

PCS compact soft starters

Soft starting solutions with integrated motor protection.

MOTOR CONTROL AND DRIVES





PCS Soft Starters—The Compact Choice

The PCS provides intelligence and consistent performance in a compact design for controlling your motor. PCS soft starters are suitable for motor starting applications up to 45 kW (3 wire) and 75 kW (6 wire) at 400/415V AC. It features microprocessor-controlled electronic overload with adjustable trip class, motor and system diagnostics, configurable auxiliary contacts, and selectable start and stop modes. All of these combined features provide a highly accurate, reliable, and efficient soft starter with one of the smallest footprints in the industry.

The PCS Advantage

Compact size with integral bypass

From a slim 45 mm in width, the PCS integrates a bypass to minimise heat generation during run time. The bypass automatically closes when the motor reaches its nominal speed, resulting in a cooler-running component and reduction in enclosure size.

True three phase control

The PCS controls all three motor phases for smoother starting and minimal thermal stress on the motor.

3 wire / 6 wire motor connection

With 3 wire and 6 wire motor connection compatibility as standard, the PCS offers you flexibility. When configured for 6 wire mode the PCS is able to control larger motors without any cost penalty to the user.

Choice of starting & stopping modes

PCS soft starters provide the user with a selection of starting and stopping modes as standard. The ability to select and tailor the starting mode ensures the full benefits of soft starting can be achieved in any industrial motor starting application.

Side-by-side stacking at 40 °C ¹⁾

The PCS can be stacked side-by-side thereby saving further panel space and reducing enclosure size.

24V AC/DC control variant

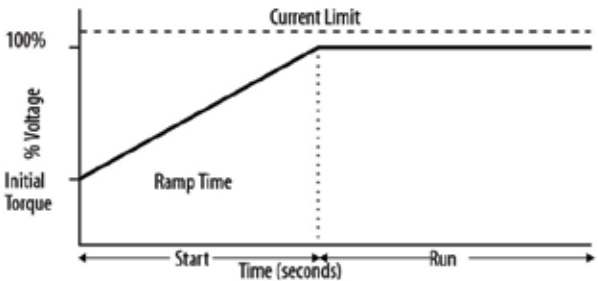
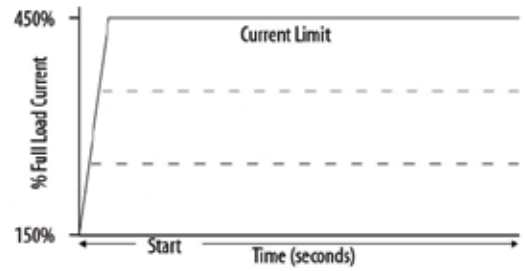
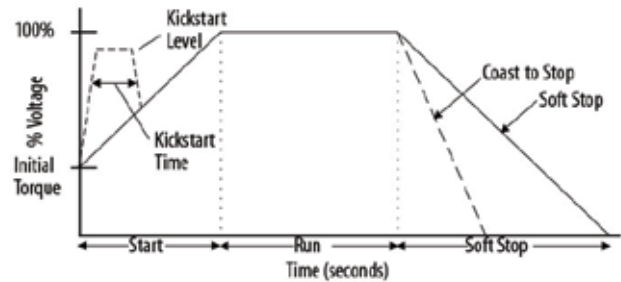
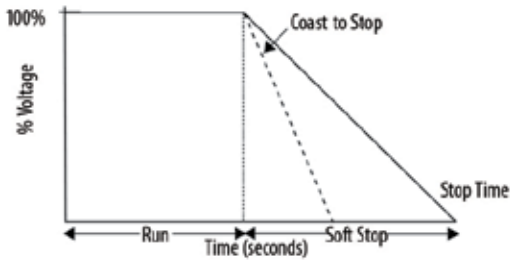

The standard PCS has a wide control supply range of 100-240V AC for ease of installation. In addition, a 24V AC/DC control variant is available, maximising your control options.



Notes:

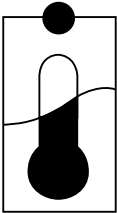
- ¹⁾ The PCS can be stacked side-by-side with no space between units. However, frame size one models (1...37 A) require the optional add-on fan attachment (retains same compact footprint). Frame size two models (43...85 A) include fan as standard.

