Low-cost Soft Starter for Small AC Induction Motors

The PFE is the latest development from Fairford Electronics, who have 25 years of experience producing innovative designs in the soft start market.

With ratings from 2.2kW to 22kW, the PFE is ideally placed to support the majority of AC induction motors in use today. This makes the PFE the natural choice for distributors and customers alike.

Benefiting from Fairford’s excellence in engineering, the PFE combines the quality and reliability you have come to expect. This is one product that ticks all the boxes.

Main Features

- Voltage: 230V AC - 460V AC
- Current: 5 - 41A (460V)
- Control Voltage: 24VDC
- Start Time: 1 - 30s
- Stop Time: 0 - 30s
- Start Pedestal Voltage: 30% - 100%
- Standard Duty: IE: AC53B : 3-5: 355
- Industry Standard 45mm width (up to 16A)
- DIN Rail Mounting
- Two Phase Control
- Internally Bypassed
- Over Current Protected
- Designed for: CE, UL, CSA, CCC
- OEM Labelling/Branding options

<table>
<thead>
<tr>
<th>Model</th>
<th>Current (I)</th>
<th>Motor kW (400V)</th>
<th>Motor HP (460V)</th>
</tr>
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<td>PFE-02</td>
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<td>PFE-06</td>
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<td>5.5</td>
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<td>PFE-10</td>
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<td>PFE-12</td>
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<td>PFE-14</td>
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<td>20</td>
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<tr>
<td>PFE-16</td>
<td>36</td>
<td>18.5</td>
<td>25</td>
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<tr>
<td>PFE-18</td>
<td>41</td>
<td>22</td>
<td>30</td>
</tr>
</tbody>
</table>
Operational Voltage (Ue) 230-460 VAC rms  3-Phase (-15%  +10%)
Rated Frequency 50  - 60Hz +/- 2Hz
Index Rating Standard  AC53a:  3-5: 99-10
Class 10A  AC53a:  3-12:  99-10
Control Supply 24V DC approx 4VA supplied externally to terminals 0 - 24.
Enable and Start/ Soft Stop 24V DC galvanically isolated terminals -A2, EN, +A1
Indication Multi function LEDs on front panel
Start Time 0 to 30 seconds.
Stop Time 0 to 30 seconds
Start Duty 3 x FLC for 5 seconds at standard rating
Starts / Hour 10 starts per hour or 5 starts + 5 soft stops per hour. Up to 60 Starts/Hr with Optional Fan
Internally bypassed
Power Terminals
Input 1/L1, 3/L2 & 5/L3 output 2/T1, 4/T2 6/T3. IP20 Rated wire clamping terminals (unit is IP20)
Ambient Temperature 0°C to 40°C. Above 40°C de-rate linearly by 2% of unit FLC per °C to a derate of 40% at 60°C
Transport and Storage -25°C to +60°C
Altitude 1000m. Above 1000m de-rate linearly by 1% of unit FLC per 100m to a max altitude of 2000m.
Humidity max. 85% non-condensing, not exceeding 50% at 40°C
IP Rating IP20
Design Standards IEC 60947-4-2; EN60947-4-2 “AC Semiconductor Motor Controllers and Starters”

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SD0022006
This device is suitable for use in industrial environments. EN 55011/22 Class A.

Das Gerät ist für den industriellen Einsatz geeignet. EN 55011/22 Klasse A.

L’appareil a été conçu pour l’emploi en milieu industriel. EN 55011/22 classe A.

L’apparecchio è adatto per uso in ambienti industriali. EN 55011/22 Classe A.

El aparato es adecuado para uso en ambiente industrial. EN 55011/22 clase A.

Size 1 5Amp to 16Amp
2.2kW @ 400V 5Amp
3kW @ 400V 7Amp
4kW @ 400V 9Amp
5.5kW @ 400V 12Amp
7.5kW @ 400V 16Amp

Size 2 22Amp to 41Amp
11kW @ 400V 22Amp
15kW @ 400V 30Amp
18.5kW @ 400V 36Amp
22kW @ 400V 41Amp

Operation
Betrieb
Service
Funzionamento

Fault – Störung – Défaut – Guasto – Avería

Run – LED grün – DEL vert – LED verde – LED verde – LED error rojo
Slow Flash – Initialisation – Initialisation – Initializzazione – Inizializzazione

Run – LED green – DEL vert – LED verde – LED verde
Slow Flash – Ready for operation – Betriebsbereit – Prêt à fonctionner – Pronto al funzionamento – En condiciones para funcionamiento

