



HIGH FIDELITY OUTPUT TRANSFORMER

OP308

TYPE OP308

JUNE, 1958

Ferguson Type OP308 Output Transformer is designed primarily for the Mullard 5-10 Amplifier and has been approved by the Technical Services Dept. of Mullard-Australia Pty. Ltd. for this application.

The primary is tapped for either low or high loading conditions. Circuitry and further information may be obtained from the Mullard "5-10" Amplifier booklet.

RATING

POWER RATING Nominal.. 10 Watts, Maximum.. 12-13 Watts
FREQUENCY RESPONSE ... 10-50000 cps $\pm$ 1db.
PRIMARY IMPEDANCE Plate to Plate 8000, 6000 ohms
SECONDARY IMPEDANCE .. OP308/15 15, 3.75 ohms
 OP308/12.5 12.5, 3.1 ohms
 OP308/8.4 8.4, 2.1 ohms
 OP308/2.7 10.8, 2.7 ohms

MOUNTING

Vertical side covers with mounting feet.
Connecting leads 10/.010 PVC insulated.

DIMENSIONS

HEIGHT 4-1/8 inches
WIDTH 3-1/4 inches
LENGTH (Over Covers) 3-3/8 inches
MOUNTING CENTRES 2-1/2 x 2 inches
MOUNTING SLOTS 7/32 x 7/16 inches
APPROXIMATE WEIGHT 4-3/4 lbs

COLOR CODE

PRIMARY 8000 ohms - Greens)
 6000 ohms - Blues) C.T. - Red
SECONDARY Higher Imp.-Join Yellow to Green
 Use Red and Black
 Lower Imp.- Join Red to Green
 Join Yellow to Black
 Use Red-Green & Yellow-Black ..

MATCHING COMPONENTS FOR 5-10 AMPLIFIER

POWER TRANSFORMER (Amp. plus Tuner) TYPE PF1072



ULTRA-LINEAR OUTPUT TRANSFORMER

OP312
JULY, 1965

TYPE OP312

Ferguson Ultra-Linear Output Transformer Type OP312 is primarily intended for use in the Mullard "20 Watt High Quality Amplifier". It is also suitable for use in the R.T. & H. "Playmaster No.12".

SPECIFICATION

PRIMARY IMPEDANCE 6,600 Ω Plate to Plate
SCREEN TAP IMPEDANCE 19% Primary Impedance
SECONDARY IMPEDANCE OP312/15 15 ohms or 3.75 ohms
OP312/12.5 12.5 ohms or 3.1 ohms
OP312/8.4 8.4 ohms or 2.1 ohms
POWER RATING 25 watts
POWER RESPONSE (20 Watt ref.).. +0 -1db 15-20,000 cycles
FREQUENCY RESPONSE 10 to 60,000 cycles $\pm$ 1 db
PRIMARY INDUCTANCE
(10V RMS 50 CPS) 90 Henries
LEAKAGE INDUCTANCE 27 Milli-Henries
LUMPED PRIMARY CAPACITANCE 162 Picofarads
SELF-RESONANT FREQUENCY 75 K.C.
INSERTION LOSS Less than 1db
DISTORTION Less than 1%
TRANSIENT RESPONSE: For optimum transient response in the
"20 Watt High Quality Amplifier" C8 and R15
should be as follows:

Output Impedance (ohms) ..	15	3.75	12.5	3.1	8.4	2.1
R15 - ohms	8200	4100	7500	3800	6200	3100
C8 - Picofarads	450	900	490	980	600	1200

MOUNTING

Vertical, side covers with integral mounting feet.

DIMENSIONS

HEIGHT 4-7/8 inches
WIDTH 3-7/8 inches
DEPTH (over covers) 3-3/4 inches
MOUNTING CENTRES 3-3/8 inches x 2-1/16 inches
MOUNTING HOLES 7/32 inch dia.