Control Mode Overview

Control Mode	Description	Diagram
Soft Start	Output voltage is ramped from user-adjustable initial torque setting out to user selectable start time.	
Current Limit	User-adjustable current limit start by maintaining a constant current to the motor.	
Kickstart	User-selectable voltage boost at startup to break away loads, and then ramp continues in the mode selected.	
Coast to Stop	Voltage is removed and the motor coasts to rest.	
Soft Stop	Output voltage is ramped down from full voltage to zero voltage according to a user selectable ramp time.	

Protection features

Electronic motor overload protection with user selectable trip class



The PCS soft starter provides electronic motor overload protection with adjustable trip class and automatic or manual reset selectivity as standard. Selecting a trip class that closely resembles the driven motor's thermal withstand capabilities, minimises nuisance tripping and maximises machine up-time and plant productivity.

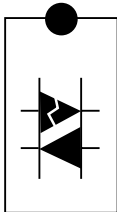
The motor full load current is user adjusted via a blue potentiometer located on the front panel. Overload trip class (either OFF, 10, 15 or 20) and automatic or manual reset operation are DIP switch selectable.

Phase imbalance protection



The phase imbalance on a PCS is a measure of the difference in current between the highest and lowest phases. If the percentage of difference is 65 % or greater, the PCS will fault on a phase imbalance.

Shorted SCR



Prior to every start, the PCS checks the integrity of its power assembly (SCRs). If the PCS detects a shorted SCR, the start will be aborted.

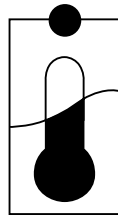
Flash coded LED indication

When a fault is detected the PCS will trip and illuminate a flash coded fault LED to protect the motor and assist in the troubleshooting process.

LED Description (Number of Flashes)

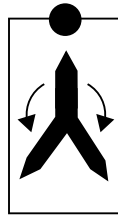
Solid	RUN/ON
☉ x 1	Overload
☉ x 2	Starter over-temperature
☉ x 3	Phase reversal
☉ x 4	Phase loss/open load
☉ x 5	Phase imbalance
☉ x 6	Shorted SCR
☉ x 7	Test

Starter over-temperature protection



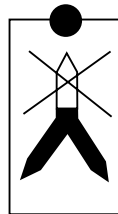
The PCS monitors the temperature of its power circuits (SCRs) by means of internal thermistors.

Phase sequence protection



The PCS provides a user selectable (ON or OFF) phase sequence protection function as standard. When selected, the PCS will monitor the incoming phases before application of power to the motor.

Phase loss protection



The PCS provides phase loss protection to both the line and load sides as standard to ensure the motor will not attempt to start when there is a power phase missing. This protects the motor from burnout resulting from single phase starting conditions.

Open circuit output (open load) protection



The PCS monitors the motor circuit to ensure the motor is connected before it commences its ramp. This feature is aimed at those installations which may have a motor isolator fitted between the starter and the motor, thus preventing a start when the isolator is in the 'open' position.



Typical Applications for the PCS

Soft starter ratings are strongly influenced by the starting time and starting current characteristics of the driven machine. NHP have classified the industrial applications listed below as normal duty, defined as 350% FLC for a 10 second start. Note this is intended as a guide only. Individual machine and motor characteristics will determine the actual start current and start time requirements. For technical assistance with soft starter selection, or PCS suitability for applications outside what is listed, consult NHP.

- Bottle washer
- Compressor – Screw (Unloaded)
- Conveyor – Roller
- Crusher – Cone
- Crusher – Rotary
- Crusher – Vertical Impact
- Dust Collector
- Edger
- Fan – Axial (Damped)
- Fan – Centrifugal (Damped)
- Grinder
- Hydraulic Power Pack
- Planer
- Press
- Pump – Bore
- Pump – Centrifugal
- Saw – Circular
- Slicer

