Austin

Installation Instructions for

AUSTIN ISOLATION TRANSFORMER

(DUAL WINDING SERIES)

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Austin Isolation/Lighting Transformers

(Dual Winding Series)

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING THIS ISOLATION/LIGHTING TRANSFORMER, WHETHER ON A NEW INSTALLATION OR AS A REPLACEMENT UNIT.

General Description

Transformer Type	Capacity (kVA)	Nominal Primary/ Secondary Voltage	R.F. Flashover Dry - Sea Level
A-07D1	0.7	115/230	65 kV peak
A-07D2	0.7	230/460	65 kV peak
A-17D1	1.7	115/230	65 kV peak
A-17D2	1.7	230/460	65 kV peak
A-25D1	2.5	115/230	100 kV peak
A-25D2	2.5	230/460	100 kV peak
A-35D1	3.5	115/230	85 kV peak
A-35D2	3.5	230/460	85 kV peak
A-50D1	5.0	115/230	100 kV peak
A-50D2	5.0	230/460	100 kV peak

The transformers listed above are intended for use on radio masts and towers with moderate RF potentials across the base insulator. When installed in the open, the permissible RF potential between primary and secondary rings will be considerably less than the dry flashover figures given above. For operation under wet, dusty, or insect infested conditions, the maximum permissible voltage will depend on the amount of rain, etc., the frequency of occurrence and the acceptability of occasional arc-overs and level of drip corona. Under heavy rain conditions, excessive drip corona will probably occur before arc-over. It is unlikely that satisfactory operation will be achieved above the following levels of RF voltage:

A-07D1 and A-07D2	-	22 kV peak
A-17D1 and A-17D2	-	22 kV peak
A-25D1 and A-25D2	-	52 kV peak
A-35D1 and A-35D2	-	34 kV peak
A-50D1 and A-50D2	-	52 kV peak

CAUTION

1. Ensure that the tower or mast is grounded.
2. Check that the mast lighting circuit is not faulty.
3. Ensure that the primary power wires are not “live”.
4. Ensure that the primary protective circuit is in accordance with the recommendations made below.

Primary Protective Circuit

A circuit breaker is not recommended unless it has been chosen to have the required delayed action to withstand the inrush current to cold lamp filaments. A fuse will provide ideal protection and has an inherent thermal delay which will take care of the inrush current at the time the system is switched on.

Whether a fuse or a circuit breaker is chosen, its operating current should be approximately 20% above the normal operating current for the lamp load in use.

Transformers are sometimes damaged because insufficient care was taken in choosing the primary protective circuit. Though there is appreciable flux leakage resulting from the open nature of the primary and secondary windings, the efficiency and regulation of the transformer is such that windings are in danger of being over-heated and damaged if the full load rating is exceeded by more than a few precent for any appreciable length of time. Safe operation is assured if the primary current is measured under normal load conditions and a fuse chosen with a rating approximately 20% above this operating current.

Installation - Mounting

WARNING:

DO NOT ATTEMPT TO TURN OR ADJUST ANY PIPE FITTINGS BELOW THE UNION ON THE SECONDARY OF THE TRANSFORMER. ANY MOVEMENT OF THE FITTINGS BELOW THE UNION WILL BREAK THE WATERPROOF SEAL AND WATER WILL ENTER AND SHORT THE SECONDARY. ANY ADJUSTMENT NECESSARY MUST BE MADE USING THE SECONDARY UNION.

The A-07D1 to A-35D2 range of transformers are shipped in triwall cartons, while the A-25D1, A-25D2, A-50D1, and A-50D2 are shipped in wooden crates. When removing the transformer from its crate or carton, do not attempt to lift it out with the secondary coil - as damage to the secondary shield may occur. Instead, both the primary and the secondary coils should be supported.

Mount the primary and secondary rings by screwing the unions onto suitable support pipes arranged so that when the unions are tightened, the rings are centred one with the other. The following sizes of pipe unions are used:

A-07D1 and A-07D2	-	*1" NPT*
A-17D1 and A-17D2	-	*1" NPT*
A-25D1 and A-25D2	-	*1½" NPT*
A-35D1 and A-35D2	-	*1½" NPT*
A-50D1 and A-50D2	-	*1½" NPT*

Install the lightning gap as shown in the profile sketch, ensuring that the arm attached to the secondary ring has the sphere with a drain hole. The gap is adjusted by movement of the primary arm through rotation of the street elbow supports which should be screwed firmly enough in place to prevent accidental movement in the arm, but not so tightly that further movement cannot be made if required for gap adjustment. A very approximate indication of the variation of flashover voltage with gap setting is given below:

