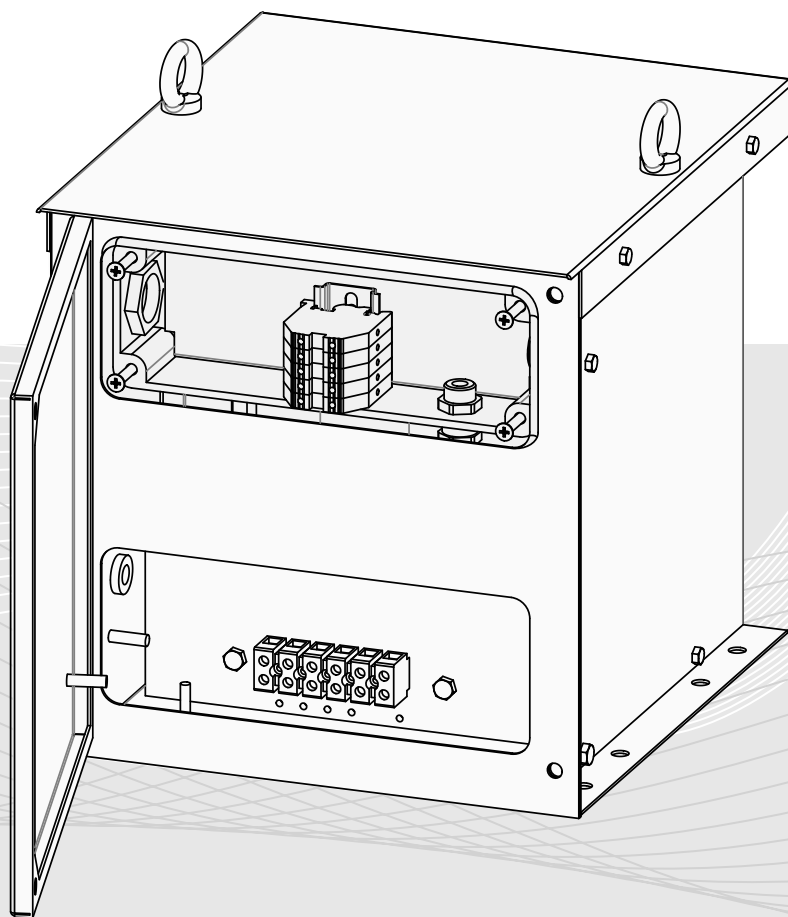


O&M MANUAL

Class II Hybrid Isolating transformers.
Lightweight Cu & Al Range



■ 650/110VAC

■ 230/110VAC

■ 400-415-440/110V

■ 650/230VAC

■ 230/230VAC

English

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Version	Implemented By	Revision Date	Approved By	Approval Date	Reason
1	N.D.H.	24/03/15	B.M.	22/05/15	Product Approval
2	N.D.H.	01/06/15	B.M.	08/06/15	General document review & Changes
3	N.D.H.	09/06/15	B.M.	10/06/15	Amended following NR Review
4	N.D.H.	07/12/16	B.M.	07/12/16	Configurations added
5	C.J.W.	28/03/19	N.D.H.	12/04/19	Configurations added
6	C.J.W.	09/07/19	N.D.H.	09/07/19	Configurations added
7	C.J.W.	09/09/19	N.D.H.	09/09/19	10KVA GA Added
8	C.J.W.	17/03/23	N.D.H.	17/03/23	PAD's Approval Numbers Added

1. INTRODUCTION

1.1 SAFETY NOTES

SAFETY PRECAUTIONS	
GENERAL	The need for Personal Protection Equipment (PPE) must be assessed prior to undertaking installation or maintenance operations.
HEAVY EQUIPMENT	All manual handling must be in accordance with the Manual Handling Operations Regulation 1992
LETHAL VOLTAGES	<p>Electrical power within this system/equipment is at a level considered, by the low voltage directive 73/23/EEC, to be sufficient to kill.</p> <p>Always assume conductors are live until proved dead.</p> <p>Before attempting any maintenance task, ensure that equipment is isolated from electrical supply.</p> <p>When the electrical supply cannot be isolated, testing/maintenance tasks are to be undertaken only by personnel who are aware of the dangers involved and after all necessary precautions have been taken.</p>
WORKING PRACTICES	<p>Unauthorized interruption of the system may endanger the safe operation of the railway. Before attempting any maintenance on the equipment, obtain the necessary permission from the relevant authority. Ensure the consequence of any interruption has been fully considered and understood.</p> <p>If a component or equipment becomes overheated or burnt, a toxic fume hazard may exist. Isolate the power to the equipment, ventilate the area and allow the equipment time to cool before carrying out repairs.</p> <p>This equipment does not liberate any toxic or injurious gases during normal operation.</p> <p>When working on equipment, especially in the confines of a case, do not wear metal rings, bracelets, watches, etc. These articles can cause personal injury or damage to equipment by becoming entangled in components or causing a short circuit.</p>

1.2 PURPOSE

This O&M Manual defines the operating & Installation guidelines for the ATL Transformers, 1 - 10KVA range of aluminium rail signalling transformers & 250VA - 4KVA range of copper rail signalling transformers for use within a standard Network Rail approved Apparatus housing. This transformer is Intended for use as a Class II Hybrid transformer for Class II based signalling power distribution systems and Suitable for Class I Legacy system integration.

1.3 GUARANTEE

The function and safety of the equipment is only guaranteed if the warning and safety instructions included in this manual are adhered to.

ATL Transformers Ltd is not liable for any personal injury or damage to property that occurs as a result of the warning and manual being disregarded.

ATL Transformers Ltd does not accept any liability or warranty for damage due to the use of non-approved spare parts and accessories.

2. PRODUCT DESCRIPTION

2.1 KEY eco-rail® FEATURES

The enclosed transformers fit inside a standard Network Rail Apparatus Housing. The transformers have an Ingress protection rating greater than IP32.

Primary Class II Terminals are housed within a separate double insulated enclosure and feature a protective inspection cover which enables cables to be traced from the point of entry and Inspection of Class II terminals under load.

Cable clamps are provided within the Class II compartment on 1KVA & above configurations to secure incoming cables prior to termination.

Optional gland entry zones for both Class I Output & Class II Input cables are available on either side of the enclosure. IP5X Blanking glands are provided to seal the unused gland holes once cables have been terminated. This feature Limits the need for additional cabling/conduit and reduces location restrictions commonly found within the FSP Apparatus Housing.

