



MOTORTRONICS™

Solid State AC Motor Control

VMX-Synergy Plus™

IEC - QUICK START GUIDE

200 - 600V, 17 - 500 Amps



- Removable 3.5" Color Touch Screen rated IP66/N4X
- 42 Smart Application profiles - easy setup in 1 minute
- Auto Pedestal to control spinning motors
- Built-in iERS – intelligent Energy Recovery System
- Advanced motor protection with memory
- Life Time Event Logging Diagnostics
- Metering for power, voltage and current
- Integral Bypass



Safety

Important information

Installers should read and understand the instructions in this guide prior to installing, operating and maintaining the soft start. The following symbols may appear in this guide or on the soft start to warn of potential hazards or to draw attention to certain information.



Dangerous Voltage

Indicates the presence of a hazardous voltage which could result in personal injury or death.

Tension dangereuse

Indique la présence d'une tension dangereuse qui peut entraîner des blessures ou la mort.



Warning/Caution

Indicates a potential hazard. Any instructions that follow this symbol should be obeyed to avoid possible damage to the equipment, and personal injury or death.

Avertissement/Mise en garde

Indique un danger potentiel. Toutes les instructions suivant ce symbole doivent être observées, afin d'éviter les dommages de l'équipement et les blessures ou la mort.



Protective Earth (Ground)

Indicates a terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault.

Mise à la terre (Masse)

Indique une borne dont l'usage prévu est d'être connecter à conducteur externe pour assurer la protection contre les chocs électriques en cas de défauts.

Caution Statements

The examples and diagrams in this manual are included solely for illustrative purposes. The information contained in this manual is subject to change at any time and without prior notice. In no event will responsibility or liability be accepted for direct, indirect or consequential damages resulting from the use or application of this equipment.

Mises en garde

Les exemples et les schémas de ce manuel ne sont donnés qu'à titre illustratif. Les informations présentées dans ce manuel peuvent être modifiées sans avis préalable. En aucun cas nous n'assumons la responsabilité ou l'obligation pour les dommages directs, indirects ou consécutifs qui résultent de l'utilisation ou application de cet équipement.

Short Circuit

Motortronics soft starts are not short circuit proof. After severe overload or short circuit, the operation of the soft start should be fully tested by an authorized service agent.

Court-circuit

Les démarreurs progressifs Motortronics ne sont pas à l'épreuve des courts-circuits. Après une forte surcharge ou un court-circuit, le fonctionnement du démarreur progressif doit être intégralement vérifié par un agent de maintenance agréé.

Safety



• VMX-Synergy Plus™ soft starts contain dangerous voltages when connected to the mains supply. Only qualified personnel that have been completely trained and authorized, should carry out installation, operation and maintenance of this equipment.

• *Les démarreurs progressifs VMX-Synergy Plus™ contiennent des tensions dangereuses, lorsqu'ils sont connectés à la tension secteur. Les activités d'installation, d'utilisation et d'entretien de cet équipement doivent être effectuées par un personnel qualifié, dûment formé et habilité.*

• Installation of the soft start must be made in accordance with existing local and national electrical codes and regulations and have a minimum protection rating.

• *Le démarreur progressif doit être installer conformément au code local et nationale d'électricité et à la réglementation en vigueur, et il doit avoir un indice de protection minimal*

• It is the responsibility of the installer to provide suitable grounding and branch circuit protection in accordance with local electrical safety codes.

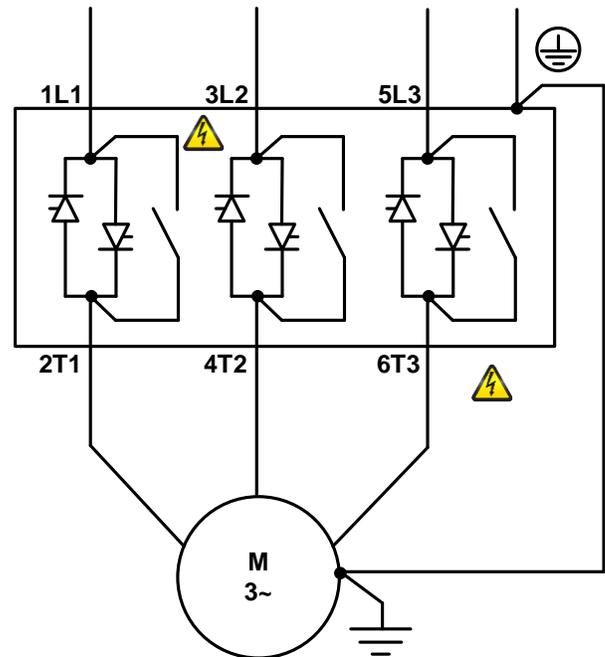
• *Il appartient à l'installateur d'assurer la mise à la terre et la protection du circuit de branchement, conformément au code de sécurité électrique local.*

• This soft start contains no serviceable or re-usable parts.

• *Ce démarreur progressif ne contient pas de pièces réparables ou réutilisables*

• The STOP function of the soft start does not isolate dangerous voltages from the output of the soft start. An approved electrical isolation device must be used to disconnect the soft start from the incoming supply before accessing electrical connections.

• *La fonction STOP du démarreur progressif n'isole pas les tension dangereuses en sortie du démarreur progressif. Avant d'accéder aux raccordement électriques, il faut utiliser un dispositif d'isolation électrique approuvé pour déconnecter le démarreur progressif de la tension d'entrée.*



Model Number Description

It is essential to check the VMX-Synergy Plus nameplate and make sure that the soft starter is properly sized for your AC motor.

VMX-SGY-I-17-6-XX-XX

Option

Non-critical customer options
(may be blank)

