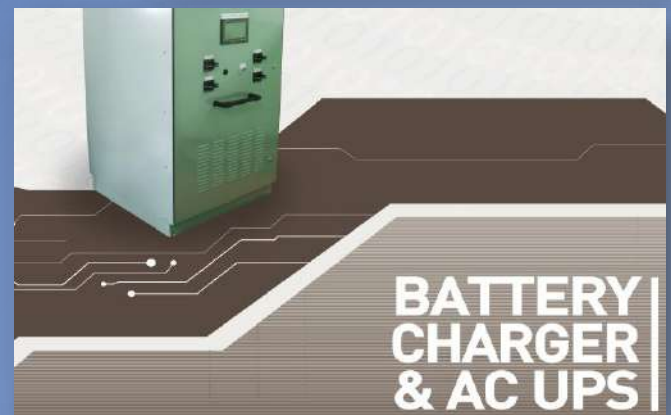
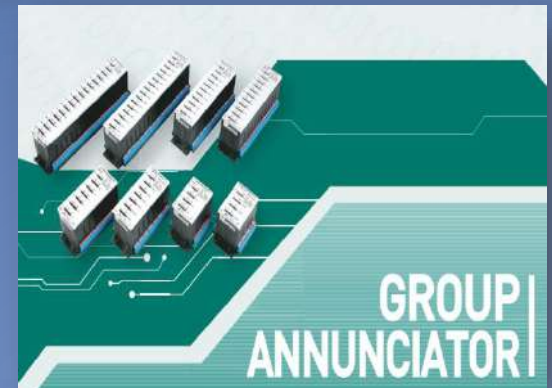
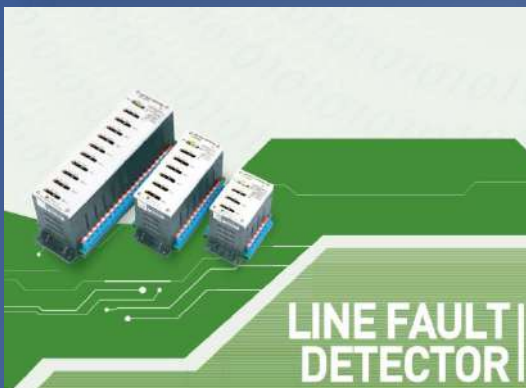
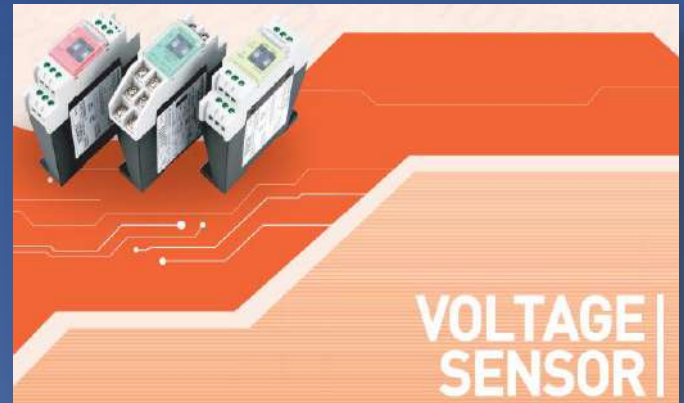




ΠΕΡΙΕΧΟΜΕ

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SLIM TIMER



Width: 22mm DIN, JIS standard satisfaction

POWER ON DELAY
SIGNAL OFF DELAY
SIGNAL ON/OFF DELAY
POWER ON INTERVAL
FLICKER
WINDING HEATER
Y-D STARTING

Slim timer, as a device to control the precise time, is a slim type one embedding MICOM. The setting time is convenient and accurate by using a digital switch.

It enables the setting time to keep accurate under the change of vibration/temperature and has various model that can be used maximum AC 440V.

And the reduction of panel size and minimal weight can be realized in slim timer.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc..