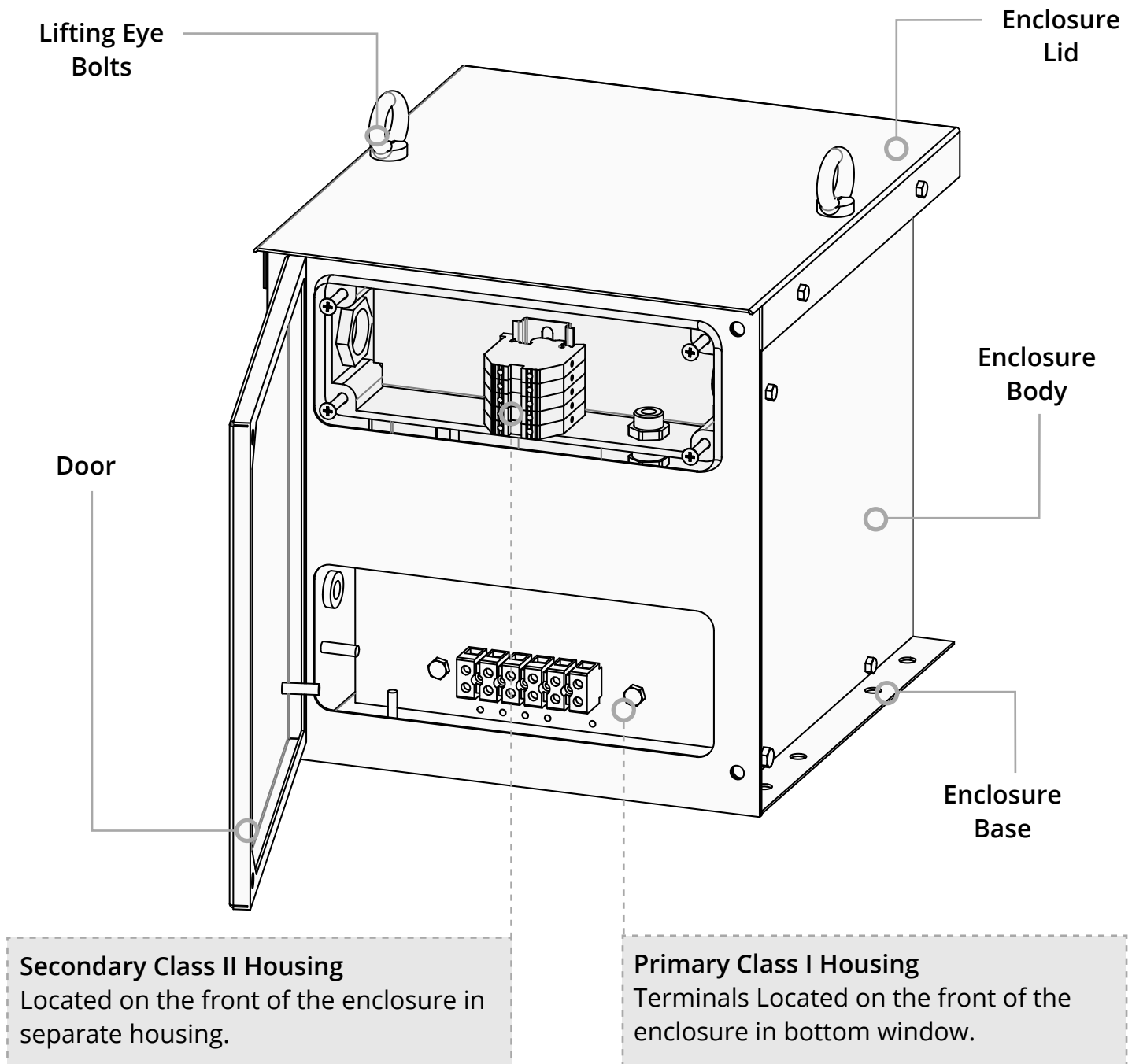
This range of eco-rail® transformers enables installation of multiple transformers within a single FSP Apparatus Housing and reduces the power consumption of the overall system by way of significantly reduced losses.

The eco-rail® Aluminium range of transformers are specifically designed to be Lightweight and compact where space and weight are of a concern. Designed to support Network Rails Legacy renewal work stream these transformers feature separate legacy brackets which enable the installation of the transformer by a single operator reducing installation costs and resources by half.

2. PRODUCT DESCRIPTION

2.1 KEY eco-rail® FEATURES

New innovative designs reduce installation and retrofit time making fitting eco-rail® transformers a simple and efficient solution when downtime is critical. Our unique mechanical design provides a sturdy and comfortable lifting facility as well as a footprint compatible with standard BRS SM 440 accordance bar work.



2.2 PRODUCT OPERATION

The Class II Hybrid transformer is designed to be fed from two wires 650VAC ($\pm 10\%$) Supply at a nominal 50Hz (+4% to -6%).

The 650VAC Class II supply cables are to be connected within the double insulated compartment through a straight or angled insulated coupling suitable for M32 flexible conduit. Conduit should meet the requirements of NR/L2/SIGELP/27410 Issue 2 & NR/L2/SIGELP/27421 & 27422.

Cables are terminated to the transformers DIN rail terminal blocks provided within the double insulated compartment which are designed to accept a cable size between 0.5-10mm².

The 110VAC Class I Output cables are connected to the transformer through an Insulated M20 Cable gland and terminated to the provided terminal blocks which are designed to accept a cable size between 0.5-10mm².

Optional Cable entry points are provided at either side of the enclosure for both Class I & Class II cables. Insulated Blanking glands are provided to cap the un-used cable entry points on the enclosure and must always be fitted.

The functional earth terminal is located with the Class I termination and is designed to accept a cable size between 0.5-10mm².

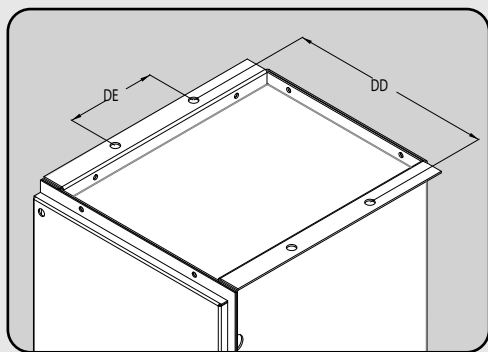
Where a multi-Output eco-rail® transformer is selected any number of output windings can be paralleled together to increase the transformers output. Care should be taken when making parallel connections to ensure that polarity is maintained.

All cabling should meet the requirements of NR standards:

NR/L2/SIGELP/27410 Issue 2 and NR/L2/SIGELP/27421 & 27422

3. PRODUCT INSTALLATION

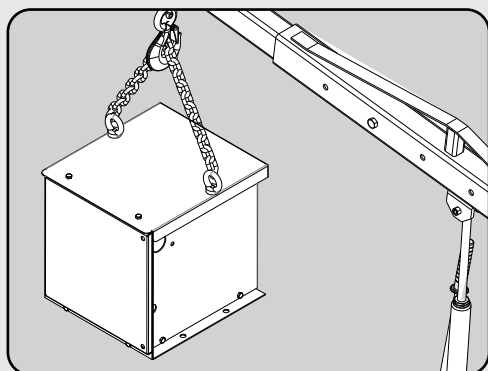
3.1 MOUNTING WITHIN APPARATUS HOUSING



1. Dimensioning

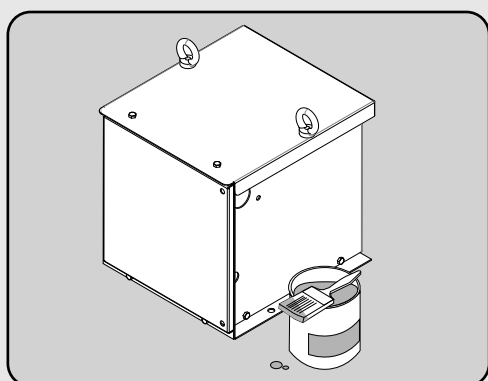
The transformers shown in the general arrangement drawings in Appendix A are designed to be securely fixed to substantial mounting rails or brackets such as BRS SM 440 bar work. The bar work should be capable of bearing the weight of the transformer using the 4 horizontal footprint holes shown in Appendix A.

Additional mounting brackets are available for backplate legacy installations where required. reference Appendix D of this document.



2. Lifting

Safe lifting practices should be observed when handling heavy transformers. Larger units 1KVA and above 30Kg + are fitted with additional top mounted removable Lifting eyes for crane assisted installation. Ensure that the lifting eyes are secure and that the main door is closed prior to lifting.



3. Repercussions

Due diligence and care should be taken not to damage any installed cable entry glands or couplings during the installation process as this could compromise the safety integrity of the unit. In the event that the paint finish is damaged during installation a touch up pen is available for aesthetics however paint is supplementary to the base material and not critical to the units operational integrity.

3.2 CABLE CONNECTION

Primary: Through glands provided into double insulated compartment, Cables to be secured using cable clamps and terminated accordingly. Secondary: Through glands provided directly onto secondary terminals. All cabling and conduit should meet the requirements of: NR/L2/SIGELP/27410 Issue 2 & NR/L2/SIGELP/27421 & 27422.