Control supply U_s

01 – $U_s = 24\text{Vdc}$, 110VAC or 230VAC

02 – $U_s = 110\text{VAC}$

03 – $U_s = 230\text{VAC}$

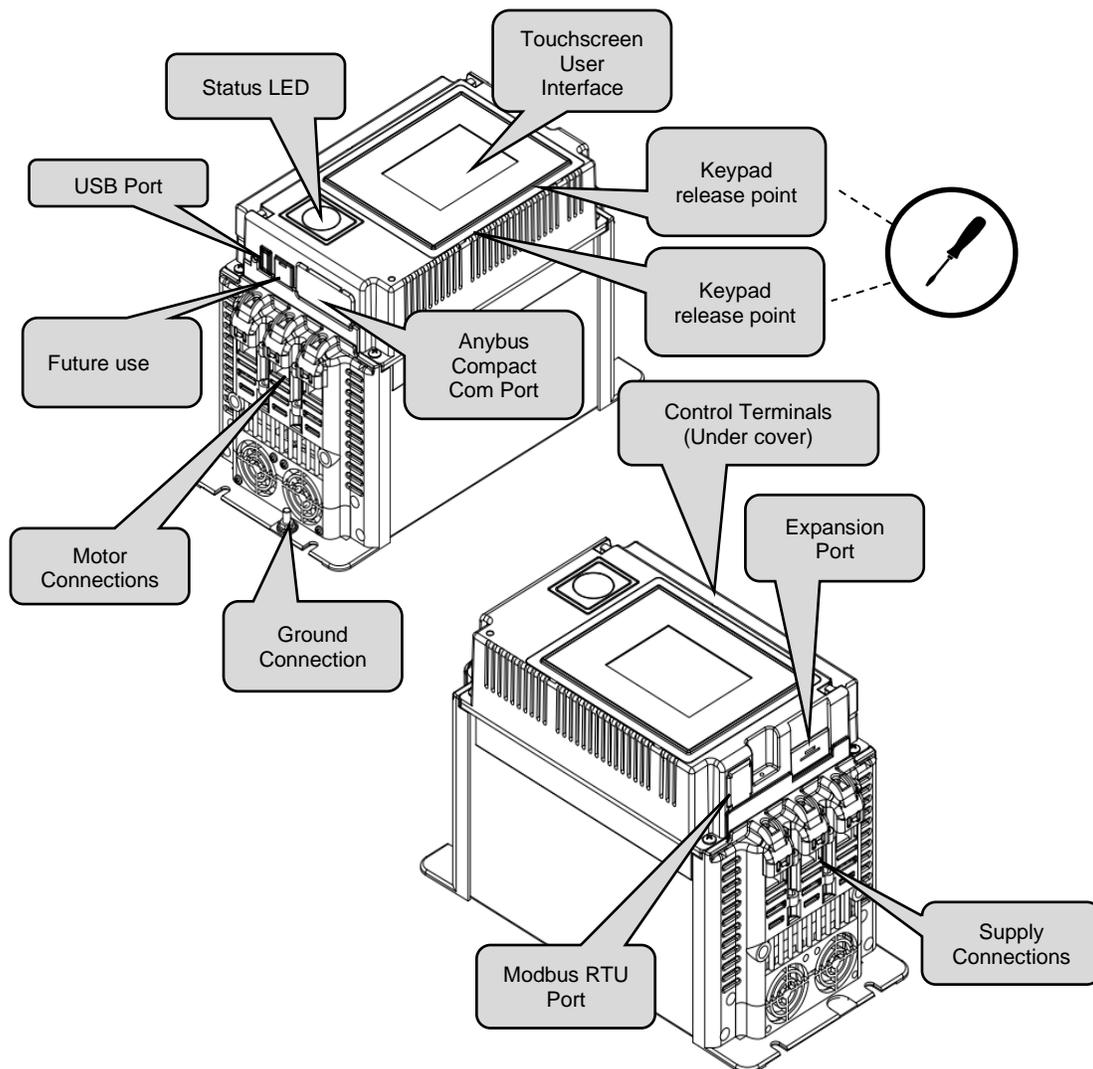
Main Supply voltage

6 – 200VAC to 600VAC, $U_i 600\text{V}$

Model rating designation

VMX-SGY-I-17 to VMX-SGY-I-500

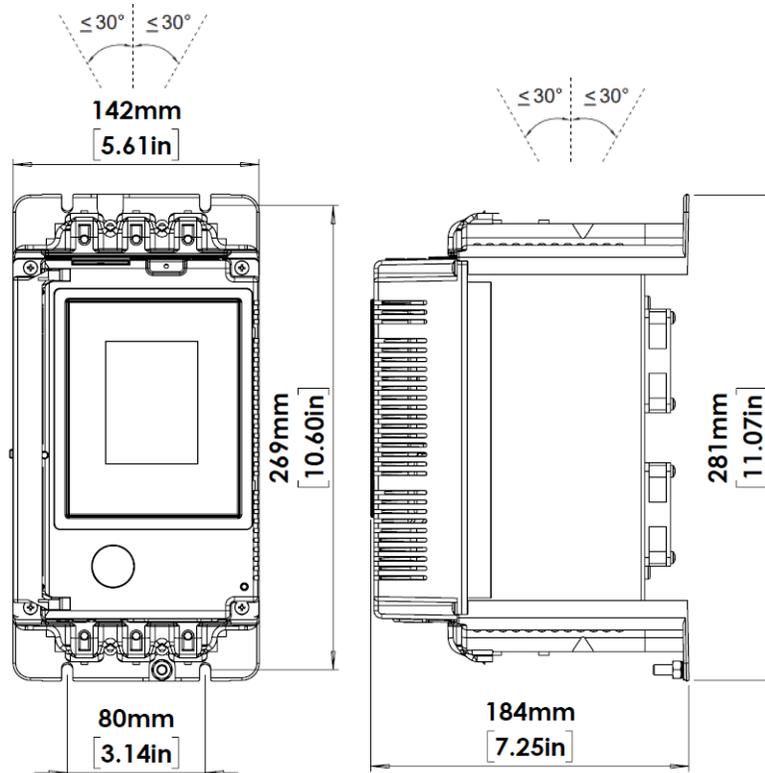
Key Features



Environment - Installation

VMX-SGY-I-17 to VMX-SGY-I-100 (Size 1)

Dimensions

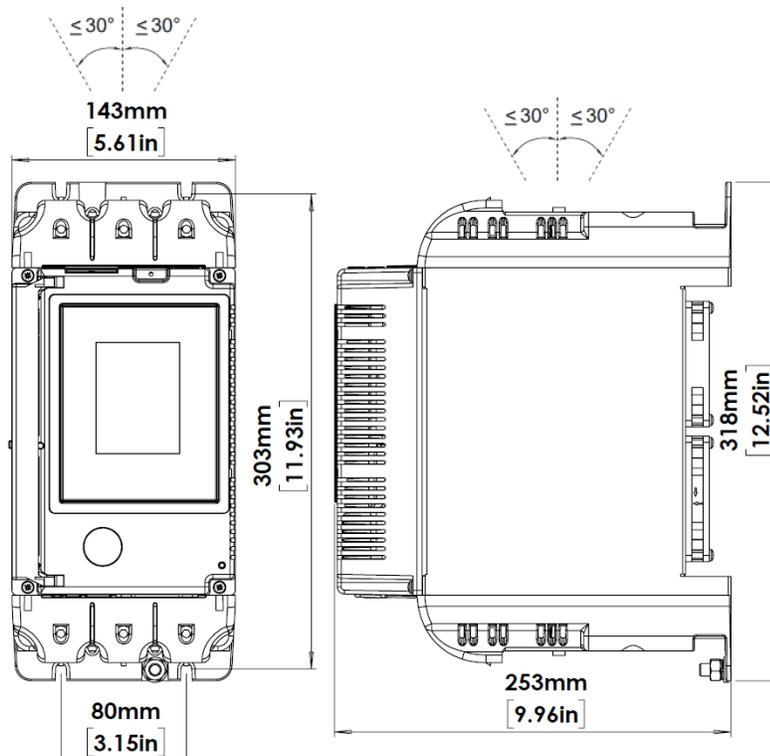


VMX-SGY-I-17 to VMX-SGY-I-29
Weight = 3.9 kg (8.6 lbs)

VMX-SGY-I-35 to VMX-SGY-I-100
Weight = 4.2 kg (9.26 lbs)

VMX-SGY-I-132 to VMX-SGY-I-195 (Size 2)

Dimensions



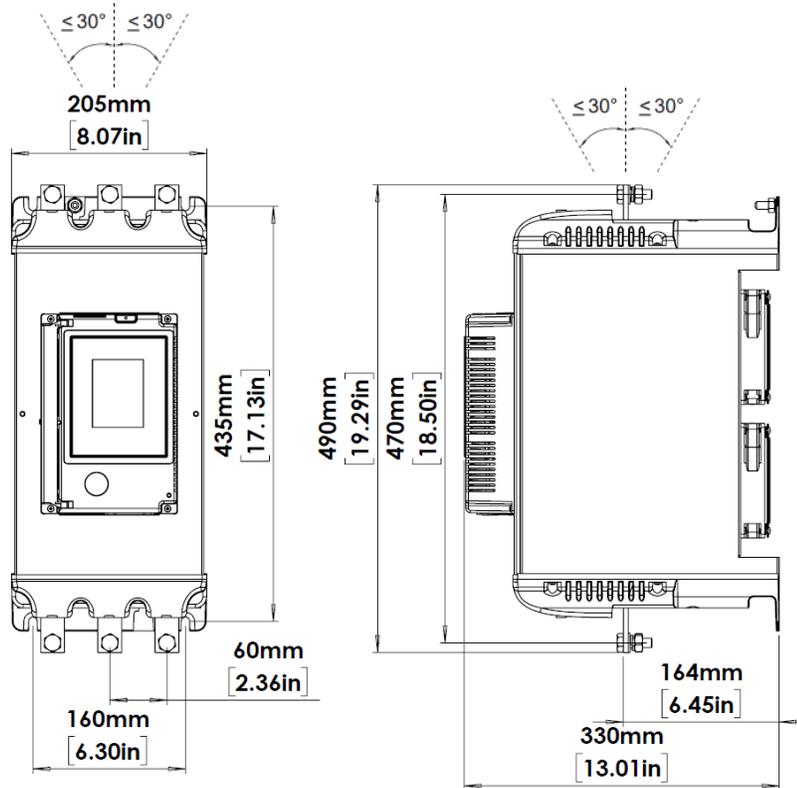
VMX-SGY-I-132
Weight = 6.7 kg (14.78 lbs)

VMX-SGY-I-160 to VMX-SGY-I-195
Weight = 7.0 kg (15.44 lbs)

Environment - Installation

VMX-SGY-I-242 to VMX-SGY-I-361 (Size 3)

