

synergy™

Quick Start Guide



Type	Ie A	Iw at 400V	UL-FLA A	HPat 440-480V
SGY-101	17	7.5	17	10
SGY-103	22	11	21	15
SGY-105	29	15	27	20
SGY-107	35	18.5	34	25
SGY-109	41	22	40	30
SGY-111	55	30	52	40
SGY-113	66	37	65	50
SGY-115	80	45	77	60
SGY-117	100	55	96	75

Ie AC-53a:3.5-17:90-5

As the original pioneers of soft start technology Fairford Electronics Ltd have been at the forefront of motor control innovation since the 1970's. A major designer and manufacturer of soft start motor control solutions Fairford have manufactured and supplied over 1 million products into the market place and are recognised as the reference point for many control solution providers worldwide.

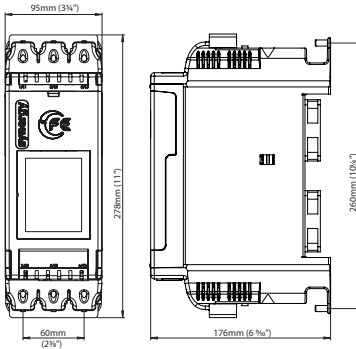
In 2009 we started to recognise the need for a new technology that bridged the gap between Drive technology and Soft start. This started the development process for synergy™, a new form of motor control that met the needs of those requiring functionality of a drive in a fixed speed application. Three years and 1000's of man hours later we have achieved our goal and met the needs of an ever increasing market.

Focusing on the key aspects of a drive such as energy saving and communications as well incorporating original features of a soft start including internal bypass and cost, we took this base design and enhanced it even further. With size and cabinet capacity becoming an ever increasing focus we developed the world's smallest power to size ratio motor controller. In addition, synergy™ utilises Fairford's globally renowned Automatic setup feature which allows the user to programme the unit to each individual application using a simple 4 button process. Not only that but in order to keep pace with the modern technology and a fast growing market it removes buttons and uses touch screen technology to bring the user interface to even greater management levels.

With built in SCR failure protection as standard, and full motor overload protection as well as full data logging, field serviceable and upgradeable software and extensive input/output programmability synergy™ meets all of the key design criteria.

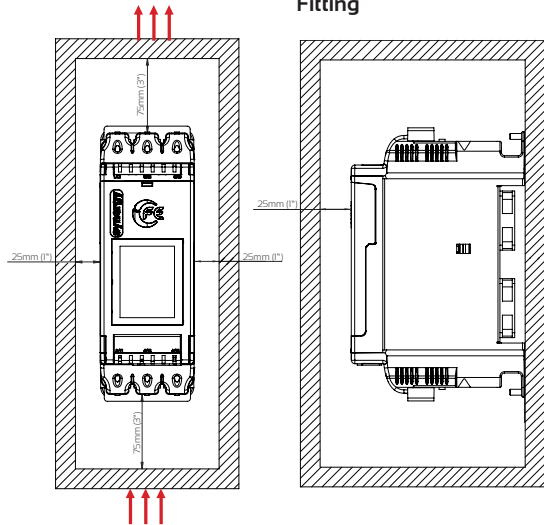
More importantly it redefines motor control solutions as we have previously known it.

Dimensions



Weight = 3.5kg

Fitting



Enclosure Ventilation

When fitting synergy into a cabinet, ventilation must be provided if the heat output of the unit is greater than the cabinet will dissipate. Use the following formula to determine the fan requirement. An allowance has been incorporated into the formula so that the figure for Q is the air delivery in the fan suppliers data.

The maximum power dissipation occurs when energy saving.