MODEL	FUNCTION	RATING VOLTAGE
GTN-S1	On delay	Combination Source • AC/DC 24V or AC 100-240V
GTN-S2	On delay	
GTN-S4	Interval	Combination Source • AC/DC 24V or AC 100-240V
GTN-SF1	Sing. off delay	• AC/DC 24V • AC 100-240V
GTN-SF2	Sig. on-off delay	• AC 100-240V
GTN-WH	Winding Heater	• AC 100-240V
GTN-YD	Y-D Starting	• AC 380-480V • AC 100-240V
GTN-H1	On delay	• AC 380-480V
GTN-H2	On delay	
GTN-F1	Sing. off delay	• AC 100-240V
GTN-M3	On delay	• AC 100-240V
GTN-M4	Interval	• AC/DC 24V • AC 100-240V

CLASSIFICATION		FUNCTION	MODEL	OUTPUT CONTACT	TIME RANGE		RATING VOLTAGE	TB
HIGH-CON		On delay	GTN-H1	[1c, 1c]	0.1sec. ~ 99min.	WR	* AC 380-480V * DC 120V (OPTION) * DC 240V	8P
		On delay	GTN-H2	[2c]				
		Interval	GTN-H3	[1c, 1c]				
		Interval	GTN-H4	[2c]				
SPECIAL		Flicker	GTN-FL	[2c]	0.2sec. ~ 99hrs.	FR	* AC/DC 24V + DC 120V * AC 110V / 220V	
		Winding heater	GTN-WH	[1a, 1a]			30sec. ~ 58sec.	
		Y-D starting	GTN-YD	[1a, 1a]	2sec. ~ 30sec.		* AC 380-480V * AC 100-240V	
		Sing. off delay	GTN-F1	[2c]	0.1sec. ~ 990hrs.	WR	* AC/DC 24V * AC 100-240V * DC 120V	
		Sig. on-off delay	GTN-F2	[2c]				
MULTI	OUTPUT	On delay	GTN-M3	[1a, 2c]	0.1sec. ~ 990hrs.			
		Interval	GTN-M4	[1a, 2c]				
	SOURCE	On delay	GTN-S1	[1c, 1c]	0.1sec. ~ 30hrs.			
		On delay	GTN-S2	[2c]				
		Interval	GTN-S3	[1c, 1c]				
		Interval	GTN-S4	[2c]				
	Pulse on delay	GTN-S5	[2c]					
GENERAL		Sing. off delay	GTN-SF1	[2c]	0.1sec. ~ 30hrs.	FR	* AC/DC 24V + DC 120V * AC 100-240V	
		Sig. on-off delay	GTN-SF2	[2c]				
		On delay	GTN-E1	[1c, 1c]	0.1sec. ~ 30hrs.		* DC 120V	
		On delay	GTN-E2	[2c]				
		Interval	GTN-E3	[1c, 1c]				
		Interval	GTN-E4	[2c]				

MOTOR CONTROLLER SMC-500 SERIES



The motor controllers of SMC-500 SERIES are multi-functional high-performance products that are to be easily used wherever the Motor Operating is needed. These Series satisfy the various international standards and adopt the standardized circuits and the control circuits are composed of international standardized parts selected rigidly.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc.. These have IP65 grade.

MODEL	FUNCTION
SMC-501	Constant start (Direct on-line start)
SMC-501A	- Constant start (Direct on-line start) - Auto-Manual
SMC-501B	- Non-Sequential start function - Constant start (Direct on-line start)
SMC-501BA	- Non-Sequential start function - Constant start (Direct on-line start) - Auto
SMC-501BH	- Non-Sequential start function - Constant start (Direct on-line start) - With heater switch and Indicator
SMC-501H	- Constant start (Direct on-line start) - With heater switch and Indicator
SMC-502H	- Constant Start (Remote/Local, Y-D Start) - With heater switch and Indicator
SMC-503	Reversible Start
SMC-503H	- Reversible Start - With heater switch and Indicator
SMC-504H	2-speed start - With heater switch and Indicator
SMC-504RH	2-speed start 2-speed reversible - With heater switch and Indicator
SMC-505(R4)	Stand-by start (2 or 3 stand-by)
SMC-505H(R4)	- Stand-by start (2 or 3 stand-by) - With heater switch and Indicator
 SMC-402(R)	- Auto-Manual - Auto-start, auto-stop, auto-signal, run

GROUND MONITOR FOR AC SYSTEM

AC LINE-LOW INSULATION MONITORING **SBAG-102 / 202 / 402**



TYPE APPROVAL: GL, KR

Detection LINE Voltage: 0 ~ 690Vac

The ground monitor of SBAG(ISA) SERIES, as a device to monitor the insulation level of non-grounded AC electrical system, is used for the system to prevent the damage or accidents occurred in power electronic devices and equipments due to the poor insulation on the power line.

