





Charoenchai Transformer Co.,Ltd.

Transformer Specification

| | | | |
|-----------|---|---------------|--------|
| Project : | TIMESTAR HOLDINGS PTY LTD. (PROJECT:UON FMG POWER STATION) | TR Code No. : | 122520 |
|-----------|---|---------------|--------|

Transformer Technical Data

| | | |
|---|-------------------------|---|
| Type of Transformer | - | Hermetically Sealed without Gas Cushion |
| Standard | - | AS60076/TIS384 |
| Number of Phase | - | 3 |
| Power Rating | kVA. | 630 |
| High Voltage Side | kV. | 11 |
| Low Voltage Side | V. | 415/240 |
| Material | : HV Winding | Copper |
| | : LV Winding | Copper |
| Tapping | : Type | Off-Load |
| | : Percentage of Tapping | $\pm 2 \times 2.5\%$ |
| Vector Group Symbol | - | Dyn1 |
| Frequency | Hz. | 50 |
| No Load Loss (No positive tolerance) | W. | 900 |
| Load Loss At 75 °C (No positive tolerance) | W. | 5450 |
| Total Losses At 75 °C (No positive tolerance) | W. | 6350 |
| Impedance Voltage At 75 °C | % | 4 |
| Ambient Temperature | °C | 50 |
| Temperature Rise of Winding | °C | 55 |
| Temperature Rise of Top Oil | °C | 50 |
| Cooling Method | - | ONAN |
| Colour of Tank | - | Munsell 5Y 7/1 |
| No Load Current | % | 1.6 |
| Oil Dielectric Strength (IEC 60156) | kV. | > 55 |

| | | | | | | | |
|----------------------|---|-------|------------|----------------|------------|------------|---|
| Engineering Division | | | | Document No. : | SP 122520 | | |
| Prepared By : |  | Dated | 03/04/2015 | Issue No. : | 1 | Rev. No. : | - |
| Approved By : |  | Dated | 03/04/2015 | Dated | 03/04/2015 | | |



DOCUMENT No. : SP 122520

ISSUE No. : 1 REVISION No. : -

DATE : 03/04/2015

Charoenchai Transformer Co.,Ltd.

Transformer Specification

| | | | |
|-----------|---|---------------|--------|
| Project : | TIMESTAR HOLDINGS PTY LTD. (PROJECT:UON FMG POWER STATION) | TR Code No. : | 122520 |
|-----------|---|---------------|--------|

Transformer Technical Data

| | | | |
|--|-----------------------------|---------|---------|
| Efficiency At P.F. = 1 | : 25% of Power Rating | % | 99.22 |
| | : 50% of Power Rating | % | 99.29 |
| | : 75% of Power Rating | % | 99.17 |
| | : 100% of Power Rating | % | 99.00 |
| Impulse Withstand Voltage (BIL) | : High Voltage Side | kV. | 75 |
| | : Low Voltage Side | kV. | - |
| Applied Potential | : High Voltage Side | kV. | 28 |
| | : Low Voltage Side | kV. | 3 |
| Insulation Resistance Test by Megger | : Between HV - LV at 20 °C | MegOhm. | ≥ 1,000 |
| | : Between HV - GND at 20 °C | MegOhm. | ≥ 1,000 |
| | : Between LV - GND at 20 °C | MegOhm. | ≥ 500 |

Routine Test : are Performed on Every Single Transformer Including .

- Measurement of Winding Resistance
- Measurement of Voltage Ratio and Vector Group or Phase Displacement
- Measurement of Short-Circuit Voltage Impedance and Load Loss
- Measurement of No-Load Loss and No-Load Current
- Separate Source AC Withstand Voltage Test or Applied Voltage Test
- Induced Voltage Test
- Insulation Resistance Test
- Leakage Test
- Oil Dielectric Strength Test

Type Test : can be Performed on Request at Extra Cost .

- | | | |
|--|--|-------------------------------------|
| <input type="checkbox"/> Lightning Impulse Test | <input type="checkbox"/> One Unit Only | <input type="checkbox"/> Total Unit |
| <input type="checkbox"/> Temperature Rise Test | <input type="checkbox"/> One Unit Only | <input type="checkbox"/> Total Unit |
| <input type="checkbox"/> Sound Level Measurement | <input type="checkbox"/> One Unit Only | <input type="checkbox"/> Total Unit |