Heat dissipated can be approximated with the formula:-

Watts (synergy) = 1/2 x Synergy current rating x 3

$$Q = \frac{4 \times Wt}{(t_{max} - t_{amb})}$$

Q = volume of air (cubic meters per hour-m³/h)

Wt = Heat produced by the unit and all other heat sources within the enclosure (Watts)

Tmax = Maximum permissible temperature within the enclosure

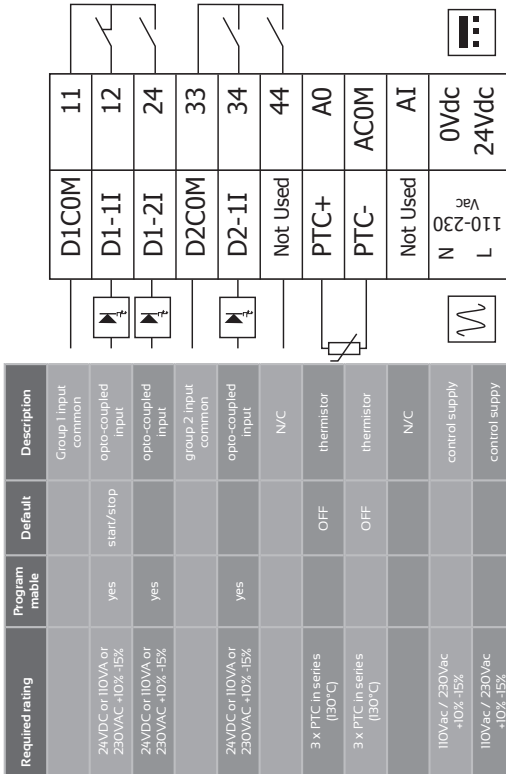
(50°C for a fully rated synergy)

Tamb = Temperature of the air entering the enclosure (°C)

If you prefer to work in CFM, substitute °F for °C. Q is now in CFM

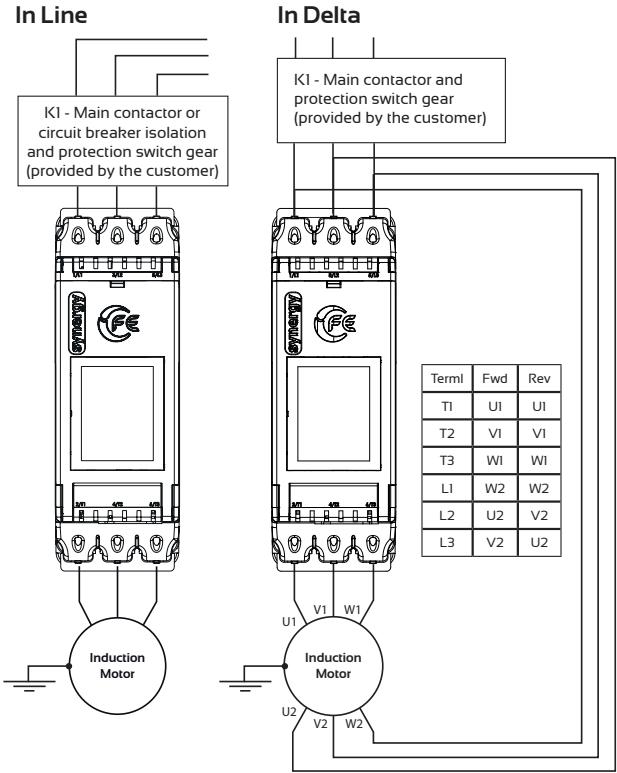
Wiring connection

Description	Default	Programmable	Required rating
group 1 relay common			
relay N/C	fault	yes	230Vac/1A AC15; 30VDC 0.5 Resistive
relay N/O	fault	yes	230Vac/1A AC15; 30VDC 0.5 Resistive
group 2 relay common			
relay N/O	run	yes	230Vac/1A AC15; 30VDC 0.5 Resistance
relay N/C	TOR	yes	230Vac/1A AC15; 30VDC 0.5 Resistance
analog output	0-10V	yes	0 to 10V 10mA / 4-20mA
analog 0V			0V
analog input	0-10V	Yes	24Vdc 50mA
0V input			0V
24V input			24Vdc +10%-15%



***24VDC Specification**
 24VDC 60W
 Residual ripple 100mV
 Spikes/switching Peaks 240mV
 Turn On/Off response
 No overshoot or V out
 Overvoltage voltage protection output voltage
 must be clamped to V50VDC