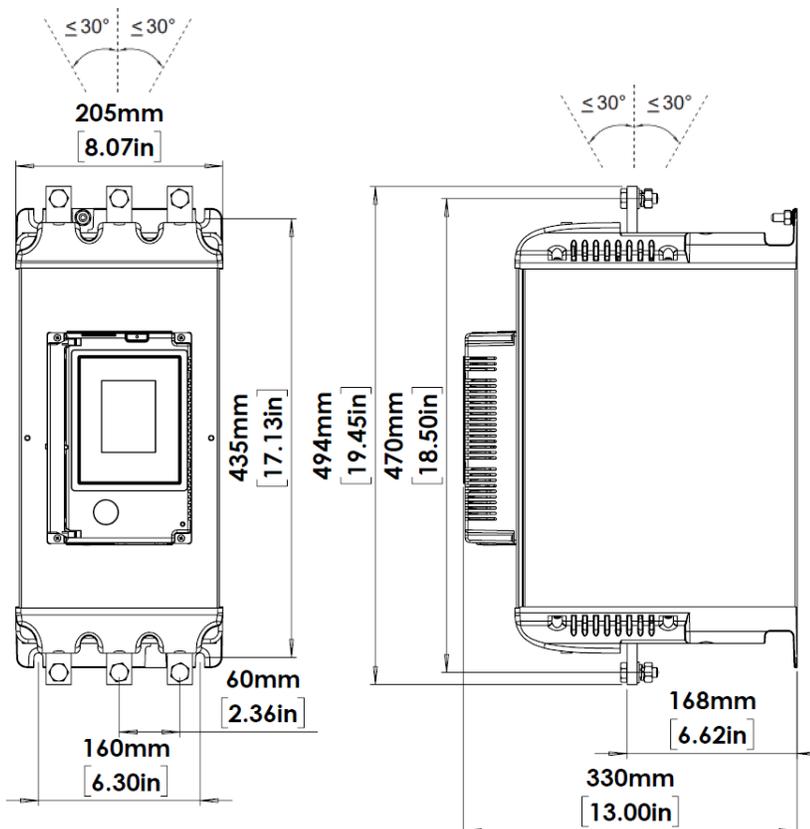
Dimensions



VMX-SGY-I-242 to VMX-SGY-I-361
Weight = 17.0 kg (37.5 lbs)

VMX-SGY-I-430 to VMX-SGY-I-500 (Size 3)

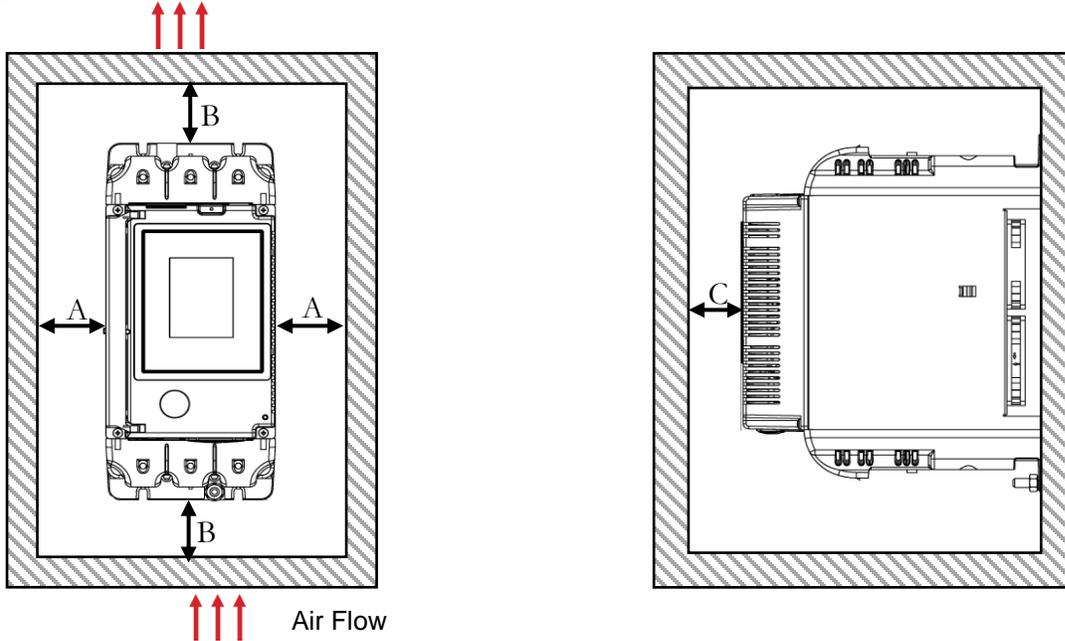
Dimensions



VMX-SGY-I-430 to VMX-SGY-I-500
Weight = 22 kg (48.5 lbs)

Environment - Installation

Enclosure Internal Clearances



Model	A		B		C	
	mm	inch	mm	inch	mm	inch
VMX-SGY-I-17 to VMX-SGY-I-100	25	0.98	75	2.95	25	0.98
VMX-SGY-I-132 to VMX-SGY-I-195	40	1.57	100	3.93	25	0.98
VMX-SGY-I-242 to VMX-SGY-I-500	60	2.36	125	4.92	25	0,98

Conductor size and torque requirements

Terminal		Models	Conductor Size		Torque	
			Metric	Imperial	Nm	lb-in
Main Terminals Cu STR 75°C only	Terminal	VMX-SGY-I-17 to VMX-SGY-I-100	2.5 - 70mm ²	12- 2/0AWG	9	80
		VMX-SGY-I-132 to VMX-SGY-I-195	4 - 185mm ²	12 – 350MCM	14	124
	M10 bolt	VMX-SGY-I-242 to VMX-SGY-I-361	2 x 95mm ²	2 x 4/0AWG	28	248
		VMX-SGY-I-430 to VMX-SGY-I-500	2 x 150mm ²	2 x 350MCM		
Control terminals		All models	0.2–1.5mm ²	24-16AWG	0.5	4.5
Protective Earth ¹⁾ Cu only 	M6 stud	VMX-SGY-I-17 to VMX-SGY-I-41	≥ 6mm ²	≥ 10AWG	8	71
		VMX-SGY-I-55 to VMX-SGY-I-80	≥ 10mm ²	≥ 8AWG		
		VMX-SGY-I-100	≥ 16mm ²	≥ 6AWG		
	M8 stud	VMX-SGY-I-132 to VMX-SGY-I-160	≥ 16mm ²	≥ 6AWG	12	106
		VMX-SGY-I-195	≥ 25mm ²	≥ 4AWG		
		VMX-SGY-I-242	≥ 35mm ²	≥ 3AWG		
		VMX-SGY-I-302	≥ 35mm ²	≥ 2AWG		
		VMX-SGY-I-361	≥ 50mm ²	≥ 1AWG		
		VMX-SGY-I-430 to VMX-SGY-I-500	≥ 70mm ²	≥ 1/0AWG		

¹⁾ Protective Earth wire size based on bonding conductor requirements of UL508 Table 7.4 and UL508A Table 15.1, with suitable equivalent metric conductor sizes as per IEC 60947-1 Table 7a.

²⁾ The actual conductor used must comply with local wiring regulations.

Environment - Installation



Enclosure Ventilation

When installing a VMX-Synergy Plus™ into an enclosure, 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 supplier's data.

Heat dissipated can be approximated with the formulas: -

Starting

Watts (VMX-Synergy Plus™) = start current(A) x start time(s) x number of starts per hour/1200

iERs Disabled

Watts (VMX-Synergy Plus™) = (VMX-Synergy Plus™ current rating) x 0.6

iERs Enabled

The maximum power dissipation occurs when energy saving and the iERS is turned on

Watts (VMX-Synergy Plus™) = (VMX-Synergy Plus™ current rating) x 1.5

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

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

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

T_{max} = Maximum permissible temperature within the enclosure (50°C for a fully rated VMX-Synergy Plus™)

T_{amb} = Temperature of the air entering the enclosure (°C)