DOCUMENT No. : SP 122520

ISSUE No. : I REVISION No. :-

DATE : 03/04/2015

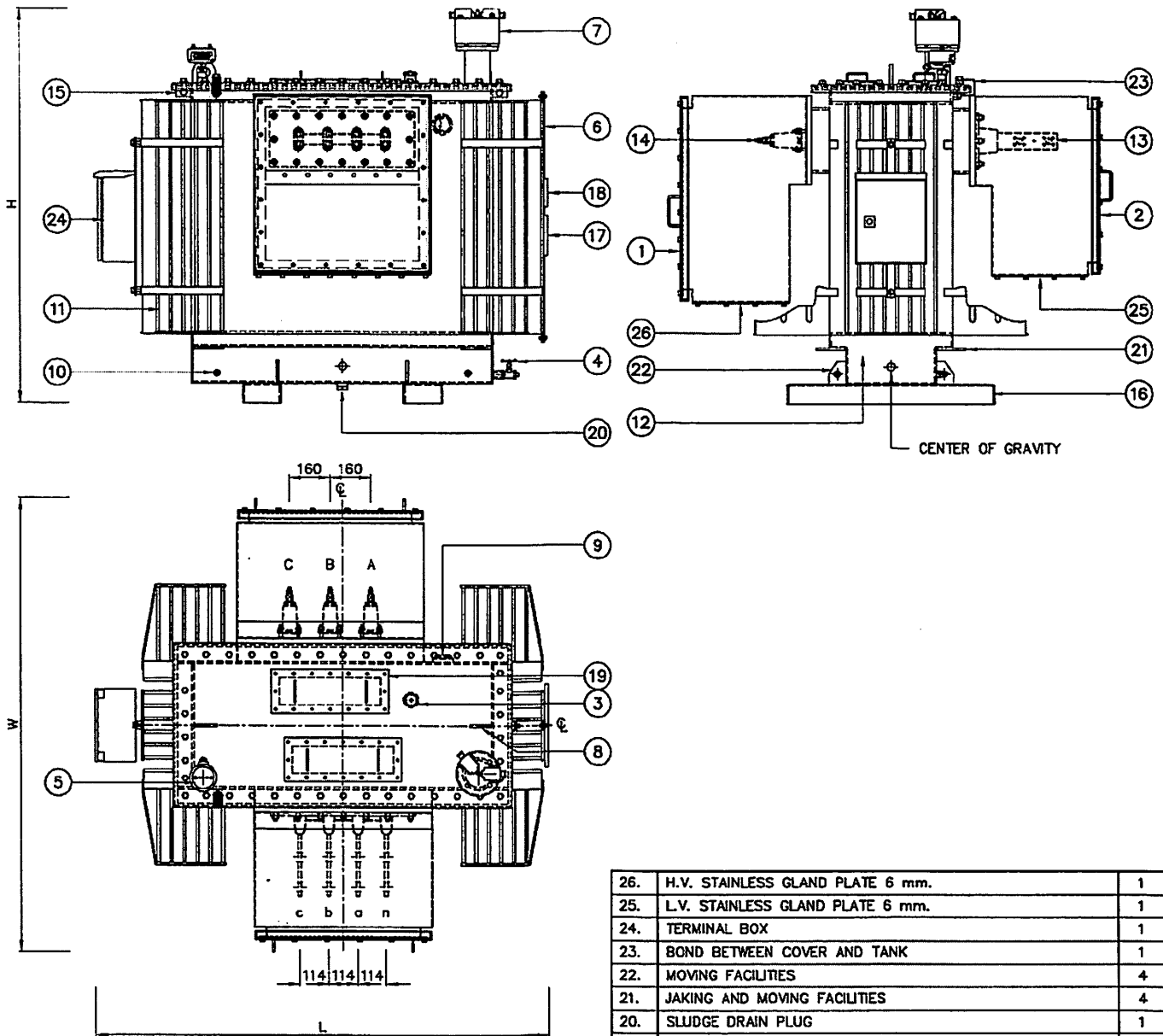
Charoenchai Transformer Co.,Ltd.

Transformer Specification

| | | | |
|------------------|---|----------------------|---------------|
| Project : | TIMESTAR HOLDINGS PTY LTD. (PROJECT:UON FMG POWER STATION) | TR Code No. : | 122520 |
|------------------|---|----------------------|---------------|

Transformer Accessories

| Drawing No. | Reference |
|-------------|---|
| 122520 | 3 PH 11 kV. 415/240 V. 50 Hz. 630 kVA |
| SA-2561101 | BUSHING INDOOR 12 kV. 250 A. |
| SA-6500202 | CAST RESIN BUSHING 1400 A. (2 TAKE OFF) |
| SA-2140101 | MAGNETIC OIL LEVEL GAUGE TYPE L 80 |
| SA-2220114 | PRESSURE RELIEF DEVICE 50 T |
| SA-2070103 | THERMOMETER PMC 1071 |
| SA-2340801 | EARTHING TERMINAL |
| SA-2620102 | OIL DRAIN VALVE 3/4" |
| SA-6510101 | TERMINAL BOX FOR TRANSFORMER (No. 01) |
| SA-2183463 | NAMEPLATE AS STD. (3 PH. Dyn1 MEPS) |



PRELIMINARY DRAWING

NOTE : This drawing is for estimate only, showing approximately dimensions and should not be referred to as the final drawing