Wiring connection

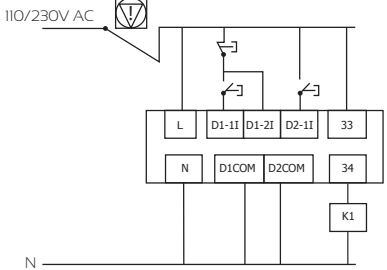


For this configuration applying the equation:
 $synergy^{TM} ie = ie (motor) / \sqrt{3}$

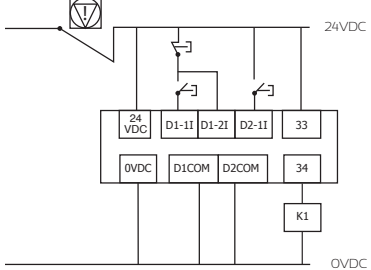
Allows lower current rating synergy than the motor.

When In Delta configuration is used a line contactor controlled by synergy **MUST** be used with the In Delta Firing Mode selected in the advanced menu.

3 Wire Control Diagram
 110/230V AC control supply
 and digital input programming



24VDC control supply and
 digital input programming



Digital input programming

- D1 - 1I = Start
- D1 - 2I = Stop
- D2 - 1I = Reset

Please note: Power factor correction capacitors must not be positioned on the output of all power circuits

1. Setup Wizard

2. Select Your Application

3. Select Your Application

Warning!
Selected Application Will Enable Trip Class 20

4. Set Motor Current Rating

5. Select Control Method

6. Select Digital Input Voltage

7. Auto Setup Summary

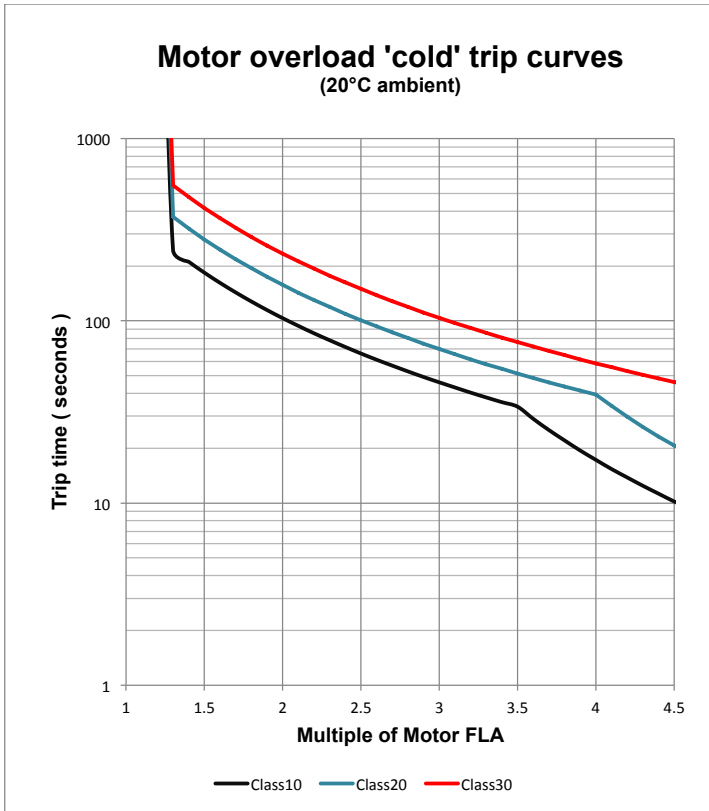
8. Start screen

Please note; Only appears if application with a trip class higher than 10 is selected

Rating table

Type	ie	IEC	kW		UL, FLA	HP			
			230v	400v		200v	208v	220-240	440-480
SGY-101	17	17	4	7.5	17	3	5	5	10
SGY-103	22	22	5.5	11	21	5	5	5	15
SGY-105	29	29	7.5	15	27	7.5	7.5	10	20
SGY-107	35	35	7.5	18.5	34	10	10	10	25
SGY-109	41	41	11	22	40	10	10	10	30
SGY-111	55	55	15	30	52	15	15	15	40
SGY-113	66	66	18.5	37	65	20	20	20	50
SGY-115	80	80	22	45	77	25	25	30	60
SGY-117	100	100	30	55	96	30	30	30	75

