High quality construction; wide range of ratings available

Drive isolation transformer

Eaton's motor drive isolation transformers are manufactured using high quality construction and are available in a wide range of ratings to meet specific voltage conversion requirements. Motor drive isolation transformers can be used anywhere a variable frequency drive is being utilized such as mining, oil and gas, pumping stations, manufacturing, and industrial facilities.

Drive isolation transformers are specifically sized to the drive kVA requirements and are braced to withstand the mechanical stresses of current reversals and short circuits associated with SCR (Silicon Controlled Rectifier) drives.

- Suitable for applications indoor or outdoor
- Ventilated enclosures
- 220°C insulation system
- 150°C rise standard (self extinguishing) 115°C or 80°C rise optional
- Available in ratings from 7.5 through 1500 kVA

Eaton's drive isolation transformers provide:

- Electrical isolation between the incoming line and the drive circuitry
- Built-in winding thermo guard
- Voltage conversion of input line to standard drive input voltage
- Minimized line disturbances caused by SCR firing
- Reduced short circuit currents and voltage line transients
- Harmonic filtering to the incoming power

Why use a motor drive isolation transformer?

There is a wide variety of motor drives; however, they all share a common characteristic: the incoming power needs to be rectified to form a DC level.

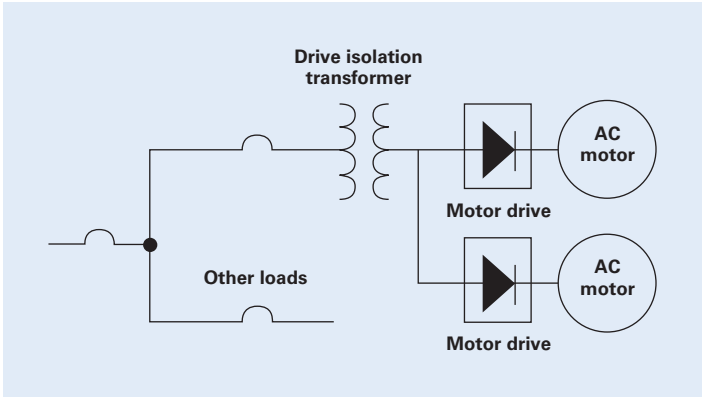
The motor drive transmutes the power AC-DC-AC with a three-phase rectifying bridge for the AC-DC transition using a SCR.

This transition from AC to DC generates electrical noise also known as harmonics. A transformer used as an isolation drive element is particularly vulnerable to harmonic currents (high frequency currents); as the frequency increases the heating and mechanical stress caused become critical. Eaton's drive isolation transformers are designed specially to handle the mechanical stresses, voltage distortions, and heating associated with the usage of motor drives.

Powering Business Worldwide

Drive isolation transformers are installed between the incoming power supply and the motor drive or bank of drives. The benefits provided by the motor drive isolation transformer are pretty much the same for both the AC motor drive and the DC motor drive.

Some of the most convenient functions of the isolation transformer are:

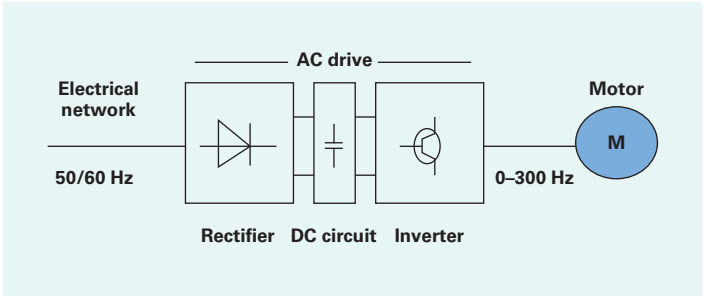


Voltage conversion

Motors are normally available in voltage ratings of 230V, 460V, and 575V. Sometimes a voltage change may be required to link the drive and motor needs to the power supply.