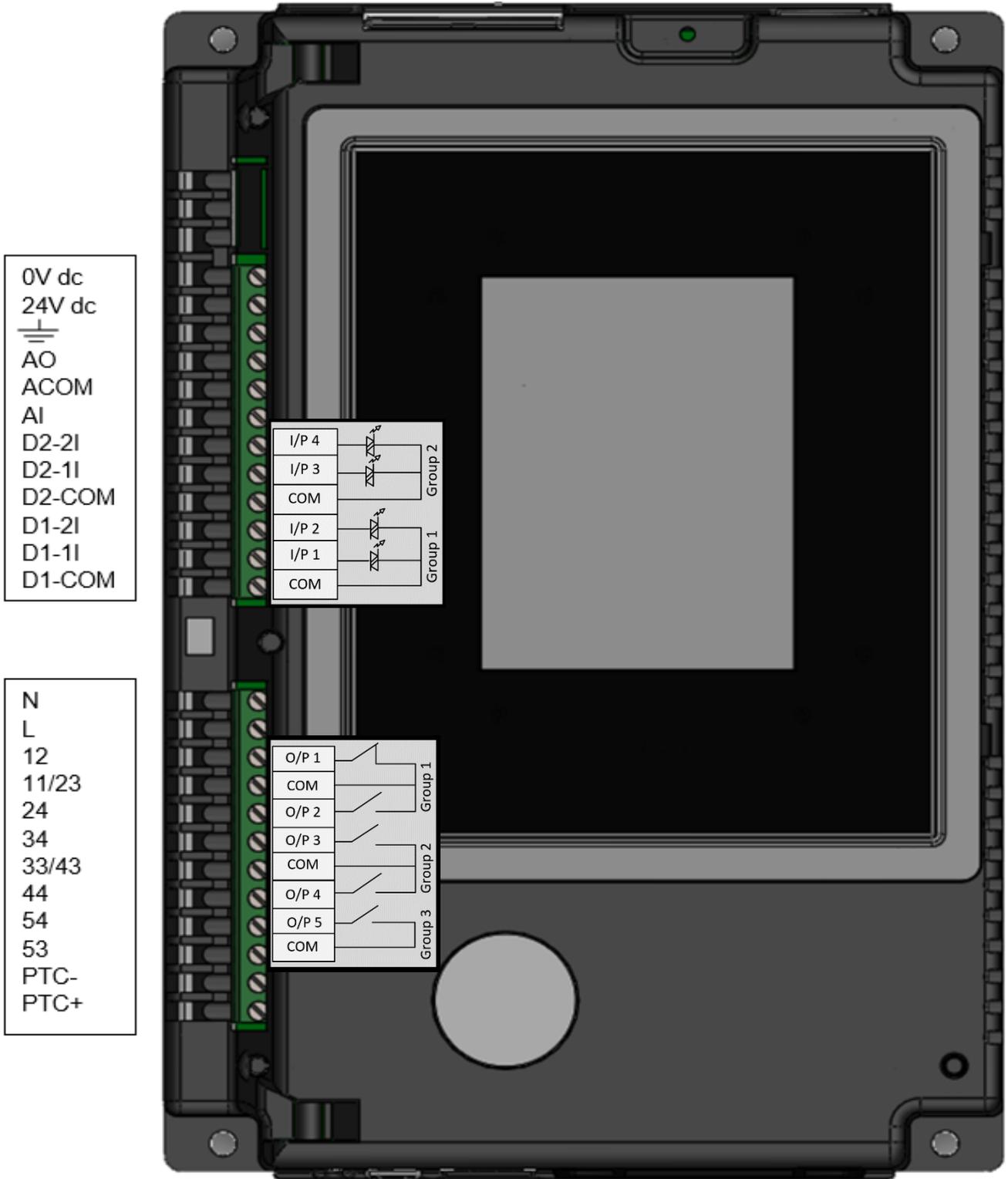
If you prefer to work in CFM, substitute °F for °C. Q is now in CFM

Control Power Consumption

VMX-SGY-I-17 to VMX-SGY-I-361 = 60W

VMX-SGY-I-430 to VMX-SGY-I-500 = 120W

Terminal Designations and Wiring Connection



Terminal Description

Terminal Name	Description	Programmable	Default	Rating	Notes
0V dc	Control Supply			See Table 1, Us	#3
24V dc					
	Signal ground				
AO	Analog Output	0-10V or 4-20mA			
ACOM	Analog Common				
AI	Analog Input	0-10V or 4-20mA			
D2-2I	Digital Input 4 - Group 2	See Table 1, Uc	None		#2
D2-1I	Digital Input 3 - Group 2	See Table 1, Uc	Reset		#2
D2-COM	Digital Input - Group 2 Common				#2
D1-2I	Digital Input 2 - Group 1	See Table 1, Uc	None		#1
D1-1I	Digital Input 1 - Group 1	See Table 1, Uc	Start / Stop		#1
D1-COM	Digital Input - Group 1 Common				#1
N	Control supply			See Table 1, Us	#3
L					
12	Digital Output 1 - Group 1 relay N/C	Yes	Fault	230VAC 1A AC15	
11 / 23	Digital Output - Group 1 Common				
24	Digital Output 2 - Group 1 relay N/O	Yes	Fault	230VAC 1A AC15	
34	Digital Output 3 - Group 2 relay N/O	Yes	Running	230VAC 1A AC15	
33 / 43	Digital Output - Group 2 Common				
44	Digital Output 4 - Group 2 relay N/O	Yes	End of Start	230VAC 1A AC15	
54	Digital Output 5 - Group 3 relay N/O	Yes	Running	230VAC 3A AC15	
53	Digital Output 5 - Group 3 Common				
PTC-	3 x PTC in series (130°C)				
PTC+	3 x PTC in series (130 °C)				

Notes

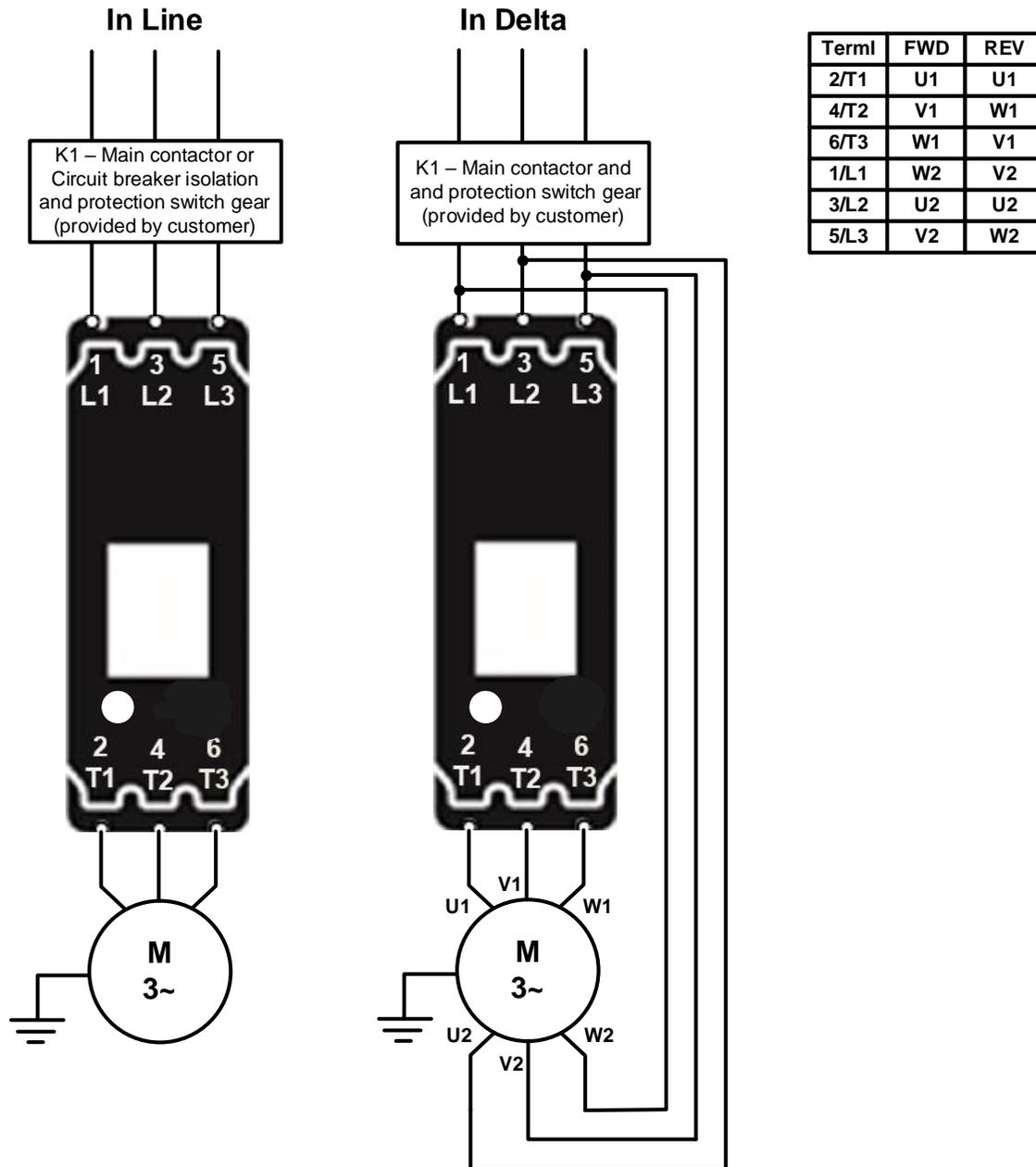
#1	The programmed digital input setting on D1-COM, D1-1I, D1-2I must correspond to the voltage applied to these terminals to avoid risk of damage to the equipment. Afin d'éviter d'endommager l'équipement, le réglage de l'entrée numérique programmé sur D1-COM, D1-1I, D1-2I doit correspondre à la tension appliquée à ces bornes.
#2	The programmed digital input setting on D2-COM, D2-1I, D2-2I must correspond to the voltage applied to these terminals to avoid risk of damage to the equipment. Afin d'éviter d'endommager l'équipement, le réglage de l'entrée numérique programmé sur D2-COM, D2-1I, D2-2I doit correspondre à la tension appliquée à ces bornes.
#3	The control supply can be 110 to 230Vac applied to the N, L terminals or 24Vdc applied to the 0Vdc, 24V input terminals. The correct voltage as specified must only be applied to one of these supply inputs to avoid risk of damage to the equipment. L'alimentation contrôle peut être 110 à 230 Vca, appliquée aux bornes N et L, ou 24 Vcc, appliquée aux bornes d'entrée de 0 Vcc, 24 V. Afin d'éviter d'endommager l'équipement, la tension appropriée selon les indications ne doit être appliquée qu'à une entrée d'alimentation.
#4	Refer to VMX-Synergy Plus User Manual for factory default settings. Référer au la Manuel de Programmation pour des paramètres par défaut d'usine