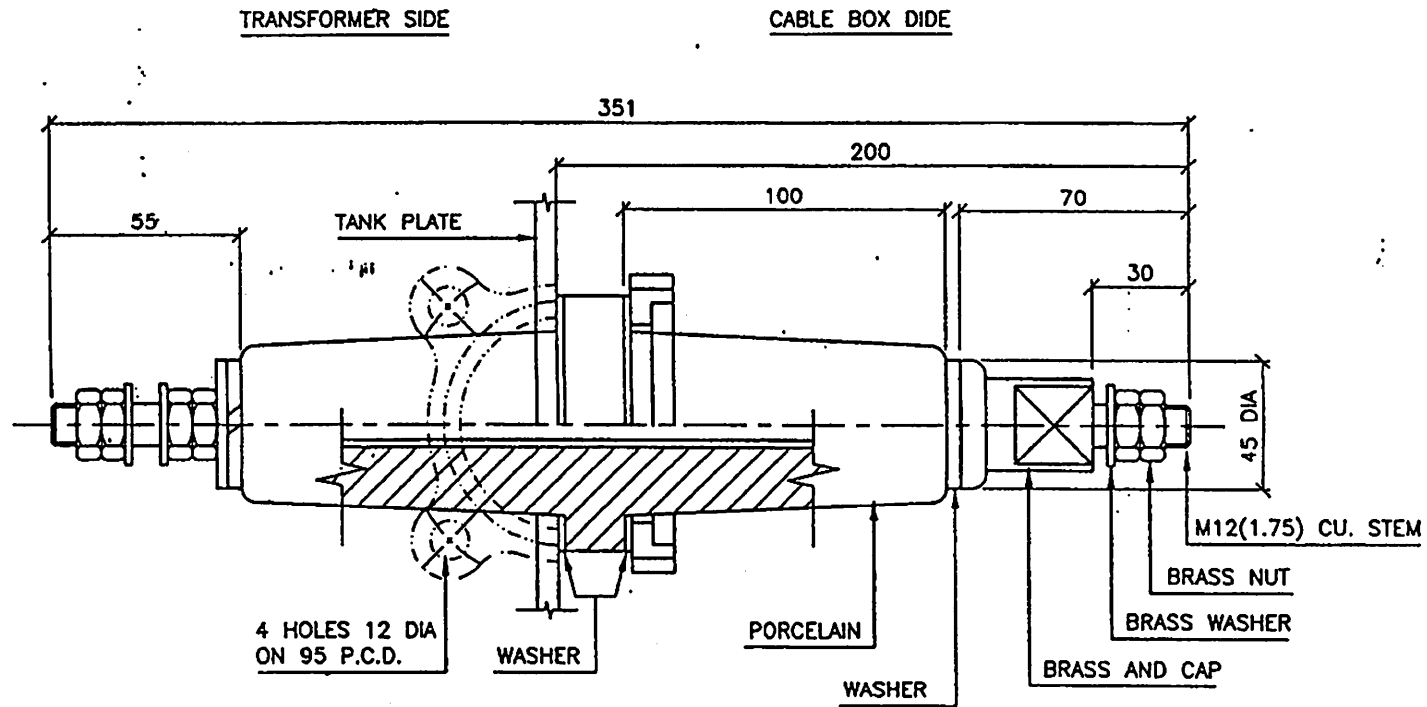
STAINLESS STEEL BOLT AND NUT

| | | |
|-----|---|------|
| 26. | H.V. STAINLESS GLAND PLATE 6 mm. | 1 |
| 25. | L.V. STAINLESS GLAND PLATE 6 mm. | 1 |
| 24. | TERMINAL BOX | 1 |
| 23. | BOND BETWEEN COVER AND TANK | 1 |
| 22. | MOVING FACILITIES | 4 |
| 21. | JAKING AND MOVING FACILITIES | 4 |
| 20. | SLUDGE DRAIN PLUG | 1 |
| 19. | HAND HOLE | 2 |
| 18. | CAPACITY PLATE | 1 |
| 17. | MANUFACTURER PLATE | 1 |
| 16. | BASE | 2 |
| 15. | LIFTING LUGS | 4 |
| 14. | H.V. BUSHINGS | 3 |
| 13. | L.V. BUSHINGS | 1 |
| 12. | TANK | 1 |
| 11. | CORRUGATED FIN | 1 |
| 10. | EARTHING TERMINAL | 2 |
| 9. | OIL LEVEL GAUGE | 1 |
| 8. | LIFTING EYES | 2 |
| 7. | PRESSURE RELIEF DEVICE WITH CONTACT | 1 |
| 6. | NAMEPLATE | 1 |
| 5. | DIAL THERMOMETER ADJUSTABLE WITH CONTACT(S) | 1 |
| 4. | OIL DRAIN VALVE | 1 |
| 3. | TAP CHANGER WITH PAD LOCK | 1 |
| 2. | L.V. CABLE BOX | 1 |
| 1. | H.V. CABLE BOX | 1 |
| NO | NAME OF PARTS | QTY. |

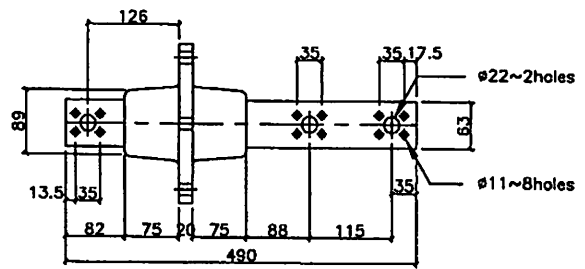
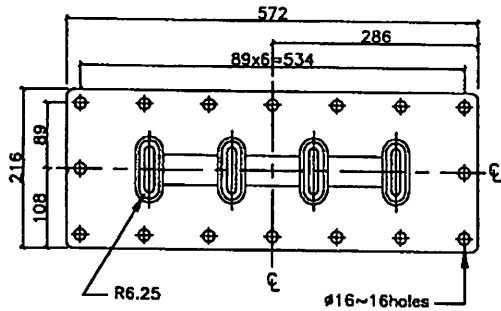
| CAPACITY (kVA.) | DIMENSION IN MILLIMETERS | | | OIL (LITRES) | TOTAL WT (kgs.) |
|-----------------|--------------------------|------|------|--------------|-----------------|
| | H | L | W | | |
| 630 | 1500 | 1790 | 1675 | 530 | 2405 |

| | | | | |
|---------|------|------|---|--|
| DWG. BY | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. |
| CHK. BY | | | 3 PH. 11 kV. 415/240 V. 50 Hz. 630 kVA. | |
| APP. BY | | | CHAROENCHAI TRANSFORMER CO.,LTD. | FILE : No. 122520 SCALE : N.T.S. PAGE : 1/1 DWG. No. 122520 REV. - |
| | | | SIZE A4 | |

| | | | |
|-------------|----------------|-------------|----------------|
| DESCRIPTION | BUSHING INDOOR | ACCESSORIES | REVISION No. _ |
|-------------|----------------|-------------|----------------|

