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ABN 50 087 646 062

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**OPERATIONAL EARTH POINT CONSTRUCTION**

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SINGLE AND THREE PHASE TRANSFORMER EARTHING - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

E PT/COM/DD

EARTH TRANSFORMER SYSTEM TYPE
E PT = Pole Transformer COM = Common DD = Deep drilled
SEP = Separate
RCOM = Remote common
RSEP = Remote HV separate

EXAMPLES:- E PT/COM/DD = Pole transformer with common earth system (CMEN), deep drilled.
E PT/RSEP = Pole transformer with remote HV separate and LV earth systems, driven rods.

SWER TRANSFORMER/REACTOR/REGULATOR EARTHING - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

E PTS/DD

EARTH TRANSFORMER TYPE
E PTS = Pole Transformer SWER
PTS = Pole Transformer SWER Isolator
PREAS = Pole Reactor SWER
PREGS = Pole Regulator SWER

EXAMPLES:- E PTS/DD = Earth, pole transformer SWER, deep drilled.
E PREAS = Earth, pole reactor SWER, driven rods.
E PTSI = Earth, pole transformer/isolator SWER, deep drilled.

* SWER Isolator deep drilled only.
### SWER/SINGLE AND THREE PHASE RECLOSER EARTHING - CONSTRUCTION CODE

**E ACRS/R/DD**

**EARTH**
- **E**

**RECLOSER**
- ACRS = Recloser SWER
- ACR1 = Recloser 1 Phase
- ACR3 = Recloser 3 Phase

**SYSTEM**
- **R** = Remote
  - (Omit for standard earth)

**TYPE**
- **DD** = Deep drilled
  - (Omit where driven rods used)

**EXAMPLES:**
- E ACRS/DD = Earth, SWER recloser earth system, deep drilled.

### ABS, HV EQUIPMENT & METAL GUARD EARTHING - CONSTRUCTION CODE

**E HVEGMG**

**EARTH**
- **E**

**EQUIPMENT**
- **ABS** = Air Break Switch
- **ABSMG** = Air Break Switch with metal guard
- **HVE** = High Voltage Equipment - New Pole
- **HVEX** = High Voltage Equipment - Existing Pole
- **HVEMG** = High Voltage Equipment and Metal Guard - New Pole
- **HVEMGMEN** = High Voltage Equipment and Metal Guard with connection to LV mains - New Pole
- **HVEMG** = High Voltage Equipment and Metal Guard - Existing pole
- **HVEMGMENX** = High Voltage Equipment and Metal Guard with connection to LV mains - Existing Pole

**SYSTEM**
- **SEP** = Separate
- **COM** = Common
- **RSEP** = Remote HV Separate
- **RCOM** = Remote Common

**MAINS (Neutral)**
- **ABC**
- **AL**
- **CU**
  - (Omit if no MEN req'd)

**EXAMPLES:**
- E HVEGMG/SEP/ABC = Earth, HV Equipment & Metal Guard with MEN on existing pole, separate earth system, connected to ABC mains neutral.

---

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OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
CONSTRUCTION CODE GUIDE
RECLOSER / A.B.S. / HV EQUIPMENT / METAL GUARD

**DRAWN**
L. Burton

**DATE**
5/2/01

**APPROVED**
C. Noel

**FILE**
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**Dwg**
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**Sh**
2

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**ORIGINAL ISSUE**
E 4.11.04
F 27.5.09
G 11.8.10
H 23.1.14
M.E.N. EARTHING - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

- **E** MEN/AL
  - **EARTH**
    - MEN = MEN - New Pole
    - MENX = MEN - Existing Pole
    - MG = Metal Guard
  - **SYSTEM**
    - GUSS = Grid Utility Support System (Rods)
    - GUSSDD = Grid Utility Support System (Deep Drilled)
  - **MAINS**
    - ABC = LVABC Mains
    - Al. = Bare Aluminium Mains
    - Cu. = Bare Copper Mains

**EXAMPLE:**
- E MEN/Al = Earthing on new pole, with bare Aluminium mains.

ADDITIONAL EARTHING - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

- **E** AR
  - **EARTH**
    - A = Additional (Single depth rod assembly)
    - AR = Additional rod (Extra depth rod)
    - ADDDC = Additional deep drilled (Cable type)
    - RA = Remote Additional (Single depth rod assembly)
    - RADDCC = Remote Additional deep drilled (Cable type)
    - AC = Additional (Single depth rod & 'C' crimp assembly)
    - ADDCC = Additional deep drilled (cable & 'C' crimp type)

**EXAMPLE:**
- E AR = Earthing, with additional extra depth rod.
POLE LIGHTNING PROTECTION EARTHING - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

E DAR

SYSTEM
DAR = Darverter New Pole
GAP = Gapped Bands New Pole
DARX = Darverter Existing Pole
GAPX = Gapped Bands Existing Pole

EXAMPLES:-
E DAR = Darverter earthing on new pole
E GAPX = Gapped bands earthing on existing pole

OVER HEAD EARTHWIRE - CONSTRUCTION CODE

Code shown within dashed box appears on relevant construction detail drawings in this manual.

E OH/IT

TYPE
OH = Overhead New Pole
OHX = Overhead Existing Pole

CONNECTION
IT = Intermediate/termination
S = Strain

EXAMPLES:-
E OHX/S = Earth Overhead On Existing Pole, Strain connection
**QUICK REFERENCE FOR DISTRIBUTION EARTH RESISTANCE**

### M.E.N - SINGLE PHASE / 3 PHASE SUBSTATIONS

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### SWER Substation Deep Drilled HV Connected (Ω)

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### SWER Isolator Deep Drilled HV Connected (Ω)

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<th>LV</th>
<th>Dwg No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1304</td>
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<tr>
<td>200</td>
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### Reactor (Ω)

<table>
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<tr>
<th>kVA</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
<th>Dwg No.</th>
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<tbody>
<tr>
<td>25</td>
<td>6</td>
<td>7</td>
<td>10</td>
<td>1307</td>
</tr>
<tr>
<td>50</td>
<td>3.3</td>
<td>3.5</td>
<td>5</td>
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### Reactor Deep Drilled (Ω)

<table>
<thead>
<tr>
<th>kVA</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
<th>Dwg No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>6</td>
<td>7.5</td>
<td>11</td>
<td>1308</td>
</tr>
<tr>
<td>50</td>
<td>3.5</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

### Regulator (Ω)

<table>
<thead>
<tr>
<th>kVA</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
<th>Dwg No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>1307</td>
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### Regulator Deep Drilled (Ω)

<table>
<thead>
<tr>
<th>kVA</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
<th>Dwg No.</th>
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</thead>
<tbody>
<tr>
<td>50</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>1308</td>
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### Other Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Disconnected (Ω)</th>
<th>Connected (Ω) Separate System</th>
<th>Connected (Ω) Common System</th>
<th>Dwg No.</th>
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<tbody>
<tr>
<td>3 Phase Recloser</td>
<td>30</td>
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<td></td>
<td>1433, 1434</td>
</tr>
<tr>
<td>SWER Recloser</td>
<td>25</td>
<td></td>
<td></td>
<td>1435, 1436</td>
</tr>
<tr>
<td>ABS</td>
<td>30</td>
<td>30</td>
<td>1</td>
<td>1298</td>
</tr>
<tr>
<td>Guard &amp; HV Equipment</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV Equipment</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV Equipment, Guard &amp; MEN</td>
<td>30</td>
<td>MEN 10</td>
<td></td>
<td>1446, 1447</td>
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<tr>
<td>Common HV Equipment</td>
<td>30</td>
<td>1</td>
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<td>1909</td>
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<tr>
<td>Common HV Equipment, Guard &amp; MEN</td>
<td>30</td>
<td>1</td>
<td></td>
<td>1450, 1451</td>
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<tr>
<td>Operating Point</td>
<td>30</td>
<td></td>
<td></td>
<td>1337, 1338</td>
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<tr>
<td>Darverter</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1283, 1329</td>
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<tr>
<td>Gapped Band</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1284, 1330</td>
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<tr>
<td>Overhead Earth Wire</td>
<td>30</td>
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<td></td>
<td>1441, 1442</td>
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</tbody>
</table>

OVERHEAD DISTRIBUTION

EARTHING WOOD POLE

QUICK REFERENCE FOR DISTRIBUTION EARTH RESISTANCE
<table>
<thead>
<tr>
<th>Type of Earthing System</th>
<th>Telstra Plant Types</th>
<th>Telstra Cable Types</th>
<th>Telephone Exchange</th>
<th>Drawing No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV Earth (M.E.N)</td>
<td>0.3 metres</td>
<td>0.3 metres</td>
<td>1 metre</td>
<td>1296, 1297</td>
</tr>
<tr>
<td>Pole Mounted Distribution Transformers on Wood Poles</td>
<td>15 metres</td>
<td>0.3 metres</td>
<td>15 metres</td>
<td>1241, 1311</td>
</tr>
<tr>
<td>Pole Mounted Distribution Transformers on Wood Poles</td>
<td>2 metres</td>
<td>0.3 metres</td>
<td>15 metres</td>
<td>1280, 1309</td>
</tr>
<tr>
<td>Pole Mounted Distribution Transformers on Conductive Poles</td>
<td>2 metres</td>
<td>0.3 metres</td>
<td>15 metres</td>
<td>Refer EARTHING CONCRETE POLE folder.</td>
</tr>
<tr>
<td>HV Poles (wood) with ABS</td>
<td>1 metre</td>
<td>0.3 metres</td>
<td>1 metre</td>
<td>1298</td>
</tr>
<tr>
<td>SWER Transformers on Wood Poles</td>
<td>25 metres</td>
<td>1 metre</td>
<td>50 metre</td>
<td>1304, 1300, 1307</td>
</tr>
<tr>
<td>Poles with HV Earth</td>
<td>15 metres</td>
<td>1 metre</td>
<td>30 metre</td>
<td>1329, 1330, 1283, 1284</td>
</tr>
<tr>
<td></td>
<td>15 metres</td>
<td>0.3 metres</td>
<td>15 metres</td>
<td>1433, 1434, 1298</td>
</tr>
<tr>
<td></td>
<td>2 metres</td>
<td>0.3 metres</td>
<td>5 metres</td>
<td>1332, 1446, 1447</td>
</tr>
<tr>
<td></td>
<td>5 metres</td>
<td>15 metres</td>
<td>1450, 1451, 1337</td>
<td></td>
</tr>
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<td></td>
<td>5 metres</td>
<td>15 metres</td>
<td>1338, 1441, 1442</td>
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### MATERIAL

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector IPC 25/95mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connector PG Al/Steel-Cu.</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connector PG Cu/Cu.</td>
<td></td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard LV to wood pole</td>
<td>1</td>
</tr>
</tbody>
</table>

### NOTES:

1. Earthing to run in direction of mains.
2. If disconnection test point required, fit connector.
   (connector not included in material list)
3. Number of earths:
   - Not counting consumer's earths: -
   - There should be as a general rule:
     One earth at the remote end of each line, 
     NOT required at end of cross street service.
   - A minimum of two earths per kilometre of line.
   - Earths at such intermediate points that will ensure no consumer's installation is more than 200m line distance from an M.E.N. earth.
4. Separation from communication equipment:
   - Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cables = 0.3m
   - For separation from other communications assets refer Standards Section.
To L.V. Neutral
Connector Assy Selection
87-3 or 10 or
18-5

Assy 105-1
(Saddles at 500 Intervals)

Assy 14-1
(500 Intervals)

Pole

Strip insulation

Wood Pole

60

2600

2400 Min.

4.0m Min. (Single rod)

8.0m Min. (Double rod)

Trench sections. Refer
EARTHING Dwg. 1238

Caution tape -

Additional earthing if required.
If more than 4 additional earthrods
required, contact local Ergon branch.
Assy selection 104-7 or 104-5 and 7

Assy 105-5

Butt earth
Minimum of 3 coils beneath base.
(strip insulation)

Construction Type
EMEN
EAC (Additional)
EAR (Additional rod)

DISCONNECTED
CONNECTED
CONNECTED

Separate System
Common System

30 ohm Max.
10 ohm Max.
1 ohm Max.

