



# SOFT STARTER BK-ZHR SERIES 0.37KW-400KW

In-Line/Built-in Bypass/Bypass

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## Product Overview

The BKPOWER ZHR series intelligent motor soft starter is a multi-functional solution for three-phase AC asynchronous motors, offering various configurations including online, built-in bypass, and external bypass to meet diverse application needs.

It provides multiple starting modes—voltage ramp start, current-limiting start, and torque control start—as well as multiple stopping modes, including free stop and timed soft stop, ensuring smooth acceleration and deceleration to minimize mechanical stress and grid interference.

Designed for high reliability, precise control, and easy maintenance, the ZHR9 series meets the demanding requirements of pumps, fans, conveyors, compressors, and other critical equipment across industrial automation, water treatment, mining, and HVAC applications.

## Applications

- General Machinery & Light Industry Equipment
- Pumps & Water Treatment Equipment
- Fans & HVAC Systems
- Construction & Building Materials Field
- Agricultural & Livestock Equipment





## Technical Advantages

### ■ Contactless Solid-State Design

Utilizes high-reliability thyristors instead of mechanical contactors for smooth voltage ramping. Eliminates contact wear, arcing, and mechanical failure—enhancing system durability, reducing maintenance, and extending service life.

### ■ Intelligent Control & Human-Machine Interface

Built-in microcontroller with LCD display provides real-time monitoring of voltage, current, power, status, and fault codes. Intuitive menus support quick parameter setting, diagnostics, and bilingual (Chinese/English) operation.

### ■ Wide Voltage Adaptability

Stable operation under  $\pm 15\%$  input voltage fluctuation (customizable). Intelligent control algorithms ensure smooth motor acceleration and reliable performance even in weak or unstable grid conditions.

### ■ Flexible Configuration & System Integration

Available in online, built-in bypass, and external bypass models to meet diverse application needs. Supports multiple voltage levels, IP-rated enclosures, and RS485 communication (Modbus-RTU), enabling seamless integration with PLCs and industrial automation systems.

## Product Features

### ■ Triple Start Modes, Adapt to Diverse Loads

Supports voltage ramp start, current-limiting star, and torque start, flexibly matching different equipment characteristics.

### ■ Comprehensive Protection System, Safe & Reliable

Integrates 10+ core protections including input/output phase loss, overload, overcurrent, overvoltage, undervoltage, underload, overheating, and phase sequence error. Dual overload protection avoids equipment failure under heavy loads, extending motor service life.

### ■ Intelligent Communication & Centralized Control

Equipped with RS485 communication interface and Modbus-RTU protocol, supporting remote start/stop, parameter adjustment, and fault monitoring. Facilitates centralized management of multiple devices, reducing on-site operation costs.

### ■ Pump-Specific Custom Functions, Scenario Optimization

Supports 4 pump-matching functions, optimizing start-stop logic for water supply/drainage systems and realizing automatic operation of pump equipment.

### ■ Flexible Installation & Strong Expandability

Supports wall-mounted installation (soft starter) and cabinet-type installation (soft starter cabinet), adapting to different on-site space requirements. Optional programming relays and 4-20mA analog output meet personalized expansion needs.

### ■ Stable Heat Dissipation & Environmental Adaptability

Forced air cooling design and sealed heat dissipation structure effectively isolate dust and moisture.