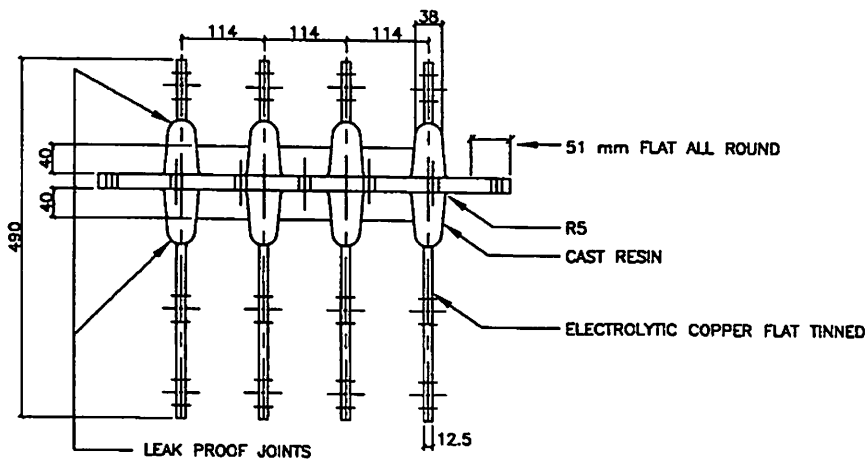


| | NAME | DATE | REFERENCE |  CHAROENCHAI TRANSFORMER CO., LTD. | TYPE | DRAWING No. | SHT | DIMENSION IN mm. |
|----------|--------------|----------|-------------------------------|--|--------------|-------------|--------|--------------------|
| DRAWN | <i>A. Am</i> | 19-05-05 | BUSHING INDOOR 12KV. 250 A | | BS STD | SA-2561101 | 1 1 | FILE NO. SA2561101 |
| CHECKED | <i>S. C.</i> | 19-05-05 | | | TOLERANCE: - | | | |
| APPROVED | <i>D. K.</i> | 24-05-05 | | | SCALE: NONE | | | |



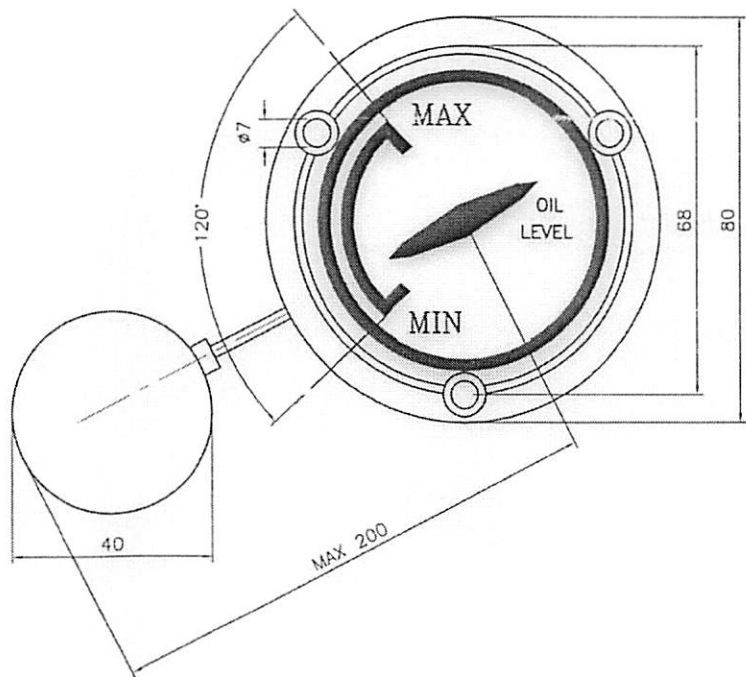
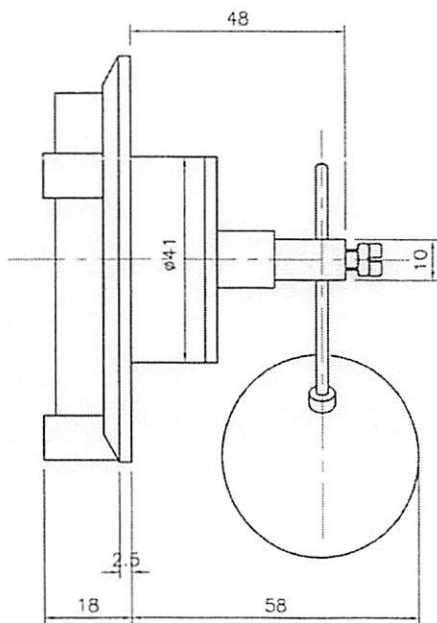
TRAFO END

AIR END

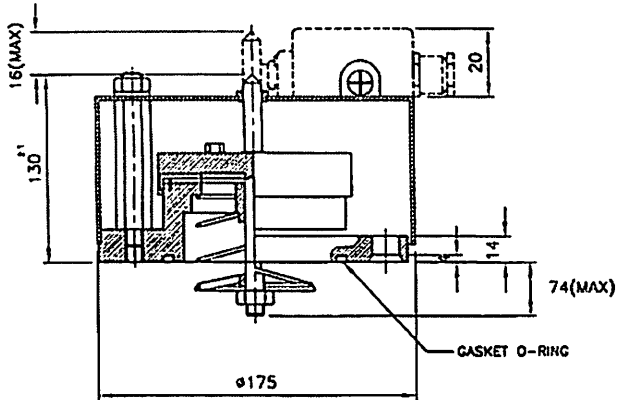


| GENERAL TOLERANCES | | | | |
|---------------------------------|----------|---------|-----------|-------------|
| DIMENSION | 0.5 6 | 6 30 | 30 120 | 400 1000 |
| TOLERANCES ± | 0.1 | 0.2 | 0.3 | 0.5 |
| ANGULAR ± √2 CONCENTRICITY #0.1 | | | | |