Max.
Max.
Max.

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
M.E.N. EARTH - NEW POLE

05.12.07

05.12.07

C. Noel

C. Avenell

T. Borg

FILE: 5 11296 2
NOTES:

1. Earthing to run in direction of mains.

2. If disconnection test point required, fit connector.
   (connector not included in material list)

3. Number of earths:
   - Not counting consumer's earths:-
   - There should be as a general rule:
     One earth at the remote end of each line,
     NOT required at end of cross street service.
   - A minimum of 2 earths per kilometre of line.
   - Earths at such intermediate points that
     will ensure no consumer's installation is
     more than 200m line distance from an
     M.E.N. earth.

4. Separation from communication equipment:
   - Provide the following minimum separation to
     communications pillars/cabinets, cable pits/manholes
     payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
   - Provide the following minimum separation to
     communications cable plastic sheathed / jacketed
     or in plastic conduit:
     - LV earth rod or cables = 0.3m
   - For separation from other communications
     assets refer Standards Section.
NOTES:

1. LV Metal cable guard must be connected to an M.E.N. earth system.
   Where a M.E.N. earth is not existing, one is to be installed in accordance with earthing drawing 1296 and 1297. Construction types EMEN or EMENX.

2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cables = 0.3m
   For separation from other communications assets refer Standards Section.
### Materials - Separate Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm² to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>102-1</td>
<td>Earth LV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth HV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>2</td>
</tr>
</tbody>
</table>

### Materials - Remote Separate Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm² to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>102-1</td>
<td>Earth LV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>2</td>
</tr>
</tbody>
</table>

### Notes:

1. Earthing to run in direction of mains.

2. Separation from communication equipment:
   - Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
     - HV earth rod = 15.0m
     - HV bare earth cable = 15.0m
   - Provide the following minimum separation to communications cable in plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cable = 0.3m
     - HV bare earth cable (site earth) = 0.3m
   - For separation from other communications assets refer Standards Section.

3. Attach warning sign beside remote HV earth lead.

4. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Strip insulation for portable earth connection

LV DISCONNECTED

10 ohm Max.

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assay selection 104-5 or 104-1 and 5

4.0m Min. (Single rod)
8.0m Min. (Double rod)

30 ohm Max.

H.V. CONNECTED
H.V. Earth wire must not be broken

H.V. CONNECTED

A.PoL

Earthing Wood Pole
Transformer Separate Earth Construction

Construction Type
EPT/SEP
EA (Additional)
EAR (Additional rod)

Trench sections
Refer EARTHING Dwg. 1238

Ergon Energy Corporation Ltd
ABN 50 087 646 062

DATE 30.10.01
PASSED C. Avenell
DRAWN E. Newton

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
TRANSFORMER SEPARATE EARTH CONSTRUCTION

FILE: E 11 1241 2 Dwg 1241 Sh2
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Strip insulation for portable earth connection.

LV DISCONNECTED

H.V. CONNECTED

H.V. Earth wire must not be broken

30 ohm Max.

Caution tape

LV Neutral bushing

Remote HV earth pit

Refer sheet 1 note 3
Assy 105-5
(Saddles at 500 Intervals)

Refer note 4 sheet 1.
Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 and 225-3

Construction Type
EPT/RSEP
EAR (Additional)
ERA (Additional rod)

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 or 104-1 and 5

4.0m Min. (Single rod)
8.0m Min. (Double rod)

2.0m

15.0m min

2400 min

3400

10 ohm Max.

Trench sections
Refer EARTHING Dwg. 1238

To Transformer
L.V. Neutral bushing
To Transformer tank

Assy 223-1

Assy 102-1

Assy 14-1
(500 Intervals)

Strip insulation

Pole

Telstra pit

HV Earth

300 min

500 Intervals

Wood Pole

L.V.

H.V.

Remote HV equipment

Refer EARTHING Dwg. 1238

Ergon Energy Corporation Ltd
ABN 50 087 646 062

DRAWN
L. Barton

DATE 22.5.09

APPROVED C. Noel

PASSED C. Avenell

FILE: 5 11 1241 3

Dwg 1241 Sh 3

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
TRANSFORMER REMOTE HV SEPARATE EARTH CONSTRUCTION
### MATERIAL - SEPARATE EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>123-1</td>
<td>Earth LV 35mm² to wood pole - deep drilled</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>125-1</td>
<td>Earth HV to wood pole - deep drilled</td>
<td>1</td>
</tr>
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### MATERIAL - REMOTE SEPARATE EARTH

<table>
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<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>123-1</td>
<td>Earth LV 35mm² to wood pole - deep drilled</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>224-1</td>
<td>Earth remote HV separate (35mm²) deep drilled to wood pole</td>
<td>1</td>
</tr>
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</table>

### MATERIAL - ADDITIONAL EARTH

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<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>124-1</td>
<td>Earth additional - deep drilled</td>
<td>AR</td>
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</table>

### MATERIAL - ADDITIONAL EARTH REMOTE

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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>124-1</td>
<td>Earth additional - deep drilled</td>
<td>AR</td>
</tr>
<tr>
<td>225-7</td>
<td>Earth remote HV additional - deep drilled</td>
<td>1</td>
</tr>
</tbody>
</table>

### NOTES:

1. Earthing to run in direction of mains.
2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable:
     - LV earth rod or cable = 0.3m
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section.
3. Attach warning sign beside remote HV earth lead.
4. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-7.
5. Deep drilled earth testing: Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieved prior to completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.
6. H.V. & L.V. electrodes
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound. DO NOT ADD WATER.
7. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode. For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Vertical earth connection for portable earth connections

LV DISCONNECTED

10 ohm Max.

H.V. CONNECTED

H.V. Earth wire must not be broken

30 ohm Max.

Refer EARTHING Dwg. 1238

Caution tape

Additional earthing if required Assy 124-1

Refer note 7

Construction Type

EPT/SEP/DD EADDC (Additional)
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Additional earthing if required

Assemblies

Refer note 7

Refer note 4 sheet 1.
### NOTES:

1. Earthing to run in direction of mains.

2. Separation from communications equipment:
   * Provide the following minimum separation to communications manholes, pillars, pits etc:
     - Earth rod = 2.0m
     - Bare earth cable = 2.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - Earth rod = 0.3m
     - Bare earth cable = 0.3m
   For separation from other communications assets refer Standards Section

3. Attach warning sign beside remote CMEN earth lead.

4. A remote earth identification pit to be installed at first remote earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
CONNECTED

To Transformer
L.V.Neutral bushing

1 ohm
Max.

To Transformer tank

H.V.

Assy 14-1
(500 Intervals)

Assy 140-14
141-18
70mm² Cu.
35mm² Cu.

Assy 102-1

Assy 105-5
(Saddles at 500 Intervals)

DISCONNECTED

30 ohm
Max.

2.0m

4.0m Min. (Single rod)

8.0m Min. (Double rod)

Caution tape

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy selection 104-5 or 104-1 and 5

Trench sections
Refer EARTHING Dwg. 1238

Strip insulation for portable earth connection

Construction Type

EPT/COM
EA (Additional)
EAR (Additional rod)

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
TRANSFORMER COMMON EARTH
CONSTRUCTION

ERGON ENERGY CORPORATION LTD
ABN 50 087 646 062

C. Noel

APPROVED

DATE

PASSED

DRAWN

FILE: 5 112802

Dwg 1280 Sh 2
### Notes:

1. Earthing to run in direction of mains.

2. **Deep Drilled Earth Testing:**
   - Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieved prior to completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.

3. Separation from communication equipment:
   - Provide the following minimum separation to communications manholes, pillars, pits etc:
     - Earth rod = 2.0m
     - Bare earth cable = 2.0m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - Earth rod = 0.3m
     - Bare earth cable = 0.3m
   - For separation from other communications assets refer Standards Section

4. Attach warning sign beside remote CMEN earth lead

5. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-7.

6. **H.V. & L.V. Electrodes**
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER.**

7. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode. For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.

### Material - Common Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>123-2</td>
<td>Earth HV 35mm² to wood pole - deep drilled</td>
<td>1</td>
</tr>
<tr>
<td>140-14</td>
<td>Cable insulated annealed Cu. 70mm²</td>
<td>1</td>
</tr>
<tr>
<td>141-18</td>
<td>Lug, compression 70mm² M12</td>
<td>2</td>
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</table>

### Material - Remote Common Earth

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
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<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>224-3</td>
<td>Earth rempte CMEN (35mm²) deep drilled to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-14</td>
<td>Cable insulated annealed Cu. 70mm²</td>
<td>1</td>
</tr>
<tr>
<td>141-18</td>
<td>Lug, compression 70mm² M12</td>
<td>2</td>
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### Material - Additional Earth

<table>
<thead>
<tr>
<th>ASSY</th>
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<tbody>
<tr>
<td>124-1</td>
<td>Earth additional - deep drilled AR</td>
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### Material - Additional Earth Remote

<table>
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<td>124-1</td>
<td>Earth additional - deep drilled AR</td>
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</tr>
<tr>
<td>225-7</td>
<td>Earth remote HV additional - deep drilled</td>
<td>1</td>
</tr>
</tbody>
</table>
To Transformer
L.V. Neutral bushing
Assy 140-14
141-18
To Transformer tank
Assy 14-1
(500 Intervals)
2400 Min.
2600
2400 Min.
Assy 224-3
Strip insulation for portable earth connection
Refer sheet 1 note 4

1 ohm Max.

30 ohm Max.

HV Earth
300 min
Telstra pit
Detail Top View

Trench sections
Refer EARTHING Dwg. 1238

Refer note 5 sheet 1
Additional earthing if required
Refer assy 124-1 and 225-7

Remote HV earth pit
Telstra pit or equipment

2.0m min

Refer note 7

Assy 105-5
(Saddles at 500 Intervals)

Construction Type
EPT/RCOM/DD
EADDC (Additional)

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
TRANSFORMER REMOTE COMMON EARTH
DEEP DRILLED - CONSTRUCTION

Ergon Energy Corporation Ltd
ABN 50 087 646 062

ORIGINAL ISSUE
11.11.15

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DRAWN
L. Burton

DATE
26.5.09

PASSED
C. Avenell

APPROVED
C. Noel

FILE: 5 11 13093

Dwg 1309 Sh 3

B
### MATERIAL - SEPARATE EARTH

<table>
<thead>
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<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>123-1</td>
<td>Earth LV 35mm² to wood pole - deep drilled</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>124-1</td>
<td>Earth additional - deep drilled</td>
<td>5</td>
</tr>
<tr>
<td>125-1</td>
<td>Earth HV to wood pole - deep drilled</td>
<td>1</td>
</tr>
</tbody>
</table>

### MATERIAL - ADDITIONAL EARTH

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>124-1</td>
<td>Earth additional - deep drilled</td>
<td>AR</td>
</tr>
</tbody>
</table>

#### Notes: (Continued on sheet 2)

The following conditions need to be met for concessional earthing values to be adopted.