Gap Setting	Gap - Dry Flashover kV peak at 100 kHz	Gap - Wet Flashover kV peak at 100 kHz
½"	38	18
1"	68	29
1½"	88	38

Installation - Bonding

Two bonding braids are provided on the primary assembly and two on the secondary assembly. The primary bonding leads, on of which is attached to the Lightning Gap Arm and the other to the Transformer mounting clamp and core, should be connected with a good mechanical and electrical bond to the antenna ground system. The secondary bonding braids, one of which is connected to the Lightning Gap Arm and the other to the secondary shield, should be mechanically and electrically securely connected to the tower or mast. Bonding connections should be made as short and direct as possible after allowing any necessary slack for mounting adjustments. Any surplus length of braid should be cut off.

Installation - Wiring

It is necessary to ensure that no substantial radio frequency potential exists between the secondary winding and its outer shield or between the primary winding and its core. If the mast lighting circuit is run continuously in metal conduit well bonded to the mast, this will generally by satisfactory. If the primary power is brought to the transformer from the transmitter building in conduit or metallic covered cable which is bonded to the antenna ground system, this too should be adequate protection against stray RF pickup.

If the above conditions are not met, then it is desirable at the transformer primary and secondary connections to provide RF bypassing by installing good quality mica capacitors of 0.01 µF minimum from each line to ground. These capacitors should have a minimum DC working voltage range of 600 V for 115/230 volt circuits and 1200 V for 230/460 volt circuits.

Installation - Secondary Connections

Two identical secondary windings are provided on each transformer. These can be connected in series of in parallel, or used as individual windings. Each of the two secondary windings is designed to carry half the rated kVA output of the transformer.

On transformers type D1, a parallel connection provides 115 volts while a series connection provides 230 volts. On a type D2 transformer, a parallel connection provides 230 volts and a series connection 460 volts.

Secondaries may be connected in parallel by joining wire numbers BK1 & Y3 to one line and wire numbers R2 & G4 to the other line. Secondaries may be connected in series by joining wire numbers R2 & Y3 and connecting the line to wire numbers BK1 & G4.

With a series connection of the secondaries, the connection of wire numbers R2 & Y3 may be used as a centre tap or neutral line if required by the mast lighting system.

All secondary connections should be well insulated with approved connectors or electrical tape.

Installation - Primary Connections

Two primary windings are provided on each transformer. As with the secondaries, these windings can be connected in series or in parallel but, due to the arrangement of voltage adjustment taps, care must be exercised in making the parallel connection. On each transformer, the section of the primary windings connected to wire numbers R2 & Y3 and numbers G4 & B5 are balanced, and it is these portions of the primary windings than can be connected in parallel. Portions of the primary windings between wire numbers BK1 & R2 and B5 & W6 are not identical and are unbalanced to give greater flexibility when voltage adjustments are required. Both D1 and D2 types of transformers have similar primary windings which, when connected in parallel, can be connected to a nominal 115 volt power source, and when connected in series to a nominal 230 volt circuit.

Taps have been provided on the primaries to permit a range of voltage adjustments connected to either 115 or 230 volt operation. As an example, assuming the primaries have been connected in series and the line voltage was 230 V, the two line wires would be connected to wire numbers R2 & W6. If this did not give the desired secondary voltage, a lower secondary voltage can be obtained by connecting the line to wire numbers BK1 & B5 or numbers R2 & B5. A similar voltage adjusting arrangement is available when primaries are connected in parallel.

All unused wires and all connections should be well insulated with approved connectors or electrical tape.

Maintenance

A can of grey alkyd enamel is enclosed which can be used for touch-up purposes on completion of the installation. The transformer assembly should be painted with this, or a similar enamel every two or three years to maintain the resistance to moisture. No further maintenance is required beyond repairing any obvious mechanical damage that might have occurred.

Note: Transformers now use colour leads instead of number coding. The following chart shows equivalent colour to number.

