Reactor

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Introduction

Dry-type iron-core series reactors are applied in low-voltage reactive power compensation cabinets in series with capacitors. When a large number of harmonic sources such as rectifiers and converters exist in the low-voltage power grid, the high-order harmonics generated will seriously endanger the safe operation of the main transformer and other electrical equipment.

When connected in series with capacitors, such reactors can effectively absorb grid harmonics, optimize the system voltage waveform, and improve the system power factor. They can also significantly suppress switching inrush currents and switching overvoltages, providing reliable protection for capacitors.

Special input and output reactors for frequency converters are generally installed at the input or output terminals of frequency converters and DC speed regulators. They can prevent harmonics generated by frequency converters from transmitting back to the power grid, reduce harmonic interference to other components, enhance power quality, raise the power factor, limit abnormal voltage fluctuations and surge currents in the grid, smooth voltage waveforms, and mitigate impacts on frequency converters.

When installed at the output side, these reactors limit the capacitive charging current of the connecting cables between frequency converters and motors, and slow down the voltage rise rate of the PWM waveform generated by frequency converters.

As one of the key components between frequency converters and motors, they effectively improve the power factor and compensation performance, optimize power quality and smooth electrical waveforms.

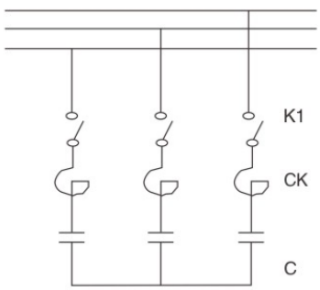
Knowledge on the application of reactors

1.Selection of Reactance Rate

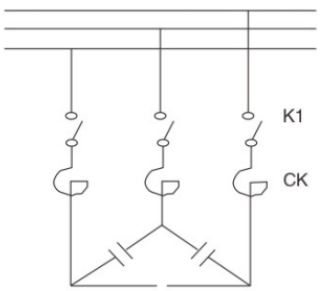
The selection of reactance rate is rather complicated, because power harmonics themselves are unstable: their magnitude and frequency both change continuously. A properly selected reactance rate that suppresses a certain order of harmonics may amplify other orders of harmonics. Generally speaking, for the 3rd harmonic, a reactance rate of 12%–14% is mostly adopted; for the 5th harmonic, a reactance rate of 4.5%–7% is commonly used. Practical experience shows that a slightly higher reactance rate is beneficial to safe operation.

2.Wiring Mode

2.1 Wiring of Series Reactors



Y-type connection



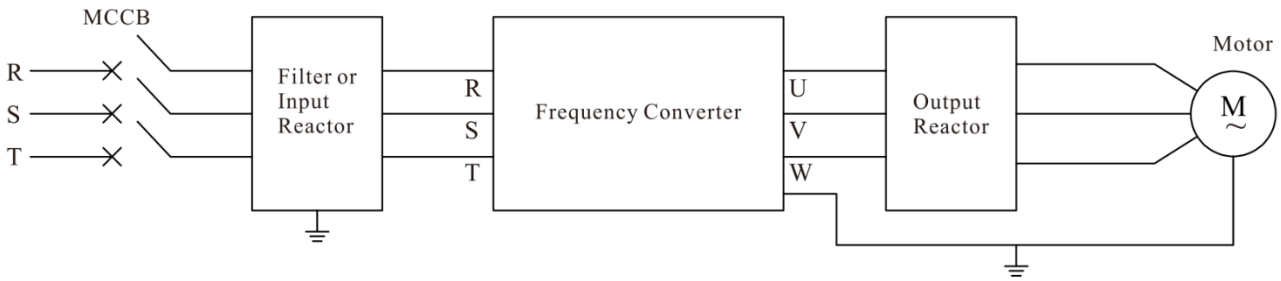
△-type connection

K1: Contactor

CK： Reactor

C: Capacitor

2.2 Wiring of Incoming and Outgoing Line Reactors



3 Technical Parameters

3.1 Series Reactor

a) Applicable to 400V and 660V systems.

b) Reactance rate types: 1%, 6%, 7%, 12%, 13%, 14%;

c) Rated insulation level: 3kV/min.

d) Temperature rise limits for each part of the reactor: core not exceeding 85K, coil temperature rise not exceeding 95K.

e) The reactor can operate for a long time under power frequency plus harmonic current not greater than 1.35 times the rated current.

f) The reactance difference between any two phases of a three-phase reactor is no more than ±3%, and the heat resistance grade is above Class HF (180°C).

3.2 Inlet and Outlet Reactor

a) Rated operating voltage: 380V/440V 50Hz

b) Rated operating current: 5A to 1600A @ 40°C

c) Dielectric strength: core-winding 3000VAC/50Hz/5mA/10s, no arc breakdown (factory test)

Insulation resistance: insulation resistance ≥ 100MΩ at 1000VDC; reactor noise: less than 65dB (tested at 1 meter horizontal distance from the reactor);

d) Protection grade: IP00; insulation grade: Class F or above.

CKSG Series three-phase dry-type reactor

Three-phase dry-type series reactors are used in low-voltage reactive power compensation cabinets in series with power capacitors.

When a large number of rectifiers and converters in the low-voltage power grid generate harmonics, the resulting high-order harmonics will seriously endanger the safe operation of the main transformer and other electrical equipment.

Connected in series with capacitors, the reactors can effectively absorb grid harmonics, optimize the system voltage waveform, and improve the system power factor. They can also reliably suppress switching inrush currents and switching overvoltages, so as to protect power capacitors.

TYPE	Matching capacitor capacity kvar	Reactor capacity kvar	Rated current A	Inductance mH	Overall dimensions mm	Mounting dimensions mm
CKSG-0.6/0.45-6%	10	0.60	12.83	3x3.87	190x160x170	150x85-ø8
CKSG-0.9/0.45-6%	15	0.90	19.24	3x2.58	190x170x170	150x95-ø8
CKSG-1.2/0.45-6%	20	1.20	25.66	3x1.94	190x170x170	150x95-ø8
CKSG-1.5/0.45-6%	25	1.50	32.07	3x1.55	230x150x190	190x75-ø8
CKSG-1.8/0.45-6%	30	1.80	38.49	3x1.29	230x160x190	190x85-ø8
CKSG-2.4/0.45-6%	40	2.40	51.31	3x0.97	230x170x190	190x95-ø8
CKSG-3.0/0.45-6%	50	3.00	64.14	3x0.77	265x210x230	200x110-ø8
CKSG-3.6/0.45-6%	60	3.60	76.97	3x0.65	265x210x230	200x110-ø8
CKSG-0.710.45-7%	10	0.70	12.83	3 x4.52	190x160x170	150x85-ø8
CKSG-1.05/0.45-7%	15	1.05	19.24	3x3.01	190x170x170	150x95-ø8
CKSG-1.4/0.45-7%	20	1.40	25.66	3x2.26	230x150x190	190x75-ø8
CKSG-1.75/0.45-7%	25	1.75	32.07	3x1.81	230x160x190	190x85-ø8
CKSG-2.1/0.45-7%	30	2.10	38.48	3x1.51	230x170x190	190x95-ø8
CKSG-2.8/0.45-7%	40	2.80	51.31	3x1.13	230x180x190	190x105-ø8
CKSG-3.5/0.45-7%	50	3.50	64.14	3x0.90	265x220x230	200x120-ø8
CKSG-4.210.45-7%	60	4.20	76.97	3x0.75	265x220x230	200x120-ø8

Note： The above specifications are common ones for reference only. Reactors with other voltage levels, different capacities, and different reactance rates can be manufactured according to user requirements.