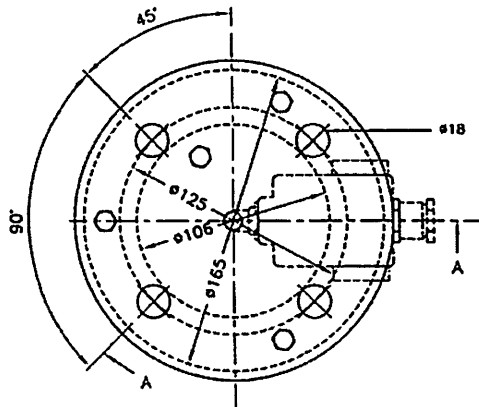
| | | | | |
|---------|--------------------|----------|--|--------------------------------|
| | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. |
| DWG. BY | <i>L. Amm</i> | 93-06-1 | CAST RESIN BUSHING 1400 A. (2 TAKE OFF) | |
| CHK. BY | <i>[Signature]</i> | 23-06-11 | | SCALE : 1:10 |
| APP. BY | <i>[Signature]</i> | 15-07-11 | CHAROENCHAI TRANSFORMER CO.,LTD. | PAGE : 1/1 |
| | | | SIZE A4 | DWG. No. SA-6500202 REV. 1 |



| | | | | | |
|---------|-----------------|----------|--|--------------------------------|---------------------|
| | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. | |
| DWG. BY | <i>A. Armit</i> | 07-05-10 | MAGNETIC OIL LEVEL GAUGE TYPE L 80 | FILE : No. SA2140101 22 | |
| CHK. BY | <i>SA</i> | 03-05-10 | CHAROENCHAI TRANSFORMER CO.,LTD. | SCALE : N.T.S. | PAGE : 1/1 |
| APP. BY | <i>Ch</i> | 14-05-10 | | SIZE A4 | DWG. No. SA-2140101 |

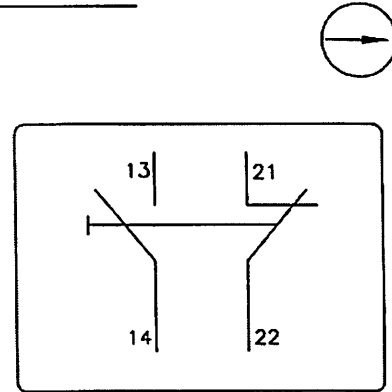


SECTION A-A



OPERATING PRESSURE = 7PSI (0.5 BAR)