Black	-	#1
Red	-	#2
Yellow	-	#3
Green	-	#4
Blue	-	#5
White	-	#6

Encl: Profile Sketch of a Dual Winding Series Transformer
Wiring Diagram for Transformer Secondary
Wiring Diagram for Transformer Primary

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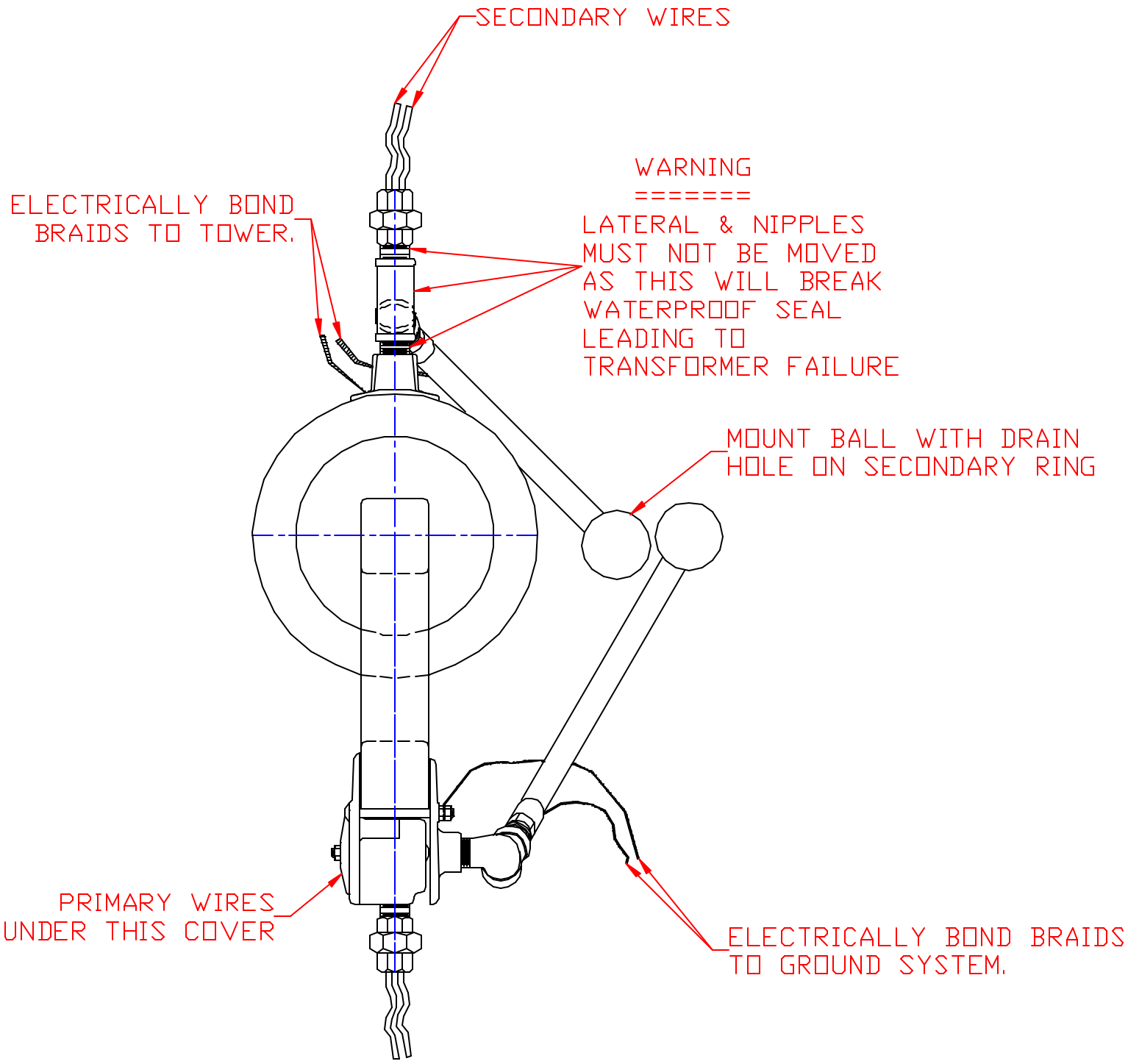
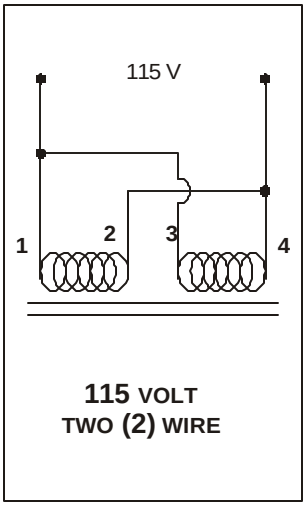

SECONDARY WIRES
WARNING
=======
LATERAL & NIPPLES
MUST NOT BE MOVED
AS THIS WILL BREAK
WATERPROOF SEAL
LEADING TO
TRANSFORMER FAILURE
ELECTRICALLY BOND
BRAIDS TO TOWER.
MOUNT BALL WITH DRAIN
HOLE ON SECONDARY RING
PRIMARY WIRES
UNDER THIS COVER
ELECTRICALLY BOND BRAIDS
TO GROUND SYSTEM.