COLOUR CODE

PRIMARY Plate 1 - Green, C.T. - Red, Plate 2 - Blue
SCREENS Screen 1 - Black, Screen 2 - Yellow
SECONDARY High Imp. - Join Yellow to Green. Use Red & Black
Low Imp. - Join Yellow to Black, Red to Green.
Use Yellow and Black, Red and Green

MATCHING COMPONENTS

POWER TRANSFORMER PF1067 FILTER CHOKE CF110
-o-o-o-o-o-

GRAIN ORIENTED
ULTRA-LINEAR OUTPUT TRANSFORMER
TYPE OP387

OP387
OCTOBER 1961

Ferguson Ultra-Linear Output Transformer Type OP387 is a high fidelity type employing grain-oriented steel laminations. It is intended for use with Type EL84 or similar output valves. Type OP387 is thoroughly wax impregnated.

SPECIFICATION

PRIMARY IMPEDANCE	8000 ohms, Plate to Plate
SCREEN TAP IMPEDANCE	18.5% of plate impedance
SECONDARY IMPEDANCES	OP387-15.. 15 or 3.75 ohms OP387-8.4. 8.4 or 2.1 ohms
NOMINAL POWER RATING	12 Watts
FREQ. RESPONSE ATTAINABLE (at 1 watt)..	20 cps - 100,000 cps $\pm$ 1db
POWER RESPONSE ATTAINABLE (at 10 watts)	30 cps - 50,000 cps $\pm$ 1db
PRIMARY D.C. RESISTANCE (EACH HALF) ...	90 ohms
MAX.D.C. PRIMARY CURRENT (EACH HALF) ..	80 Milliamperes
SECONDARY D.C. RESISTANCE	Less than 6% of sec. imp.
PRIMARY INDUCTANCE (At 10V 50 cps. 5 mA. unbalance)	160 Henries
LEAKAGE INDUCTANCE	7 Millihenries
PRIMARY FUNDAMENTAL RESONANCE	140 KC.
INSERTION LOSS	Less than 1db

MOUNTING

Vertical side covers with mounting feet.

DIMENSIONS

HEIGHT	3-5/16 inches
WIDTH	2-5/8 inches
DEPTH (Over Covers)	2-13/16 inches
MOUNTING CENTRES	2-3/16 x 2-1/16 inches
MOUNTING SLOTS	11/64 x 11/32 inches
APPROXIMATE WEIGHT	2-lbs.9 oz.

COLOR CODE

PRIMARY Plate 1 - Green, C.T. - Red, Plate 2 - Blue
Screen 1 - Black, Screen 2 - Yellow

SECONDARY Higher Imp. - Join Yellow to Green (C.T. if required)
Use Red and Black

Lower Imp. - Join Red to Green
Join Yellow to Black
Use Red-Green & Yellow-Black



AUGUST, 1964

OUTPUT TRANSFORMER

TYPE OP389

MEDIUM FIDELITY 40-30000 CPS

TYPE OP389

Ferguson type OP389 output transformer is a medium fidelity type designed to couple a push-pull output stage to 15 ohms voice coil impedance.

SPECIFICATIONS

NOMINAL POWER RATING	12 watts
FREQUENCY RESPONSE	40 - 30000 cps
PRIMARY IMPEDANCE	8000 Ohms PP.
PRIMARY INDUCTANCE ,..... (1V @1000 cps)	17.5 Henries
LEAKAGE INDUCTANCE	17 Millihenries
PRIMARY D.C.RESISTANCE (@ 20°C).....	511 Ohms
SECONDARY D.C.RESISTANCE (@ 20°C)	1.6 Ohms

CONNECTIONS

PRIMARY LEADS	10/010	3" approx.
PRIMARY C.T.LEADS	10/010	8" approx.
SECONDARY LEADS	10/010	3" approx.

MOUNTING

Vertical side covers with slotted mounting feet.