Insulation status can be always measured by these Series whether the status is in conducting state or non-conducting state and these Series are used to prevent the problem caused by low insulation level by generating the alarm in such case that the insulation level drops below the predetermined value.

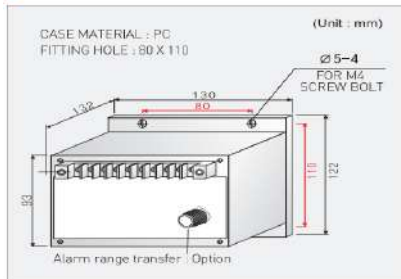
The size of case is classified into two kinds and can be selected according to the space of mounting place of the enclosure. As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc..

FRONT VIEW

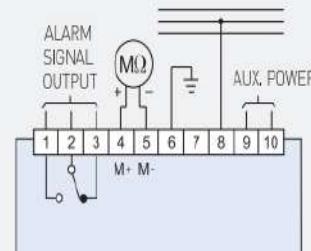


- ① Power indicating lamp (Green)
- ② Alarm indicating lamp (Red)
- ③ Alarm setting (MΩ)

DIMENSION



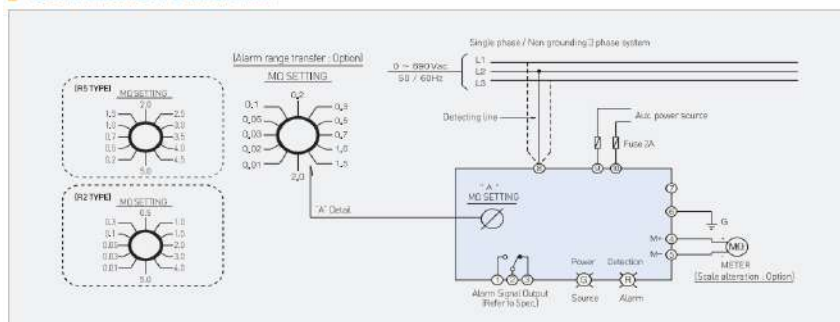
T.B LAYOUT



SPECIFICATIONS (LOW INSULATION SPEC)

MODEL	SBAG-102	SBAG-202	SBAG-402
AUX. POWER RATING	AC 110V 50/60Hz	AC 220V 50/60Hz	AC 440V 50/60Hz
RANGE OF POWER VARIATION	AC 85~135V	AC 170~270V	AC 395~485V
MAX. POWER CONSUMPTION	5VA		
INSULATION MONITORING RANGE	$\infty \sim 5 \sim 0.2 \sim 0.05 \sim 0.0M\Omega$ $[R2 : \infty \sim 50 \sim 0.0M\Omega]$ $[R5 : \infty \sim 10 \sim 5 \sim 1 \sim 0.5 \sim 0.0M\Omega]$		
INSULATION VOLTAGE RANGE	AC 1P / 3 Phase 0 ~ 690V (max.)		
DETECTOR ACCURACY	$\pm 5\%$ [0.1 ~ 2MΩ] $\pm 10\%$ [under 0.05MΩ, 2MΩ above]		
ALARM SETTING RANGE	0.01 ~ 2.0MΩ [select by 12 steps selector switch] $[R2 : 0.01 \sim 5.0M\Omega]$ $[R5 : 0.2 \sim 5.0M\Omega]$		
ALARM DELAY TIME	3.0sec. [±0.5sec.] Reset time : 0.5sec. or less		
ALARM SIGNAL OUTPUT	5A (resistive) 2A (inductive) 30V DC 5A (resistive) 2A (inductive p.f.=0.4) 125V AC 3A (resistive) 1A (inductive p.f.=0.4) 250V AC		
AMBIENT TEMP.	-20°C ~ +60°C		
STORAGE TEMP.	-40°C ~ +85°C		
DIELECTRIC STRENGTH	Between terminal to cabinet 2.5KV / 1min Between 9, 10 to 6, 8 terminal 1.5KV / 1min		
METER	Refer to page 45		

