SECONDARIES<br>CONNECTED OPEN DELTA<br>SEE NOTE 3 |  |
|  | 3 PT'S WITH PRIMARIES AND SECONDARIES<br>CONNECTED WYE<br>SEE NOTE 3        |  |
|  | 3 PT'S WITH PRIMARY CONNECTED<br>WYE AND SECONDARY DELTA<br>SEE NOTE 3      |  |

CADD REF.  
CELL NO.



1 PT WITH PRIMARY CONNECTED  
PHASE TO PHASE

1 PT WITH PRIMARY CONNECTED  
PHASE TO NEUTRAL

3-WINDING PT

WINDING CONNECTION (NOTE 5)

SYMBOLS FOR USE ADJACENT TO THE TRANSF. SYMBOLS.

THE ANGULAR DISPLACEMENT BETWEEN HIGH & LOW VOLTAGE ('H' AND 'X') TERMINAL VOLTAGES SHALL BE INDICATED BY THE RELATIVE POSITION OF THE WINDING CONNECTION SYMBOLS.

THE ANGULAR DISPLACEMENT OF TRANSFORMERS WITH Y-Δ OR Δ-Y CONNECTIONS SHALL BE 30 DEGREES, WITH THE LOW-VOLTAGE LAGGING THE HIGH-VOLTAGE AS SHOWN BELOW.

| SYMBOL | REPRESENTATION | EXPLANATION       |
|--------|----------------|-------------------|
|        |                | 69Y/13.8KV        |
|        |                | 13.8-2.4KV        |
|        |                | 480-208Y/<br>120V |

- 3 ϕ 3 WIRE, DELTA
- 3 ϕ 3 WIRE, OPEN-DELTA
- 3 ϕ OPEN-DELTA, GROUNDED AT COMMON POINT
- 3 ϕ BROKEN-DELTA
- 3 ϕ WYE, UNGROUNDED
- 3 ϕ WYE, GROUNDED NEUTRAL
- 3 ϕ 4 WIRE, UNGROUNDED
- 3 ϕ ZIGZAG, UNGROUNDED
- 3 ϕ ZIGZAG, GROUNDED

- NOTES:
- GENERATORS MAY BE SHOWN WITH OR WITHOUT FIELD WINDING.
  - NUMBER OF HP INSIDE CIRCLE.
  - WITHOUT NUMBER: MULTIPHASE PT.
  - NUMBER SHOWN THUS 03004A REFER TO SAME NUMBER OF COMPUTER AIDED DRAFTING AND DESIGN "CADD" CELL INTERGRAPH SYSTEM.
  - TYPICAL SYMBOLS, BUT NOT NECESSARILY MEETING ARAMCO APPLICATION STANDARDS.

REFER TO ANSI Y32.2 - 1975  
(IEEE STD.315-1975)

MANDATORY DRAWING

|          |       |     |        |                     |       |       |       |
|----------|-------|-----|--------|---------------------|-------|-------|-------|
|          |       |     |        |                     |       |       |       |
|          |       |     |        |                     |       |       |       |
|          |       |     |        |                     |       |       |       |
| 05       | DEC87 | MHJ |        | REDRAWN FOR CLARITY |       |       |       |
| REV. NO. | DATE  | BY  | JO/EWO | DESCRIPTION         | CHKD. | CERT. | APPD. |

SAUDI ARABIAN OIL COMPANY

|                   |    |                |    |          |      |
|-------------------|----|----------------|----|----------|------|
| DRAWN BY          | PD | CHECKED BY     | FZ | SCALE    | NONE |
| DATE STARTED      |    | DATE COMPLETED |    | 08-12-76 |      |
| OPR'G. DEPT.      |    | ENG. DEPT.     |    | SFB      |      |
| APP'D FOR CONSTR. |    |                |    |          |      |

|                                                                                                    |           |         |
|----------------------------------------------------------------------------------------------------|-----------|---------|
| THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION OR FOR ORDERING MATERIAL UNTIL CERTIFIED AND DATED | CERTIFIED | SFB00TH |
|                                                                                                    | BY        | DATE    |

STANDARD ELECTRICAL SYMBOLS  
ONE LINE DIAGRAM ( POWER )

|           |       |                |          |          |
|-----------|-------|----------------|----------|----------|
| STD. DWG. |       |                |          |          |
| PLANT NO. | INDEX | DRAWING NUMBER | SHT. NO. | REV. NO. |
| 990       | P     | AB-036766      | 001      | 05       |