1. RAM approval required to use this earthing system.
2. Greater than 3000Ω.m soil resistivity measured in dry conditions for surface to 1m deep.
3. Greater than 2000Ω.m soil resistivity at depth (e.g. 10m) measured in dry conditions.
4. Transformer size must be less than 63kVA. This may be extended to larger transformers subject to assessment of protection clearing times.
5. Local 11kV EDO protection must be able to clear an earth fault in less than 3 seconds and SEF (i.e. sensitive earth fault) protection must be enabled on the feeder.

6. HV earthing system should be located away from areas which could be subject to frequent presence of human activity (e.g. gates, yards, public meeting places) and a separation of at least 10m to separately earthed structures must be maintained. Installation of insulating sections in adjacent fences may be utilised to achieve this.

7. For single customer installations, the HV earth should be located on the side of the transformer pole away from the customer installation.

8. At least 3 drilled earths, minimum of 3m deep, attached to HV earthing system to ensure stable resistance, even when ground surface dries out. At least 60m of buried earthing cable for HV earthing system. Additional earth stakes may also be installed to achieve target resistance. The location of earthing system to be recorded.

9. The LV earthing system lower impedance must be less than the HV earthing system value.

10. LV earths must be located in a different direction from pole than HV earth.

11. LV underground earthing cable, drilled earths and earth stakes to be separated from HV underground earthing system by 10m. 10m PVC insulated section in LV earthing cable away from pole to ensure separation from HV earth. The location of earthing system to be recorded.

12. The LV earthing system should be located at least 2 metres away from any conductive structures (e.g. pipelines or fences).

13. At least 4 drilled earths, minimum of 3m deep, attached to LV earthing system to ensure stable resistance, even when ground surface dries out. At least 60m of buried earthing cable for LV earthing system. Additional earth stakes may also be installed to achieve target resistance.

14. An additional deep drilled MEN earth at the customer's supply pole must be installed if supply is not taken off the transformer.

15. The Customer's installation must be checked for compliance with AS3000 requirements in section 5.4.6 Structural metalwork including Conductive building materials and section 5.6 Equipotential Bonding. Particular regard should be given to the presence of any metal framed buildings, bore casings and extensive conductive fences.

16. Separation from communication equipment

*Provide the following separation to communications pillars, cabinets, cable pits/manholes, payphones or miscellaneous earths:
- LV earth rod or cable = 0.3m - HV earth rod = 15m - HV bare earth cable (site earth) = 15.0m

*Provide the following minimum separation s to communications cable plastic sheathed/jacketed or in plastic conduit.
- LV earth rod or cable = 0.3m - HV bare earth cable (site earth) = 0.3m

For separation from other communications assets refer to Standards Section.

17. Deep drilled earth testing: Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieve prior to completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.

18. H.V. & L.V. electrodes

- 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.

- Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.

- A drilling rig using nominal 75mm bit is required.

- The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER**

19. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode. For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Strip insulation for portable earth connection

LV DISCONNECTED

90 ohm Max.

Assy 123-1

Assy 14-1 (500 Intervals)

2600

2400 Min

3400

Assy 105-5

(Saddles at 500 Intervals)

Assy 125-1

To Transformer

L.V. Neutral Bushing

To Transformer tank

Wood Pole

H.V.

Pole

Strip insulation

Caution tape

Trench sections

Refer EARTHING Dwg. 1238

Additional earthing if required

Assy 124-1

Refer note 19

Refer note 19

Refer note 19

10.0m

2.0m

Minimum 3 additional deep drilled

Minimum 2 additional deep drilled

H.V. CONNECTED

H.V. Earth wire must not be broken

100 ohm Max.

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Ergon Energy Corporation Ltd
ABN 50 087 646 062

FILE: 5 11 1834 3

Dwg 1834 Sh 3

C

Construction Type

EPT/SEP/DDC

EADDCC (Additional)

OVERHEAD DISTRIBUTION

EARTHING WOOD POLE

CONCESSION TRANSFORMER SEPARATE EARTH DEEP DRILLED - CONSTRUCTION

APPROVED C. Noel

DATE 13.1.13

PASSED C. Avenell

DRAWN L. Burton

ORIGINAL ISSUE 9.5.13

11.11.15
### MATERIAL

<table>
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<th>ASSY</th>
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<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>30</td>
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<tr>
<td>105-5</td>
<td>Earth guard LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-10</td>
<td>Earth guard SWER to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>122-1</td>
<td>Earth H.V. SWER (35mm²) to wood pole - deep drilled</td>
<td>1</td>
</tr>
<tr>
<td>123-1</td>
<td>Earth LV 35mm² to wood pole - deep drilled</td>
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### MATERIAL - ADDITIONAL

#### EARTH LV

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<tbody>
<tr>
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<td>Earth additional - deep drilled</td>
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#### EARTH HV

<table>
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<th>DESCRIPTION</th>
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<tbody>
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<td>124-2</td>
<td>Earth additional SWER - deep drilled</td>
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### ADDITIONAL EARTHING

**IF REQUIRED**

<table>
<thead>
<tr>
<th>Assy 124-1</th>
<th>Earth additional - deep drilled</th>
<th>5.0m</th>
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</thead>
<tbody>
<tr>
<td>Assy 124-2</td>
<td>Earth additional SWER - deep drilled</td>
<td>2.5m</td>
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### MATERIAL - ADDITIONAL EARTHING

#### EARTH LV

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<thead>
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</thead>
<tbody>
<tr>
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<td>Earth additional - deep drilled</td>
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</table>

#### EARTH HV

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<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>124-2</td>
<td>Earth additional SWER - deep drilled</td>
<td>AR</td>
</tr>
</tbody>
</table>

### OVERHEAD DISTRIBUTION

S.W.E.R. ISOLATOR/TRANSFORMER EARTH DEEP DRILLED - MATERIAL

Ergon Energy Corporation Ltd
ABN 50 087 646 062

FILE: 5 1113041

Dwg 1304 Sh1

ORIGINAL ISSUE

1.9.15

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Ergon Energy Corporation Ltd
ABN 50 087 646 062

DATE

11.12.00

APPROVED

C. Noel

PASSED

C. Avenell

DRAWN

L. Burton

OVERHEAD DISTRIBUTION

EARTHING WOOD POLE

S.W.E.R. ISOLATOR/TRANSFORMER EARTH

DEEP DRILLED - MATERIAL

Refer note 6

min 3.0m

5.0m

2.5m

35mm² Cu. Bare

35mm² Cu. Insulated

L.V. Earthing

H.V. S.W.E.R.

Earthing

35mm² Cu. Insulated

35mm² Cu. Bare

IF REQUIRED

Assy 124-2

Refer note 6
NOTES

1. Earthing to run in direction of mains.
2. L.V. earthing system to be connected to L.V. neutral (M.E.N. system).
3. H.V. Earthing system to be connected to H.V. earth bushing and tank earth.
   H.V. Earth leads to run down opposite sides of the pole and must be insulated
   and continuous from H.V. earth bush and tank earth to first H.V. electrode.
4. H.V. & L.V. electrodes - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when
     squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - H.V earthing electrode shall be installed to the same depth
   - The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER**

5. DEEP DRILLED EARTH TESTING
   Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieved prior to
   completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.

6. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode.
   For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.

7. Customer Underground Mains are not allowed on S.W.E.R. poles carrying H.V. Earths.

8. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
     - HV earth rod = 15.0m Distribution Transformer / 25.0m Isolating Transformer
     - HV bare earth cable (site earth) = 15.0m Distribution transformer / 25.0m Isolating transformer
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cable = 0.3m
     - HV earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section.

9. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.

10. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

**L.V. DISCONNECTED**

- 10 ohm Max.

**Strip insulation for portable earth connection**

- To Transformer L.V. Neutral bushing
- H.V. to Transformer E.R. bush.
- Refer note Assy 114 or 126
- To Transformer tank

**Warning Sign**

- Strip insulation on both HV Earth downleads

**Assy 14-1** (500 Intervals)

- Assay 105-10 (Saddles at 500 Intervals)
- Assay 105-5 (Saddles at 500 Intervals)

**Caution tape**

- Trench sections
- Refer EARTHING Dwg. 1238

**H.V. CONNECTED MAX. RESISTANCE**

- H.V. Earth wires must not be broken (Minimum of 3 electrodes)

**DISTRIBUTION S/STN**

- kVA 11kV 12.7kV 19.1kV
- 10 14Ω 16Ω 25Ω
- 25 6Ω 7.5Ω 11Ω
- 50 3.5Ω 4Ω 6Ω
- 100 2Ω 2.3Ω 3.4Ω

**ISOLATING S/STN**

- kVA 11kV 12.7kV 19.1kV
- 100 2Ω 2.3Ω 3.4Ω
- 200 1Ω 1.2Ω 1.9Ω

**Additional LV earthing if required**

- Assy 124-1
- Refer note 6

**Additional HV earthing if required**

- Assy 124-2
- Refer note 6

**Construction Type**

- EPTS/DD
- EPTSI/DD
- EADDCC (Additional)

**OVERHEAD DISTRIBUTION**

- EARTHING WOOD POLE
- S.W.E.R. ISOLATOR/TRANSFORMER EARTH DEEP DRILLED

**Ergon Energy Corporation Ltd**

**ABN 50 087 646 062**

**DATE** 11.12.00

**PASSED** C. Avenell

**DRAWN** L. Burton

**FILE:** 5 11304.3

**Dwg:** 1304 Sh3 C
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch.

Assy selection 104-5 or 104-1 and 5 (Additional rod) (Additional)

Strip insulation on both HV Earth downleads

L.V. Earth wires must not be broken

H.V. Earth wires must not be broken

(Minimum of 3 electrodes)

11kV 12.7kV 19.1kV

kVA 10 25 50 100

Ω 13 6 3.3 2

Ω 15 7 3.5 2.3

Ω 22 10 5 3.4

DISTRIBUTION S/STN

Trench sections Refer EARTHING Dwg. 1238

WARNING!

