Transformers & Inductors

UKAS QUALITY MANAGEMENT 043 NABCB QM 016

Indusree®

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Content

COMPANY PROFILE........2
FROM CEO'S DESK........3
CONTROL TRANSFORMERS........4
AUTO TRANSFORMER........5
3 PHASE TO 1 PHASE TRANSFORMER........5
DRY TYPE LIGHTING & DISTRIBUTION TRANSFORMERS.......6
OIL COOLED TRANSFORMER........7
CONSTANT VOLTAGE TRANSFORMER........7
CURRENT TRANSFORMERS........8
CHOKES / INDUCTORS........9
IN HOUSE TESTING FACILITIES........10
SOME IMPORTANT TECHNICAL INFORMATIONS........10 & 11

Company Profile

Since 1980 INDUSREE has emerged as a leading manufacturer of different kinds of Transformers viz. Control, Lighting, Distribution, Converter Duty, Current, Power, CVT as well as Inductor, Control Panel, power supply unit, Battery Charger etc.

Backed up by a long record of success and experience, from 2008 INDUSREE has started manufacturing of CAST RESIN TRANSFORMERS in class F with complete satisfaction of customers.

"INDUSREE" maintains standard of quality assurance as per ISO 9001:2008. All our products are designed, manufactured and tested in accordance with IS and IEC standards as well as other National & International standards as per requirement of customers.

From CEO's Desk

I am privileged that you are taking interest to learn about INDUSREE and thank you for the same.

Since 1980 we are extensively engaged in manufacturing different kinds of Transformers and other electrical equipments with full satisfaction of our clients. In our factory in Kolkata we have state-of-art machineries and best possible testing facilities supported by an intelligent, experienced and enthusiast work force. We are proud of maintaining high standard of quality, competitive price and timely delivery.

Always, we look forward to opportunity to serve the esteemed clients like you and to take part in your present and future projects. We are confident that once given opportunity, we will be able to deliver you complete satisfaction of your need.

You may have some general idea about INDUSREE and our products from this brochure. Please don't hesitate to call us whenever you require any further details with regard to these.

Thanking you and assuring you always of our best technical co-operation,

Yours Sincerely,

Ajoy Kumar Sensarma
CEO **"INDUSREE"**

CONTROL TRANSFORMERS

Control Transformer

"INDUSREE" make Control transformers are open dry-type step down/stepping voltage transformers. All these transformers have electric application as a source of secondary control power.

Available capacity

From 5 VA to 50 KVA, Single or three phase, 50Hz / 60 Hz.

Application

It has a very wide range of applications like supplying most important control power in MCC, PCC & other various electrical panels. These transformers can also be used in separate enclosures individually for stand alone application.

Quality features

Windings : Transformer coils are wound with the help of high graded automatic machine, thus ensures excellent quality winding.

Core lamination: Usually 0.27mm to 0.3mm silicon steel with high permeability to ensure minimum core loss and no load current.

Insulation: The bobbin, interlayer insulation and inter winding insulation are high quality insulation like nomex paper, film, fibre glass based material, resi glass tape etc. The high quality impregnating varnishes are used for vacuum impregnation (VPI) of coils.

Clamping: Assembled Cores are fixed with box clamp / channel / angle etc. to avoid noise and mechanical breakage.

"INDUSREE" MAKE TRANSFORMER IS TYPE TESTED FROM CPRI

Terminal : To ensure good connection stud type terminals fitted in a fibre glass board are used for termination of lead. This board is shrouded by transparent acrylic sheet to protect terminals from foreign objects and mechanical damage.

Auto Transformer

"INDUSREE" make auto transformers are open/close, dry/type, have all electric application in Motor starter panel to limit starting current of and induction motor.

Tapings are available 50%, 60%, 80%, 100%.

Available capacity : From 5 KVA to 500 KVA, Three phase, 50Hz / 60HZ.

Applications : Motors, CNC machine etc. etc.