NOTE: - If Ferrules are not being used cables should be stripped 10mm and secured into the terminals. The recommended torque setting is between 2.0 – 4.0 Nm.

3.2.1 CONNECTING MULTI OUTPUT TRANSFORMER WINDINGS IN PARALLEL

Where a multi-Output eco-rail® transformer is selected any number of output windings can be Paralleled together to increase the transformers Output. Eco-rail® transformers have been designed to accommodate additional circulating currents generated when Paralleling the small imbalanced winding impedances of our multi-output range. Care should be taken when making Parallel connections to ensure that polarity is maintained across all windings. i.e to parallel two 500VA coils on a 1KVA dual output transformer. Connect the cables from the “to” terminals on coil 1&2 together & the cables from the “t110” terminals on coils 1&2 together to supply a 1KVA load.



WARNING

Antiphase connections are detrimental to a transformer and can cause irreparable damage rendering the unit unsafe. **Do not** connect dissimilar voltage groups together.

3.3 VOLTAGE SELECTION

INPUT: Monitor the supply voltage with a calibrated DVM and take an average value over 3 minutes. Connect Supply to the nearest Input Voltage terminal provided i.e. If the monitored voltage average RMS value over 3 minutes is 648VAC then connect to input terminals T650 and T0 respectively.

OUTPUT: The output terminals facilitate fine Voltage adjustment and the relevant terminal should be used to achieve an Output voltage of 110V +/- 2% under load ensure that the output voltage is achieved within the range of +/- 2%

4. PRODUCT MAINTENANCE

4.1 ROUTINE MAINTENANCE

These units are non serviceable and require observational maintenance only to their Class I & Class II Terminals and protective covers which must be intact and installed as originally supplied.

This does not supersede any maintenance tasks or scheduling procedures network rail deem necessary and set in accordance with. NR/SP/SIG/10661 Signalling Maintenance Task Intervals.

Each unit is provided with a serial number and part code reference. This Information is located on the transformer rating plate and should be quoted at any Point where the unit is examined and suspected to be compromised.

4.2 TESTING IN SERVICE

Disconnect incoming supply, and secondary connections.

Using a calibrated 500V d.c insulation resistance tester check insulation resistance. Primary to body (Functional Earth) Secondary to body (Functional Earth) & Primary to Secondary.

All values should be greater than 100M ohms. Check Primary and Secondary winding resistances with values on Data Sheet in Appendix C, and reconnect incoming supply to Primary terminals.



WARNING

The Inspection cover on the double insulated Class II compartment **MUST** be fitted and secured in the correct orientation following its removal to access Class II terminals. The Inspection cover is notched so as not to locate easily in an incorrect orientation, the fitting of this part correctly after any work within the Class II compartment is essential in maintaining the Class II Integrity and safety of the transformer.

Check incoming supply voltage, adjusting Primary taps if necessary (using the method specified in section 3.3).

Check Primary tap voltages. Terminal voltages should be within 10% of the nominal 650VAC terminal voltage.

Reconnect secondary, and using a calibrated ammeter check the load current. The load current should not exceed the value shown on the data sheet in Appendix C.

Check Secondary tap voltages. Voltages should be within 2% of the terminal voltage. Adjust Secondary taps if necessary.

Relevant safety checks & testing should be conducted in addition to these checks & in line with Network Rails controlled safety & inspection procedures prior to energizing the transformer.

4.3 MAINTENANCE AFTER FLOODING

Please note that the transformer should be sent back to ATL Transformers if the transformer has sustained flooding

Please see section 7 of this document for contact details.

4.4 SPARE PARTS

Item	Part Reference
TOUCH UP PAINT	RS-PAINT-RAL6005-125ml
CLASS II BLANKING NUT	RS-BLANK-NUT-LNPB/25
CLASS II BLANKING PLUG	RS-BLANK-PLUG-66B
CLASS I BLANKING NUT	RS-BLANK-NUT-LNPB/20
CLASS I BLANKING PLUG	RS-BLANK-PLUG-65B
M8X18MM LIFTING EYE BOLTS	RS-M8-EYEBOLT-DIN580-COLLARED

5. TRAINING & COMPETENCE

The transformers are to be installed within a Network Rail approved Apparatus Housing by trained & authorized Network Rail installers only.

All maintenance activities shall be undertaken by trained and authorized Network Rail crews and/or contractors familiar with the Class II system installation.

6. PRODUCT MAINTENANCE

6.1 DATA SHEET REFERENCE

Refer to manufacturers Datasheets for required specification.

6.2 NR COMPONENT APPROVALS

CUSTOMER	DECLARATION OF CONFORMITY
	NETWORK RAIL
PRODUCT NAME	ECO-RAIL CLASS II Lightweight AL/Cu Isolating Transformers
ATL DATA SHEETS	Appendix A
NETWORK RAIL CERTIFICATE(S)	PA 05/ 05761 (Copper), PA 05/ 06391 (Aluminium)

6.3 DECLARATION OF CONFORMITY

ATL Transformers claim conformity for this family of product(s) manufactured at our Manchester facility. In accordance with the specifications referenced below. This declaration is based upon our technical file which contains data supporting our claims.

COMPLIANCE SPECIFICATION(S)	
EC Directives	2006/95/EC Low Voltage Directive
Harmonized Standards	BS EN 61558-1:2009
Internal Standards	ISO 9001: 2008 BSI Audited Quality Assurance
Customer Standards/Specifications	NR/L2/SIGELP/30007 Issue3 - Product Specification for Power Transformers for Signalling Systems.
This declaration is made by: Mr. Neville D Haide (Company Director) ATL Transformers Ltd. Hanson Close, Middleton, Manchester, Lancashire, UK, M24 2HD	
Declaration by: N. Haide	Date 25/03/2015

7. MANUFACTURER CONTACTS

ATL Transformers Ltd
Hanson Close
Hanson Street
Middleton
Manchester
Lancashire
UK
M24 2HD

Tel: +44 (0) 161 653 0902 Monday – Thurs 08:00 – 17:15 Friday 8:00 – 13:00
Web: www.atltransformers.co.uk
Email: sales@atltransformers.co.uk

8. REGULATORY REQUIREMENTS APPLICABLE STANDARDS

BS EN 50122-1 – Railway Applications – Fixed Applications – Part 1 Protective Provisions relating to Electrical Safety & Earthing.

BS EN 50125-2 – Railway applications. Environmental conditions for equipment. Fixed electrical installations.

BS EN 50125-3 – Railway applications. Environmental conditions for equipment. Equipment for signalling and telecommunications.

BS EN 60529 – Degrees of protection provided by enclosures.

BS EN 62262 – Degrees of protection provided by enclosures for electrical equipment against mechanical impacts (IK code).

NR/L1/ELP/27000 – Asset Management Policy for Electrical Power assets.

NR/L2/SIGELP/27408 – Product Specification for Signalling Power Distribution Cables.

NR/GN/ELP/27315 – Management of Power Supplies for Telecoms Equipment.

NR/L2/SIGELP/27410 Issue 2

NR/L2/SIGELP/27421 & 27422 - Flexible Conduits & Glands

NR/L2/SIGELP/27410 – Specification for Class II Based Signalling Power distribution systems.

NR/L2/SIGELP/30007 – Product Specification for Power Transformers for Signalling Systems.

NR/L2/SIG/11201 – Signalling Design Handbook.

NR/L2/SIG/30050 - Functional Signalling Power Circuits.

NR/L3/SIG/10663 – Signal Maintenance Specifications.

NR/SP/SIG/11221 – Signalling Works Testing.

NR/SP/SIG/11231 – Signalling Maintenance Testing Handbook.