## Specifications-BK-ZHR9 Series(In-Line Soft Starter)

Basic Information	Power (KW/HP)	15KW/20HP, 18.5KW/25HP, 22KW/30HP, 30KW/40HP, 37KW/50HP, 45KW/60HP, 55KW/75HP, 75KW/100HP, 90KW/120HP, 115KW/150HP, 135KW/176HP, 160KW/215HP, 185KW/240HP, 200KW/270HP, 225KW/295HP, 250KW/350HP, 285KW/380HP, 320KW/420HP, 350KW/485HP, 400KW/550HP
	Type	Online (Non-Bypass) Intelligent Soft Starter(Solid-State, 6 SCR Full-Wave Control)
	Applicable Motor	Squirrel-cage Three-phase Induction Motor
	Power Range	220V System: 15 kW – 220 kW; 380V System: 15kW – 400 kW
	Rated Current	11A – 800A (User-settable via F00)
	Connection Method	Line (Star/Y) or Internal Delta ( $\Delta$ ) connection
Electrical Characteristics	Input Voltage	220V / 380V AC $\pm 15\%$ (Three-phase)
	Input Frequency	30 Hz – 70 Hz (Auto-adaptive)
	Control Power	Built-in (No external 24V required for control logic)
	Output Voltage Control	Phase-angle control via thyristors (30%–80% start voltage adjustable)
Control & Operation	Start Modes	Voltage Ramp (Default) , Current Limiting, Torque Control
	Stop Modes	Free Stop; Timed Soft Stop (0–60 s adjustable)
	Start Time	1 – 120 s
	Start Current Limit	50% – 600% of motor rated current ( $I_e$ )
	Initial Voltage	30% – 80% $U_e$
	Maintenance Voltage	60% – 85% $U_e$ (F08)
	Early/Late Acceleration	Adjustable (F09, F11)
Protection	Built-in Protections	Input Phase Loss, Output Phase Loss, Overload (Class 1–30), Start Overcurrent, Run Overcurrent, Overvoltage, Undervoltage, Underload, Phase Sequence Error, Current Unbalance; Module Overheat; External Fault Input; Thyristor Breakdown
	Protection Response	Configurable: Trip or Ignore (via F41–F49)
	Overload Curve	IEC Standard Inverse-time (Adjustable Class 1–30 via F21)
Control & I/O	Digital Inputs	3 Programmable (IN1, IN2, IN3) + 24V COM; Functions: Start, Stop, External Fault
	Relay Outputs	Relay 1: TA1/TB1/TC1 (Common/NC/NO); Relay 2: TA2/TC2 (NO only, optional)
	Relay Functions	Selectable: Power-on, Soft-start, Bypass, Soft-stop, Running, Standby, Fault
	Analog Output	1 Channel: 4–20mA (Scalable 50%–500% $I_e$ via F17)
	Communication	RS485 (Modbus RTU Protocol)
User Interface	Display	LCD with Backlight (Chinese / English)
	Keypad	Local Start/Stop, Parameter Setting, Fault Reset
	LED Indicators	READY (Standby), RUN (Start/Run/Soft-stop), TRIP (Fault), LOCAL

## Specifications-BK-ZHR10 Series(Built-in Bypass)

Basic Information	Power (KW/HP)	0.37KW/0.5HP, 0.75KW/1HP, 3KW/4HP, 7.5KW/10HP, 15KW/20HP, 18.5KW/25HP, 22KW/30HP, 30KW/40HP, 37KW/50HP, 45KW/60HP, 55KW/75HP, 75KW/100HP, 90KW/120HP, 115KW/150HP
	Type	Built-in Bypass Intelligent Soft Starter (Solid-State, 6 SCR Full-Wave Control)
	Applicable Motor	Squirrel-cage Three-phase Induction Motor
	Rated Current	Corresponds to motor rated current (user-settable via F01)
	Connection Method	Star (Y) or Internal Delta ( $\Delta$ ) connection supported
Electrical Characteristics	Input Voltage	220V / 380V AC $\pm 15\%$ (Three-phase)
	Input Frequency	50/60 Hz $\pm 5\%$
	Control Power	Built-in (No external 24V required; A1/A2 for internal power)
	Output Voltage Control	Phase-angle control via thyristors (30%–80% start voltage adjustable)
Control & Operation	Start Modes	Voltage Ramp (Default), Current Limiting
	Stop Modes	Free Stop; Timed Soft Stop (0–60 s adjustable)
	Start Time	1 – 120 s
	Start Current Limit	50% – 600% of motor rated current ( $I_e$ )
	Initial Voltage	30% – 80% $U_e$ (Minimum 37% in closed-loop mode)
Protection	Built-in Protections	Input Phase Loss, Output Phase Loss, Overload (Class 1–30), Start Overcurrent, Run Overcurrent, Underload, Thyristor Breakdown, External Fault Input, Startup Timeout
	Protection Response	Configurable: Trip or Ignore (via F27–F34)
	Overload Curve	IEC Standard Inverse-time (Adjustable Class 1–30 via F14)
Control & I/O	Digital Inputs	3 Programmable (IN1, IN2, IN3) + 12/24V COM; Functions: Start, Stop, External Fault
	Relay Outputs	Relay 1: TA/TB/TC (Common/NC/NO); Relay 2: TA2/TC2 (for 18.5–115kW models)
	Relay Functions	Selectable: Power-on, Soft-start, Bypass, Soft-stop, Running, Standby, Fault
	Analog Output	1 Channel: 4–20mA (Scalable via F44–F46, optional)
	Communication	RS485 (Modbus RTU Protocol)
User Interface	Display	LCD with Backlight (Chinese / English)
	Keypad	Local Start/Stop, Parameter Setting, Fault Reset
	LED Indicators	READY (Standby), RUN (Start/Run/Soft-stop), TRIP (Fault), LOCAL