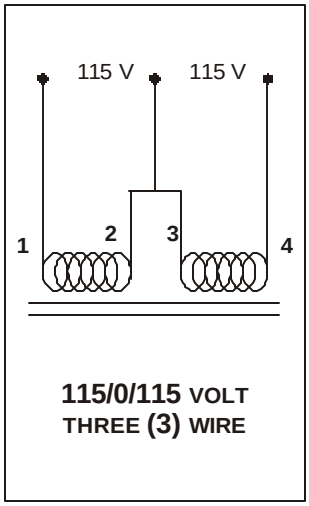
Austin Isolation/Lighting Transformers
(Dual Winding Series)

Secondary Load Connections for D1 type Transformer:

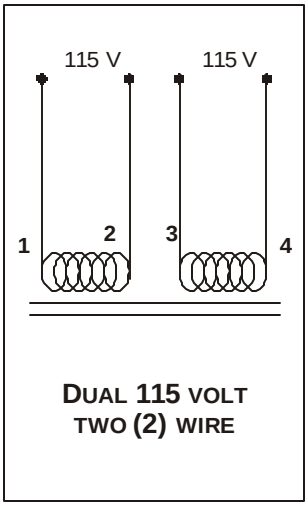
(A-07D1, A-17D1, A-35D1, A-50D1, and A-25D1)



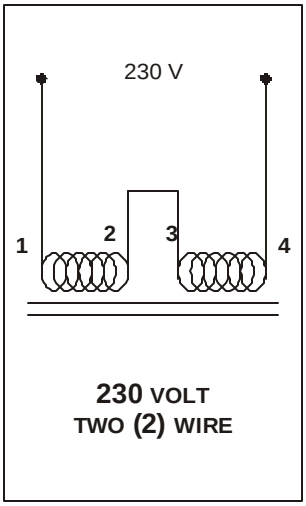
115 VOLT
TWO (2) WIRE



115/0/115 VOLT
THREE (3) WIRE



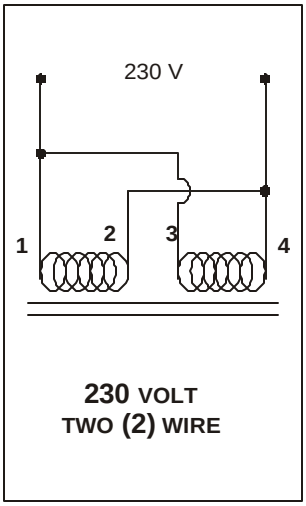
DUAL 115 VOLT
TWO (2) WIRE



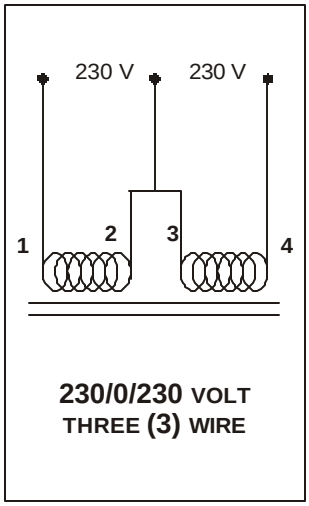
230 VOLT
TWO (2) WIRE

Secondary Load Connections for D2 type Transformer:

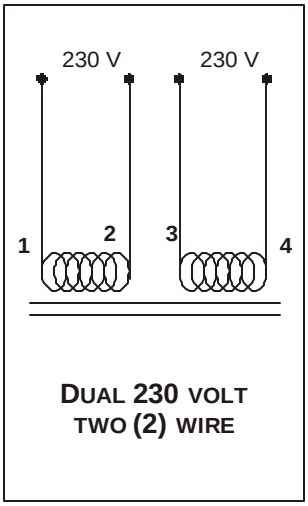
(A-07D2, A-17D2, A-35D2, A-50D2, and A-25D2)