Strip insulation for portable earth connection

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 or 104-1 and 5
NOTES:

1. Earthing to run in direction of mains.
2. L.V. earthing system to be connected to L.V. neutral (M.E.N. system).
3. H.V. earthing system to be connected to H.V. Earth bushing and tank earth. Earth leads to run down opposite side of the pole and must be insulated and continuous from H.V. earth bushing to first H.V. electrode and from tank earth to first H.V. electrode on opposite side of pole.
4. The H.V. Earth system is to be a minimum of 1.0m from any insulated communication cable and 15.0m from any communications manhole, pit or pillar.
5. Customer Underground Mains are not allowed on S.W.E.R. poles carrying H.V. Earths.
6. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
     - HV earth rod = 15.0m Distribution Transformer / 25.0m Isolating Transformer
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cable = 0.3m
     - HV earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section.
7. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.
8. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.
**OVERHEAD DISTRIBUTION**

**EARTHING WOOD POLE**

**S.W.E.R. REACTOR / REGULATOR EARTH**

---

**MATERIAL**

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<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>105-10</td>
<td>Earth guard SWER to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>121-1</td>
<td>Earth H.V. SWER (35mm²) to wood pole</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**MATERIAL - ADDITIONAL EARTH**

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
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<td>Earth rod additional</td>
<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
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</tbody>
</table>

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**H.V. CONNECTED MAX. RESISTANCE**

H.V. Earth wires must not be broken
(Minimum of 3 electrodes)

<table>
<thead>
<tr>
<th>REACTOR</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>6Ω</td>
<td>7Ω</td>
<td>10Ω</td>
</tr>
<tr>
<td>50</td>
<td>3.3Ω</td>
<td>3.5Ω</td>
<td>5Ω</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGULATOR</th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>3.5Ω</td>
<td>3.5Ω</td>
<td>3.5Ω</td>
</tr>
</tbody>
</table>

---

**Trench sections**

Refer EARTHING Dwg. 1238

---

**Construction Type**

- EPREAS (Reactor)
- EPREGS (Regulator)
- EA (Additional)
- EAR (Additional rod)

---

**Notes**

- Maintain as much separation as possible between HV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.
- Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 or 104-1 and 5.
- Strip insulation on both HV Earth downleads.
- The minimum separation shall not be less than 50mm. Between HV earthwire downleads, LV cables & apparatus. Maintain as much separation as possible.

---

**REFERENCES**

- Refer note Assy 152
- Refer EARTHING Dwg. 1238
NOTES:

1. Earthing to run in direction of mains.
2. H.V. earthing system to be connected to H.V. Earth bushing and tank earth. Earth leads to run down opposite sides of the pole and must be insulated and continuous from H.V. earth bushing to first H.V. electrode and from tank earth to first H.V. electrode on opposite side of pole.
3. The minimum requirements for electrodes is that they be copper clad electrodes.
4. The spacing of additional earth electrodes to be equal to twice the earth electrode length installed.
5. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/
cabinets, cable pits/manholes, payphones or miscellaneous earths:
   - HV earth rod = 15.0m
   - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable
     plastic sheathed / jacketed or in plastic conduit:
   - HV earth cable (site earth) = 1.0m
   For separation from other communications
   assets refer Standards Section
6. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.
7. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.
Maintain as much separation as possible between HV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
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<tr>
<td>105-10</td>
<td>Earth guard SWER to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>122-1</td>
<td>Earth H.V. SWER (35mm²) to wood pole - deep drilled</td>
<td>1</td>
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**MATERIAL - ADDITIONAL EARTH**

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<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>124-2</td>
<td>Earth H.V. additional - deep drilled</td>
<td>AR</td>
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**H.V. CONNECTED MAX. RESISTANCE**

- H.V. Earth wires must not be broken (Minimum of 3 electrodes)

<table>
<thead>
<tr>
<th></th>
<th>REACTOR</th>
<th></th>
<th></th>
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<tr>
<td></td>
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<td>11kV</td>
<td>12.7kV</td>
</tr>
<tr>
<td>Amps</td>
<td>25</td>
<td>6Ω</td>
<td>7.5Ω</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>3.5Ω</td>
<td>4Ω</td>
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**REGULATOR**

<table>
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<tr>
<th></th>
<th>11kV</th>
<th>12.7kV</th>
<th>19.1kV</th>
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</thead>
<tbody>
<tr>
<td>Amps</td>
<td>50</td>
<td>4Ω</td>
<td>4Ω</td>
</tr>
</tbody>
</table>

- Additional earthing if required Assy 124-2
- Refer note 5

**Construction Type**

- EPREAS/DD (Reactor)
- EPREGS/DD (Regulator)
- EADDCC (Additional)
NOTES
1. Earthing to run in direction of mains.
2. H.V. Earthing system to be connected to H.V. earth bushing and tank earth. H.V. Earth leads to run down opppositesides of the pole and must be insulated and continuous from H.V. earth bush and tank earth to first H.V. electrode.
3. H.V. Electrodes
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER.**
4. DEEP DRILLED EARTH TESTING
   Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieved prior to completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.
5. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode.
   For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.
6. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars / cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section
7. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.
8. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.
**NOTES:**

1. Earthing to run in direction of mains. For clarity, drawing shows earth trenching tranverse to mains.

2. Separation from communications equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section.

3. Attach warning sign beside remote HV earth lead.

4. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.

---

### MATERIAL - EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>104-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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</tr>
<tr>
<td>103-1</td>
<td>Earth HV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth Guard (20mm) HV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable insulated annealed Cu. 35mm²</td>
<td>4</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression 35mm² M12</td>
<td>4</td>
</tr>
<tr>
<td>87-12</td>
<td>Connector P.G. Cu to Cu</td>
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### MATERIAL - REMOTE EARTH

<table>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth Guard (20mm) HV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable insulated annealed Cu. 35mm²</td>
<td>4</td>
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<tr>
<td>141-14</td>
<td>Lug, compression 35mm² M12</td>
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<tr>
<td>87-12</td>
<td>Connector P.G. Cu to Cu</td>
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---

### MATERIAL - ADDITIONAL EARTH

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<td>104-5</td>
<td>Depth earth rod additional</td>
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### MATERIAL - ADDITIONAL EARTH REMOTE

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<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>225-3</td>
<td>Earth rod remote HV additional</td>
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</tr>
</tbody>
</table>
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

H.V. DISCONNECTED

30 ohm Max.

To Aux. Supply External V.T.

Assy 140-6

Assy 141-14

H.V.

To Recloser Tank

Assy 103-1

Assy 87-12

Assy 14-1 (500 Intervals)

Assy 140-6

Assy 141-14

To Radio Antenna

Assy 105-5 (Saddles at 500 Intervals)

Trench sections. Refer EARTHING Dwg. 1238

Caution tape

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assay selection 104-5 or 104-1 and 5

4.0m Min. (Single rod)

8.0m Min. (Double rod)

To Control Cubicle

Construction Type

EACR3 (3 Phase)

EA (Additional)

EAR (Additional rod)
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Refer sheet 1 note 3

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 and 225-3

ASSY selection 104-5 and 225-3

Refer note 4 Sheet 1

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
3 PHASE RECLOSER REMOTE EARTH CONSTRUCTION

Construction Type
EACR3 (3 Phase)
EAR (Additional)
ERA (Additional rod)
# MATERIAL - EARTH

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<th>DESCRIPTION</th>
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<tr>
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<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
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<tr>
<td>105-5</td>
<td>Earth guard (20mm) HV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>123-2</td>
<td>Earth HV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable insulated annealed Cu. 35mm²</td>
<td>4</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression 35mm² M12</td>
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</tr>
<tr>
<td>87-12</td>
<td>Connector P.G. Cu to Cu</td>
<td>1</td>
</tr>
</tbody>
</table>

# NOTES:

1. Earthing to run in direction of mains. For clarity, drawing shows earth trenching tranverse to mains.

2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section

3. Attach warning sign beside remote HV earth lead.

4. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-7.

5. H.V. & L.V. electrodes
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER.**

6. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode. For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Additional earthing if required
Assy 124-1

Refer note 6
2.0m

Trench sections. Refer EARTHING Dwg. 1238

Assy 123-2
Assy 87-12
Assy 14-1
(500 Intervals)

Assy 140-6
141-14

To Aux Supply External V.T.

To Recloser tank

H.V. DISCONNECTED

30 ohm Max.

2600
2400 Min.

Caution tape

Strip insulation

Assy 105-5
(Saddles at 500 Intervals)

To Control Cubicle

To Radio Antenna

Construction Type
EACR3 (3 Phase)
EADDC (Additional)

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
3 PHASE RECLOSER EARTH DEEP DRILLED CONSTRUCTION

Ergon Energy Corporation Ltd
ABN 50 087 646 062

FILE: 5 111434 2

Dwg 1434 Sh 2
Trench sections. Refer EARTHING Dwg. 1238

Additional earthing if required
Assy 124-1 and 225-7

Refer note 4 sheet 1

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Strip insulation

H.V. DISCONNECTED

30 ohm Max.

Pole

60

150

20

Refer note 6

Caution tape

2600

2400 Min.

Assy 140-6
141-14

Assy 87-12

Assy 14-1
(500 Intervals)

Assy 224-3

To Recloser tank

To Aux. Supply
External V.T.

H.V.

To Radio Antenna

To Control Cubicle

Assy 105-5
(Saddles at
500 Intervals)

Refer sheet 1
note 3

Refer note 3

Refer sheet 1

15.0m min

15.0m min

Additional earthing if required
Assy 124-1 and 225-7

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
3 PHASE RECLOSER REMOTE EARTH
DEEP DRILLED - CONSTRUCTION

Construction Type
EACR3 (3 Phase)
EADDC (Additional)
**H.V. CONNECTED**

H.V. Earth wires must not be broken

(Minimum of 3 electrodes)
Recloser - 25 ohms max.

**MATERIAL**

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>105-10</td>
<td>Earth guard SWER to wood pole</td>
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</tr>
<tr>
<td>121-1</td>
<td>Earth H.V. SWER (35mm²) to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable insulated annealed Cu. 35mm²</td>
<td>6</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression 35mm² M12</td>
<td>8</td>
</tr>
<tr>
<td>87-12</td>
<td>Connector P.G. Cu to Cu</td>
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**MATERIAL - ADDITIONAL EARTH**

<table>
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<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>104-1</td>
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<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
</tbody>
</table>

Maintain as much separation as possible between HV earth wire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.
NOTES:
1. Earthing to run in direction of mains.
2. H.V. earthing system to be connected to H.V. Earth bushing and tank earth. Earth leads to run down opposite sides of the pole and must be insulated and continuous from H.V. earth bushing to first H.V. electrode and from tank earth to first H.V. electrode on opposite side of pole.
3. The minimum requirements for electrodes is that they be copper clad electrodes.
4. The spacing of additional earth electrodes to be equal to twice the earth electrode length installed.
5. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed/jacketed or in plastic conduit:
     - HV earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section
6. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.
7. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.
H.V. CONNECTED

H.V. Earth wires must not be broken

(Minimum of 3 electrodes)

Recloser - 25 ohms max.

Strip insulation on both HV Earth downleads

Trench sections

Refer EARTHING Dwg. 1238

MATERIAL - ADDITIONAL EARTH

<table>
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<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>124-2</td>
<td>Earth HV additional - deep drilled</td>
<td>AR</td>
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</tbody>
</table>

Maintain as much separation as possible between HV earthwire downleads, LV cables & apparatus.

The minimum separation shall not be less than 50mm.

Additional earthing if required

Assy 124-2

Refer note 5

OVERHEAD DISTRIBUTION

EARTHING WOOD POLE

S.W.E.R. RECLOSER

DEEP DRILLED

DATE: 14.7.04

C. Noel

EACRS

EADDC (Additional)

EADDC (Additional)
NOTES:
1. Earthing to run in direction of mains.
2. H.V. Earthing system to be connected to H.V. earth bushing and tank earth. H.V. Earth leads to run down opposite sides of the pole and must be insulated and continuous from H.V. earth bush and tank earth to first H.V. electrode.
3. H.V. & L.V. electrodes
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound **DO NOT ADD WATER**.
4. DEEP DRILLED EARTH TESTING
   Specified earth resistance may not be achieved for some days after earthing is installed. Where specified resistance is not achieved prior to completion of work on site the installation shall be tested after 7 days and additional earthing added as necessary.
5. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode. For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.
6. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV earth cable (site earth) = 1.0m
     For separation from other communications assets refer Standards Section
7. If the required separations can not be obtained between Telstra equipment and Ergon SWER earths contact Lines Standards.
8. A minimum 2.0m separation shall be maintained between the HV earth system and any conductive structure.