Model No (s)	Us (+10% -15%)	Uc (+10% -15%)	Notes
VMX-SGY-I-17-6-01 to VMX-SGY-I-361-6-01	110-230Vac or 24Vdc	110Vac or 230Vac or 24Vdc 230Vac factory default. 230Vac défaut d'usine #4	The system can have either a 110/230Vac mains or 24Vdc input NOT both. Le système peut avoir soit une alimentation principale de 110/230Vac ou de 24 Vdc, mais en aucun cas les deux simultanément
VMX-SGY-I-430-6-02 to VMX-SGY-I-500-6-02	110Vac		
VMX-SGY-I-430-6-03 to VMX-SGY-I-500-6-03	230Vac		

Table 1: Interface Control Voltages, 2 Amp Supply (continuous)

24Vdc Supply Specification: 24Vdc 60W. Residual ripple 100mV. Spikes/switching peaks 240mV. Turn On/Off no overshoot of V out. Overvoltage protection output voltage must be clamped to <30Vdc

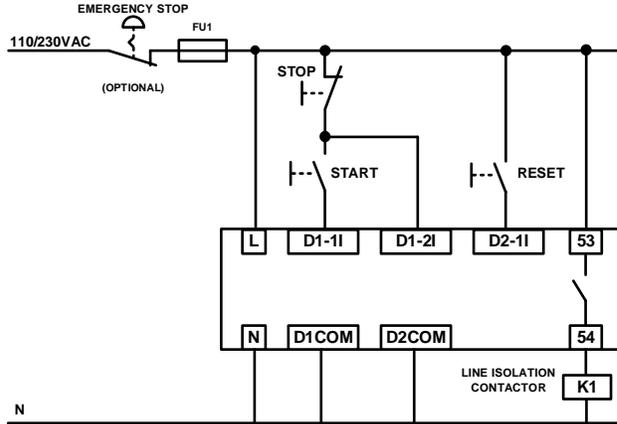
Wiring Connection



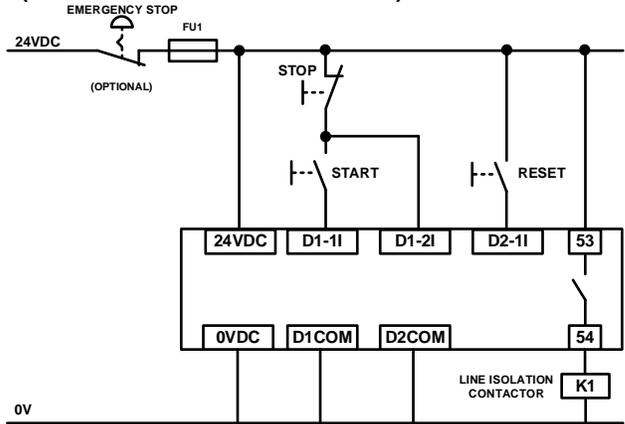
<p>! For suitable short circuit protection devices (SCPD's) see short Circuit Protection in the Technical Information/ standards section of this guide.</p> <p>Pour un dispositif de protection approprié contre le court-circuit, voir la protection contre le court-circuit dans la section « Informations techniques/normes » du présent guide.</p>	<p>! For wire size and torque requirements see Technical Information/ standards section of this guide.</p> <p>Pour les dimensions de câble et les besoins en couple, voir la section « Informations techniques/normes » du présent guide.</p>	<p>! In Delta For this configuration applying the equation.</p> <p>$VMX-Synergy Plus I_e = I_e (motor) / \sqrt{3}$</p> <p>Allows lower current rating VMX-Synergy Plus than the motor.</p> <p>The contactor K1 can also be connected inside the delta circuit.</p> <p>When connected in the delta $K1 \text{ current rating} = I_e (motor) / \sqrt{3}$</p>	<p>! En Delta Pour cette configuration, appliquer l'équation suivante:</p> <p>$VMX-Synergy Plus I_e = I_e (moteur) / \sqrt{3}$</p> <p>Cela permet le courant nominal inférieur de VMX-Synergy Plus par rapport au moteur.</p>
---	--	---	---

Wiring Connection

3 Wire Control Diagram
110/230Vac control supply (U_s)
and digital input (U_c) programming.



3 Wire Control Diagram
24Vdc control supply (U_s)
and digital input (U_c) programming.
(VMX-SGY-I-17 to VMX-SGY-I-361)



CAUTION

#1

REFER to TABLE 1 on page 11 for input control voltages.

These recommended wiring diagrams are specifically where the control supply voltage (US) is identical to the control circuit voltage (UC) and not to be supplied separately. Other wiring configurations must also be in accordance with existing local and national codes and regulations.

RÉFÉRER au TABLEU 1 à la page 12 pour des tensions de contrôle d'entrée.

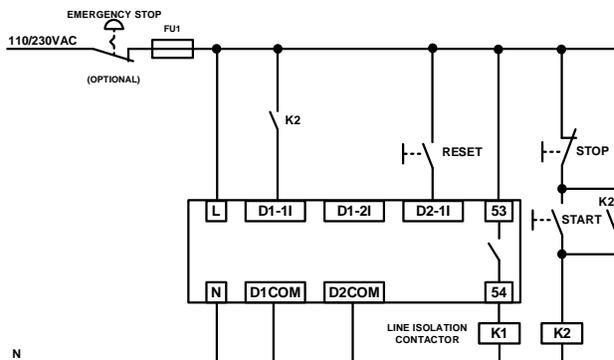
Ces schémas de câblage sont recommandées spécifiquement lorsque la tension d'alimentation de commande (US) est identique à la tension du circuit de commande (UC). US et UC ne doivent pas être alimentés séparément. Toutes les configurations de câblage doivent également être en conformité avec les codes et les règlements locaux et nationaux en vigueur.

#2

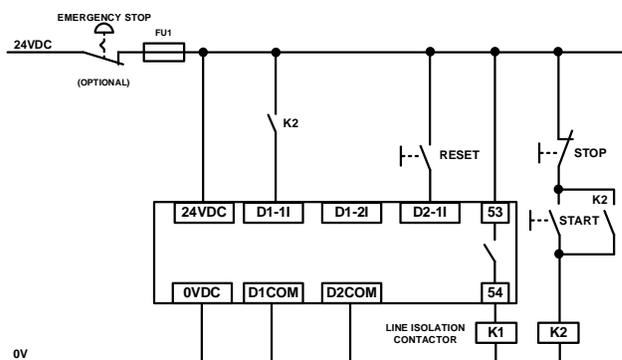
Power factor correction capacitors must NOT be positioned between the soft start and the motor or there is a risk of damaging thyristors due to current peaks.

Condensateurs de correction de facteur de puissance NE doivent pas être placés entre le moteur et le démarreur progressif ou il y a un risqué d'endommager les thyristors en raison des pics de courant.