CONNECTION DIAGRAM



STANDARD

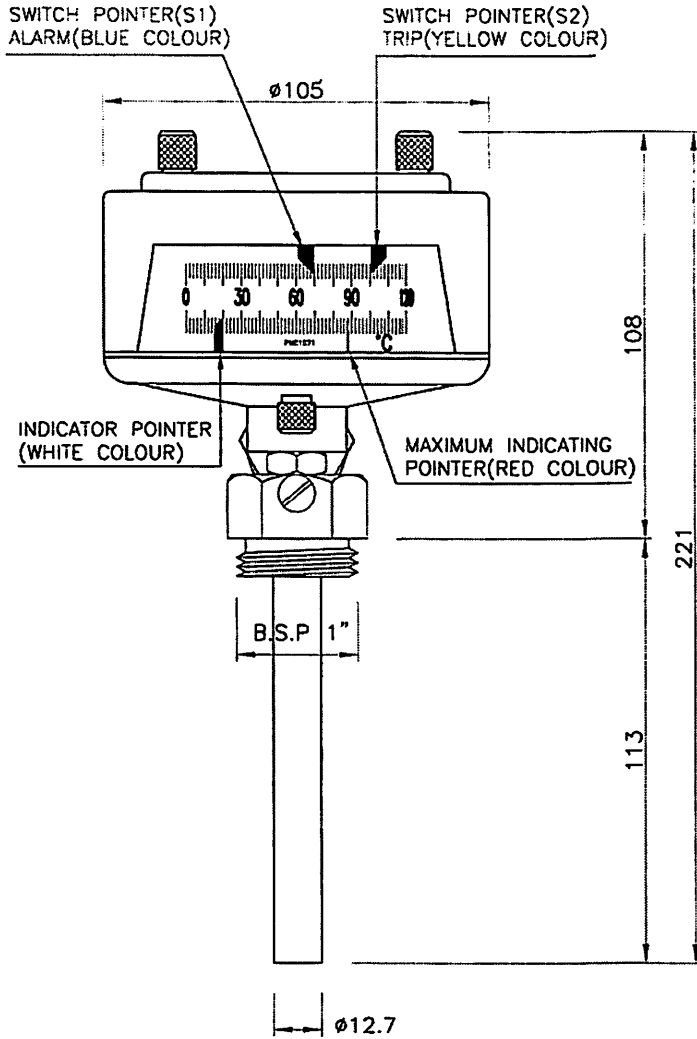
21-22 NORMALLY CLOSED

13-14 NORMALLY OPEN

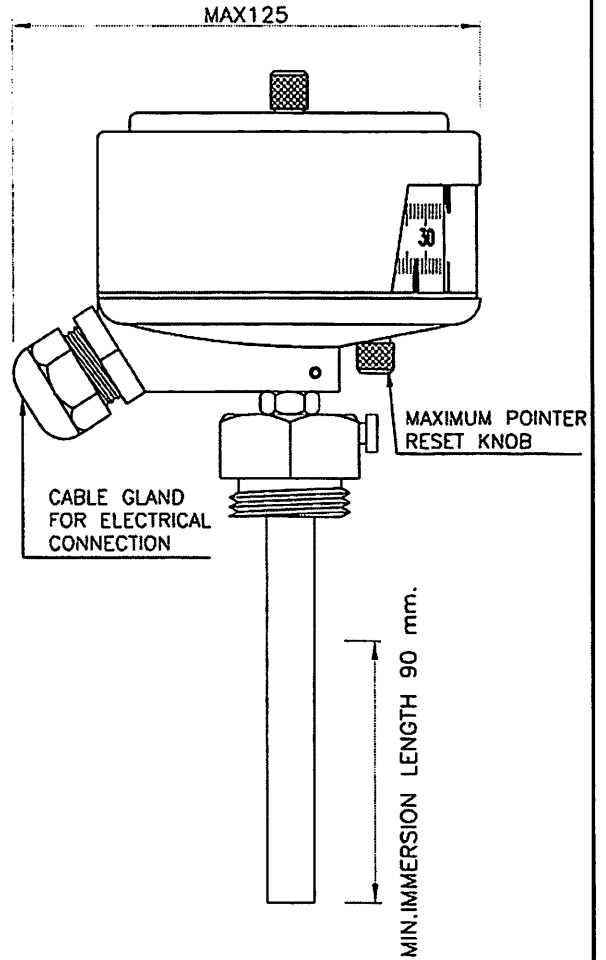
| APPLIED VOLTAGE | RESISTIVE LOAD ($\cos\phi = 1$) | INDUCTIVE LOAD ($\cos\phi = 0.3$) |
|-----------------|--------------------------------------|--|
| 125 VAC | 6.5 A | 4 A |
| 250 VAC | 4 A | 2.5 A |
| 400 VAC | 2.5 A | 1 A |
| 125 VDC | 0.5 A | - |

| | | | | |
|---------|--------------------|----------|--|--|
| NAME | | DATE | TITLE : PRESSURE RELIEF DEVICE SOT | SYMBOL ISO DIMENSION IN mm. |
| DWG. BY | <i>C. Am</i> | 03-11-14 | | |
| CHK. BY | <i>[Signature]</i> | 03-11-14 | SIZE A4 | SCALE : N.T.S. |
| APP. BY | <i>[Signature]</i> | 08-11-14 | | DWG. No. SA-2220114 |
| | | | | CHAROENCHAI TRANSFORMER CO.,LTD. |

FRONT VIEW



SIDE VIEW



DIAL : SEGMENT DIAL ANGULAR SWEEP 105°

RANGE : 0-120°C

ACCURACY : ±4°C BETWEEN
40°C TO 110°C

PROTECTION

DEGREE : IP55-OUTDOOR
MOUNTING

CASE : ALUMIUM

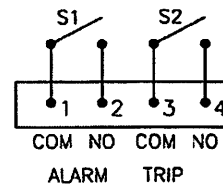
FINISH : POWDER COATED
LIGHT GRAY (IS631)

NO. OF CONTACTS : 2

MICRO SWITCH RATING : 5A-240V AC/0.25A-220V DC

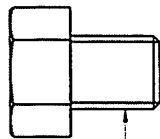
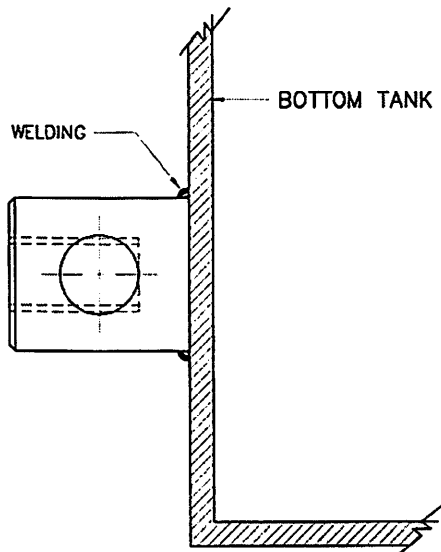
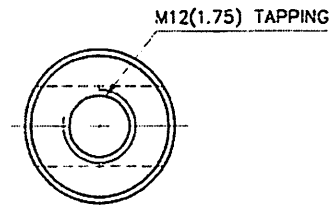
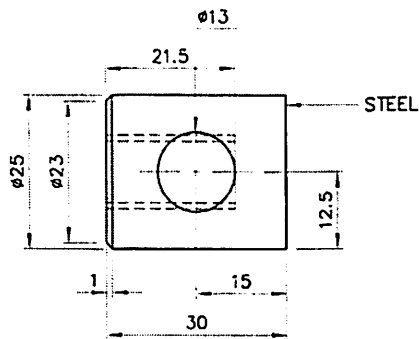
SWITCH ADJUSTABLE RANGE : 20°C TO 105°C

CABLE GLAND CLAMPING RANGE : 9mm TO 14mm



WIRING DIAGRAM



| | | | | | |
|---------|--------------|----------|-------------------------------------|--------------------------------|---------------------|
| | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. | |
| DWG. BY | <i>L. Am</i> | 25-10-11 | THERMOMETER PMC 1071 | FILE : No. SA-2070103R2 | |
| CHK. BY | <i>SChan</i> | 25-10-11 | CHAROENCHAI TRANSFORMER CO.,LTD. | SCALE : 1:2 | PAGE : 1/1 |
| APP. BY | <i>SChan</i> | 31-10-11 | | SIZE A4 | DWG. No. SA-2070103 |