Quick Flash – Starting – in Rampe – en rampe – in rampa – en rampa

Full On – Full volts – vollen Spannung – pleine tension – piena tensione – plena tensión

Quick Flash – Soft Stop – Soft stop – Arrêt progressif – Soft-Stop – Paro suave

Very quick green flash – Starting to trip on over current

Error
Fault LED red – Fehler LED rot – DEL erreur rouge – LED errore rosso – LED error rojo
1 SCR or supply low volts
3 Control supply low volts
5 Shrapin (4.4 x Ie)
6 Overcurrent

30% 10S
30S
~15S
~50%
0S

20% 10S
30S
~25S
~30%
~20S

Ready (23/24)
+ 24 V

Error

RUN

UL1, L2, L3
EN
+ A1

~0.25 s

1 - Start

Alarm

Mounting Centres 30mm x 130mm

Mounting Centres 40mm x 155mm

PFE-02 2.2kW @ 400V 5Amp
PFE-04 3kW @ 400V 7Amp
PFE-06 4kW @ 400V 9Amp
PFE-08 5.5kW @ 400V 12Amp
PFE-10 7.5kW @ 400V 16Amp
PFE-12 11kW @ 400V 22Amp
PFE-14 15kW @ 400V 30Amp
PFE-16 18.5kW @ 400V 36Amp
PFE-18 22kW @ 400V 41Amp

PFE Digital Soft Starters
Installation Instructions
Montageanweisung
Notice d’installation
Istruzioni per il montaggio
Instrucciones de montaje
**EMC EMISSION AND IMMUNITY LEVELS**

**ESD immunity**
- IEC 61000-4-2
- 4kV contact
- 8kV air discharge

**R FI immunity**
- IEC 61000-4-4
- 1.5kV line to ground, 1.5kV line to line

**Fast Transient immunity**
- IEC 61000-4-4
- 2kV line to ground

**Surge immunity**
- IEC 61000-4-5
- 2kV line to ground

**Conducted RF emissions**
- EN 55011 Class A

**Radiated RF emissions**
- EN 55011 Class A

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**Rated Impulse withstanding Voltage (Uimp)** 2.5kV

**Rated Insulation Voltage (Ue)** 500V

**Pollution Degree** 2

**Rated Short Circuit Current (Iimp)** 10KA

**Short Circuit Co-ordination** Type 2

**Ambient Temperature** 0°C to 40°C

**Transport and Storage** -25°C to +60°C

**Humidity** max. 90% non-condensing, not exceeding 50% at 40°C

**Overload protection**
- F1 = Coordination Class 2 Fusing
- PFE-02 to PFE-10: SIBA 201920-35
- PFE-10: SIBA 201920-40
- PFE-12 to PFE-18: SIBA 201920-125

**Control Circuit Elements**
- E1 = Optional switch to allow trip reset without opening main breaker Q1
- Q1 = Start/Stop control switch
- F1 = Semiconductor fuse for type 2 coordination, in addition to Q1
- Z1 = Overload relay - Überlastrelais - Relè termico - Relé de sobrecarga - Relé termique
- Q1 = Cable protection - Leitungsschutz - Protezione di linea - Proteção de cabos - Protection de câbles
- E1 = Optional switch to allow trip reset without opening main breaker Q1
- S1 = Start/Stop control switch
- L1 = Indicator:
- On: Ready
- Off: Fault

**Operational Voltage (Ue)**
- 230-460 VAC rms - 3-Phase (-15%+10%)

**Rated Frequency**
- 50 - 60Hz +/- 2Hz

**Index Rating**
- Standard (Class 3)
- AC03b: 3-35S

**Control Supply**
- 24V DC approx 4VA supplied to terminals 0V - +24V

**Enable Control**
- 24V DC galvanically isolated terminals -A2 - EN

**Start/Stop Control**
- 24V DC galvanically isolated terminals -A2 - +A1

**Auxiliary Circuits relay**
- Ready/Stop: -230VAC 2.5A, AC11.

**Indication**
- Red = Error - Green = Run LEDs

**I-Start**
- 1 to 30 seconds

**U-Start**
- 30% - 100%

**t-Stop**
- 0 to 30 seconds

**Start Duty**
- 3 x FLC for 5 seconds at standard rating

**Starts / Hour**
- 10 starts per hour or 5 starts + 5 soft stops per hour

**Power Terminals**
- IP20 Rated wire clamping terminals

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