- Rated operational powers in kW according to IEC 60072-1(primary series) corresponding to IEC current rating optimised for 400V
- Rated operational powers in hp according to UL508 corresponding to FLA current rating(optimised for 440-480v)
- The IEC, Ie rating will apply for EN 60947-4-2, AC-53a:3.5-17:90-5
- The UL minimum FLA ratings will apply for UL temperature rise testing, as limited by UL components specs at 50°C ambient.
- The rated operation current Ie as specified in rating index, is determined by highest current at 400V or 440-480V (IEC or UL)



* Please note: When the overload has tripped there is a forced cooling time to allow the overload to recover before the next start.

Rated operational voltages	U_e	230Vac to 480Vac	
Rated operational current	I_e	See model ratings table below	
Rating index		I_e : AC-53a:3.5-17: 90-5	
Rated frequency/frequencies		45 to 65Hz	
Rated duty		Uninterrupted	
Form designation		Form 1 Internally bypassed	
Rated insulation voltage	U_i	480V	
Rated impulse withstand voltage	U_{imp}	Main circuit	4kV
		Control supply circuit	2.5kV
IP code		Main circuit	IP00 (IP 20 optional)
		Supply and control circuit	IP 20
Pollution degree		2	
Rated conditional short-circuit current and type of co-ordination with associated short circuit protective device		Type 1 co-ordination. See model ratings table below for rated conditional short-circuit current and required current rating and characteristics of the associated SCPD	
Rated control circuit voltage (programmable)	U_c	24Vdc, 110Vac or 230Vac	
Rated control supply voltage	U_s	24Vdc, 110Vac or 230Vac	
Relay specification		AC-15 230Vac, 1A DC-13 30Vdc, 0.7A	
EMC Emission levels	EN 55011	Class A	
EMC Immunity levels	IEC 61000-4-2	8kV/air discharge or 4kV/contact discharge	
	IEC 61000-4-3	10 V/m	
	IEC 61000-4-4	2kV/5kHz (main power and ports)	
		1kV/5kHz (signal ports)	
	IEC 61000-4-5	2kV line-to-ground	
		1kV line-to-line	
IEC 61000-4-6	10V		
IEC 61000-4-11	0% U_e for 0.5 cycle 0% U_e for 1 cycle 40% U_e for 10/12 cycles 70% U_e for 25/30 cycles 80% U_e for 250/300 cycles		



-20°C (-4°F) to 50°C (122°F) above 50°C de-rate by 2% per degree to a maximum of 60°C (140°F).



Maximum altitude above sea level 1000m (3281ft) above 1000m de rate by 1% per 100m (328ft) to a maximum altitude of 2000m (6562ft).

Please note for higher temperatures and altitudes contact your supplier.

Correctly selected semi-conductor fuses can provide additional protection against damage to the synergy™ unit (This is sometimes referred to as type 2 co-ordination). The following semi-conductor fuses have been calculated to provide increased protection.

Models ratings table

Type designation (eg. SGY-101-4-01)			SGY 101	SGY 103	SGY 105	SGY 107	SGY 109	SGY 111	SGY 113	SGY 115	SGY 117
Rated operational current	I _e	A	17	22	29	35	41	55	66	80	100
Rated conditional short circuit current	I _q	kA	5	5	5	5	5	5	5	10	10
Semiconductor fuse (class aR) for protection of thyristors	Mersen 6.9 URD 30	A	80A	80A	125A	125A	160A	200A	200A	250A	315A
	Bussmann 170M31_ 170M32_	A	80A	80A	125A	125A	160A	200A	200A	250A	315A
Class J time-delay	Maximum rating	A	30	40	50	60	70	100	125	150	175
UL listed inverse-time circuit breaker	Maximum rating	A	60	60	60	80	60	150	150	250	300

Terminal wiring

Wire sizes and torques	Main terminals	mm ²	2.5 - 70	Nm	9	Cu STR only 75C
		AWG	12-2/0	lb-in	80	
	Control terminals	mm ²	0.2-1.5	Nm	0.5	
		AWG	24-16	lb-in	4.5	
	Protective Earth (PE)	M6		Nm	8	
				Lb-in	70	

Quick Start Guide

⚠️ Electric current! Danger to life!