ADDITIONAL EARTHING IF REQUIRED
Assy 124-2
Refer note 5
Earth cable supplied with switch. Connected between downrod pipe, handle and mounting bracket.

**NOTES:-**
1. For wood pole attachments and foundations refer to Construction Practices.
2. ABS with insulated operating rod separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - ABS earth rod = 1.0m
     - ABS bare earth cable (site earth) = 1.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - ABS bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 or 104-1 and 5

**OVERHEAD DISTRIBUTION EARTHING WOOD POLE**
**SEPARATE EARTH ARRANGEMENT**

**EABS**
**MATERIAL**

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<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
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</tr>
<tr>
<td>120-1</td>
<td>Earth air break switch to wood pole</td>
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<tr>
<td>140-6</td>
<td>Cable insulated hard drawn Cu. 35mm²</td>
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<tr>
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<td>Lug, compression 35mm² M12</td>
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**MATERIAL - ADDITIONAL EARTH**

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</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
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</table>

**NOTES:**

1. For wood pole attachments and foundations refer to Construction Practices.
2. ABS with insulated operating rod separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes
   - ABS earth rod = 1.0m.
   - ABS bare earth cable (site earth) = 1.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
   - ABS bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section

---

**OVERHEAD DISTRIBUTION**

**EARTHING WOOD POLE**

**AIR BREAK SWITCH & METAL CABLE GUARD**

**SEPARATE EARTH ARRANGEMENT**
NOTES:-

1. For wood pole attachments and foundations refer to Construction Practices.

2. ABS with insulated operating rod separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes
     or miscellaneous earths:
     - ABS earth rod = 2.0m
     - ABS bare earth cable (site earth) = 2.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed
     or in plastic conduit:
     - ABS bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section.

3. If 2.0m separation cannot be achieved separate HV equipment earth and install remote earth.
   Refer Earthing Wood Pole dwg 1331.
   This will achieve a 1.0m minimum separation.
## MATERIAL

<table>
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<tr>
<th>ASSY</th>
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<tr>
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<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
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<tr>
<td>120-1</td>
<td>Earth air break switch to wood pole</td>
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<tr>
<td>140-6</td>
<td>Cable insulated hard drawn 35mm²</td>
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<td>Lug, compression 35mm² M12</td>
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## MATERIAL - ADDITIONAL EARTH

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<tbody>
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</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
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</table>

### NOTES:

1. For wood pole attachments and foundations refer to Construction Practices.
2. ABS with insulated operating rod separation from communication equipment:
   - ABS earthing earth cable (site earth) = 2.0m
   - ABS earthing earth cable (site earth) = 0.3m
   - ABS earthing earth cable (site earth) = 0.3m
   - For separation from other communications assets refer Standards Section
3. If 2.0m separation cannot be achieved separate HV equipment earth and install remote earth. Refer Earthing Wood Pole dwg 1331.
   - This will allow a 1.0m minimum separation.

## OVERHEAD DISTRIBUTION

**EARTHING WOOD POLE**

**AIR BREAK SWITCH & METAL CABLE GUARD**

**COMMON EARTH ARRANGEMENT**

---

**Construction Type**

**EABSMEG**
**MATERIAL - SEPARATE EARTH**

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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<td>103-1</td>
<td>Earth HV 35mm² to wood pole</td>
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<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
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<tr>
<td>87-12</td>
<td>Connection P.G. Cu-Cu</td>
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**MATERIAL - REMOTE SEPARATE EARTH**

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<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
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<td>87-12</td>
<td>Connection P.G. Cu-Cu</td>
<td>1</td>
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<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
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**MATERIAL - ADDITIONAL EARTH**

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<th>DESCRIPTION</th>
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<td>104-1</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
</tbody>
</table>

**MATERIAL - ADDITIONAL EARTH REMOTE**

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>225-3</td>
<td>Earth rod remote HV additional</td>
<td>1</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Earth leads and metal work above ground to be separated by at least 50mm.

2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.

3. For wood pole attachments and foundations refer to Construction Practices.

4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching transverse to mains.

5. Separation from communication equipment:
   - Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   - For separation from other communications assets refer Standards Section.

6. Attach warning sign beside remote HV earth lead.

7. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Additional earthing if required.
If more than 4 additional earthing rods required, contact local Ergon branch.
Assy selection 104-5 or 104-1 and 5

Refer EARTHING Dwg. 1238

To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darverter)
Assy 103-1

To Regulator Control Cubicle (etc)
Assy 14-1
(Saddles at 500 intervals)
Assy 105-5
(Saddles at 500 intervals)

H.V. CONNECTED
H.V. Earth wire must not be broken
30 ohm Max.

No specified resistance for Darverter

EARTHING WOOD POLE

To Regulator Control Cubicle (etc)
Assy 14-1
(Saddles at 500 intervals)
Assy 105-5
(Saddles at 500 intervals)

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OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
HV EQUIPMENT EARTH ARRANGEMENT
EXISTING POLE - CONSTRUCTION

Construction Type
EHVEX
**H.V. CONNECTED**
H.V. Earth wire must not be broken

No specified resistance for Darverter

**Refer** EARTHING Dwg. 1238

**Construction Type**
EHVEX
EAR (Additional)
ERA (Additional rod)

**HV EQUIPMENT REMOTE EARTH ARRANGEMENT**

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.

**Assy selection**
104-5
225-3

**Additional earthing if required.**
If more than 4 additional earthrods required, contact local Ergon branch.

**Refer note 7 sheet 1**
<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu-Cu</td>
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</table>

### MATERIAL - ADDITIONAL EARTH

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>104-7</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
</tbody>
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---

**NOTES:-**

1. Earth leads and metal work above ground to be separated by at least 50mm.

2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.

3. For wood pole attachments and foundations refer to Construction Practices.

4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching transverse to mains.

5. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section

6. If Telstra equipment is within 15m of butt earth this structure can not be used.
   Use Earthing Wood Pole dwg 1294.
H.V. CONNECTED

H.V. Earth wire must not be broken

30 ohm Max.

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy selection 104-7 or 104-5 and 7

4.0m Min. (Single rod)
8.0m Min. (Double rod)

Assy 87-12
To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darverter)

Assy 105-1
To Regulator Control Cubicle (etc)

Assy 14-1
(Saddles at 500 intervals)

Assy 105-5
(Saddles at 500 intervals)

Additional earthing if required.
Assy selection 104-7 or 104-5 and 7

4.0m Min. (Single rod)
8.0m Min. (Double rod)

Construction Type
EHVE
EAC (Additional)
EAR (Additional rod)
### MATERIAL - SEPARATE EARTH

<table>
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<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu-Cu</td>
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### MATERIAL - REMOTE SEPARATE EARTH

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<th>DESCRIPTION</th>
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<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu-Cu</td>
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### MATERIAL - ADDITIONAL EARTH LV

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<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>104-7</td>
<td>Earth rod additional</td>
<td>AR</td>
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### MATERIAL - ADDITIONAL EARTH REMOTE

<table>
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<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>225-3</td>
<td>Earth rod remote HV additional</td>
<td>1</td>
</tr>
</tbody>
</table>

### NOTES:

1. Earth leads and metal work above ground to be separated by at least 50mm.
2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.
3. For wood pole attachments and foundations refer to Construction Practices.
4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching transverse to mains.
5. Separation from communication equipment:
   - Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - HV earth rod = 15.0m - HV bare earth cable (site earth) = 15.0m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section
6. Attach warning sign beside remote HV earth lead.
7. Metal cable guard associated with HV cable only, must be changed to a polymeric guard if located within 15m of Telstra equipment. Refer U/G Construction Manual assy 531.
   LV metal cable guard is acceptable.
8. A Remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3
H.V. Earth wire must not be broken

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Trench sections Refer EARTHING Dwg. 1238

Additional earthing if required.
Assy Selection 104-1 or 104-1 and 5.

Butt earth Minimum of 3 coils beneath base. (strip insulation)

3.0m Min. (Refer Note 2 on sheet 1)

Assy 105-5 (Saddles at 500 intervals)

2600

2400

Assy 86-12

Assy 103-1

Assy 87-12

Pole

Wood Pole

Assy 105-1

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.

To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darverter)

3.0m Min. Clear to other earth
(Refer Note 2 on sheet 1)

METAL GUARD CONNECTED
HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

LV / HV Cable Guard Refer U/G Construction Manual

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy Selection 104-7 or 104-5 and 7.

Construction Type
EHVEMG
EAC (Additional)
EAR (Additional Rod)

Ergon Energy Corporation Ltd
ABN 50 087 646 062

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
HV EQUIPMENT AND METAL GUARD EARTH ARRANGEMENT NEW POLE - CONSTRUCTION

DATE 8.5.02
PASSED C. Avenell
DRAWN L. Burton
FILE: 5 1113312
Dwg 1331 Sh 2
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assys 104-5 and 225-3

Refer note 8 sheet 1

Additional earthing if required.

H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

WARNING

HV EQUIPMENT AND METAL GUARD REMOTE EARTH

H.V. CONNECTED

H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Refer EARTHING Dwg. 1238

To HV equipment (e.g. Arrester/Tank/Sectionaliser/ Darvater)
Assy 87-12

To Control Cubicle (if required)
Assy 14-1 (Saddles at 500 intervals)
Assy 105-5 (Saddles at 500 intervals)

Refer note 7 Sh 1
HV Cable Guard Refer U/G Construction Manual Assy 531

Refer Sh 1 note 6

HV Earth

300 min

Strip insulation

Telstra pit

Detail Top View

Caution tape

Remote HV earth pit

Tranch sections

Refer EARTHING Dwg. 1238

Telstra pit of equipment

Wood Pole

15.0m min.

150

20

2400

2600

2400

2600

Construction Type

EHVEMG
EAR (Additional)
ERA (Additional rod)
### Material - Separate Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>108-8</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connector P.G. Cu-Cu</td>
<td>1</td>
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</tbody>
</table>

### Material - Remote Separate Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>108-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connector P.G. Cu-Cu</td>
<td>1</td>
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</tbody>
</table>

### Material - Additional Earth

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>104-1</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
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</table>

### Material - Additional Earth Remote

<table>
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<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>225-3</td>
<td>Earth rod remote HV additional</td>
<td>1</td>
</tr>
</tbody>
</table>

### Notes:

1. Earth leads and metal work above ground to be separated by at least 50mm.
2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.
3. For wood pole attachments and foundations refer to Construction Practices.
4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching transverse to mains.
5. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, papphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * For separation from other communications assets refer Standards Section
6. Attach warning sign beside remote HV earth lead.
7. Metal cable guard associated with HV cable only, must be changed to a polymeric guard if located within 15m of Telstra equipment. Refer U/G Construction Manual assy 531.
   LV metal cable guard is acceptable.
8. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

H.V. CONNECTED
H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch.

Assy Selection 104-5 or 104-1 and 5

To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darverter)

Assy 87-12

To Control Cubicle (if required)

Assy 86-12

Assy 105-5 (Saddles at 500 intervals)

3.0m Min.

Clear to other earth

(Refer Note 2 on sheet 1)

METAL GUARD CONNECTED
HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

LV / HV Cable Guard Refer U/G Construction Manual

To Control Cubicle

30 ohm Max.