DIMENSIONS

HEIGHT	3-5/16 Inches.
WIDTH (W)	2-5/8 Inches
LENGTH (Over Coils) (L).....	2-5/8 Inches
MOUNTING CENTRES	1 3/4 (L) x 2-3/16 (W)
MOUNTING SLOTS	11/32 x 5/32 Ins.
APPROX. WEIGHT	2 Lb. 8 Ozs.

COLOUR CODE

PRIMARY.....Plate 1 - Blue, Plate 2 - Black, C.T. - Red
SECONDARY..... Red & Yellow 15 Ohms.



OUTPUT TRANSFORMER
TYPE OP390

TYPE OP390
Oct. 1953.

Ferguson Type OP390 output Transformer is a medium fidelity type designed to couple a single-ended output stage to the speaker voice coil.

RATING

NOMINAL POWER RATING	5 watts.
FREQUENCY RESPONSE	40 - 12000 C.P.S.
PRIMARY IMPEDANCE	5,000 OHMS S.E.
SECONDARY IMPEDANCE	15 OHMS V.C.
PRIMARY D.C. RESISTANCE (At 20°C).....	400 OHMS
SECONDARY D.C. RESISTANCE (At 20°C).....	1.58 OHMS
MAX. PRIMARY D.C.	40 MA.

MOUNTING

WRAP-OVER BRACKET, CADMIUM PLATED, FIRMLY CRIMPED TO THE CORE WITH HEAVY CORE-LOCKING TABS AND SLOTTED MOUNTING FEET.

TERMINATION

PRIMARY:	Leads 10/.010
SECONDARY:	Leads Natural & Sleeves.

DIMENSIONS

HEIGHT	2-5/16 inches
WIDTH (Over coils).....	2-1/2 inches
LENGTH	2-3/4 inches
OVERALL LENGTH (Inc.Mtg.Feet).....	3-3/4 inches
MOUNTING CENTRES (Nominal)	3-1/4 inches
MOUNTING SLOTS	3/16 inches wide
APPROXIMATE WEIGHT	1 lb. 12 ozs.

COLOUR CODE

PRIMARY	5000 OHMS	Start-Red, Finish-Blue.
SECONDARY.....	15 OHMS	Start-Black, Finish-Green.

FERGUSON

GRAIN ORIENTED
ULTRA-LINEAR OUTPUT TRANSFORMER
TYPE OP412

SPECIFICATION

MOUNTING

DIMENSIONS

COLOUR CODE

For the Mullard 5 Stereo 7 use Power Transformer Type PF1508



COUPLING TRANSFORMER

OP428

TYPE OP428

MARCH 1962.

FERGUSON TYPE OP428 coupling transformer is designed to couple a single plate of a 12AU7 or similar valve to a low impedance phase shift network as required in the S.S.B. Transmitter described in the March 1962 issue of Radio Television & Hobbies.

RATING

NOMINAL POWER RATING.....0.5 Watts
PRIMARY IMPEDANCE.....20,000 ohms C.T.
SEC.1 IMPEDANCE.....150 ohms
SEC.2 IMPEDANCE.....150 ohms
SEC.1 & SEC.2 in Series.....600 ohms
PRIMARY INDUCTANCE @ 20V,1000 C/S.....18 henries
LEAKAGE INDUCTANCE @ 20V,1000 C/S.....150 millihenries

MOUNTING

Wrap-over bracket cadmium plated, firmly crimped to the core with heavy core-locking tabs and mounting feet.

DIMENSIONS

HEIGHT.....1-7/16 inches
WIDTH (over coils).....1-1/4 inches (approx)
LENGTH.....1-3/4 inches
OVERALL LENGTH (Inc. mtg. feet).....2-1/2 inches
MOUNTING CENTRES.....2-1/16 inches.
MOUNTING HOLES.....5/32 inch. dia.
APPROXIMATE WEIGHT.....6-1/2 oz.