CONNECTION DIAGRAM



GROUND MONITOR FOR AC SYSTEM

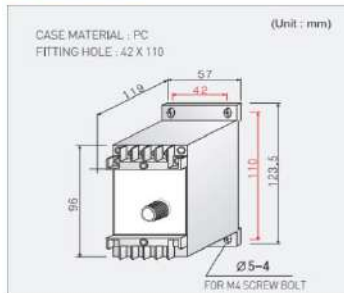
AC LINE-LOW INSULATION MONITORING **ISA690A1 / ISA690A2 / ISA690A4**

FRONT VIEW

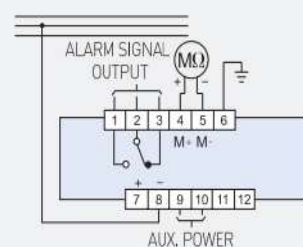


- 1 Power indicating lamp (Green)
- 2 Alarm indicating lamp (Red)
- 3 Alarm setting (MΩ)

DIMENSION



T.B LAYOUT



MODEL AUX. POWER RATING

ISA690A1	AC 110V 50/60Hz
ISA690A2	AC 220V 50/60Hz
ISA690A4	AC 440V 50/60Hz

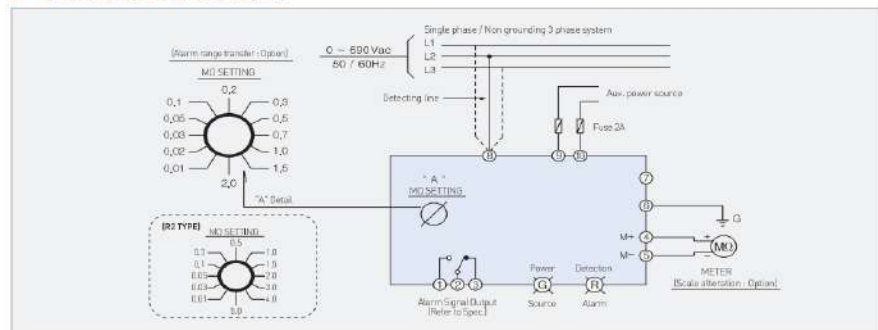
INSULATION MONITORING RANGE 0.5-0.2-0.05-0MΩ

ALARM SETTING RANGE 0.01-2MΩ

SPECIFICATIONS (LOW INSULATION SPEC)

MODEL	ISA690A1	ISA690A2	ISA690A4
AUX. POWER RATING	AC 110V 50/60Hz	AC 220V 50/60Hz	AC 440V 50/60Hz
RANGE OF POWER VARIATION	AC 85-135V	AC 170-270V	AC 395-485V
MAX. POWER CONSUMPTION	5VA		
INSULATION MONITORING RANGE	∞ - 5 - 0.2 - 0.05 - 0MΩ (R2 : ∞ - 50 - 0MΩ)		
INSULATION VOLTAGE RANGE	AC 1P / 3 Phase 0 - 690V (max.)		
DETECTOR ACCURACY	±5% (0.1 - 2MΩ) ±10% (under 0.05MΩ, 2MΩ above)		
ALARM SETTING RANGE	0.01 - 2.0MΩ (select by 12 steps selector switch) (R2 : 0.01 - 5.0MΩ)		
ALARM DELAY TIME	3.0sec. (±0.5sec.) Reset time : 0.5sec. or less		
ALARM SIGNAL OUTPUT	5A (resistive) 2A (inductive) 30V DC 5A (resistive) 2A (inductive p.i.=0.4) 125V AC 3A (resistive) 1A (inductive p.i.=0.4) 250V AC		
AMBIENT TEMP.	-20°C - +50°C		
STORAGE TEMP.	-40°C - +55°C		
DIELECTRIC STRENGTH	Between terminal to cabinet 2.5KV / 1min Between 9, 10 to 8, terminal 1.5KV / 1min		
METER	Refer to page 45		