Assy 14-1

(Saddles at 500 intervals)

Assy 103-1

Strip insulation

Caution tape

Trench sections Refer EARTHING Dwg. 1238

3.0m Min.

(Refer Note 2 on sheet 1)

Construction Type
EHVEXMG

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
HV EQUIPMENT AND METAL GUARD EARTH ARRANGEMENT EXISTING POLE - CONSTRUCTION
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 60mm.

To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darvverter)
Assy 87-12
To Control Cubicle (if required)
Refer EARTHING Dwg. 1238

Assy Selection 104-5 or 104-1 and 5.

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch.

Construction Type
EHVEMG
EAR (Additional)
ERA (Additional rod)

Remote HV earth pit

Metal guard earth
MUST NOT BE CONNECTED

HV equipment earth and
Metal guard earth
MUST NOT BE CONNECTED

Refer note 8 sheet 1
Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

HV Earth
Telstra pit
Detail Top View

15.0m min
0.5m
3.0m Min.
Clear to other earth (Refer Note 2 on sheet 1)

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Refer note 7 sheet 1

Refer note 1 note 6

30 ohm Max.

Strip insulation

Pole

2400

2600

Caution tape

Telstra pit of equipment

Trench sections
Refer EARTHING Dwg. 1238

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Ergon Energy Corporation Ltd
ABN 50 087 848 082

FILE: 5 11 1332 3
Dwg 1332 Sh 3

C. Avenell
C. Noel

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PASSED C. Avenell
APPROVED C. Avenell

DATE 8.5.02
DRAWN C. Lindsay

C.Lindsay

30 ohm Max.

H.V. CONNECTED
H.V. Earth wire must not be broken

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Metal guard connected
HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Refer note 8 sheet 1

Assy 223-1

Assy 14-1
(Saddles at 500 intervals)

Assy 105-6
(Saddles at 500 intervals)

Assy 88-12

Assy 87-12

Assy 104-5 or 104-1 and 5.

704 min

3.0m Min.
Clear to other earth (Refer Note 2 on sheet 1)

To HV equipment (e.g. Arrester/Tank/Sectionaliser/Darvverter)
Assy 87-12
To Control Cubicle (if required)

Refer EARTHING Dwg. 1238

MUST NOT BE CONNECTED

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch.

Construction Type
EHVEMG
EAR (Additional)
ERA (Additional rod)
### MATERIAL - SEPARATE EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector I.P.C. 25/95mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG4)</td>
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<td>Connection P.G. Cu. - Cu. (PG5)</td>
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<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
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<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
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<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
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<td>6m</td>
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<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
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### MATERIAL - REMOTE SEPARATE EARTH

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<td>18-5</td>
<td>Connector I.P.C. 25/95mm² main to 6/35mm² tap</td>
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<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
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<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG4)</td>
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<tr>
<td>87-12</td>
<td>Connection P.G. Cu. - Cu. (PG5)</td>
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</tr>
<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable, insulated hard drawn Cu. 35mm²</td>
<td>6m</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
<td>1</td>
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NOTES:-
1. Earth leads and metal work above ground to be separated by at least 50mm.
2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.
3. For wood pole attachments and foundations refer to Construction Practices.
4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.
5. Separation from communication equipment:
   * Provide the following minimum separation to communications
     - pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
       - HV earth rod = 15.0m, Cable guard = 0.3m
       - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic
     sheathed / jacketed or in plastic conduit:
       - HV bare earth cable (site earth) = 0.3m
6. Attach warning sign beside remote HV earth lead.
7. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
8. The L.V. neutral is to be connected to the cable guard earth.
H.V. Earth wire must not be broken.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED.

Trench sections Refer EARTHING Dwg. 1238

Additional earthing if required.
Assy Selection 104-1 or 104-1 and 5.

Butt earth
Minimum of 3 coils beneath base.
(strip insulation)

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy Selection 104-7 or 104-5 and 7.

Assy 105-1

3.0m Min.
(Refer Note 2 on sheet 1)

4.0m Min. (Single rod)

8.0m Min. (Double rod)

Assy 105-5 (Saddles at 500 intervals)

2600

2400

Assy 103-1

Assy 86-12

Assy 87-12

M.E.N. SYSTEM
RESISTANCE TO GROUND

DISCONNECTED
CONNECTED

30 ohm Max.
10 ohm Max.

LV / HV Cable Guard
Refer U/G Construction Manual

Assy Selection 87-3, 10 or 18-5

To Control Cubicle
(if required)

To HV equipment
(e.g. Arrester/Tank/Sectionaliser/Darverter)

To LV neutral
Assy Selection 87-3.10 or 18-5

Construction Type
EHVEMGMEN
EAC (Additional)
EAR (Additional rod)

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 50mm.
Refer EARTHING Dwg. 1238

**Trench sections**

- **4.0m Min. (Single rod)**
- **8.0m Min. (Double rod)**

**Caution tape**

- Assy 87-12

**To Control Cubicle** (if required)

- Assy 86-12
- Assy 141-14
- Assy 140-6

**Assy Selection 87-3, 10 or 18-5**

**To LV neutral**

- Assy Selection 87-3, 10 or 18-5

**Construction Type**

- **EAR** (Additional)
- **ERA** (Additional rod)

**EARTH ARRANGEMENT NEW POLE - CONSTRUCTION**

**M.E.N. SYSTEM**

- **RESISTANCE TO GROUND**
  - **DISCONNECTED**
    - 30 ohm Max.
  - **CONNECTED**
    - 10 ohm Max.

**H.V. CONNECTED**

- H.V. Earth wire must not be broken
- HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

- 30 ohm Max.

**Strip insulation**

**Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm**

**Remote HV earth pit**

- Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy selection 104-5 and 225-3

**Telstra pit or equipment**

**Butt earth minimum of 3 coils beneath base. (strip insulation)**

- 4.0m Min. (Single rod)
- 8.0m Min. (Double rod)

**Construction Manual**

- LV / HV Cable Guard Refer U/G

**OVERHEAD DISTRIBUTION**

- EARTHING WOOD POLE
- HV EQUIPMENT, METAL GUARD AND M.E.N. REMOTE SEPARATE

**FILE:** 5 11 1446 3

**Dwg 1446 Sh 3**
### MATERIAL - SEPARATE EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector I.P.C. 25/85mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG4)</td>
<td>1</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu. - Cu. (PG5)</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable, insulated hard drawn Cu. 35mm²</td>
<td>6m</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
<td>1</td>
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### MATERIAL - ADDITIONAL EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>104-1</td>
<td>Earth rod additional</td>
<td></td>
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<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
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</table>

### MATERIAL - ADDITIONAL EARTH REMOTE

<table>
<thead>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>226-3</td>
<td>Earth rod remote HV additional</td>
<td>1</td>
</tr>
</tbody>
</table>

### NOTES:-

1. Earth leads and metal work above ground to be separated by at least 50mm.
2. The earthing electrode of other apparatus mounted on the same pole should be located at least 3.0m clear of earth mat and the conductor insulated to avoid transfer potential.
3. For wood pole attachments and foundations refer to Construction Practices.
4. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.
5. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m, Cable guard = 0.3m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section
6. Attach warning sign beside remote HV earth lead.
7. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
8. The L.V. neutral is to be connected to the cable guard earth.
Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

H.V. CONNECTED
H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5

30 ohm Max.

LV / HV Cable Guard Refer U/G Construction Manual

Assy 105-5 (Saddles at 500 intervals)

Assy 103-1

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5

To HV equipment (e.g. Arrester/Tank/Sectionalisers/Darverters)
To LV neutral Assy Selection 87-3,10 or 18-5
To Control Cubicle (if required)

Assy 86-12

Assy 87-12

Assy 140-6

Assy 141-14

Assy 14-1

Clear to other earth (Refer Note 2 on sheet 1)

LV / HV Cable Guard Refer U/G Construction Manual

To HV equipment

10 ohm Max.

30 ohm Max.

M.E.N. SYSTEM RESISTANCE TO GROUND

CONNECTED

Assy 103-1

DISCONNECTED

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5

3.0m Min. (Refer Note 2 on sheet 1)

0.5m

To HV equipment

C. Noel

C. Avenell

C. Lindsay

C. Noel

C. Avenell

C. Lindsay

Ergon Energy Corporation Ltd
ABN 50 087 646 062

OVERHEAD DISTRIBUTION EARTHING WOOD POLE

HV EQUIPMENT, METAL GUARD AND M.E.N. SEPARATE EARTH ARRANGEMENT EXISTING POLE - CONSTRUCTION
**M.E.N. SYSTEM**

**RESISTANCE TO GROUND**

<table>
<thead>
<tr>
<th>DISCONNECTED</th>
<th>CONNECTED</th>
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</thead>
<tbody>
<tr>
<td>H.V. Connected</td>
<td>H.V. Connected</td>
</tr>
<tr>
<td>30 ohm Max.</td>
<td>10 ohm Max.</td>
</tr>
</tbody>
</table>

**H.V. CONNECTED**

H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

**EARNED SYSTEM**

**RESISTANCE TO GROUND**

<table>
<thead>
<tr>
<th>DISCONNECTED</th>
<th>CONNECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.V. Connected</td>
<td>H.V. Connected</td>
</tr>
<tr>
<td>30 ohm Max.</td>
<td>10 ohm Max.</td>
</tr>
</tbody>
</table>

**H.V. CONNECTED**

H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

**WARNING**

LV cables & apparatus. earthwire downleads, between HV & LV separation as possible

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

**FROM**

To HV equipment
(e.g. Arrester/Tank/Sectionaliser)

To LV neutral
Assy Selection 87-3,10 or 18-5
Assy 103-1

to Control Cubicle
(if required)
Assy 86-12
Assy 141-14
Assy 140-6

Assy 14-1
(Saddles at 500 intervals)

Assy 105-5
(Saddles at 500 intervals)

LV / HV Cable Guard Refer U/G Construction Manual

Refer EARTHING Dwg. 1238

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5.

**Construction Type**

EHVEMGMEMEX
EA (Additional)
ERA (Additional rod)

**EARNED SYSTEM**

**RESISTANCE TO GROUND**

<table>
<thead>
<tr>
<th>DISCONNECTED</th>
<th>CONNECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.V. Connected</td>
<td>H.V. Connected</td>
</tr>
<tr>
<td>30 ohm Max.</td>
<td>10 ohm Max.</td>
</tr>
</tbody>
</table>

**H.V. CONNECTED**

H.V. Earth wire must not be broken

30 ohm Max.

HV equipment earth and Metal guard earth MUST NOT BE CONNECTED

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

**WARNING**

LV cables & apparatus. earthwire downleads, between HV & LV separation as possible

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 and 225-3

**FROM**

To HV equipment
(e.g. Arrester/Tank/Sectionaliser)

To LV neutral
Assy Selection 87-3,10 or 18-5
Assy 103-1

to Control Cubicle
(if required)
Assy 86-12
Assy 141-14
Assy 140-6

Assy 14-1
(Saddles at 500 intervals)

Assy 105-5
(Saddles at 500 intervals)

LV / HV Cable Guard Refer U/G Construction Manual

Refer EARTHING Dwg. 1238

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5.