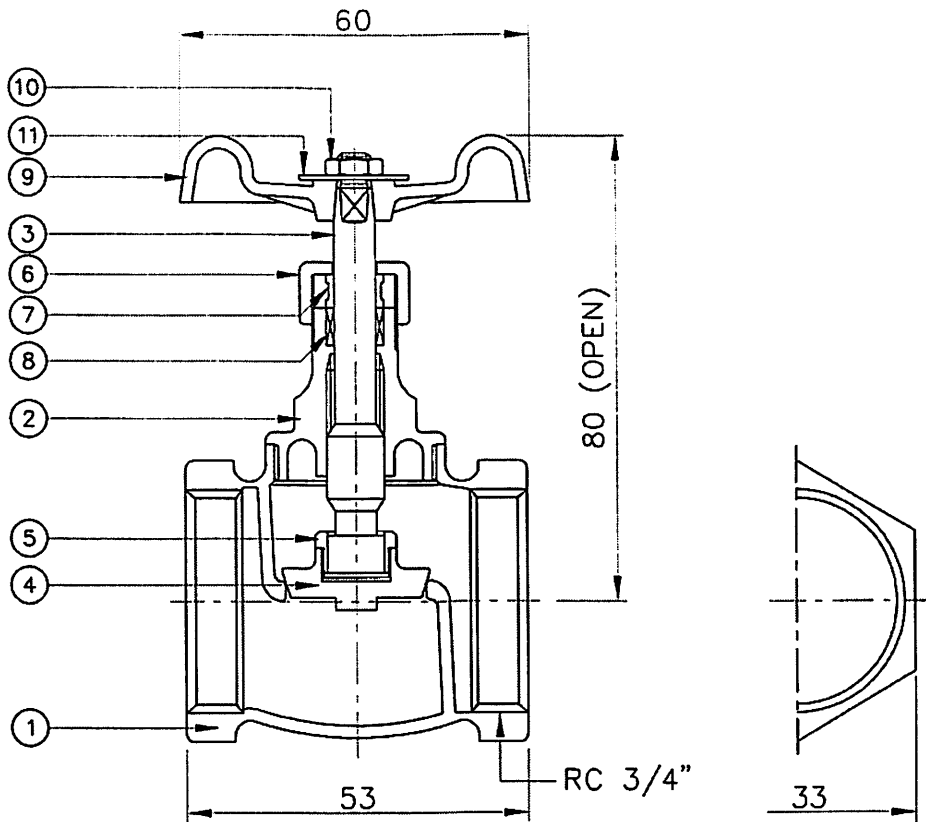


STAINLESS STEEL BOLT M12(1.75)x15

INSTALLATION INSTRUCTION

SUITABLE FOR CONDUCTOR SIZE 35-120 mm.²

| | | | | |
|---------|----------------|----------|--|--|
| | NAME | DATE | TITLE : |  SYMBOL ISO DIMENSION IN mm. |
| DWG. BY | <i>C. Tan</i> | 21-04-12 | EARTHING TERMINAL | FILE : No. SA-2340801R6 |
| CHK. BY | <i>D. S.</i> | 21-04-12 | | SCALE : 1:1.2 |
| APP. BY | <i>S. Chan</i> | 30-04-12 |  CHAROENCHAI TRANSFORMER CO.,LTD. | SIZE A4 DWG. No. SA-2340801 REV. 6 |

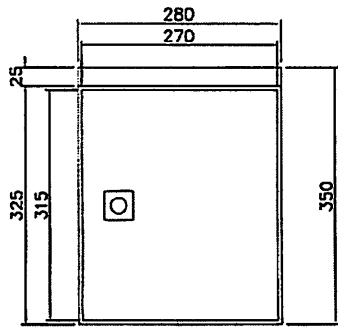


CLASS 100 CAST BRONZE GLOBE VALVES

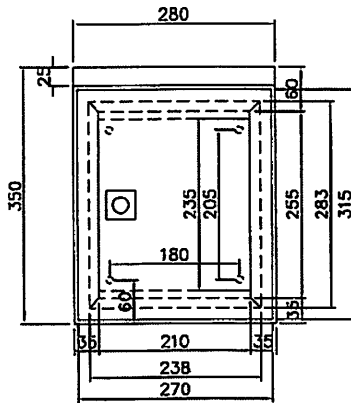
| 11 | NAME PLATE | 1 | ALUMINUM | A1050P |
|-----|---------------|------|-------------------|------------------------|
| 10 | WHEEL NUT | 1 | CARBON STEEL | SS400 |
| 9 | HAND WHEEL | 1 | ZINC DIE-CAST | ZDC (SIZE 1/4-1) |
| | | 1 | ALUMINUM DIE-CAST | ADC 12 (SIZE 1. 1/4-3) |
| | | 1 | CAST IRON | FC200 (SIZE 4 ONLY) |
| 8 | GLAND PACKING | 1 | PLASTIC GRAPHITE | |
| 7 | GLAND | 1 | BRASS ROD | C3604BD |
| 6 | PACKING NUT | 1 | FORGED BRASS | C3771BE |
| 5 | LOCK NUT | 1 | BRASS ROD | C3771BD |
| 4 | DISC | 1 | CAST BRONZE | BC |
| 3 | STEM | 1 | SPECIAL BRASS (2) | KITZ "K-METAL" |
| 2 | BONNET | 1 | FORGED BRASS | C3771BE (SIZE 1/4-3) |
| | | 1 | CAST BRONZE | BC (SIZE 4 ONLY) |
| 1 | BODY | 1 | CAST BRONZE | BC |
| NO. | NAME OF PARTS | QTY. | MATERIALS | SPECIFICATIONS |

NOTE : (1) VALVE SIZE IDENTIFICATION.
 (2) SPECIAL BRASS. KITZ "K-METAL" IS DEVELOPED FOR ANTI-DEZINCIFICATION BY KITZ CORP.