CONNECTION DIAGRAM



MODEL

MΩ METER
96X96

AUX. POWER RATING

5MΩ 1mA

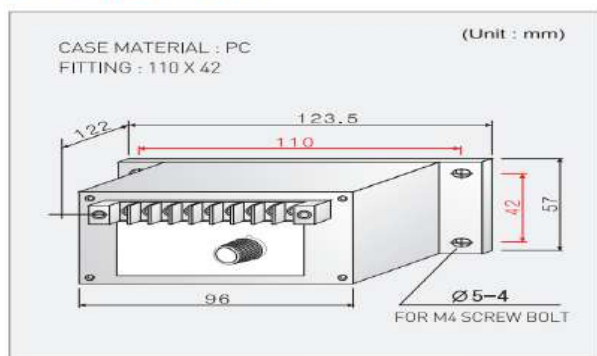
PROTECTION FOR AC LOW VOLTAGE MOTOR

PROTECTION FOR LOW VOLTAGE AC MOTOR **SBMG-102A/202A/402A**

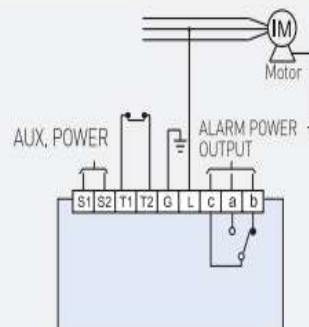


- ① Power indicating lamp (Green)
- ② Alarm indicating lamp (Red)
- ③ Alarm setting (MΩ)

DIMENSION



T.B LAYOUT



MODEL

AUX. POWER RATING

SBMG-202A

AC 220V 50/60Hz

INSULATION MONITORING RANGE

0-5-0.2-0.05-0MΩ

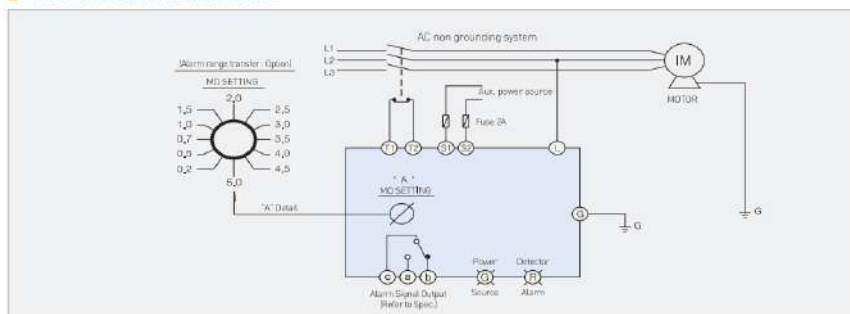
ALARM SETTING RANGE

0.01-2MΩ

SPECIFICATIONS (LOW INSULATION SPEC')

MODEL	SBMG-102A	SBMG-202A	SBMG-402A
AUX. POWER RATING	AC 110V 50/60Hz	AC 220V 50/60Hz	AC 440V 50/60Hz
RANGE OF POWER VARIATION	AC 85-135V	AC 170-270V	AC 395-485V
MAX. POWER CONSUMPTION	5VA		
INSULATION MONITORING RANGE	$\infty \sim 10 \sim 5 \sim 0.2 \sim 0.05 \sim 0M\Omega$		
INSULATION VOLTAGE RANGE	AC 1P / 3 Phase 0 ~ 690V [max.]		
DETECTOR ACCURACY	±5% (0.2 ~ 5MΩ) ±10% (under 0.2MΩ, 5MΩ above)		
ALARM SETTING RANGE	0.2 ~ 5MΩ (select by 12 steps selector switch) [0.2-0.5-0.7-1.0-1.5-2.0-2.5-3.0-3.5-4.0-4.5-5.0]		
ALARM DELAY TIME	3.0sec. (±0.5sec.) Reset time : 0.5sec. or less		
ALARM SIGNAL OUTPUT	5A (resistive) 2A (inductive) 30V DC 5A (resistive) 2A (inductive p.f.=0.4) 125V AC 3A (resistive) 1A (inductive p.f.=0.4) 250V AC		
AMBIENT TEMP.	-20°C ~ +60°C		
STORAGE TEMP.	-40°C ~ +65°C		
DIELECTRIC STRENGTH	Between terminal to cabinet 2.5KV / 1min		