**Construction Type**

EHVEMGMEMEX
EA (Additional)
ERA (Additional rod)
### MATERIAL - EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>New 20</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector I.P.C. 25/95mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG4)</td>
<td>2</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu. - Cu. (PG5)</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Cable guard 20mm HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable, insulated hard drawn Cu. 35mm²</td>
<td>2m</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
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</table>

### MATERIAL - REMOTE EARTH

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>New 20</td>
</tr>
<tr>
<td>105-5</td>
<td>Cable guard 20mm HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector I.P.C. 25/95mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG4)</td>
<td>2</td>
</tr>
<tr>
<td>87-12</td>
<td>Connection P.G. Cu. - Cu. (PG5)</td>
<td>1</td>
</tr>
<tr>
<td>223-1</td>
<td>Earth remote HV separate 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable, insulated hard drawn Cu. 35mm²</td>
<td>2m</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
<td>1</td>
</tr>
</tbody>
</table>

### MATERIAL - ADDITIONAL EARTH

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>104-7</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
</tbody>
</table>

NOTES:

1. Earth leads and metal work above ground to be separated by at least 50mm.
2. For wood pole attachments and foundations refer to Construction Practices.
3. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.
4. Separation from communication equipment:
   - Provide the following minimum separation to communications manholes, pillars, pits etc:
     - Earth rod = 2.0m
     - Bare earth cable = 2.0m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - Earth rod = 0.3m
     - Bare earth cable = 0.3m
   - For separation from other communications assets refer Standards Section
5. Attach warning sign beside remote HV earth lead.
6. A remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
7. Install butt earth on new pole.
To HV equipment (e.g. Arrester/Tank/Sectionaliser)

To LV neutral
Assy Selection 87-3,10 or 18-5

To Control Cubicle (if required)
Assy Selection 140-6 and 141-14

Assy 105-5
(500 intervals)

Assy 87-12

Assy 105-1
(Existing pole)

Assy 103-1
(Existing pole)

Butt Earth
Minimum of 3 coils beneath base. (Strip insulation).

Caution tape

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy Selection 104-7 or 104-5 and 7.

Construction Type
EHVEMEN/COM
EHVEMENX/COM
EAC (Additional)
EAR (Additional rod)

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
HV EQUIPMENT COMMON EARTH ARRANGEMENT
CONSTRUCTION

Ergon Energy Corporation Ltd
ABN 50 087 646 062

FILE: 5 1119092
Dwg 1909 Sh 2
NOTES:-

1. Earth leads and metal work above ground to be separated by at least 50mm.

2. For wood pole attachments and foundations refer to Construction Practices.

3. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.

4. Separation from communication equipment:
   * Provide the following minimum separation to communications manholes, pillars, pits etc:
     - Earth rod = 2.0m
     - Bare earth cable = 2.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - Earth rod = 0.3m
     - Bare earth cable = 0.3m
   For separation from other communications assets refer Standards Section

5. If Telstra equipment is within 2m of butt earth this structure can not be used.
   Use Earthing Wood Pole dwg 1451.

6. The L.V. neutral is to be connected to the cable guard earth.
**EARTHING WOOD POLE**

**HOE EQUIPMENT, METAL GUARD AND M.E.N. COMMON EARTH ARRANGEMENT NEW POLE - CONSTRUCTION**

**Construction Type**
- **EHVEMGMEN**
- **EAC** (Additional)
- **EAR** (Additional rod)

**Trench sections**
- Refer EARTHING Dwg. 1238

**Strip insulation**
- Minimum of 3 coils beneath base.
- (strip insulation)

**Assy 14-1**
(Saddles at 500 intervals)

**Assy 87-12**

**Assy 86-12**

**Assy 141-14**

**Assy 140-6**

**Assy 105-1**

**HV Cable Guard refer Note 5 Sh 1**

**LV / HV Cable Guard**
- Refer U/G Construction Manual

**Caution tape**

**4.0m Min. (Single rod)**

**8.0m Min. (Double rod)**

**1 ohm Max.**

**30 ohm Max.**

**Butt earth**
- Minimum of 3 coils beneath base.

**Additional earthing if required**
- If more than 4 additional earthrods required, contact local Ergon branch.
  - Assy Selection 104-7 or 104-5 and 7.

**Assy Selection 87-3, 10 or 18-5**
- To Control Cubicle
- (if required)

**Assy 104-5 and 7**
- Required, contact local Ergon branch.

**Assy 105-1**
- (if required)

**HV equipment**
- (e.g. Arrester/Tank/Sectionaliser/Darverter)

**To HV equipment**
- Assy Selection 87-3, 10 or 18-5

**To LV neutral**
- Assy Selection 87-3, 10 or 18-5

**Ergon Energy Corporation Ltd**
ABN 50 087 646 062

**DATE**
- 3/3/16

**PASSED**
- C. Avenell

**DRAWN**
- L. Burton

**FILE:** 5 114502

**Dwg 1450 Sh 2**

**OVERHEAD DISTRIBUTION**
## MATERIAL - EARTH

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
</tr>
<tr>
<td>86-12</td>
<td>Setscrew fixing M12 x 25 S/S</td>
<td>1</td>
</tr>
<tr>
<td>18-5</td>
<td>Connector I.P.C. 25/35mm² main to 6/35mm² tap</td>
<td>1</td>
</tr>
<tr>
<td>87-3</td>
<td>Connection P.G. Al./Steel - Cu. (PG2)</td>
<td>1</td>
</tr>
<tr>
<td>87-10</td>
<td>Connection P.G. Cu. - Cu. (PG5)</td>
<td></td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>140-6</td>
<td>Cable, insulated hard drawn Cu. 35mm²</td>
<td>6m</td>
</tr>
<tr>
<td>141-14</td>
<td>Lug, compression Cu. 35mm² M12</td>
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## MATERIAL - ADDITIONAL EARTH REMOTE

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>225-3</td>
<td>Earth rod remote HV additional</td>
<td>1</td>
</tr>
</tbody>
</table>

## NOTES:-

1. Earth leads and metal work above ground to be separated by at least 50mm.
2. For wood pole attachments and foundations refer to Construction Practices.
3. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.
4. Separation from communication equipment:
   - Earth rod = 2.0m
   - Bare earth cable = 2.0m
   - Provide the following minimum separation to communications cable plastic sheathed / jacketed or plastic conduit.
     - Earth rod = 0.3m
     - Bare earth cable = 0.3m
5. Attach warning sign beside remote HV earth lead.
6. Remote earth identification pit to be installed at first remote HV earth electrode position. If additional earthing is required an identification pit is to be installed at last electrode position also. Refer assy 225-3.
7. The L.V. neutral is to be connected to the cable guard earth.
Construction Manual

Refer Underground LV / HV Cable Guard

Trench sections
Refer EARTHING Dwg. 1238

Additional earthing if required.
If more than 4 additional earthrods required, contact local Ergon branch.
Assy Selection 104-5 and 225-3.

WARNING
Refer sheet 1 note 5

ERA (Additional)
EAR (Additional rod)

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
HV EQUIPMENT, METAL GUARD AND M.E.N. REMOTE COMMON
EARTH ARRANGEMENT EXISTING POLE - CONSTRUCTION

Construction Type
EHVMGEMX

HARD COPY
UNCONTROLLED

Ergon Energy Corporation Ltd
ABN 50 087 646 062

Dwg 1451 Sh 3

FILE: 5.11451.2
### Material

<table>
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<th>QTY</th>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth Guard LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>127-5</td>
<td>Earth Operation point to new wood pole</td>
<td>1</td>
</tr>
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### Material - Additional Earth

<table>
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<tr>
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<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
<tr>
<td>104-7</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
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</table>

### Notes:

1. Earthing to run in direction of mains.
2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   * For separation from other communications assets refer Standards Section
3. This construction cannot be used if Telstra equipment is within 15m of pole

---

**Eartthing Wood Pole**

**Operation Point - New Pole**

**Resistance to Ground**

**Disconnected**

- 30 ohm, max.

**HV Earth**

- 300 min.

**Telstra pit**

**Detail Top View**

**Construction Type**

- EOP
- EAC (Additional)
- EAR (Additional rod)

**Additional Earthing if required.**

- If more than 4 additional earthrods required, contact local Ergon branch.
- Assy selection 104-7 or 104-5 and 7

**Trench Sections. Refer Eartthing Dwg. 1238**

- Caution tape

**Additional Earthing**

- Minimum of 3 coils beneath base.
- 4.0m Min. (Single rod)
- 8.0m Min. (Double rod)

---

**OVERHEAD DISTRIBUTION**

**Eartthing Wood Pole**

**Operation Point - New Pole**

**Approved by:** C. Noel

**Drawn by:** L. Burton

**FILE:** 5 111337 1 Dwg 1337 Sh
### ASSY DESCRIPTION QTY

<table>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>2</td>
</tr>
<tr>
<td>104-1</td>
<td>Earth rod additional</td>
<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
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### ASSY DESCRIPTION QTY

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<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>105-5</td>
<td>Earth Operation point to existing pole</td>
<td>1</td>
</tr>
</tbody>
</table>

### NOTES:

1. Earthing to run in direction of mains.
2. Separation from communication equipment:
   * Provide the following minimum separation to:
     - communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed/jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section.
3. This construction can not be used if Telstra equipment is within 15m of pole.

### ADDITIONAL EARTH

<table>
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<tr>
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<th>QTY</th>
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<tr>
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<td>Earth rod additional</td>
<td>AR</td>
</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
<td>AR</td>
</tr>
</tbody>
</table>

### NOTES:

- Assay 127-1
- Assay 105-5 (Saddles at 500 Intervals)
- Assay 14-1

### RESISTANCE TO GROUND

- 30 ohm Max.
- 15.0m min.
- 4.0m Min. (Single rod)
- 8.0m Min. (Double rod)

###碰觸電話

- Caution tape
- Additional earthing if required.
- If more than 4 additional earthing required, contact local Ergon branch.
- Assay selection 104-5 or 104-1 and 5

### OVERHEAD DISTRIBUTION

- EARTHING WOOD POLE
- OPERATION POINT - EXISTING POLE

### ENDNOTES

- Ergon Energy Corporation Ltd
- ABN 50 087 646 062

### DRAWN

- Z. Newton

### APPROVED

- Ergon Energy

### FILE: 5 11138

### Dwg 1338 Sh
NOTES:

1. All metalwork that passes through or into wood shall be greased for the entire length that may come into contact with the wood.

2. For wood pole attachments and foundations refer to Construction Practices.

3. A 26mm gap is required between bottom of pole top bracket and top of earth wire. Strip end of cable insulation approx. 10mm and place two saddles as shown in detail ‘A’.

4. Darverter not required on stayed poles.

5. Gapped bands are to be installed on all new intermediate SWER poles.

6. Earth leads and metal work above ground to be separated by at least 50mm.

7. Separation from communications equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section.

8. This construction can not be used if Telstra equipment is within 15m of pole.
Lowest pole step

Assy 105-1

Assy 105-5
(Saddles at 500 intervals)

Refer Note 4.

F

Assy 55-1
(Saddles at 500 intervals)

Refer Note 3.

DETAIL 'A' Refer Note 3.

Maintain as much separation as possible between HV & LV earthing downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

EDAR

15.0m min.