Three Phase to Single Phase Transformer

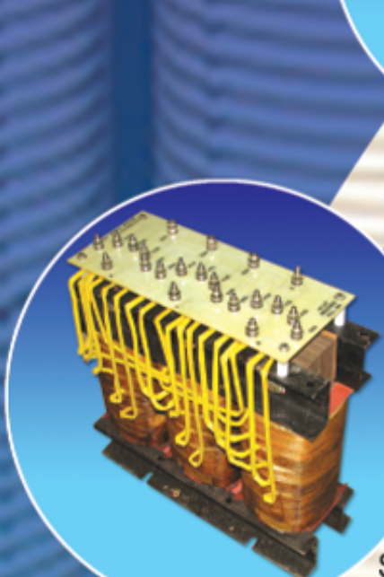
"INDUSREE" make 3ph / 1ph transformers are open / close dry / oil cooled type, are used where there is a high single phase load. Unbalance in the input side can be reduced by using this type of transformer.

Available capacity : Up to 50 KVA, 50Hz / 60 Hz

Application : UPS bypass panels, Furnace application etc.

"INDUSREE" MAKE TRANSFORMERS HELPS IN REDUCING GLOBAL WARMING

DRY TYPE LIGHTING AND DISTRIBUTION TRANSFORMERS



"INDUSREE" make Dry type Lighting & Distribution transformers are manufactured using VIP (Vacuum Pressure Impregnated) technology, resulting high quality & reliability product as well as the dielectric strength. Vacuum processed dry type transformers are safe and environment friendly equipments.

Available capacity :

10 KVA to 500 KVA, VPI / Resin Cast Type HT & LT / Single phase / Three phase, 50Hz / 60Hz.

Application

Steel plants, Power Distribution companies, High rise buildings, Oil & Gas plants, Marine, Hospitals and all Hazardious & fire prone areas.

Quality features

- High quality non-aging, cold rolled grain oriented high permeability silicon steel with thickness as low as 0.27mm are used.
- Precision cut to close tolerance using modern equipment to eliminate burrs resulting minimum loss.
- Mitre cut, stepped core construction for optimum efficiency.
- Windings are Class F or H insulated according to customers requirements.
- For Insulation Nomex paper which is under 220^0 C limit.
- Fibre glass materials are used for cylinders, spacers, ducts and dog bone.
- Mechanically robust to absorb unforcing forces during short circuit condition.
- Enclosure is made from sheet steel with a lifting arrangement on sides.

"INDUSREE" MAKE TRANSFORMER HAS LOW NO LOAD CURRENT AND NO LOAD LOSSES

Oil Cooled Distribution Transformer

"INDUSREE" make oil cooled type Distribution transformers 1ph.or 3ph, are manufactured to effectively improve the quality and reliability of electrical distribution system. Oil cooled transformers (upto 11 KV) are tested as per IS 2026/1180 for Indian Standard and matching other International standards. Vacuum processed dry type transformers are safe and Environment friendly.

Available capacity :

25 KVA to 500 KVA HT & LT / Single phase / Three phase, 50Hz / 60Hz.

Quality features

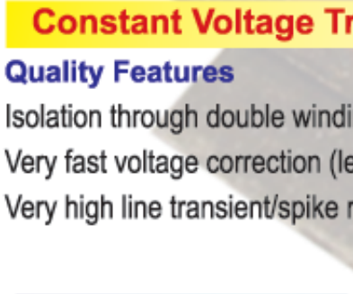
- High quality non-aging, cold rolled grain oriented high permeability silicon steel with thickness as low as 0.27mm are used.
- Precision cut to close tolerance using modern equipment to eliminate burrs resulting minimum loss.
- Mitre cut, stepped core construction for better efficiency.
- Windings are Class "A".
- For Insulation high quality craft papers are used.
- Compressed paper based material are used for cylinders, spacers, ducts.
- Mechanically robust to withstand unforcing forces during short circuit condition.
- Enclosure is made from sheet steel with a lifting arrangement on both sides.

Constant Voltage Transformer (CVT)

Quality Features

Isolation through double winding.
Very fast voltage correction (less than 40 m sec).
Very high line transient/spike rejection capability.
Intrinsic current limit and short circuit protection.
Short time overload capacity.
100 times faster than a servo voltage stabilizer.