COLOUR CODE

PRIMARY.....START - Brown, C.T. - Red, FINISH - Blue
SECONDARY 1.....START - Black, FINISH - Green
SECONDARY 2.....START - White, FINISH - Grey
Series Connection.....Join Green to White
(600 ohms impedance).....Use Black to Grey
Parallel Connection.....Use junctions of Black joined to
(150 ohms impedance).....White and Green joined to Grey.



GRAIN ORIENTED
ULTRA-LINEAR OUTPUT TRANSFORMER
TYPE OP447/8.

OP447/8
OCTOBER 1963

Ferguson Type OP447/8 Output Transformer is designed primarily for the Miniwatt "TWIN TEN" Amplifier.

Grain oriented steel laminations and vacuum wax impregnation are employed to produce a transformer of high quality and reliability.

SPECIFICATION

PRIMARY IMPEDANCE	8000 ohms, Plate to Plate
SCREEN TAP IMPEDANCE	4% of plate impedance = 20% turns
SECONDARY IMPEDANCES	OP447/8..8 or 2 ohms
NOMINAL POWER RATING	12 Watts
FREQ. RESPONSE ATTAINABLE (at 1 watt)	20 cps - 100,000cps $\pm$ 1db
POWER RESPONSE ATTAINABLE (at 10 watts)	30 cps - 50,000 cps $\pm$ 1db
PRIMARY D.C. RESISTANCE (EACH HALF)....	90 ohms
MAX. D.C. PRIMARY CURRENT (EACH HALF)	80 Milliampères
SECONDARY D.C. RESISTANCE	Less than 6% of sec. imp.
PRIMARY INDUCTANCE (At 10V 50 cps. 5 mA. unbalance).....	160 Henries
LEAKAGE INDUCTANCE	7 Millihenries
PRIMARY FUNDAMENTAL RESONANCE	140 KC.
INSERTION LOSS	Less than 1 db.

MOUNTING

Vertical side covers with mounting feet.

DIMENSIONS

HEIGHT	3-5/16 inches
WIDTH	2-5/8 inches
DEPTH (over covers)	2-13/16 inches
MOUNTING CENTRES	2-3/16 x 2-1/16 inches
MOUNTING SLOTS	11/64 x 11/32 inches
APPROXIMATE WEIGHT	2-lbs. 9 ozs.

COLOUR CODE

PRIMARY	Plate 1 - Green, C.T. - Red, Plate 2 - Blue Screen 1- Black, Screen 2 - Yellow
SECONDARY.....	Higher Imp. - Join Yellow to Green (C.T. if required) Use Red and Black. Lower Imp. - Join Red to Green Join Yellow to Black Use Red-Green & Yellow-Black

MATCHING POWER TRANSFORMER FOR "TWIN TEN" AMPLIFIER
TYPE PVD109



GRAIN ORIENTED
ULTRA-LINEAR OUTPUT TRANSFORMER
TYPE OP447/15

OP447/15
JANUARY 1962.

Ferguson Type OP447/15 Output Transformer is designed primarily for the Miniwatt "TWIN TEN" Amplifier and has been approved by the "Miniwatt" Electronics Division of Philips Electrical Industries for this application.

Grain oriented steel laminations and ~~vacuum wax~~ impregnation are employed to produce a transformer of high quality and reliability.

SPECIFICATION

PRIMARY IMPEDANCE	8000 ohms, Plate to Plate
SCREEN TAP IMPEDANCE	4% of plate impedance = 20% turns
SECONDARY IMPEDANCES	OP447/15 ..15 or 3.75 ohms
NOMINAL POWER RATING	12 Watts
FREQ. RESPONSE ATTAINABLE (at 1 watt)	20 cps - 100,000cps + 1db
POWER RESPONSE ATTAINABLE (at 10 watts)	30 cps - 50,000cps - 1db
PRIMARY D.C. RESISTANCE (EACH HALF) ..	90 ohms
MAX. D.C. PRIMARY CURRENT (EACH HALF)	80 Milliampères
SECONDARY D.C. RESISTANCE	Less than 6% of sec. imp.
PRIMARY INDUCTANCE	
(At 10V 50 cps. 5 mA. unbalance)	160 Henries
LEAKAGE INDUCTANCE	7 Millihenries
PRIMARY FUNDAMENTAL RESONANCE	140 KC.
INSERTION LOSS	Less than 1 db.