NR/L2/ELP/21120 – E & P Records Management Process.

Low Voltage Directive 2006/95/EC. EMC Directive 2004/108/EC.

9. FREQUENTLY ASKED QUESTIONS

1) What tools are required to access the Transformer for termination?



WARNING

Ensure supply is Isolated before removing the Class II Compartments Protective Cover. Never attempt to replace Nylon screws or fasteners with metal screws or fasteners.

- **To access Class I & Class II Terminals:**

To access both Class I & Class II Terminals the two captive screws securing the enclosure access door must be unscrewed using an M8 spanner or Socket.

To access Class II Terminals: Remove Inspection cover from double insulated compartment using Phillips head driver, secure cables into cable clamps and Terminate into the correct terminals using a Flat head terminal driver.

If Ferrules are not being used cables should be stripped 10mm and secured into the terminals. The recommended torque setting is between 2.0 – 4.0 Nm.



NOTE: - All terminal housing covers must be replaced in the correct orientation after terminating cables to maintain protection.

To access Class I Output Terminals: Terminate using a Flat head terminal driver.

Where Glands and/or couplings are provided use a suitable spanner or socket to secure tightly in place.

2) Where do I connect the cables?

- The cables are connected in the case of the Primary, to the terminals in the Double insulated compartment behind the main door or, in the case of the secondary to the terminals in the non insulated compartment behind the main door.

3) How do I gain access to the different sections of the assembly?

- This unit is designed to offer access to terminals only for installation purposes. Both Class I & Class II terminals are accessible via the front enclosure door.

4) What is the procedure for installing & connecting cables?

- All cables shall be installed in accordance with NR Installation handbook.

5) Is there a start-up or switch on procedure?

- The assembly must be installed, commissioned & tested in accordance with NR Installation handbook by qualified person/s before power is applied to any part of the system.

6) The assembly is damaged or not functioning correctly, who shall I Contact for spare or replacement parts?

- Contact:
ATL Transformers Ltd - details are given in section 7 of this document.

10. PRODUCT WARRANTY

These products are under ATL's standard warranty which is 12 months. Product warranty document is available upon request.

11. END OF LIFE DISPOSAL

All Electrical equipment must be disposed of in accordance with the Wee Directive 2002/96/EG.

End of life or completed equipment may be returned to ATL Transformers for Disposal or alternatively must be issued to a certified waste disposal vendor.

12. ECO-RAIL® TRANSFORMER RANGE

- Table-12.1 650/110V Lightweight Transformer Product Range

Part No.	Description	Catalogue No.
T3067	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 250VA*	091/049116
T3068	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 500VA*	091/049117
T2834	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA*	054/214900
T2966	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA	091/049118
T2902	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA*	054/214893
T3065	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA	091/049119

• Table-12.1 650/110V Lightweight Transformer Product Range Continued.

Part No.	Description	Catalogue No.
T2925	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA*	054/214894
T2967	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA	091/049120
T2903	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA*	054/214895
T2968	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA	091/049121
T2930	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 4000VA*	054/214896
T2969	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 5000VA	091/049122
T3149	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 10,000VA	091/000067
T3073	CLASS II HYBRID 650/2x 110v @ 500VA - 2000VA DUAL (WTS)	091/049123
T3074	CLASS II HYBRID 650/4x 110-135V@350VA - 1400VA (SSI)	091/049154
T3074-1	CLASS II HYBRID 400/4x 110-140V@350VA - 1400VA (SSI)	091/045794
T3074-2	CLASS II HYBRID 650/4x 110-140V@350VA - 1400VA (SSI)	091/045795
T3075	CLASS II HYBRID 650/4x 110V@500VA - 2000VA QUAD (WTS)	091/049124

Note: * denotes copper wound transformers

• Table-12.2 230/110V Lightweight Transformer Product Range

Part No.	Description	Catalogue No.
T3351	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 250VA*	0054/213920
T3355	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 500VA*	0054/213921
T3359	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA	0091/044321
T3363	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA	0091/044322
T3367	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA	0091/044323
T3371	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA	0091/044324
T3379	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 5000VA	0091/044325
T3383	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 10,000VA	0091/044326
T3387	CLASS II HYBRID 230/2x 110v @ 500VA - 2000VA DUAL (WTS)	0091/044327
T3391	CLASS II HYBRID 230/4x 110-135V@350VA - 1400VA (SSI)	0091/044328
T3395	CLASS II HYBRID 230/4x 110-140V@350VA - 1400VA (SSI)	0091/044329
T3399	CLASS II HYBRID 230/4x 110V@500VA - 2000VA QUAD (WTS)	0091/044330

Note: * denotes copper wound transformers

• Table-12.3 400-415-440/110V Lightweight Transformer Product Range

Part No.	Description	Catalogue No.
T3352	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 250VA*	0054/213927
T3356	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 500VA*	0054/213928
T3360	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA	0091/044331
T3364	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA	0091/044332
T3368	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA	0091/044333
T3372	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA	0091/044334
T3380	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 5000VA	0091/044335
T3384	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 10,000VA	0091/044336
T3388	CLASS II HYBRID 230/2x 110v @ 500VA - 2000VA DUAL (WTS)	0091/044337
T3392	CLASS II HYBRID 230/4x 110-135V@350VA - 1400VA (SSI)	0091/044338
T3396	CLASS II HYBRID 230/4x 110-140V@350VA - 1400VA (SSI)	0091/044339
T3400	CLASS II HYBRID 230/4x 110V@500VA - 2000VA QUAD (WTS)	0091/044340

Note: * denotes copper wound transformers

• Table-12.4 650/230 Lightweight Transformer Product Range

Part No.	Description	Catalogue No.
T3353	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 250VA*	0054/213934
T3357	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 500VA*	0054/213935
T3361	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA	0091/044341
T3365	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA	0091/044342
T3369	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA	0091/044343
T3373	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA	0091/044344
T3381	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 5000VA	0091/044345
T3385	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 10,000VA	0091/044346
T3389	CLASS II HYBRID 650/2x 230v @ 500VA - 2000VA DUAL (WTS)	0091/044347
T3393	CLASS II HYBRID 650/4x 135-230V@350VA - 1400VA (SSI)	0091/044348
T3397	CLASS II HYBRID 650/4x 140-230V@350VA - 1400VA (SSI)	0091/044349
T3401	CLASS II HYBRID 650/4x 230V@500VA - 2000VA QUAD (WTS)	0091/044350