Specifications



Input Voltage : 170 volts to 270 volts.
Line frequency : 50 Hz.
Phase : Single
Output voltage : 220/230/240 Nominal
Efficiency : 80%
Wave form : Almost sinusoidal.
Distortion : Approx. 5% under full load condition

Line Regulation : A variation of input voltage of 15% will result in only a 1% variation in output voltage.
Load Regulation : For a load variation from 50% to full load, only 3% variation in output Voltage will occur.
Class of Insulation : F or H
Effect of Frequency : Approx. 2.5% voltage change in output voltage for every 1Hz change in frequency.

CURRENT TRANSFORMERS

A current Transformer is defined as an instrument transformer working on the principle of variable flux. The current Transformer as a device protects and measures any power system. CT's are available as single, double or multi ratio units. 5A secondary is standard but 1A secondary is also available in the product palate of INDUSREE.

Applications

- To reduce line current to a value, which is suitable for standard measuring instruments, relays, etc.
- To isolate the measuring instruments, meters, relays, etc. from line voltage of an installation.
- To protect measuring instruments against short circuit currents.
- To sense abnormalities in current and give current signals to protective relays to isolate the defective system.

The Standard Accuracy classes are available as 0.2, 0.5, 1, 3 & 5.

Limits of error for above Standard Accuracy Class are as follows:

RATIO ERROR

± Ratio Error at % of Rated Current

Accuracy Class	5%	20%	50%	100%	120%
0.2	0.75	0.35	-	0.20	0.20
0.5	1.50	0.75	-	0.50	0.50
1.0	3.00	1.50	-	1.00	1.00
3.0			3.0		3.0
5.0			5.0		5.0

PHASE ANGLE ERROR

± Phase displacement in minutes at % of Rated Current

Accuracy Class	5%	20%	50%	100%	120%
0.2	30	15	-	10	10
0.5	90	45	-	30	30
1.0	180	90	-	60	60

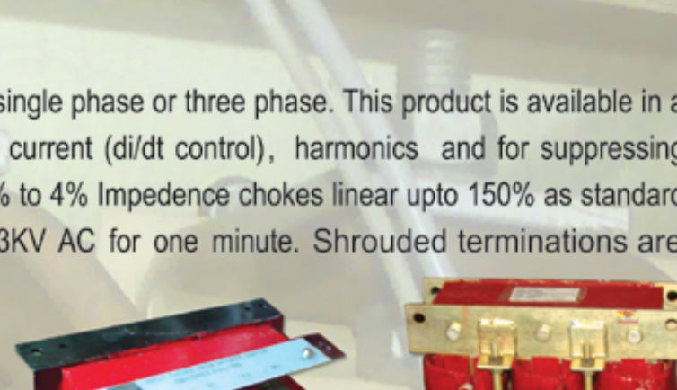
"INDUSREE" MAKE ENERGY EFFICIENT TRANSFORMER LEADS TO CO2 REDUCTION

CHOKES / INDUCTORS

Chokes / Inductors

INPUT CHOKES

The line chokes are used mostly in drives. These are either single phase or three phase. This product is available in a variety ranging from 1Amp to 2000 Amp for reducing input current (di/dt control), harmonics and for suppressing spikes and surges. Our line chokes are mostly air-cooled. 2% to 4% Impedence chokes linear upto 150% as standard product . All LT chokes are tested for insulation level at 3KV AC for one minute. Shrouded terminations are used for safe handling, custom designs for other ratings are also available.



OUTPUT CHOKES

Used in output line of AC drives for long distance cable to a Motor. 1% to 2% Impedence Chokes linear upto 110% as standard product. All LT chokes are tested for insulation level at 3KV AC for one minute. We design and build AC as well as DC chokes as per customers' requirements. We also offer standard designs to support power factor controllers, where the chokes are built to reduce harmonics.

Design

- Core : CRGO/CRNO laminated cores.
- Windings : Super enameled class "F" OR "H" insulated copper wires.
- Bobbins : Fibre Glass.
- Windings : Vacuum impregnated with class "F"or "H" Varnish.
- Terminals : Stud type for robust contact.
- Mounting : Floor mounted / wall mounted.

D.C. Iron core & Air Core Reactors Chokes upto 2000Amps are also available.