CONNECTION DIAGRAM



GROUND MONITOR FOR AC HIGH VOLTAGE MOTOR

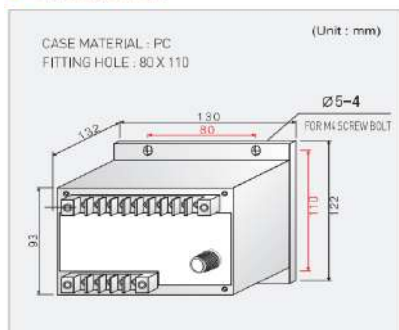
PROTECTION FOR HIGH VOLTAGE AC MOTOR **ISAH6600-2**

FRONT VIEW



- ① Power indicating lamp (Green)
- ② Alarm indicating lamp (Red)
- ③ Alarm setting (MΩ)
- ④ 4~20mA power output terminal (Apply only to ISAH6600M-1/2)

DIMENSION



The high voltage ground monitor of ISAH SERIES, as a device to monitor the insulation level of high voltage motor, is used for the system to prevent the damage or some kinds of accidents occurred in power electronic devices and equipment due to the poor insulation on the power line.

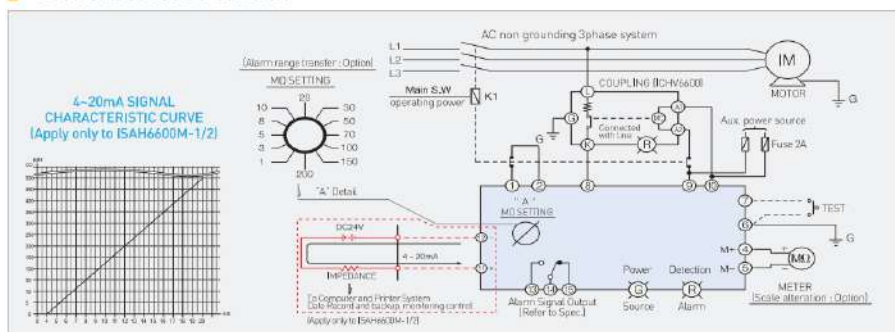
In case the insulation level drops below the predetermined value, the monitor is able to be manipulated not to work the motor and these Series are used to prevent the problem caused by low insulation level by generating the alarm.

SPECIFICATIONS

MODEL	ISAH-6600-1	ISAH-6600-2
	ISAH-6600M-1	ISAH-6600M-2
AUX. POWER RATING	AC 110V 50/60Hz	AC 220V 50/60Hz
RANGE OF POWER VARIATION	AC 85~133V	AC 170~270V
MAX. POWER CONSUMPTION	10VA	
INSULATION MONITORING RANGE	∞ ~ 500 ~ 100 ~ 50 ~ 0MΩ	
INSULATION VOLTAGE RANGE	AC 3P 0~7500V (max.)	
DETECTING METHOD OF INSULATION	Connect With Coupling (ICHV6600)	
DETECTOR ACCURACY	±5% (1~200MΩ) ±10% (under 1MΩ, 200MΩ above)	
ALARM SETTING RANGE	1 ~ 200MΩ (select by 12 steps selector switch) (1-3-5-8-10-20-30-50-70-100-150-200)	
ALARM DELAY TIME	3.0sec, (±0.5sec.) Reset time: 0.5sec. or less	
ALARM SIGNAL OUTPUT	5A (resistive) 2A (inductive) 30V DC 5A (resistive) 2A (inductive) p.f.=0.4 120V AC 3A (resistive) 1A (inductive) p.f.=0.4 250V AC	
AMBIENT TEMP.	-20°C ~ +60°C	
STORAGE TEMP.	-40°C ~ +65°C	
DIELECTRIC STRENGTH	Between terminal to cabinet 2.5kV / 1min Between 9, 10 to 6, 8 (terminal 1.5kV / 1min)	
REMOTE SIGNAL (MICOM CONTROL)	4 ~ 20mA Current loop 0 ~ 500MΩ to 4 ~ 20mA (Apply only ISAH6600M-1/2)	
METER	Refer to page 45	
TEST BUTTON	Meter center (100MΩ) Indication	