Butt earth Minimum of 3 coils beneath base.
(strip insulation)

Minimum of 3 coils

Butt earth Minimum of 3 coils beneath base.
(strip insulation)

Construction Type

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
DARVERTER NEW POLE CONSTRUCTION

C. Noel

DATE 24.4.02

PASSED

C. Asenell

DRAWN

C. Lindsay

FILE: 5

Ergon Energy Corporation Ltd
ABN 50 087 646 062

Dwg 1329 Sh 2
### NOTES:

1. All metalwork that passes through or into wood shall be greased for the entire length that may come into contact with the wood.
2. For wood pole attachments and foundations refer to Construction Practices.
3. A 25mm gap is required between bottom of pole top bracket and top of earth wire.
   - Strip end of cable insulation approx. 10mm and place two saddles as shown in detail 'A'.
4. Gapped bands are not required on stayed poles.
5. Gapped bands are to be installed on all new intermediate SWER poles
6. Earth leads and metal work above ground to be separated by at least 50mm.
7. Separation from communication equipment:
   - HV earth rod = 15.0m
   - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section
8. This construction can not be used if Telstra equipment is within 15m of pole.

### MATERIAL

<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>55-5</td>
<td>12.7/19.1kV Lightning protection</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>gapped bands to wood pole</td>
<td></td>
</tr>
<tr>
<td>105-1</td>
<td>Earth butt HV/LV to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
</tr>
</tbody>
</table>

*Gapped bands are to be installed on all new intermediate SWER poles*
NOTES:

1. All metalwork that passes through or into wood shall be greased for the entire length that may come into contact with the wood.
2. For wood pole attachments and foundations refer to Construction Practices.
3. A 25mm gap is required between bottom of pole top bracket and top of earth wire.
   Strip end of cable insulation approx. 10mm and place two saddles as shown in detail 'A'.
4. Gapped Bands not required on stayed poles.
5. Gapped bands are to be installed on all new intermediate SWER poles.
6. Earth leads and metal work above ground to be separated by at least 50mm.
7. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/
cabinets, cable pits/manholes, payphones or miscellaneous earths:
   - HV earth rod = 15.0m
   - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable
   plastic sheathed / jacketed or in plastic conduit:
   - HV bare earth cable (site earth) = 1.0m
   For separation from other communications
   assets refer Standards Section
8. This construction can not be used if Telstra equipment is within 15m of pole.
Maintain as much separation as possible between HV & LV earthwire/downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.
NOTES:

1. All metalwork that passes through or into wood shall be greased for the entire length that may come into contact with the wood.

2. For wood pole attachments and foundations refer to Construction Practices.

3. A 25mm gap is required between bottom of pole top bracket and top of earth wire. Strip end of cable insulation approx. 10mm and place two saddles as shown in detail 'A'.

4. Darverter not required on stayed poles.

5. Gapped bands are to be installed on all new intermediate SWER poles.

6. Earth leads and metal work above ground to be separated by at least 50mm.

7. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.

8. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed/jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 1.0m
   For separation from other communications assets refer Standards Section

9. If Telstra equipment is within 15m of butt earth this structure can not be used.
   Use Earthing Wood Pole dwg 1294.
Refer Detail 'A'.

Maintain as much separation as possible between HV & LV earthing downleads, LV cables & apparatus. The minimum separation shall not be less than 50mm.

Refer Note 3.

Refer Note 4.

Assy 55-1
Assy 103-1
Assy 14-1
Assy 105-5

(Saddles at 500 intervals)

Refer Detail 'A'.

Assy 103-1

(Saddles at 500 intervals)

Refer Note 3.

Refer Note 4.

Refer EARTHING Dwg. 1238.

C. Avenell
C. Noel

E. L. Lindsay

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
DARVERTER EXISTING POLE CONSTRUCTION

Ergon Energy Corporation Ltd
ABN 50 087 646 062
NOTES:
1. All metalwork that passes through or into wood shall be greased for the entire length that may come into contact with the wood.
2. For wood pole attachments and foundations refer to Construction Practices.
3. A 25mm gap is required between bottom of pole top bracket and top of earth wire. Strip end of cable insulation approx. 10mm and place two saddles as shown in detail 'A'.
4. Gapped bands not required on stayed poles.
5. Gapped bands are to be installed on all new intermediate SWER poles.
6. Earth leads and metal work above ground to be separated by at least 50mm.
7. Earthing to run in direction of mains. For clarity, drawing shows earth trenching traverse to mains.
8. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
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   For separation from other communications assets refer Standards Section.
9. If Telstra equipment is within 15m of butt earth this structure can not be used. Use Earthing Wood Pole dwg 1294.

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<tbody>
<tr>
<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>10</td>
</tr>
<tr>
<td>55-5</td>
<td>12.7/19.1kV Lightning protection gapped bands to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth HV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
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**MATERIAL**

**DESCRIPTION**

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</tr>
<tr>
<td>103-1</td>
<td>Earth HV 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard HV/LV to wood pole</td>
<td>1</td>
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</tbody>
</table>

**OVERHEAD DISTRIBUTION**

EARTHING WOOD POLE
GAPPED BANDS EXISTING POLE

Ergon Energy Corporation Ltd
ABN 50 087 646 062
DETAIL 'A'
Refer Note 3.

Band (Half Wildlife guard)

Lug

Refer Detail 'A'
Refer Note 4.

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus. The minimum separation shall not be less than 60mm.

(3 SCREWS PER BAND)

ASSY 103-1

ASSY 14-1
(Saddles at 500 intervals)

ASSY 105-5
(Saddles at 500 intervals)

Construction Type
EGAPX

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE
GAPPED BANDS EXISTING POLE CONSTRUCTION

Ergon Energy Corporation Ltd
ABN 50 087 646 062

C. Lindsay

DATE 24.4.02
APPROVED C. Noel
PASSED C. Avenell
DRAWN C. Noel

FILE: 5 1112842
Dwg 1284 Sh 2
### MATERIAL

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<td>14-1</td>
<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
<td>20</td>
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<td>87-1</td>
<td>Connector PG Al/Steel-Cu. (PG1)</td>
<td>1</td>
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<td>105-1</td>
<td>Earth Butt to wood pole</td>
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</tr>
<tr>
<td>105-5</td>
<td>Earth guard to wood pole</td>
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### MATERIAL - ADDITIONAL EARTH

<table>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
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</tr>
<tr>
<td>104-7</td>
<td>Earth rod additional</td>
<td>AR</td>
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#### NOTES:

1. Earthing to run in direction of mains.
2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section
3. If Telstra equipment is within 15m of butt earth this structure cannot be used.

Use Earthing Wood Pole dwg 1294.

Additional earthing if required
If more than 4 additional earthrods required, contact local Ergon branch.
Assy selection 104-7 or 104-5 and 7

---

**OVERHEAD DISTRIBUTION**

EARTHING WOOD POLE

OVERHEAD EARTH WIRE

NEW POLE

---

**OVERHEAD EARTHWIRE SYSTEM**

RESISTANCE TO GROUND

---

**EARTH**

- HV Earth
- Telstra pit
- Detail Top View

---

**Construction Type**

- EOH (Earthing)
- EAC (Additional)
- EAR (Additional rod)

---

**OVERHEAD DISTRIBUTION**

EARTHING WOOD POLE

OVERHEAD EARTH WIRE

NEW POLE

---

**Hard Copy Uncontrolled**

---

**Ergon Energy Corporation Ltd**

ABN 50 087 646 062

FILE: 5 11 1441 1

Dwg 1441 Sh
MATERIAL

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<td>Saddle Cu. 10mm to suit 35mm² cable to wood pole</td>
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<tr>
<td>87-1</td>
<td>Connector PG Al/Steel-Cu. (PG1)</td>
<td>1</td>
</tr>
<tr>
<td>103-1</td>
<td>Earth 35mm² to wood pole</td>
<td>1</td>
</tr>
<tr>
<td>105-5</td>
<td>Earth guard to wood pole</td>
<td>1</td>
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MATERIAL - ADDITIONAL EARTH

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<tr>
<td>104-1</td>
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</tr>
<tr>
<td>104-5</td>
<td>Earth rod additional depth</td>
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NOTES:

1. Earthing to run in direction of mains.
2. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes payphones or miscellaneous earths:
     - HV earth rod = 15.0m
     - HV bare earth cable (site earth) = 15.0m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - HV bare earth cable (site earth) = 0.3m
   For separation from other communications assets refer Standards Section
3. If Telstra equipment is within 15m of butt earth this structure cannot be used.
   Use Earthing Wood Pole dwg 1284.
   Additional earthing if required.
   If more than 4 additional earths required, contact local Ergon branch.
   Assy selection 104-5 or 104-1 and 5

Maintain as much separation as possible between HV & LV earthwire downleads, LV cables & apparatus.
The minimum separation shall not be less than 60mm.
EARTHWIRE TRENCH SECTIONS

UNCULTIVATED AREAS

CULTIVATED AREAS

SOLID ROCK

Earth backfill

Caution Tape

Earthwire

Earth backfill

Caution Tape

Earthwire

Earth backfill

Concrete

Earthwire

500

250

600 Normal Cultivation
900 Deep Cultivation

100

50

OVERHEAD DISTRIBUTION
EARTHING WOOD POLE TRENCH SECTIONS

FILE: 5 11 1238
Dwg 1238 Sh

Ergon Energy Corporation Ltd
ABN 60 087 646 068

APPROVED
DATE
11.9.00

DRAWN
E. Newton

PAID

HARD COPY UNCONTROLLED

A ORIGINAL ISSUE
NOTES:
1. Earthing can be installed either end of precast concrete panels.
2. Cable guard to be earthed to precast concrete panel earth point.
3. GUSS skid to be earthed to concrete panels 1 & 4.
4. Separation from communication equipment:
   * Provide the following minimum separation to communications pillars/cabinets, cable pits/manholes, payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
   * Provide the following minimum separation to communications cable plastic sheathed / jacketed or in plastic conduit:
     - LV earth rod or cables = 0.3m
   For separation from other communications assets refer Standards Section.

Additional earthing if required. If more than 4 additional earthrods required, contact local Ergon branch. Assy Selection 104-5 or 104-1 and 5.

- LV earth rod or cable = 0.3m
- Sheathed / jacketed or in plastic conduit:
- LV earth rod or cables = 0.3m

Separation from communication equipment:
- LV earth rod or cable = 0.3m
- Sheathed / jacketed or in plastic conduit:
- LV earth rod or cables = 0.3m
- For separation from other communications assets refer Standards Section.
NOTES:

1. Earthing can be installed either end of precast concrete panels.
2. Cable guard to be earthed to precast concrete panel earth point.
3. GUSS skid to be earthed to concrete panels 1 & 4.
4. Separation from communication equipment:
   * Provide the following minimum separation to communications
     pillars/cabinets, cable pits/manholes
     payphones or miscellaneous earths:
     - LV earth rod or cable = 0.3m
   * Provide the following minimum separation to communications cable plastic
     sheathed / jacketed or in plastic conduit:
     - LV earth rod or cables = 0.3m
     For separation from other communications assets refer Standards Section.
5. H.V. & L.V. electrodes
   - 35mm² bare copper cable deep drilled to a minimum of 20m unless good moisture is reached.
   - Good moisture is defined as extracted bore hole soil containing adequate proportion of water so that
     when squeezed by hand it holds its form and releases water content - similar to mud.
   - A drilling rig using nominal 75mm bit is required.
   - The holes are to be refilled immediately with dry earth enhancing compound. **DO NOT ADD WATER.**
6. The additional earthing if required must be spaced at least two times the depth of adjacent earthing electrode.
   For example if adjacent earthing is at 20m, then the additional earthing must be spaced at least 40m.