HT Potential Transformer

"INDUSREE" make L. T. potential transformers are 1 ph. or 3 ph, open dry-type, step down / stepping voltage transformers.

Available capacity

25VA, 50VA & 100VA Single or three phase, 50Hz / 60 Hz.

Application

These potential transformers are usually fitted with switch boards, electrical panels, motor control centre (MCC) etc. as isolated low voltage power for voltmeter, indicating lamp and for small control voltages.

International Standard

"INDUSREE" make potential transformers meet standards recommended by the IS, IEC, IEEE, ANSI and other international standards.

ALL INSTRUMENTS ARE CALLIBRATED FROM AUTHORISED TEST HOUSES

SOME IMPORTANT TECHNICAL INFORMATIONS

In House Testing Facilities

All **"INDUSREE"** make transformer go through the Routine test (as per Indian Standard) as follows:

1. Insulation Resistance
2. Winding Resistance
3. No load loss & current
4. Ratio, Polarity & Phase relationship
5. Short-circuit Impedence Voltage & Load loss
6. Separate- source AC withstand voltage test
7. Induced AC withstand test

Temperature Rise test is also carried out on **INDUSREE** make transformers which is under Type test.

Enclosures

As per customers requirements Enclosures with IP Protection as per IS 2147 (from IP00 to IP65) are made.

Temperature Monitoring

"INDUSREE" make Dry type Transformer is with Temperature control/monitoring by PT100/PTC sensors & a relay output

Gauge	Black Sheet Standard Thickness mm	Approx. Theoretical Weight in sq. metre
10	3.15	24.75
11	2.8	22
12	2.5	19.6
13	2.24	17.6
14	2	15.7
15	1.8	14.15
16	1.6	12.55
17	1.4	11
18	1.25	9.8
19	1.12	8.8
20	1	7.85
21	0.9	7.05
22	0.8	6.3
24	0.63	4.95

Sound Levels

All Transformers sound level will not exceed the limit below as per ANSI & NEMA ST -20

UPTO	
9 KVA	40 dB
10-50 KVA	45 dB
51-150 KVA	50 dB
151-300 KVA	55 dB
301-500 KVA	60 dB

Copper

Density : 8.9g / Cm^3
Resistivity at 20^{0}C : 0.0168 micro Ohm.m

Aluminium

Density : 2.7g / Cm^3
Resistivity at 20^{0}C : 0.02655 micro Ohm.m

Some Indian Standards Related to Transformers

Specification of Power Transformers	IS 2026 (Part I - V)
Specification of Dry Type Transformer	IS 11171
Specification of Current Transformer	IS 2705 (Part I - IV)
Specification of Voltage Transformer	IS 3156 (Part I - IV)
Specification of New Insulating Oil	IS 335
Specification of Control Transformer for switchgear & control gear fo voltages not exceeding 1000 V A. C.	IS 12021
Specifiation of Outdoor Three Phase Distribution Transformer upto and including 100 KVA , 11 KV	IS 1180 (Part I - II)
Classification of Insulating materials for electrical Machinery and apparatus in relation to their thermal stability in service	IS 1271
Degree of Protection provided by Enclosures for Low Voltage Switchgear and control gear	IS 2147

RELATED TO TRANSFORMERS

Class of Insulation

We are using excellent Insulating materials like Nomex paper, Glass tapes, Film etc. which are strong enough & better in dielectric strength. As a result we can increase the maximum allowable temperature. Thus, the overload strength is strong especially in case of Dry type transformers. The Nomex paper is aging resistant and having great toughness and elastic properties. Therefore the transformer remains at the best condition for whole of its life. Always we maintain the rise in maximum temperature limited to the previous class of insulation than the class claimed. As an example, when we claim class of insulation as "H", definitely temperature rise will be restricted to class "F". Usually we consider Ambient temperature as 45^0 C, if not specified by the client otherwise.