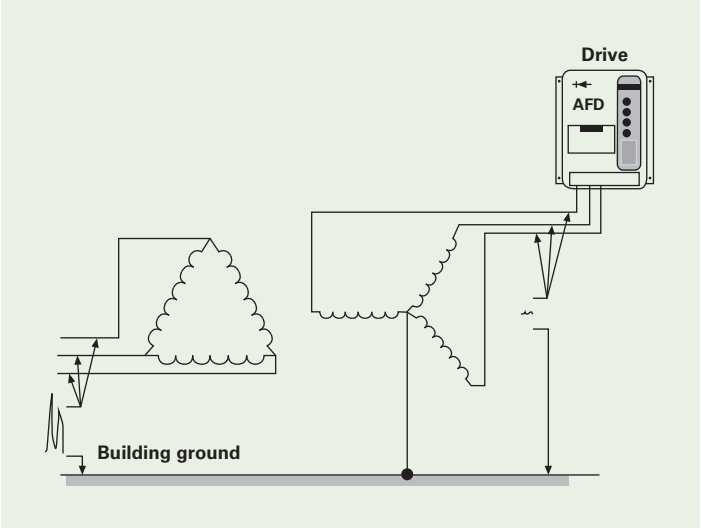
Common-mode noise reduction

AC drive systems are connected to the main line through a rectifier. There is a DC link between the rectifier and the inverter; this DC stage creates a common voltage by nature.



Common-mode voltages can cause motor bearing currents, line to ground voltage transient and other noise problems in the system.

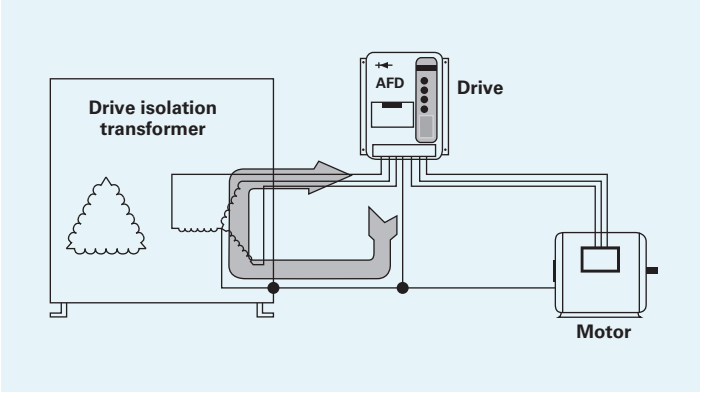
Delta-wye connected drive isolation transformers can establish a ground reference on the secondary side; grounding the secondary side will prevent the transfer of common-mode noise and significantly improve the reliability and safety of the system.



Induced ground currents[1]

Ground currents are due to the action of the diodes, SCR or inverters. These elements create a capacitive link through the ground back to the supply.

By grounding the secondary side of the transformer the induced ground currents will flow back through the grounding system.



[1] High-frequency induced ground currents can cause data corruption in digital communication and triggering of the ground fault systems.

Winding heating

The motor drive system creates a wave distortion of the current on the line; these distortions are high frequency currents that return from the drive to the transformer winding.

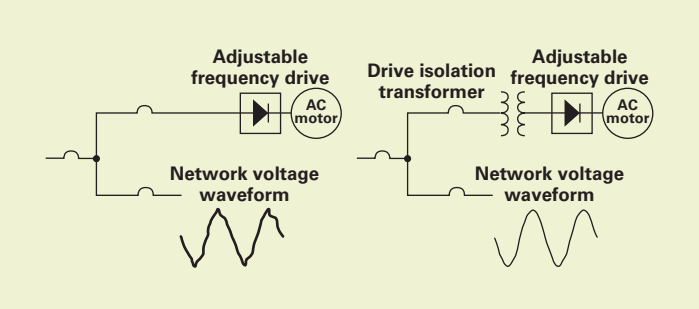
These currents can greatly increase the eddy-current losses in the windings; these extra watts must be considered in the temperature rise calculation when a new transformer is specified. Eaton's drive isolation transformers are specifically designed to handle the high frequency currents from the drive.

Since the high temperatures in the winding can result in reduction of the lifetime of the transformer or even a catastrophic failure, Eaton's drive isolation transformers include a thermo guard protection embedded in coils to indicate that high temperatures are present. Thermo guards consist of a set of NO dry contacts.

Non-linear voltage

In the incoming voltage rectification, the SCR, Pulse Width Modulation (PWM) and other components are present in the motor drive construction. For a brief period of time, more than one is on at the same moment creating a short; this instantaneous short causes a distorted voltage that will travel to the supply source affecting the electrical equipment on the network.

The isolation transformers are specifically built to withstand the stress due to voltage distortion, at the same time transformer reactance reduces the distortion of the voltage waveform of the incoming supply.