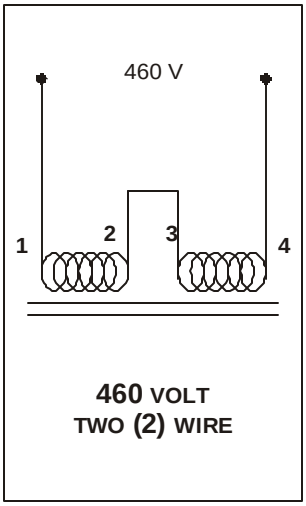
230 VOLT
TWO (2) WIRE



230/0/230 VOLT
THREE (3) WIRE



DUAL 230 VOLT
TWO (2) WIRE



460 VOLT
TWO (2) WIRE

Wire Colour/Numbering Code

Black	-	#1
Red	-	#2
Yellow	-	#3
Green	-	#4
Blue	-	#5
White	-	#6

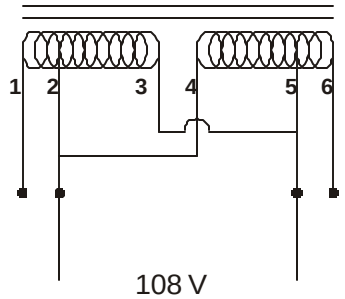
Austin Isolation/Lighting Transformers

(Dual Winding Series)

Primary Line Connections for Dual Winding Series Transformer:

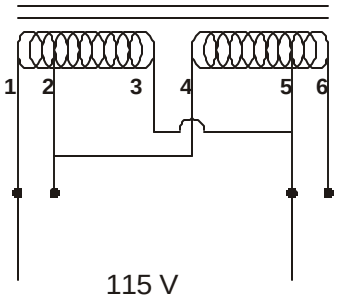
(A-07D1, A-17D1, A-35D1, A-50D1, and A-25D1) and
(A-07D2, A-17D2, A-35D2, A-50D2, and A-25D2)

108 LINE VOLTAGE CONNECTIONS



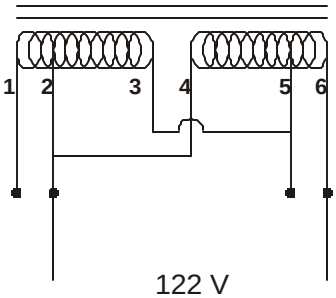
108 V

115 LINE VOLTAGE CONNECTIONS



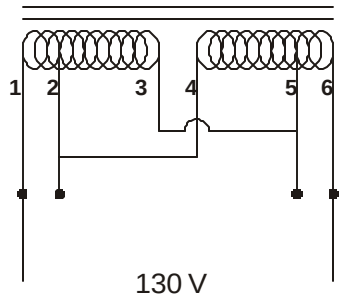
115 V

122 LINE VOLTAGE CONNECTIONS



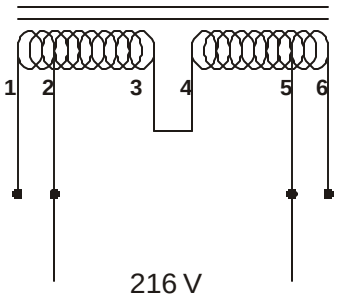
122 V

130 LINE VOLTAGE CONNECTIONS



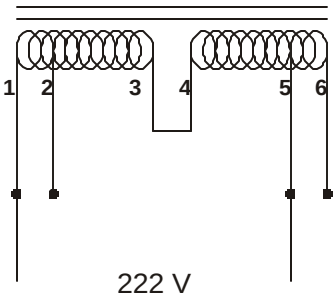
130 V

216 LINE VOLTAGE CONNECTIONS



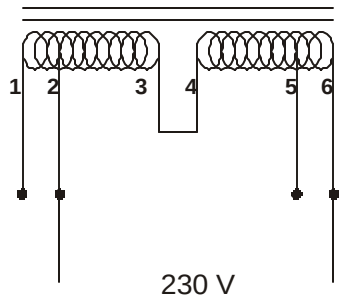
216 V

222 LINE VOLTAGE CONNECTIONS



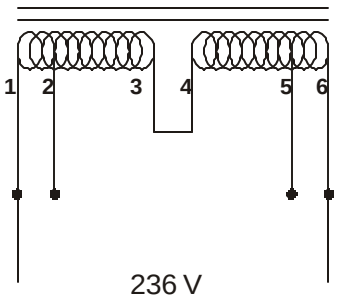
222 V

230 LINE VOLTAGE CONNECTIONS



230 V

236 LINE VOLTAGE CONNECTIONS



236 V

Wire Colour / Numbering Code

Black	-	#1
Red	-	#2
Yellow	-	#3
Green	-	#4
Blue	-	#5
White	-	#6