Only skilled or instructed persons may carry out the following operations.

⚠️ Lebensgefahr durch Strom!

Nur Elektrofachkräfte und elektrotechnisch unterwiesene Personen dürfen die im Folgenden beschriebenen Arbeiten ausführen.

⚠️ Tension électrique dangereuse!

Seules les personnes qualifiées et averties doivent exécuter les travaux ci-après.

⚠️ ¡Corriente eléctrica! Peligro de muerte!

El trabajo a continuación descrito debe ser realizado por personas cualificadas y advertidas.

⚠️ Tensione elettrica: Pericolo di mortal!

Solo persone abilitate e qualificate possono eseguire le operazioni di seguito riportate.

⚠️ 触电危险!

只允许专业人员和受过专业训练的人员进行下列工作。

⚠️ Электрический ток! Опасно для жизни!

Только специалисты или проинструктированные лица могут выполнять следующие операции.

⚠️ Levensgevaar door elektrische stroom!

Uitsluitelijk deskundigen in elektriciteit en elektrotechnisch geïnstrueerde personen is het toegestaan, de navolgend beschreven werkzaamheden uit te voeren.

⚠️ Livsfare på grund af elektrisk strøm!

Kun uddannede el-installatører og personer der er instruerede i elektrotekniske arbejdsopgaver, må udføre de nedenfor anførte arbejder.

⚠️ Προσοχή, κίνδυνος ηλεκτροπληξίας!

Οι εργασιές που αναφέρονται στη συνέχεια θα πρέπει να εκτελούνται μόνο από ηλεκτρολόγους και ηλεκτροτεχνίτες.

⚠️ Perigo de vida devido a corrente elétrica!

Apenas electricistas e pessoas com formação electrotécnica podem executar os trabalhos que a seguir se descrevem.

⚠️ Livsfara genom elektrisk ström!

Endast utbildade elektriker och personer som undervisats i elektroteknik får utföra de arbeten som beskrivs nedan.

⚠️ Hengenvaarallinen jännitel!

Vain pätevät sähköasentajat ja opastusta saaneet henkilöt saavat suorittaa seuraavat työt.

⚠️ Nebezpečí úrazu elektrickým proudem!

Níže uvedené práce směji provádět pouze osoby s elektrotechnickým vzděláním.

⚠️ Eluoltlik! Elektrilöögioht!

Järgnevalt kirjeldatud töid tohib teostada ainult elektriala spetsialist või elektrotehnilise instrueerimise läbinud personal.

⚠️ Életveszély az elektromos áram révén!

Csak elektromos szakemberek és elektrotechnikában képzett személyek végezhetik el a következőkben leírt munkákat.

⚠️ Elektriská stráva apraud dzīvību!

Tālāk aprakstītos darbus drīkst veikt tikai elektrospeciālisti un darbam ar elektrotehnikām iekārtām instruetās personas!

⚠️ Pavojuš gyvybei dėl elektros srovės!

Tik elektrikai ir elektrotechnikos specialistai gali atlikti žemiau aprašytus darbus.

⚠️ Poráženie prądem elektrycznym stanowi zagrożenie dla życia!

Opisane poniżej prace mogą przeprowadzać tylko wykwalifikowani elektrycy oraz osoby odpowiednio poustruowane w zakresie elektrotechniki.

⚠️ Življenjska nevarnost zaradi električnega toka!

Spodaj opisana dela smejo izvajati samo elektrostrokovnjaki in elektrotehnično poučene osebe.

⚠️ Nebezpečentvo ohrozenia života elektrickým prúdom!

Práce, ktoré sú nižšie opísané, smú vykonávať iba elektroodborníci a osoby s elektrotechnickým vzdelaním.

⚠️ Опасност за живота от електрически ток!

Операциите, описани в следващите раздели, могат да се извършват само от специалисти-електротехници и инструктиран електротехнически персонал.

⚠️ Atentjtel Pericol electric!

Toate lucrările descrise trebuie efectuate numai de personal de specialitate calificat și de persoane cu cunoștințe profunde în electrotehnică.