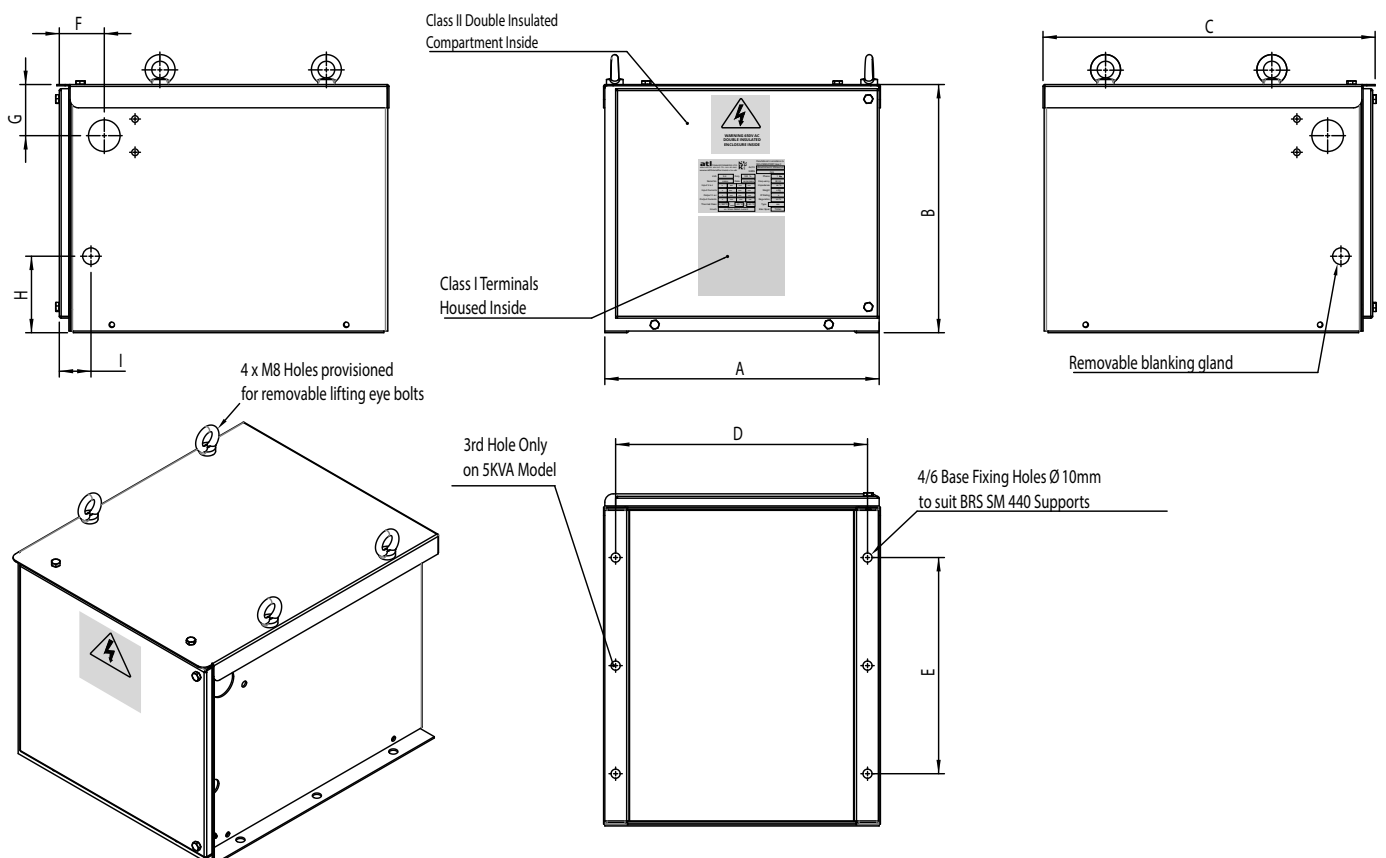
Note: * denotes copper wound transformers

• Table-12.5 230/230V Lightweight Transformer Product Range

Part No.	Description	Catalogue No.
T3354	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 250VA*	0054/213941
T3358	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 500VA*	0054/213942
T3362	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1000VA	0091/044351
T3366	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 1500VA	0091/044352
T3370	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 2000VA	0091/044353
T3374	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 3000VA	0091/044354
T3382	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 5000VA	0091/044355
T3386	CLASS II HYBRID LIGHTWEIGHT TRANSFORMER 10,000VA	0091/044356
T3390	CLASS II HYBRID 230/2x 230v @ 500VA - 2000VA DUAL (WTS)	0091/044357
T3394	CLASS II HYBRID 230/4x 135-230V@350VA - 1400VA (SSI)	0091/044358
T3398	CLASS II HYBRID 230/4x 140-230V@350VA - 1400VA (SSI)	0091/044359
T3402	CLASS II HYBRID 230/4x 230V@500VA - 2000VA QUAD (WTS)	0091/044360

Note: * denotes copper wound transformers

APPENDICES A GENERAL ARRANGEMENTS



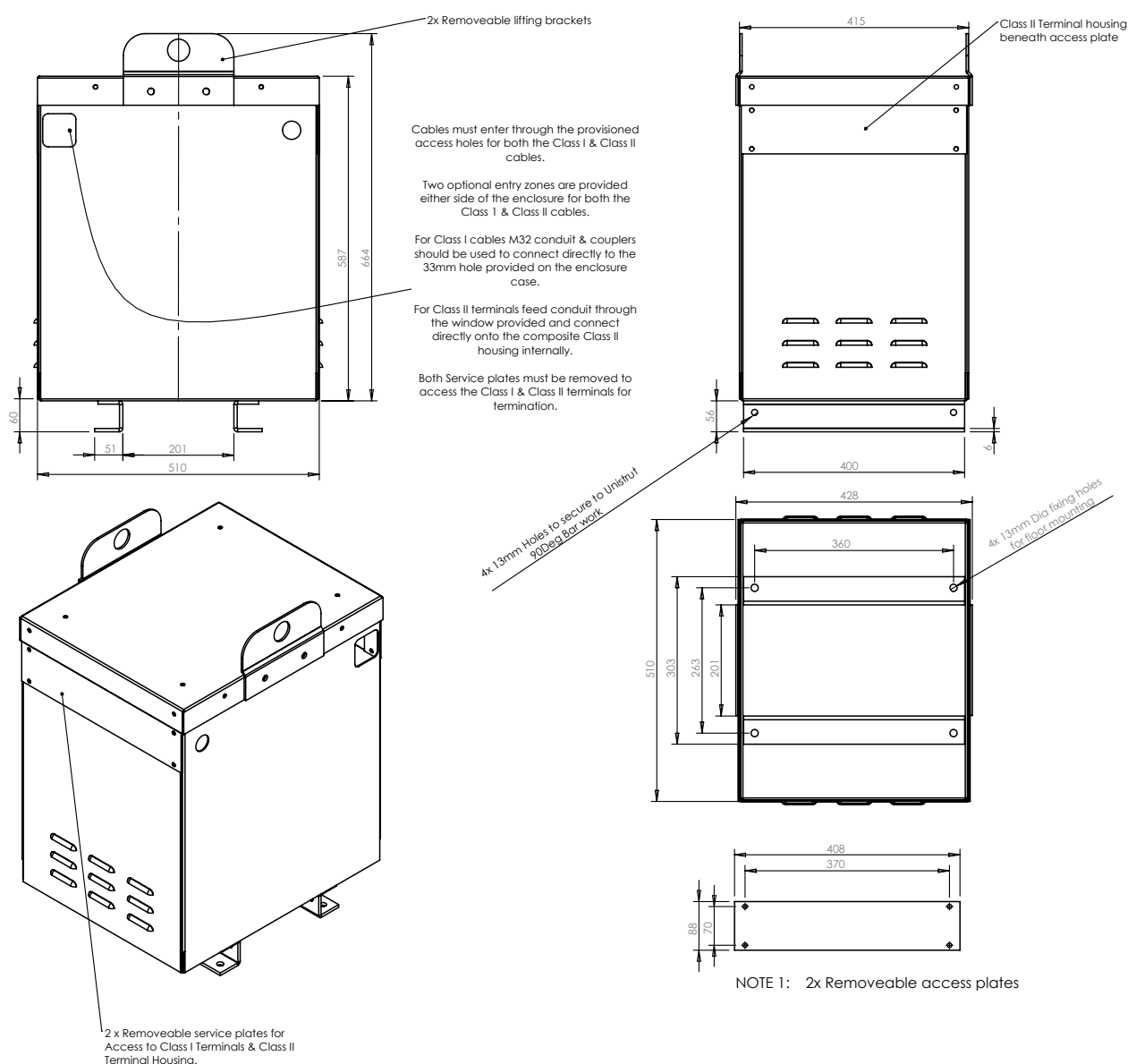
APPENDICES A

GENERAL ARRANGEMENTS

Note: Dimension D has a tolerance of +/- 3mm

Aluminium Wound & Copper Wound Transformers											
Model	Dimension (mm)									Weight (kg)	
	A	B	C	D	E	F	G	H	I	Alu	Cu
250VA	230	275	218	195	115	55	62	92	22		12
500VA	230	275	218	195	115	55	62	92	22		17
1KVA	289	299	245	257	115	43	61	73	27	22	29
1KVA Dual	289	299	277	257	115	54	62	93	27	24	
1.4KVA Quad	289	299	320	257	115	54	62	93	27	27	
1.5KVA	289	299	277	257	115	54	62	93	27	26	38
2KVA	289	299	320	257	115	43	62	93	27	33	39
3KVA	289	299	320	257	115	43	62	93	27	38	54
4KVA	289	299	320	257	115	43	62	93	27		69
5KVA	333	325	402	307	260	54	62	91	48	65	