MOUNTING

Vertical side covers with mounting feet.

DIMENSIONS

HEIGHT	3-5/16 inches
WIDTH	2-5/8 inches
DEPTH (over covers)	2-13/16 inches
MOUNTING CENTRES	2-3/16 x 2-1/16 inches
MOUNTING SLOTS	11/64 x 11/32 inches
APPROXIMATE WEIGHT	2-lbs. 9 ozs.

COLOUR CODE

PRIMARY	Plate 1 - Green, C.T. - Red, Plate 2 - Blue Screen 1 - Black, Screen 2 - Yellow
SECONDARY	Higher Imp. - Join Yellow to Green (C.T. if required) Use Red and Black Lower Imp. - Join Red to Green Join Yellow to Black Use Red-Green & Yellow-Black

MATCHING POWER TRANSFORMER FOR "TWIN TEN" AMPLIFIER
TYPE PVD109



SCREEN COUPLING CHOKE

OP474

TYPE OP474

DECEMBER, 1963

The type OP474 Screen Choke is designed specifically for the single-ended push-pull amplifier featured in the September, 1963 issue of the Miniwatt Digest.

RATINGS (EACH WINDING)

INDUCTANCE (MEASURED AT 20V, 50 C/s..... 81H/81H
D.C.RESISTANCE 530Ω/530Ω

MOUNTING

Cadmium-plated, wrap-over bracket with slotted mounting feet.

DIMENSIONS

HEIGHT..... 2 INCHES
WIDTH (over coils) 1-5/8 INCHES
LENGTH 2-1/4 INCHES
OVERALL LENGTH (inc. mtg. feet)..... 3-1/4 INCHES
NOMINAL MOUNTING CENTRES 2-3/4 INCHES
APPROXIMATE WEIGHT 15 Ozs.

COLOUR CODE

WINDING 1..... START - blue, FINISH - brown
WINDING 2..... START - red, FINISH - orange

JUNE, 1964

FERGUSON

OP499/8

GRAIN ORIENTED
CLASS B OUTPUT TRANSFORMER
TYPE OP499/8

Ferguson Type OP499 output transformer is designed for use in the High Quality 60W Class "B" Power Amplifier as described in the Philips Miniwatt Digest, April 1964.

Grain oriented steel laminations and varnish impregnation are employed to produce a transformer of high quality and reliability.

SPECIFICATION

PRIMARY IMPEDANCE..... 4000 ohms plate to Plate
SECONDARY IMPEDANCE 8 Ohms
NOMINAL POWER RATING 60W (Class B)
FREQUENCY RESPONSE ATTAINABLE (-3db)..... 28 cps - 36 kc/s
PRIMARY DC RESISTANCE @ 20°C..... 182 Ohms
SECONDARY DC RESISTANCE @ 20°C..... 0.4 Ohms
PRIMARY INDUCTANCE @ 20V 50 cps..... 190 Henries

MOUNTING

Wrap over bracket, cadmium plated firmly crimped to the core, slotted mounting feet.

TERMINATION

PRIMARY: Leads 10/.010 insulated.
SECONDARY: Leads enamelled copper wire P.V.C. sleeved.