Features, benefits, and functions

- 60 Hz operation (50/60 Hz operation available)
- Short-term overload capability as required by ANSI
- Primary and secondary terminals are front accessible for fast and easy connection
- Slotted screw mounting holes in enclosure and cover reduce installation time
- Sound dampening pads, which isolate the core and coil from the case, reduce noise levels to meet NEMA® ST-20
- Core laminations of precision sheared silicon steel are hand stacked to ensure quiet operation
- Terminations are clearly marked for easy identification
- Three-phase transformers have one five-percent full capacity tap above and below nominal voltage for incoming source adjustment
- Units are suitable for continuous operation in a 40°C ambient maximum
- Full current neutral
- Thermo guard protection embedded in coils of three-phase models to indicate that high temperatures (approximately 190°C) are present; thermo guards consist of a set of NO dry contacts
- Three coil delta-wye configurations are used throughout the product line

Standards and certifications

- ANSI C89.2
- NEMA ST-20
- UL® 5085-1
- UL 5085-2
- UL 1561
- Seismic qualified

Optional

- Copper windings
- Non-standard voltages
- 50/60 Hz designs
- Delta-delta configuration
- 80°C or 115°C rise designs
- Encapsulated designs[2] (up to 34 kVA)
- Totally enclosed non-ventilated
- Electrostatic shields

[2] Thermo guards are not available on encapsulated designs.

Ordering information

12 345 6 78 9 10

Type	
Code	**Type**
MD	Motor drive
HD	MD K Factor=4
ND	MD K Factor=13
GD	MD K Factor=20

Equivalent table hp->kVA	
hp	**kVA**
5	7.5
7.5	11
10	14
15	20
20	27
25	34
30	40
40	51
50	63
60	75
75	93
100	118
125	145
150	175
200	220
250	275
300	330
400	440
500	550

kVA's	
Code	**kVA**
075	7.5
11	11
14	14
20	20
27	27
34	34
40	40
51	51
63	63
75	75
93	93
118	118
145	145
175	175
220	220
275	275
330	330
440	440
550	550
660	660
770	770

Tap configuration	
Code	**kVA**
E	1@+5%, 1@-5%
D	2@+2.5%, 2@-2.5%
F	1@-10%
G	2@-5%
J	4@-2.5%
M	2@+2.5%, 4@-2.5%
N	None
R	1@+5%, 2@-5%
T	1@+4.2%, 1@-4.2%
U	1@+2.5%, 3@-2.5%
W	1@+3.5%, 1@-3.5%
X	2@+3.1%, 2@-3.1%
Z	Special/unlisted

Voltage					
Code	**Primary voltage**	**Secondary voltage**	**Code**	**Primary voltage**	**Secondary voltage**
00	Special/ unlisted	Special/ unlisted	82	230 D	208Y/120
65	380 D	230Y/133	83	208 D	208Y/120
66	460 D	380Y/220	84	240 D	480 D
67	380 D	380Y/220	85	208 D	230Y/133
68	460 D	208Y/120	86	208 D	460Y/266
69	480 D	400Y/231	87	208 D	480 D
70	480 D	380Y/220	88	230 D	230Y/133
71	550 D	460Y/266	89	230 D	460Y/266
72	416 D	460Y/266	90	230 D	575Y/332
73	460 D	460 D	91	460 D	230Y/133
74	460 D	120Y/69	92	460 D	460Y/266
75	460 D	400Y/231	93	460 D	575Y/332
76	380 D	460Y/266	94	575 D	230Y/133
77	480 D	240 D	95	575 D	460Y/266
78	440 D	440Y/231	96	575 D	575Y/332
79	480 D	480Y/277	97	575 D	480 D
80	208 D	220Y/127	98	600 D	480 D
81	575 D	208Y/120	99	480 D	480 D

Features	
Code	**Feature**
Y	Encapsulated
ES	Electrostatic shield
CU	Copper windings
F	115ºC rise
B	80ºC rise
CSA®	Canadian standard design
CE	Standard for European community CE

E.g. catalog number: MD075E86F
Motor drive isolation transformer
7.5 kVA, for a 5 hp motor drive
Taps at 1@+5%, 1@-5%
208 D primary voltage
460Y/266 secondary voltage
115ºC temperature rise (optional feature)

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