PCS Product Selection

3 wire motor connection, 200 to 480V AC Three-Phase Supply

Normal duty 3.5x FLC, 10 sec	Dimensions (mm)			Catalogue. No. ¹⁾	
	W	H	D	100...240V AC control	24V AC/DC control
3 A	45	140	112	PCS-003-480V	PCS-003-480V-024
9 A	45	140	112	PCS-009-480V	PCS-009-480V-024
16 A	45	140	112	PCS-016-480V	PCS-016-480V-024
19 A ²⁾	45	140	112	PCS-019-480V	PCS-019-480V-024
25 A	45	140	112	PCS-025-480V	PCS-025-480V-024
30 A	45	140	112	PCS-030-480V	PCS-030-480V-024
37 A ²⁾	45	140	112	PCS-037-480V	PCS-037-480V-024
43 A	72	206	132	PCS-043-480V	PCS-043-480V-024
60 A	72	206	132	PCS-060-480V	PCS-060-480V-024
85 A	72	206	132	PCS-085-480V	PCS-085-480V-024

For 600V AC supply or ratings for 6 wire motor connection, consult NHP.

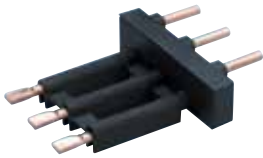
¹⁾ Current ratings at 40° C ambient. Models PCS-003 to PCS-037 rated at 6 starts/hour. Models PCS-043 to PCS-085 rated at 10 starts/hour

²⁾ When used with optional fan Cat. No. PCV-064

Accessories



Side-mounted auxiliary contacts ¹⁾	Cat. No.
1x N/O contact	PCS-PA-10
1x N/C contact	PCS-PA-01
2x N/O contacts	PCS-PA-20
1x N/O and 1x N/C contact	PCS-PA11



Contactor connection modules	Cat. No.
Connects PCS-003...019 to CA7-9...23	PCS-23-CI23
Connects PCS-030...037 to CA7-30...37	PCS-23-CI37



Remote reset magnets	Cat. No.
24 V AC coil	CMR7-24VA
240 V AC coil	CMR7-230VA
24 V DC coil	CMR7-24VDC



Cooling fans	Cat. No.
Field installable fan to suit PCS-003...37	PCV-064
Field installable replacement fan to suit PCS-045...85	PCV-147



Marking tags	Cat. No.
Marking tag covers (x 100)	CA7-FMP
Transparent cover (x 100)	CA7-FMC
Marking tag stickers (x 100)	CA7-FMS

Notes:

¹⁾ As standard, the PCS includes a configurable (normal or up-to-speed) normally open (N/O) auxiliary contact.

Specifications

Category	PCS - 3 wire operation	PCS - 6 wire operation
Motor rating at 415V AC	0.55 to 45 kW	0.55 to 75 kW
Current rating	1 to 85 Amps	1.7 to 147 Amps ¹⁾
Motor connection	3 wire (line)	6 wire (inside delta)
Utilisation category to AS/NZS 60947-4-2	AC 53b (internal bypass contactor)	
No. of controlled phases	3	
Supply voltage range (3 phase)	PCS-xxx-480-xxx V 200 to 480V AC	
Control voltage range (+10 % / -15 %)	PCS-xxx-xxx V 100 to 240V AC PCS-xxx-xxx V-024 24V AC/DC	
Supply frequency range	50/60 Hz, 3 phase supply and control	
Soft start modes	Soft Start Current limit Kickstart	
Stop modes	Soft stop Coast to stop	
Selectable start times	2, 5, 10, 15, 20, 25, or 30 s	
Selectable initial torque	15 %, 25 %, 35 % and 65 % of locked rotor torque	
Selectable current limit	150 %, 250 %, 350 % and 450 % of full load current	
Selectable kick start - 450 % FLC	OFF, 0.5, 1.0, or 1.5 s	
Selectable soft stop	OFF, 100 %, 200 %, or 300 % of the start time setting when configured	
Protective functions	Electronic motor overload with adjustable trip class (OFF, 10, 15 or 20) Starter over-temperature Phase sequence/reversal Phase loss Phase imbalance Shorted SCR Open load	
Enclosure rating	IP 2X	
Ambient temperature	40° C, with de-rating to 50° C	
Altitude	2000 m	
Relative humidity	5...95 % (non condensing)	

Notes:

¹⁾ Refer NHP for ratings information.

For complete PCS specification consult NHP.

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