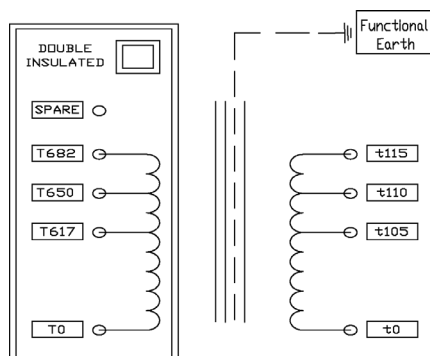
10KVA GENERAL ARRANGEMENT



APPENDICES B

LABEL DETAILS

LABEL 1



LABEL 2

atl TRANSFORMERS LTD
MANCHESTER, M24 2HD TEL: 0161 653 0902
www.atltransformers.co.uk

Manufactured in accordance to
NR/L2/SIGELP/3007 Issue 3

AL/CU Aluminum Wound
NRPA N/A

kVA	5	Duty	100 %	Phase	1 ~
Serial No	xxxxx	Date	09/04/2018	Frequency	50 Hz
Input V a.c	0 105 110 115			Impedance	4.35 %
Input Currents	0 47.6 45.5 43.4			Weight	Kg
Output V a.c	0 228 240 252			IP Rating	32
Output Currents	0 21.9 20.8 19.8			Regulation	2.43 %
Thermal Class	H (180°C) t_{amin} -20 °C t_a +60 °C			Type	Class II Hybrid
Inrush	6.12 times Rated current			Elec Spec	T3288

LABEL 3



LABEL 4



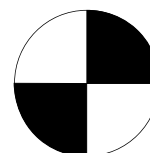
LABEL 5



LABEL 6

TESTED	
DATE	INITIALS

LABEL 7



Label	Description	Location
1	Electrical Specification Wiring Diagram	Enclosure Door
2	Electrical Specification Rating Plate	Enclosure Door
3	Danger - Isolate Supply	Primary & Secondary Housing Lid
4	ATL Transformers Eco-Rail® Logo	Enclosure Lid
5	CE Mark	Enclosure Lid
6	Tested Label - Date & Initials	Transformer
7	Centre of Gravity Symbol	Enclosure Lid

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
650/110V Aluminium Copper	Aluminium: T2966 T3065 T2967 T2968 T2969 T3149 T3149 Copper: T3067 T3068 T2834 T2902 T2925 T2903 T2930	
230/110V Aluminium Copper	Aluminium: T3351 T3355 T3359 T3363 T3367 T3371 T3375 T3379 T3383 Copper: T3351 T3355	
400-415- 440/110V Aluminium Copper	Aluminium: T3352 T3356 T3360 T3364 T3368 T3372 T3376 T3380 T3384 Copper: T3352 T3356	
650/230V Aluminium Copper	Aluminium: T3353 T3357 T3361 T3365 T3367 T3373 T3377 T3381 T3385 Copper: T3353 T3357	

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
<p>230/230V</p> <p>Aluminium Copper</p>	<p>Aluminium: T3354 T3358 T3362 T3366 T3368 T3374 T3378 T3382 T3386</p> <p>Copper: T3354 T3358</p>	
<p>650/110V Dual Output (WTS Schemes)</p> <p>Aluminium</p>	<p>Aluminium: T3073</p>	
<p>230/110V Dual Output (WTS Schemes)</p> <p>Aluminium</p>	<p>Aluminium: T3387</p>	
<p>400-415- 440/110V Dual Output (WTS Schemes)</p> <p>Aluminium</p>	<p>Aluminium: T3388</p>	

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
<p>650/230V Dual Output (WTS Schemes)</p> <p>Aluminium</p>	<p>Aluminium: T3389</p>	
<p>230/230V Dual Output (WTS Schemes)</p> <p>Aluminium</p>	<p>Aluminium: T3390</p>	
<p>650/110V Quad Output SSI (110 - 135V)</p> <p>Aluminium</p>	<p>Aluminium: T3074</p>	<p>T3074</p>

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
650/110V Quad Output SSI (110 - 140V) Aluminium	Aluminium: T3074-2	
650/110V Quad Output WTS (110 - 115V) Aluminium	Aluminium: T3075	

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
400/110V Quad Output WTS (110 - 140V) Aluminium	Aluminium: T3074-1	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>L3 →</p> <p>T420</p> <p>L2 →</p> <p>T400</p> <p>T380</p> <p>L1 →</p> <p>T0</p> <p>Functional Earth</p> <p>t140 (1)</p> <p>t115 (1)</p> <p>t110 (1)</p> <p>t105 (1)</p> <p>t0 (1)</p> <p>MAX LOAD 350VA</p> <p>t140 (2)</p> <p>t115 (2)</p> <p>t110 (2)</p> <p>t105 (2)</p> <p>t0 (2)</p> <p>MAX LOAD 350VA</p> <p>t140 (3)</p> <p>t115 (3)</p> <p>t110 (3)</p> <p>t105 (3)</p> <p>t0 (3)</p> <p>MAX LOAD 350VA</p> <p>t140 (4)</p> <p>t115 (4)</p> <p>t110 (4)</p> <p>t105 (4)</p> <p>t0 (4)</p> <p>MAX LOAD 350VA</p> <p>T3074-1</p>
230/110V Quad Output SSI (110 - 135V) Aluminium	Aluminium: T3391	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>T241</p> <p>T230</p> <p>T218</p> <p>T0</p> <p>Functional Earth</p> <p>t135 (1)</p> <p>t115 (1)</p> <p>t110 (1)</p> <p>t105 (1)</p> <p>t0 (1)</p> <p>MAX LOAD 350VA</p> <p>t135 (2)</p> <p>t115 (2)</p> <p>t110 (2)</p> <p>t105 (2)</p> <p>t0 (2)</p> <p>MAX LOAD 350VA</p> <p>t135 (3)</p> <p>t115 (3)</p> <p>t110 (3)</p> <p>t105 (3)</p> <p>t0 (3)</p> <p>MAX LOAD 350VA</p> <p>t135 (4)</p> <p>t115 (4)</p> <p>t110 (4)</p> <p>t105 (4)</p> <p>t0 (4)</p> <p>MAX LOAD 350VA</p> <p>T3391</p>