110/230Vac (US) and (UC) user programmable control diagram



24Vdc (US) and (UC) user programmable control diagram (VMX-SGY-I-17 to VMX-SGY-I-361)



User programmable inputs are full programmable

D1 - 1I = High Start / Low Stop

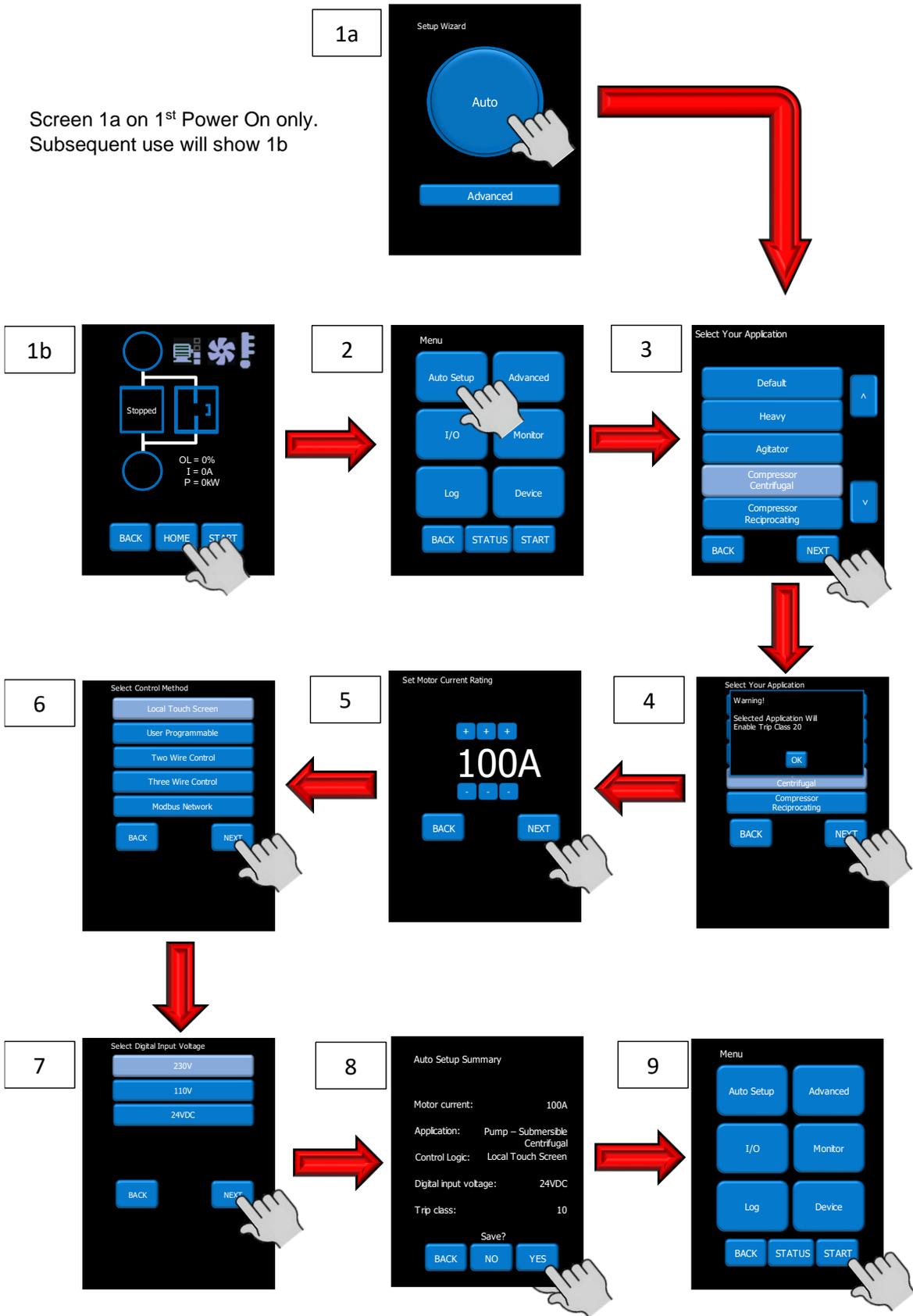
D1 - 2I = None

D2 - 1I = High Reset

1) Optional high reset. If this reset is required ensure "User Programmable" is selected in the control method menu found in the Digital Inputs menu. If you would prefer the reset to work by removing and reapplying the Start Signal on D1 - 1I then select "Two wire control" in the control method menu.

Programming

Screen 1a on 1st Power On only.
Subsequent use will show 1b



Rating Table

Minimum current ratings based on typical rated operation currents of motors for the corresponding rated operational powers

Current rating optimized for kW@600V & hp@550-600V - Ref IEC 60947-4-1 Table G.1 where applicable.

Size 1,2 and 3

Type	I _e A ³⁾	kW ¹⁾			FLA A ³⁾	Hp ²⁾					U _s
		230V	400V	500V		200V	208V	220-240V	440-480V	550-600V	
VMX-SGY-I-17-6-01	17	4	7.5	7.5	17	3	5	5	10	15	24VDC, 110VAC to 230VAC
VMX-SGY-I-22-6-01	22	5.5	11	11	22	5	5	5	15	20	
VMX-SGY-I-29-6-01	29	7.5	15	15	27	7.5	7.5	7.5	20	25	
VMX-SGY-I-35-6-01	35	7.5	18.5	22	34	10	10	10	25	30	
VMX-SGY-I-41-6-01	41	11	22	22	41	10	10	10	30	40	
VMX-SGY-I-55-6-01	55	15	30	37	52	15	15	15	40	50	
VMX-SGY-I-66-6-01	66	18.5	37	45	65	20	20	20	50	60	
VMX-SGY-I-80-6-01	80	22	45	55	77	20	25	25	60	75	
VMX-SGY-I-100-6-01	100	30	55	55	99	30	30	30	75	100	
VMX-SGY-I-132-6-01	132	37	75	90	125	40	40	40	100	125	
VMX-SGY-I-160-6-01	160	45	90	110	156	50	50	60	125	150	
VMX-SGY-I-195-6-01	195	55	110	132	192	60	60	75	150	200	
VMX-SGY-I-242-6-01	242	75	132	160	242	75	75	75	200	250	
VMX-SGY-I-302-6-01	302	90	160	200	302	100	100	100	250	300	
VMX-SGY-I-361-6-01	361	110	200	250	361	125	125	150	300	350	
VMX-SGY-I-430-6-02	430	132	250	250	414	150	150	150	350	450	110VAC
VMX-SGY-I-500-6-02	500	150	280	355	480	150	150	150	400	500	230VAC
VMX-SGY-I-430-6-03	430	132	250	250	414	150	150	150	350	450	
VMX-SGY-I-500-6-03	500	150	280	355	480	150	150	200	400	500	

¹⁾ Rated operational powers in kW as per IEC 60072-1 (primary series) corresponding to IEC current rating.

²⁾ Rated operational powers in hp corresponding to FLA current rating according to UL508 and Table 430.250 of the National Electrical Code.

³⁾ The I_e and FLA rating applies for a maximum surrounding air temperature of 50°C. Above 50°C de-rate linearly by 4% of I_e or FLA per °C to a maximum of 60°C.