DIMENSIONS

LENGTH 4-3/8
HEIGHT 2-1/2
WIDTH (Over Bracket) 1-5/8
WIDTH (Over Coil) 2-7/8
MOUNTING CENTRES 3-3/4
MOUNTING SLOTS 3/8 x 3/16
APPROX. WEIGHT 3 LBS

COLOUR CODE

PRIMARY Plate 1 - Brown, Plate 2 - Blue, C.T. - Red
SECONDARY Black - Green

MATCHING COMPONENTS

POWER TRANSFORMER PF2252
FILTER CHOKES 2 x F1/285

JUNE, 1964

FERGUSON

OP499/15

GRAIN ORIENTED
CLASS B OUTPUT TRANSFORMER
TYPE OP499/15

Ferguson Type OP499 output transformer is designed for use in the High Quality 60W Class "B" Power Amplifier as described in the Philips Miniwatt Digest, April, 1964.

Grain oriented steel laminations and varnish impregnation are employed to produce a transformer of high quality and reliability.

SPECIFICATION

PRIMARY IMPEDANCE..... 4000 ohms plate to Plate
SECONDARY IMPEDANCE..... 15 Ohms
NOMINAL POWER RATING60W (Class B)
FREQUENCY RESPONSE ATTAINABLE (-3db)..... 28 cps - 36 kc/s
PRIMARY DC RESISTANCE @ 20°C.....182 Ohms
SECONDARY DC RESISTANCE @ 20°C.....0.8 Ohms
PRIMARY INDUCTANCE @ 20V 50 cps.....190 Henries

MOUNTING

Wrap over bracket, cadmium plated firmly crimped to the core, slotted mounting feet.

TERMINATION

PRIMARY: Leads 10/.010 insulated.
SECONDARY: Leads enamelled copper wire P.V.C. sleeved.

DIMENSIONS

LENGTH 4-3/8
HEIGHT..... 2-1/2
WIDTH (Over Bracket)..... 1-5/8
WIDTH (Over Coil)..... 2-7/8
MOUNTING CENTRES 3-3/4
MOUNTING SLOTS 3/8 x 3/16
APPROX. WEIGHT 3 LBS

COLOUR CODE

PRIMARY..... Plate 1 - Brown, Plate 2 - Blue, C.T. - Red.
SECONDARY..... Black - Green

MATCHING COMPONENTS

POWER TRANSFORMER PF2252
FILTER CHOKES 2 x F1/285

JUNE, 1964



GRAIN ORIENTED

OP499/500

CLASS B OUTPUT TRANSFORMER

TYPE OP499/500

Ferguson Type OP499 output transformer is designed for use in the High Quality 60W Class "B" Power Amplifier as described in the Philips Miniwatt Digest, April, 1964.

Grain oriented steel laminations and varnish impregnation are employed to produce a transformer of high quality and reliability.

SPECIFICATION.

PRIMARY IMPEDANCE 4000 ohms plate to Plate
SECONDARY IMPEDANCE 500 Ohms, 250 Ohms, 125 Ohms
NOMINAL POWER RATING 60W (Class B)
FREQUENCY RESPONSE ATTAINABLE (-3db) 28 cps - 36 kc/s.
PRIMARY DC RESISTANCE @ 20°C 184 Ohms
SECONDARY DC RESISTANCE @ 20°C 26.0 Ohms
PRIMARY INDUCTANCE @ 20V 50 cps 190 Henries

MOUNTING

Wrap over bracket, cadmium plated firmly crimped to the core, slotted mounting feet.

TERMINATION

PRIMARY: Leads 10/.010 insulated.
SECONDARY: Leads enamelled copper wire P.V.C.sleeved.

DIMENSIONS

LENGTH 4-3/8
HEIGHT 2-1/2
WIDTH (Over Bracket) 1-5/8
WIDTH (Over Coil) 2-7/8
MOUNTING CENTRES 3-3/4
MOUNTING SLOTS 3/8 x 3/16
APPROX. WEIGHT 3 LBS

COLOUR CODE

PRIMARY Plate 1 - Brown, Plate 2 - Blue, C.T. - Red
SECONDARY Black - Common, Yellow 125 Ohms, Orange 250 Ohms
Green 500 Ohms.

MATCHING COMPONENTS

POWER TRANSFORMER PF2252
FILTER CHOKES 2 x F1/285