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
230/110V Quad Output SSI (110 - 140V) Aluminium	Aluminium: T3395	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>T241</p> <p>T230</p> <p>T218</p> <p>T0</p> <p>Functional Earth</p> <p>t140 (1)</p> <p>t115 (1)</p> <p>t110 (1)</p> <p>t105 (1)</p> <p>t0 (1)</p> <p>MAX LOAD 350VA</p> <p>t140 (2)</p> <p>t115 (2)</p> <p>t110 (2)</p> <p>t105 (2)</p> <p>t0 (2)</p> <p>MAX LOAD 350VA</p> <p>t140 (3)</p> <p>t115 (3)</p> <p>t110 (3)</p> <p>t105 (3)</p> <p>t0 (3)</p> <p>MAX LOAD 350VA</p> <p>t140 (4)</p> <p>t115 (4)</p> <p>t110 (4)</p> <p>t105 (4)</p> <p>t0 (4)</p> <p>MAX LOAD 350VA</p> <p>T3395</p>
230/110V Quad Output WTS (110 - 115V) Aluminium	Aluminium: T3399	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>T241</p> <p>T230</p> <p>T218</p> <p>T0</p> <p>Functional Earth</p> <p>t115(1)</p> <p>t110(1)</p> <p>t105(1)</p> <p>t0(1)</p> <p>MAX LOAD 500VA</p> <p>t115(2)</p> <p>t110(2)</p> <p>t105(2)</p> <p>t0(2)</p> <p>MAX LOAD 500VA</p> <p>t115(3)</p> <p>t110(3)</p> <p>t105(3)</p> <p>t0(3)</p> <p>MAX LOAD 500VA</p> <p>t115(4)</p> <p>t110(4)</p> <p>t105(4)</p> <p>t0(4)</p> <p>MAX LOAD 500VA</p> <p>T3399</p>

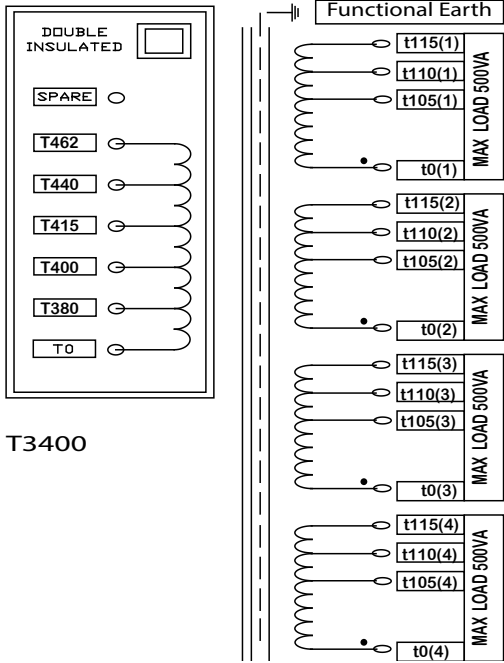
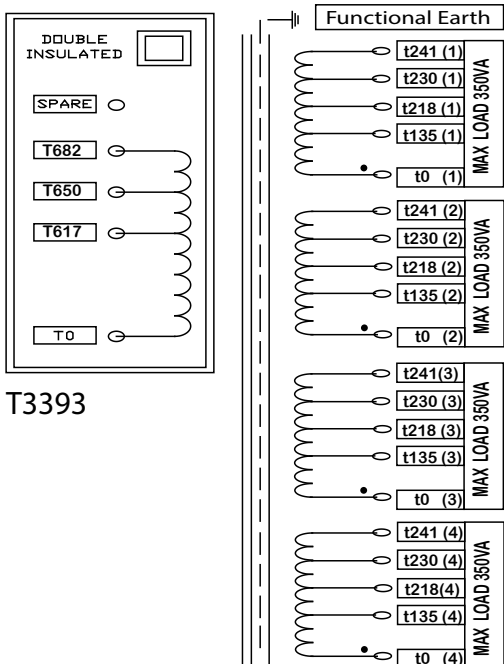
APPENDICES C

WIRING DIAGRAMS

Title	Descriptipion	Diagram
<div>400-415-440/110V</div> <div>Quad Output SSI (110 - 135V)</div> <div>Aluminium</div>	<div>Aluminium:</div> <div>T3392</div>	<div>T3392</div>
<div>400-415-440/110V</div> <div>Quad Output SSI (110 - 140V)</div> <div>Aluminium</div>	<div>Aluminium:</div> <div>T3396</div>	<div>T3396</div>

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
<p>400-415- 440/110V Quad Output WTS (110 - 115V)</p> <p>Aluminium</p>	<p>Aluminium: T3400</p>	 <p>T3400</p>
<p>650/230 Quad Output SSI (135 - 230V)</p> <p>Aluminium</p>	<p>Aluminium: T3393</p>	 <p>T3393</p>

APPENDICES C

WIRING DIAGRAMS

Title	Description	Diagram
650/230 Quad Output SSI (140 - 230V) Aluminium	Aluminium: T3397	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>T682</p> <p>T650</p> <p>T617</p> <p>T0</p> <p>Functional Earth</p> <p>t241 (1)</p> <p>t230 (1)</p> <p>t218 (1)</p> <p>t140 (1)</p> <p>t0 (1)</p> <p>MAX LOAD 350VA</p> <p>t241 (2)</p> <p>t230 (2)</p> <p>t218 (2)</p> <p>t140 (2)</p> <p>t0 (2)</p> <p>MAX LOAD 350VA</p> <p>t241 (3)</p> <p>t230 (3)</p> <p>t218 (3)</p> <p>t140 (3)</p> <p>t0 (3)</p> <p>MAX LOAD 350VA</p> <p>t241 (4)</p> <p>t230 (4)</p> <p>t218 (4)</p> <p>t140 (4)</p> <p>t0 (4)</p> <p>MAX LOAD 350VA</p> <p>T3397</p>
650/230 Quad Output WTS (230 - 241V) Aluminium	Aluminium: T3401	<p>DOUBLE INSULATED</p> <p>SPARE</p> <p>T682</p> <p>T650</p> <p>T617</p> <p>T0</p> <p>Functional Earth</p> <p>t241 (1)</p> <p>t230 (1)</p> <p>t218 (1)</p> <p>t0 (1)</p> <p>MAX LOAD 500VA</p> <p>t241 (2)</p> <p>t230 (2)</p> <p>t218 (2)</p> <p>t0 (2)</p> <p>MAX LOAD 500VA</p> <p>t241 (3)</p> <p>t230 (3)</p> <p>t218 (3)</p> <p>t0 (3)</p> <p>MAX LOAD 500VA</p> <p>t241 (4)</p> <p>t230 (4)</p> <p>t218 (4)</p> <p>t0 (4)</p> <p>MAX LOAD 500VA</p> <p>T3401</p>

APPENDICES C

WIRING DIAGRAMS

Title	Descriptipion	Diagram
<p>230/230 Quad Output SSI (135 - 230V)</p> <p>Aluminium</p>	<p>Aluminium: T3394</p>	<p>T3394</p>
<p>230/230 Quad Output SSI (135 - 230V)</p> <p>Aluminium</p>	<p>Aluminium: T3398</p>	<p>T3398</p>

APPENDICES C

WIRING DIAGRAMS

Title	Descriptpion	Diagram
<div>230/230</div> <div>Quad Output</div> <div>WTS</div> <div>(230 - 241V)</div> <div>Aluminium</div>	<div>Aluminium:</div> <div>T3402</div>	<div>T3402</div>