Technical Information

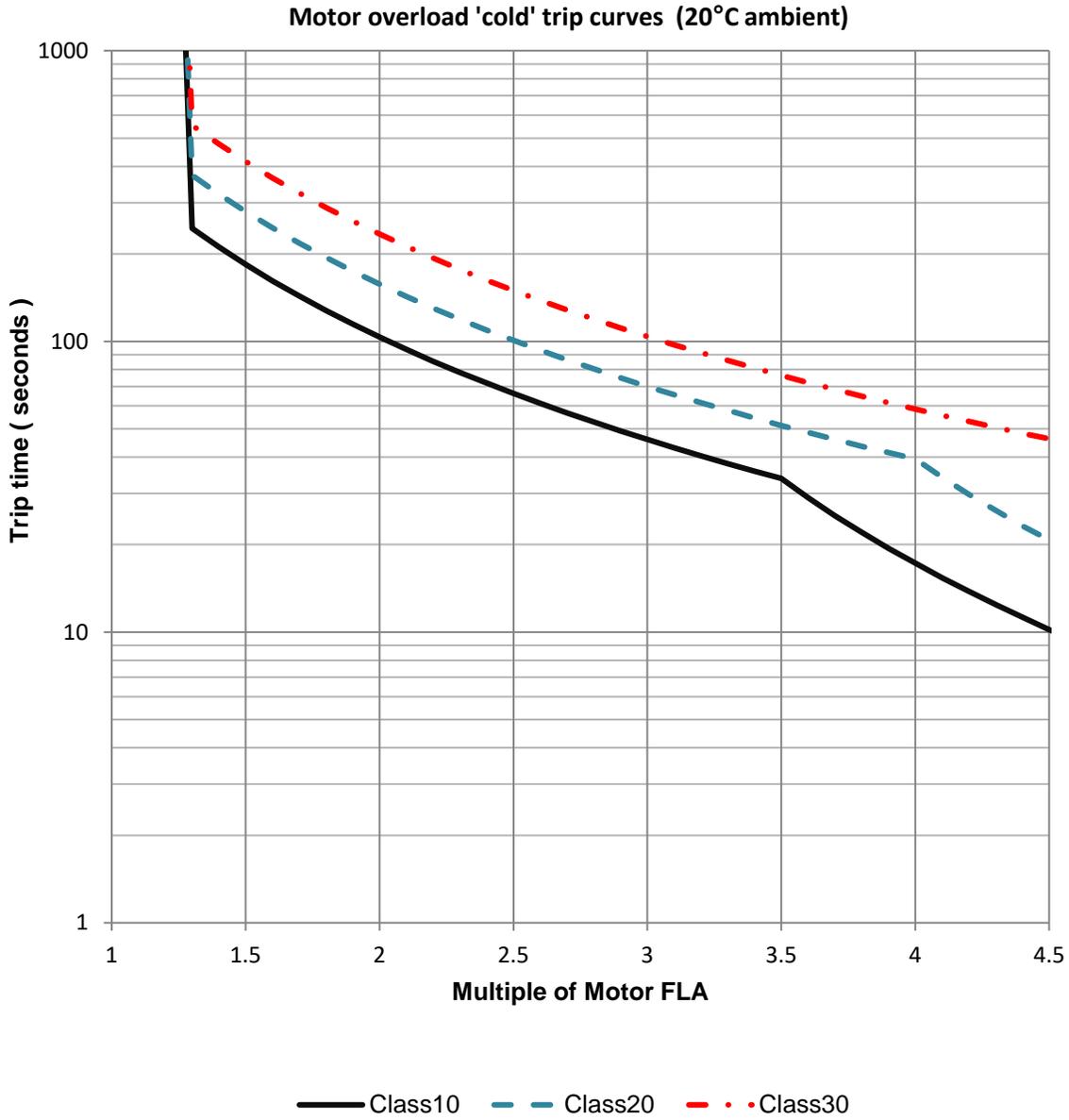


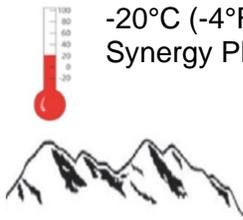
Fig 1: Trip curves

Note: When the overload has tripped, there is a forced cooling time to allow the overload to recover before the next start. The 'warm' trip times are 50% of the 'cold' trip time

Technical Information & Standards

Rated operational voltages	U_e	200VAC to 600Vac		
Rated operational currents	I_e	See Rating Table		
Rating index		VMX-SGY-I-17 to VMX-SGY-I-361 Ie: AC-53a:3.5-17:90-5 VMX-SGY-I-430 to VMX-SGY-I-500 Ie: AC-53a:3.5-17:90-3		
Rated frequency/frequencies		50 - 60Hz \pm 5Hz		
Rated duty		Uninterrupted.		
Form designation		Form 1, Internally Bypassed		
Rated insulation voltage	U_i	600V		
Rated impulse withstand voltage	U_{imp}	Main circuit	6kV	
		Control supply circuit	4kV	
IP code		Main circuit	IP00 (IP 20 optional on VMX-SGY-I-17 to VMX-SGY-I-195)	
		Supply and Control circuit	IP20	
Overvoltage Category/Pollution Degree		III/3		
Humidity		Max 85% non-condensing, not exceeding 50% at 40°C		
Rated conditional short-circuit current and type of co-ordination with associated short circuit protective device (SCPD)		Type 1 co-ordination See Short Circuit Protection Tables 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	50 - 60Hz \pm 5Hz	Protect with 4A UL 248 Listed fuse
Rated control supply voltage	U_s	See Rating Table, 2 Amp supply (cont.)		
Relay specification	11, 12, 24 and 33, 34, 44	AC-15, 230VAC, 1A DC-13 30VDC, 0.7A		
	53, 54	AC-15, 250VAC, 3A DC-13 24VDC, 2A		
Electronic Overload relay with manual reset	Trip Class	10, 20 or 30 (See Sizing Guide for associated I_e rating)		
	Current setting	10% I_e to I_e		
	Rated frequency	50 to 60Hz \pm 5Hz		
	Time-current characteristics	See Fig.1 for trip curves (Trip time $T_p \pm 20\%$)		
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 and power ports)		
		1kV/5kHz (signal ports)		
	IEC 61000-4-5	2kV line-to-ground / 1kV line-to-line		
IEC 61000-4-6	10V			
Transient surge suppression shall be installed on the line side of this equipment and shall be rated 600_V (phase to phase), suitable for overvoltage category III, and shall provide protection for a rated impulse withstand voltage peak of 6 kV" – or equivalent.				
* NOTICE: This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances, in which case the user may be required to take adequate mitigation measures				

Altitude & Short Circuit Protection



-20°C (-4°F) to 50°C (122°F). Above 50°C (122°F) de-rate linearly by 4 % of VMX-Synergy Plus I_e per °C to a maximum of 60°C (140°F).

Altitude above sea level 1000m (3281ft). Above 1000m (3281ft) de rate by 1% of VMX-Synergy Plus I_e per 100m (328ft) to a maximum altitude of 2000m (6562ft). Please note for higher temperatures and altitudes contact your supplier.

Short circuit protection

VMX-Synergy Plus models bearing the UL listing mark are UL 60947-4-2 and CSA C22.2 No.14 listed to US and Canadian safety standards respectively.

Size 1

Type designation (eg. VMX-SGY-I-...)			17	22	29	35	41	55	66	80	100
Rated operational currents	I _e	A	17	22	29	35	41	55	66	80	100
Rated conditional short circuit current	I _q	kA	10	10	10	10	10	10	10	10	10
Class J time-delay fuse #1	Maximum rating Z ₁	A	25	30	40	45	60	70	90	100	125
UL Listed inverse-time delay circuit breaker #1	Maximum rating Z ₂	A	-	-	-	-	-	-	-	-	-
Semiconductor fuse (class aR) #2	Type		Mersen 6,9 URD 30_ Bussmann 170M30_ Bussmann 170M31_ Bussmann 170M32_ SIBA 20 61_				Mersen 6,9 URD 31_ Bussmann 170M40_ Bussmann 170M41_ Bussmann 170M42_ SIBA 20 61_				
	Fuse rating	A	100	100	160	160	200	200	200	315	315

Size 2 and 3

Type designation (eg. VMX-SGY-I-...)			132	160	195	242	302	361	430	500
Rated operational currents	I _e	A	132	160	195	242	302	361	430	500
Rated conditional short circuit current	I _q	kA	10	10	10	18	18	18	30	30
Class J time-delay fuse #1	Maximum rating Z ₁	A	175	200	250	350	400	450	600	600
UL Listed inverse-time delay circuit breaker #1	Maximum rating Z ₂	A	-	-	-	400	500	600	700	800
Semiconductor fuse (class aR) #2	Type		Mersen 6,9 URD 31_ Bussmann 170M40_ Bussmann 170M41_ Bussmann 170M42_ SIBA 20 61_			Mersen 6,9 URD 33_ Bussmann 170M60_ Bussmann 170M61_ Bussmann 170M62_ SIBA 20 63_				
	Fuse rating	A	400	550	550	900	900	900	1000	1000

- # 1. Suitable for Use On A Circuit Capable Of Delivering Not More Than ___I_q___ rms Symmetrical Amperes, 600 Volts Maximum, When Protected by Class L time delay Fuses with a Maximum Rating of ___Z₁___ or by a Circuit Breaker with a Maximum Rating of ___Z₂___.
- # 2. Correctly selected semiconductor fuses can provide additional protection against damage to the Synergy Plus unit (This is sometimes referred to as type 2 co-ordination). These semiconductor fuses are recommended to provide this increased protection.