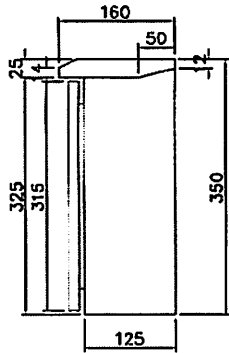
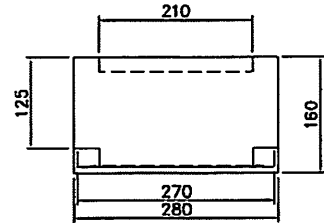
| | | | | | |
|---------|----------------|------------|--------------------------------|--|------------|
| | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. | |
| DWG. BY | <i>E. A...</i> | 05/10/10 | OIL DRAIN VALVE ϕ 3/4" | FILE : No. SA2620102 R1 | |
| CHK. BY | <i>S...</i> | 06-10-2010 | | SCALE : N.T.S. | PAGE : 1/1 |
| APP. BY | <i>...</i> | 06-11-10 | | CHAROENCHAI TRANSFORMER CO.,LTD. | SIZE A4 |



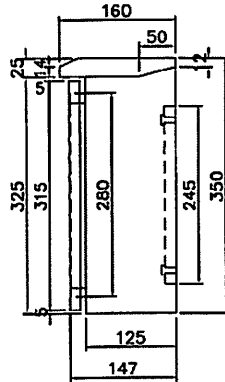
FRONT VIEW




TOP VIEW



SIDE VIEW

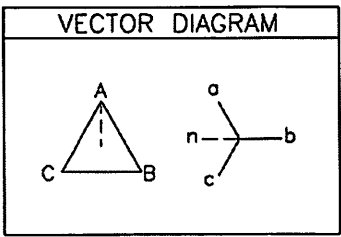
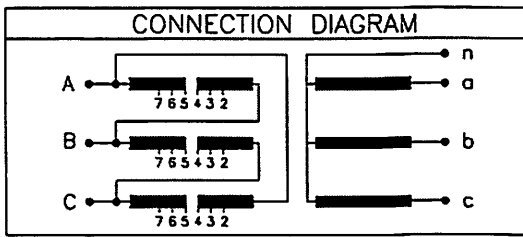


| | | | | | |
|---------|--------------------|----------|--|--------------------------------|--------------|
| | NAME | DATE | TITLE : TERMINAL BOX FOR TRANSFORMER (No. 01) | SYMBOL ISO DIMENSION IN mm. | |
| DWG. BY | <i>[Signature]</i> | 23-11-11 | | FILE : No. SA-6510101R2 | SCALE : 1:10 |
| CHK. BY | <i>[Signature]</i> | 23-11-11 |  CHAROENCHAI TRANSFORMER CO.,LTD. | DWG. No. SA-6510101 | REV. 2 |
| APP. BY | <i>[Signature]</i> | 06-12-11 | | SIZE A4 | |



THAILAND

| | | | |
|--------------------------------------|--|---------------|---|
| RATED KVA. | <input type="text"/> | STANDARD | <input type="text" value="AS 60076"/> |
| H.V. VOLT. | <input type="text"/> | L.V. VOLT. | <input type="text" value="/"/> |
| H.V. AMP. | <input type="text"/> | L.V. AMP. | <input type="text"/> |
| PHASE <input type="text" value="3"/> | FREQUENCY <input type="text"/> | %IMP. VOLT AT | <input type="text" value="75"/> °C <input type="text"/> |
| η 50% AT P.F.=1 | <input type="text"/> | INS. OIL | <input type="text" value="MINERAL OIL"/> |
| TYPE OF COOLING | <input type="text" value="ONAN"/> | H.V. WINDING | <input type="text" value="COPPER"/> |
| VECTOR GROUP | <input type="text" value="Dyn11"/> | L.V. WINDING | <input type="text" value="COPPER"/> |
| TYPE | <input type="text" value="STEP DOWN"/> | OIL QUANTITY | <input type="text"/> l. |
| INS. CLASS | <input type="text" value="A"/> | TOTAL WEIGHT | <input type="text"/> kg. |
| TEMP. WINDING | <input type="text"/> °C | SERIAL No. | <input type="text"/> |
| TEMP. TOP OIL | <input type="text"/> °C | DATE | <input type="text"/> |
| AMB. TEMP | <input type="text"/> °C | | |



| H.V. SIDE | | |
|-----------|---------|---------|
| POS. | CONNECT | VOLTAGE |
| 1. | 5 - 4 | |
| 2. | 5 - 3 | |
| 3. | 6 - 3 | |
| 4. | 6 - 2 | |
| 5. | 7 - 2 | |

| L.V. SIDE | |
|------------|---------|
| TERMINAL | VOLTAGE |
| a TO b | |
| b TO c | |
| c TO a | |
| a b c TO n | |

MINIMUM ENERGY PERFORMANCE STANDARD (AS 2374.1.2)

185

5
5
Ø3~4holes

130

MATERIAL : STAINLESS STEEL PLATE
THICKNESS : 0.5 mm.

| | | | | |
|---------|--------------------|----------|--|--|
| | NAME | DATE | TITLE : | SYMBOL ISO DIMENSION IN mm. FILE : No. SA-2183442 |
| DWG. BY | <i>[Signature]</i> | 14-05-12 | NAMEPLATE AS STD. (3 PH. Dyn11 MEPS) | |
| CHK. BY | <i>[Signature]</i> | 14-05-12 | | SCALE : 1:1 PAGE : 1/1 |
| APP. BY | <i>[Signature]</i> | 16-05-12 | CHAROENCHAI TRANSFORMER CO.,LTD. | SIZE A4 DWG. No. SA-2183442 REV. - |