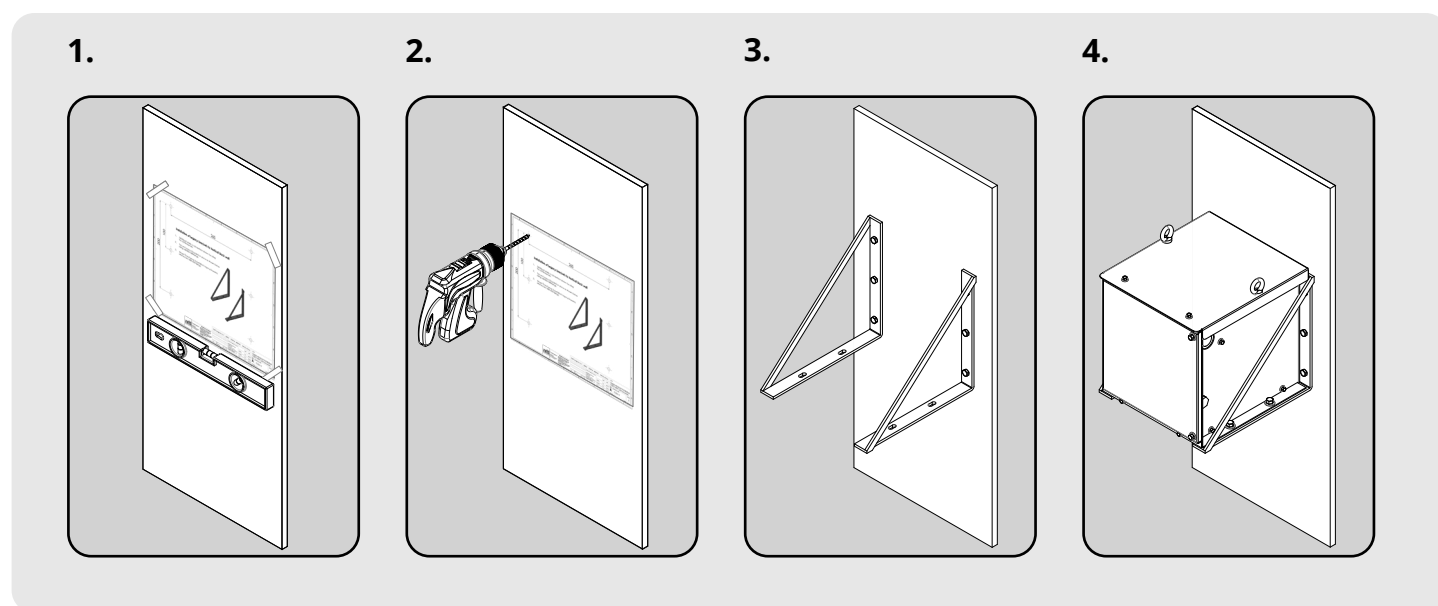
APPENDICES D

LEGACY MOUNTING BRACKETS

MOUNTING WITHIN A LOCATION CASE

The transformers shown in the data sheets in Appendix C. The transformers are designed to be securely fixed to substantial mounting rails or brackets such as BRS SM 440 apparatus racking systems, capable of bearing the weight of the transformer, using the 4 horizontal footprint holes detailed in Appendix A.

When Installing eco-rail transformers within a legacy system requiring vertical timber back board installation. Additional mounting brackets (Legacy brackets) are available from the manufacturer which enable eco-rail transformers to be installed efficiently & safely by a single operator.



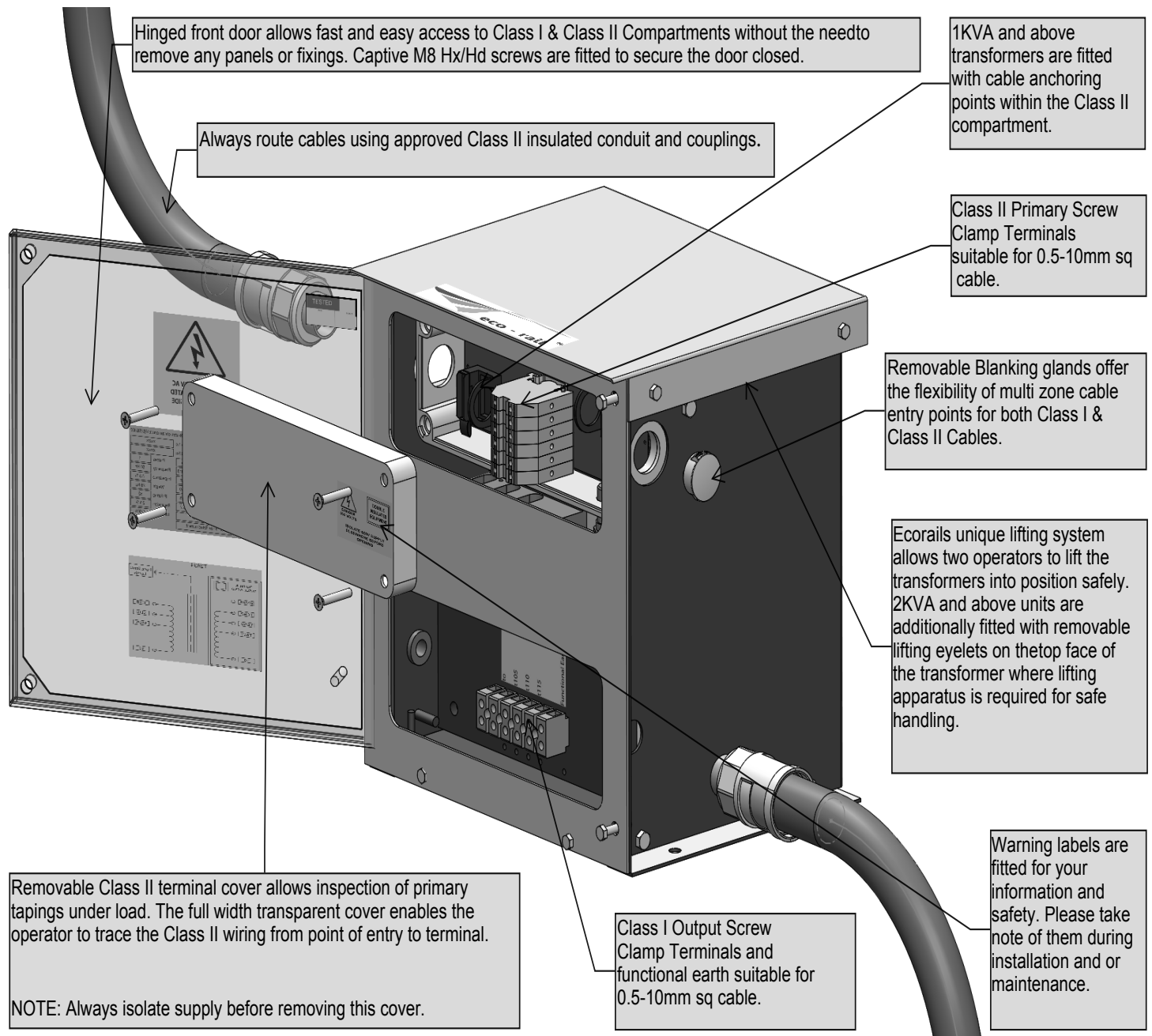
The Legacy brackets are supplied as a set of 2 for each transformer and come supplied with a back plate drilling information and installation instructions. Where legacy FSP renewals are a requirement for installation the legacy bracket is provided as an optional extra within the eco-rail transformer range. Using the template where provided drill and fix the legacy brackets to the back plate within the apparatus case and secure as instructed. For safety and ease of installation legacy brackets should be fitted & secured prior to mounting the transformer. Care should be taken when lifting and handling the transformer not to damage any attached cable entry glands or couplings. Manual lifting and handling practices should be observed when lifting the transformers into position.

Part No.	Description	Catalogue No.
D1496-1	LEGACY BRACKETS FOR 250-500VA TRANSFORMERS & 2.5A TJ's	054/214897
D1496-2	LEGACY BRACKETS FOR 1KVA - 1.5KVA TRANSFORMERS INC 1KVA DUAL OUTPUT & 5A TJ's.	054/214898
D1496-3	LEGACY BRACKETS FOR 2KVA - 4KVA TRANSFORMERS INC QUAD OUTPUTS, 10A TJ's AND DUAL 5A TJ's.	054/214899

Please contact for general arrangements for Legacy Brackets.

APPENDICES E

DETAILED ASSEMBLY OF ECORAIL® TRANSFORMER



Single Phase Transformers

Three Phase Transformers

Solutions for Rail

DC Chokes

Specialist Assemblies

Power Supplies

Control Gear



ATL Transformers Ltd, Hanson Close, Middleton, Manchester M24 2HD

Tel.: +44(0)161 653 0902 • Fax: +44(0)161 653 4744

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