Sizing Guide

In-Line Connection

Size 1 and 2

I _e	kW			FLA	Hp					Trip Class 10	Trip Class 20	Trip Class 30
	A	230V	400V		500V	A	200V	208V	220-240V	440-480V	550-600V	I _e : AC-53a: 3.5-17: 90-5 VMX-
17	4	7.5	7.5	17	3	5	5	10	15	SGY-I-17	SGY-I-22	SGY-I-29
22	5.5	11	11	22	5	5	5	15	20	SGY-I-22	SGY-I-29	SGY-I-35
29	7.5	15	15	27	7.5	7.5	7.5	20	25	SGY-I-29	SGY-I-35	SGY-I-41
35	7.5	18.5	22	34	10	10	10	25	30	SGY-I-35	SGY-I-41	SGY-I-55
41	11	22	22	41	10	10	10	30	40	SGY-I-41	SGY-I-55	SGY-I-66
55	15	30	37	52	15	15	15	40	50	SGY-I-55	SGY-I-66	SGY-I-80
66	18.5	37	45	65	20	20	20	50	60	SGY-I-66	SGY-I-80	SGY-I-100
80	22	45	55	77	20	25	25	60	75	SGY-I-80	SGY-I-100	SGY-I-132
100	30	55	55	99	30	30	30	75	100	SGY-I-100	SGY-I-132	SGY-I-160
132	37	75	90	125	40	40	40	100	125	SGY-I-132	SGY-I-160	SGY-I-195
160	45	90	110	156	50	50	60	125	150	SGY-I-160	SGY-I-195	See Size 3
195	55	110	132	192	60	60	75	150	200	SGY-I-195	See Size 3	See Size 3

Size 3

I _e	kW			FLA	Hp					Trip Class 10	Trip Class 20	Trip Class 30
	A	230V	400V		500V	A	200V	208V	220-240V	440-480V	550-600V	I _e : AC-53a: 3.5-17: 90-3 VMX-
160	45	90	110	156	50	50	60	125	150	See Size 2	See Size 2	SGY-I-242
195	55	110	132	192	60	60	75	150	200	See Size 2	SGY-I-242	SGY-I-302
242	75	132	160	242	75	75	75	200	250	SGY-I-242	SGY-I-302	SGY-I-361
302	90	160	200	302	100	100	100	250	300	SGY-I-302	SGY-I-361	SGY-I-430
361	110	200	250	361	125	125	150	300	350	SGY-I-361	SGY-I-430	SGY-I-500
430	132	250	250	414	150	150	150	350	450	SGY-I-430	SGY-I-500	-
500	150	280	355	480	150	150	200	400	500	SGY-I-500	-	-

Sizing Guide (Continued)

In-Delta Connection

Size 1 and 2

I _e ¹⁾	kW			FLA ¹⁾	Hp					Trip Class 10 I _e : AC-53a: 3.5-17: 90-5 VMX-	Trip Class 20 I _e : AC-53a: 4-19: 90-5 VMX-	Trip Class 30 I _e : AC-53a: 4-29: 90-5 VMX-
	A	230 V	400 V		500 V	A	200 V	208 V	220-240V			
29	7.5	15	18.5	29	7.5	7.5	10	20	25	SGY-I-17	SGY-I-22	SGY-I-29
38	11	18.5	22	36	10	10	10	25	30	SGY-I-22	SGY-I-29	SGY-I-35
50	11	22	30	47	10	15	15	30	40	SGY-I-29	SGY-I-35	SGY-I-41
61	18.5	30	37	59	15	15	20	40	50	SGY-I-35	SGY-I-41	SGY-I-55
71	18.5	37	45	69	20	20	25	50	60	SGY-I-41	SGY-I-55	SGY-I-66
95	22	45	55	90	25	30	30	60	75	SGY-I-55	SGY-I-66	SGY-I-80
114	30	55	75	113	30	30	40	75	100	SGY-I-66	SGY-I-80	SGY-I-100
139	37	75	90	133	40	40	50	100	125	SGY-I-80	SGY-I-100	SGY-I-132
173	55	90	110	166	50	50	60	125	150	SGY-I-100	SGY-I-132	SGY-I-160
229	55	110	160	215	60	75	75	150	200	SGY-I-132	SGY-I-160	SGY-I-195
277	75	150	185	270	75	75	100	200	250	SGY-I-160	SGY-I-195	See Size 3
338	90	185	220	312	100	100	125	250	300	SGY-I-195	See Size 3	See Size 3

Size 3

I _e ¹⁾	kW			FLA ¹⁾	Hp					Trip Class 10 I _e : AC-53a: 3.5-17: 90-3 VMX-	Trip Class 20 I _e : AC-53a: 4-19: 90-3 VMX-	Trip Class 30 I _e : AC-53a: 4-29: 90-3 VMX-
	A	230V	400V		500V	A	200V	208V	220-240V			
277	75	150	185	270	75	75	100	200	250	See Size 2	See Size 2	SGY-I-242
338	90	185	220	312	100	100	125	250	300	See Size 2	SGY-I-242	SGY-I-302
419	132	220	300	419	150	150	150	350	450	SGY-I-242	SGY-I-302	SGY-I-361
523	160	300	375	523	150	150	200	450	500	SGY-I-302	SGY-I-361	SGY-I-430
625	200	355	425	625	200	200	250	500	600	SGY-I-361	SGY-I-430	SGY-I-500
745	220	425	530	717	250	250	250	500	700	SGY-I-430	SGY-I-500	-
866	280	500	630	831	250	300	300	600	800	SGY-I-500	-	-

¹⁾ Maximum motor line current indicated. For In-Delta connections, all six motor wires must be available for connection, and it is critical to exactly follow the In-Delta wiring diagram in the Synergy Plus Quick Start Guide. The Soft Starter will only sense the Phase Current, which is about 57.7% of the motor line current.

Please refer to the full user manual MAN-VMX-SGY-I-UM for further details

Electric current, Danger to life!

Only skilled or instructed persons may carry out the 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 morte!

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 проработанные лица могут выполнять следующие операции.

Levensgevaar door elektrische stroom!

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

Livsfara 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 εργασίες που αναφέρονται στη συνέχεια θα πρέπει να εκτελούνται μόνο από ηλεκτρολόγους και ηλεκροτεχνίτες.

Perigo de vida devido a corrente eléctrica!

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 jännite!

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

Nebezpečí úrazu elektrickým proudem!

Niže uvedené práce smějí provádět pouze osoby s elektrotechnickým vzděláním.

Eluhtlik! Elektrilöögiolt!

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.

Elektriskā strāva apdraud dzīvību!

Tālāk aprakstītos darbus drīkst veikt tikai elektrospeciālisti un darbam ar elektrotehniskām iekārtām instruētās personas!

Porażenie prądem elektrycznym stanowi zagrożenie dla życia!

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

Livsfara genom elektrisk ström!

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

Hengenvaarallinen jännite!

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

Nebezpečí úrazu elektrickým proudem!

Niže uvedené práce smějí provádět pouze osoby s elektrotechnickým vzděláním.

Eluhtlik! Elektrilöögiolt!

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.

Elektriskā strāva apdraud dzīvību!

Tālāk aprakstītos darbus drīkst veikt tikai elektrospeciālisti un darbam ar elektrotehniskām iekārtām instruētās personas!

Pavojus gyvybei dėl elektros srovės!

Tik elektrikai ir elektrotechnikos specialistai gali atlikti žemiau aprašytus darbus.

Porażenie prądem elektrycznym stanowi zagrożenie dla życia!

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

Življenjska nevarnost zaradi električnega toka!

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

Nebezpečnostvo ohrozenia života elektrickým prúdom!

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

Опасност за живота от электрически ток!

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

Atenție! Pericol electric!

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

Življenjska nevarnost zaradi električnega toka!

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

Nebezpečnostvo ohrozenia života elektrickým prúdom!

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

Опасност за живота от электрически ток!

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

Atenție! Pericol electric!

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

Pavojus gyvybei dėl elektros srovės!

Tik elektrikai ir elektrotechnikos specialistai gali atlikti žemiau aprašytus darbus.

California Customers: California Proposition 65 Warning

WARNING: this product and associated accessories may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information visit <https://p65warnings.ca.gov>

Notes

Notes

Notes



MOTORTRONICS™

Solid State AC Motor Control

VMX-Synergy Plus™

Premium Digital Soft Starter

www.motortronics.com