Class of Insulation and the Temperatures Assigned to them are as follows:

"A" - 105^0 C "E" - 120^0 C "B" - 130^0 C "F" - 155^0 C "H" - 180^0 C "C" - above 180^0 C

Wire Gauge Table

SWG	Bare Dia in mm	Bare Area in sq.mm	SWG	Bare Dia in mm	Bare Area in sq.mm
1	7.62	45.6	23	0.61	0.292
2	7.01	38.6	24	0.559	0.245
3	6.4	32.2	25	0.508	0.203
4	5.89	27.3	26	0.457	0.164
5	5.38	22.8	27	0.417	0.136
6	4.88	18.7	28	0.376	0.111
7	4.47	15.7	29	0.345	0.0937
8	4.06	13	30	0.315	0.0779
9	3.66	10.5	31	0.295	0.0682
10	3.25	8.3	32	0.274	0.0591
11	2.95	6.82	33	0.254	0.0507
12	2.64	5.48	34	0.234	0.0429
13	2.34	4.29	35	0.213	0.0357
14	2.03	3.24	36	0.193	0.0293
15	1.83	2.63	37	0.173	0.0234
16	1.63	2.07	38	0.152	0.0182
17	1.42	1.59	39	0.132	0.0137
18	1.22	1.17	40	0.122	0.0117
19	1.02	0.811	41	0.112	0.0098
20	0.914	0.657	42	0.102	0.0081
21	0.813	0.519	43	0.091	0.0066
22	0.711	0.397	44	0.081	0.0052

Full Load Current in Amps in Single Phase Circuit

KVA	110 V	220 V	415 V	440 V
0.5	4.5	2.3	1.2	1.1
0.75	6.8	3.4	1.8	1.7
1	9.1	4.5	2.4	2.3
1.5	13.6	6.8	3.6	3.4
2	18.2	9.1	4.8	4.5
3	27.3	13.6	7.2	6.8
5	45.5	22.7	12	11.4
7.5	68	34	18.1	17
10	90.9	45.5	24	22.7
15	136	68	36	34
25	227	114	60	56
35	318	159	84	79
50	454	227	120	113
75	681	340	181	170
100	909	454	241	227

Full Load Current in Amps in Three Phase Circuit

KVA	110 V	220 V	415 V	440 V
1	5.24	2.6	1.39	1.3
3	15.8	7.9	4.17	3.93
4.5	23.6	11.8	6.26	5.9
5	26	13	6.96	6.56
6	31.53	15.8	8.35	7.9
9	47.24	23.6	12.5	11.8
10	52.49	26	13.9	13
15	78	39.4	20.9	19.68
30	156	78	41.7	39
45	236	118	62.7	59
75	394	197	104.3	98.4
100	525	263	139	131

WE EARN CUSTOMERS' SATISFACTION

INDUSREE MEANS

I - Integrity
N - Nationality
D - Diversification
U - Upgradation
S - Service
R - Reliability
E - Endeavour
E - Efficiency

OUR VALUED CLIENTS

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BENGAL ENGINEERING COLLEGE
BHEL
BSP
D.G.Q.A. NEW DELHI
DANIELI INDIA LTD.
DSP
DVC
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HAL
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IISCO
IOCL
ITC LTD.
JADAVPUR UNIVERSITY
JUSCO
KIRLOSKAR BROTHERS LTD.
L&T LTD.
MECON LTD.
NALCO
NTPC
ONGC LTD.
ROCKWELL AUTOMATION (INDIA) PVT.LTD.
SAIL (DSP, RSP, IISCO, BSP)
SCHNEIDER ELECTRIC (INDIA) PVT.LTD.
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TATA PROJECTS LTD.
TATA STEEL LTD.
TCE CONSULTING ENGINEERS LTD.
TRF LTD.
UTKAL ALUMINA INTERNATIONAL LTD.
VSP
AND MANY OTHERS

Indusree®
QUALITY POLICY
INDUSREE COMMITS TO ENSURE CONSISTENCY IN QUALITY OF PRODUCTS AND TIMELY DELIVERY ACCORDING TO CUSTOMER REQUIREMENTS AND MAKE CONTINUAL IMPROVEMENT OF QUALITY MANAGEMENT SYSTEM INVOLVING ALL CONCERNED BY ADEQUATE COMMUNICATION, TRAINING AND REVIEW MEETING.

ALL OF OUR PRODUCTS ARE WITH HOLOGRAMS

2015
Rev 1

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ISO 9001:2008 CERTIFIED ORGANISATION

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