## Specifications-BK-ZHR8 Series(Bypass)

Basic Information	Power (KW/HP)	5.5KW/7HP, 7.5KW/10HP, 11KW/15HP, 15KW/20HP, 18.5KW/25HP, 22KW/30HP, 30KW/40HP, 37KW/50HP, 45KW/60HP, 55KW/75HP, 75KW/100HP, 90KW/120HP, 115KW/150HP, 135KW/176HP, 160KW/215HP, 185KW/240HP, 200KW/270HP, 225KW/295HP, 250KW/350HP, 285KW/380HP, 320KW/420HP, 350KW/485HP, 400KW/550HP
	Type	Bypass-Type Intelligent Soft Starter(Solid-State, 6 SCR Full-Wave Control)
	Applicable Motor	Squirrel-cage Three-phase Induction Motor
	Rated Current	11A – 800A (User-settable via F00)
	Connection Method	Line (Star/Y) connection only
Electrical Characteristics	Input Voltage	220V / 380V AC $\pm 15\%$ (Three-phase)
	Input Frequency	30 Hz – 70 Hz (Auto-adaptive)
	Control Power	Built-in (No external 24V required for control logic)
	Output Voltage Control	Phase-angle control via thyristors during start/stop
Control & Operation	Start Modes	Voltage Ramp (Default) , Current Limiting, Torque Control
	Stop Modes	Free Stop; Timed Soft Stop (0–60 s adjustable)
	Start Time	1 – 120 s
	Start Current Limit	50% – 600% of motor rated current ( $I_e$ )
	Initial Voltage	30% – 80% $U_e$
	Maintenance Voltage	60% – 85% $U_e$ (F08)
	Early/Late Acceleration	Adjustable (F09, F11)
Protection	Built-in Protections	Input Phase Loss, Output Phase Loss, Overload (Class 1–30), Start Overcurrent, Run Overcurrent, Overvoltage, Undervoltage, Underload, Phase Sequence Error, Current Unbalance; Module Overheat; External Fault Input; Thyristor Breakdown
	Protection Response	Configurable: Trip or Ignore (via F41–F49)
	Overload Curve	IEC Standard Inverse-time (Adjustable Class 1–30 via F21)
Control & I/O	Digital Inputs	3 Programmable (IN1, IN2, IN3) + 24V COM; Functions: Start, Stop, External Fault
	Relay Outputs	Relay 1: TA1/TB1/TC1 (Common/NC/NO); Relay 2: TA2/TC2 (NO only, optional)
	Relay Functions	Selectable: Power-on, Soft-start, Bypass, Soft-stop, Running, Standby, Fault
	Analog Output	1 Channel: 4–20mA (Scalable 50%–500% $I_e$ via F17)
	Communication	RS485 (Modbus RTU Protocol)
User Interface	Display	LCD with Backlight (Chinese / English)
	Keypad	Local Start/Stop, Parameter Setting, Fault Reset
	LED Indicators	READY (Standby), RUN (Start/Run/Soft-stop), TRIP (Fault), LOCAL

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