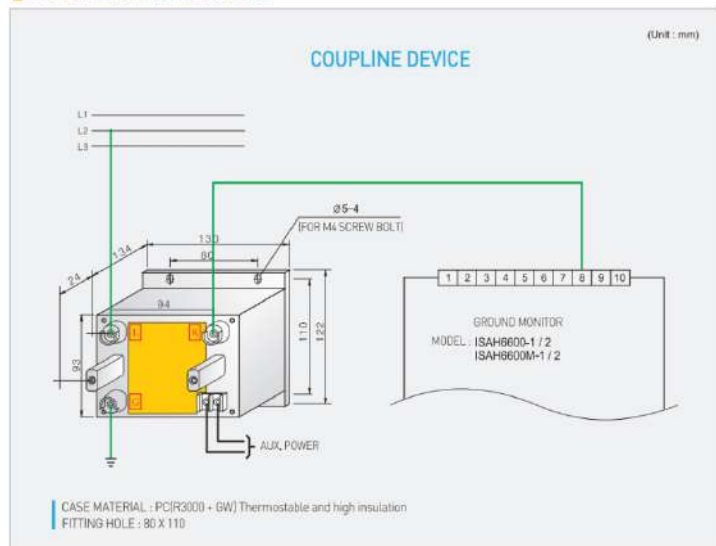
MODEL	AUX. POWER RATING
ISAH-6600-2	AC 220V 50/60Hz
INSULATION MONITORING RANGE	0-500-100-50-0MΩ
ALARM SETTING RANGE	1-200MΩ

CONNECTION DIAGRAM



PROTECTION FOR HIGH VOLTAGE AC MOTOR ICHV6600-1/2

CONNECTION DIAGRAM



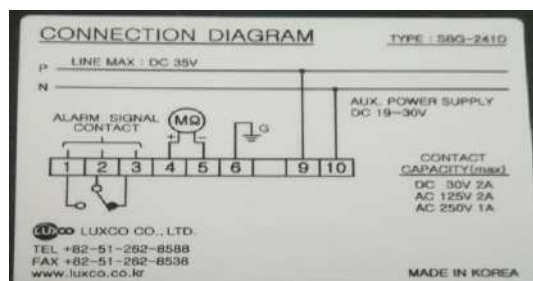
SPECIFICATIONS

MODEL	ICHV6600-1	ICHV6600-2
AUX. POWER RATING	AC 110V 50/60Hz	AC 220V 50/60Hz
RANGE OF POWER VARIATION	AC 85-135V	AC 170-270V
RATED INSULATION VOLTAGE	AC 6.6KV 50/60Hz	
RANGE OF INSULATION VOLTAGE	AC 0 - 7590V	
IMPULSE	12KV	
DIELECTRIC STRENGTH	Between terminal to cabinet 2.5KV / 1min	
RANGE OF INSULATION MEASUREMENT	0 - 500MΩ	
MEASUREMENT CIRCUIT	1P / 3Phase non grounded AC line	
RATING	Continuity	
AMBIENT TEMPERATURE	-20°C ~ +55°C	
RANGE OF STORAGE TEMPERATURE	-40°C ~ +80°C	
MATERIAL OF CABINET	PC(Flame retardant) UL94 V-0 / TRIREX3025G10 / G / FR(reinforced)	



MODEL	VOLTAGE RATING
ICHV6600-2	AC220V 50-60Hz

GROUNDING RESISTANCE (INSULATION) MONITOR SBG-



MODEL	VOLTAGE RATING
SBG-241D	DC19-30V 0.001-0.2 (M Ohm) Line Max: DC35V

SA SERIES (DOUBLE POINT)

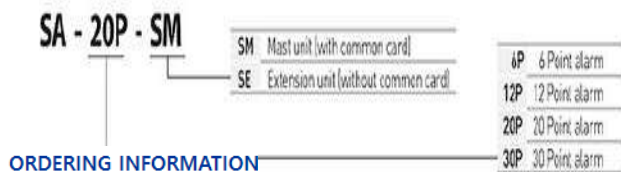


TYPE APPROVAL: KR

The group annunciator of SA SERIES(DOUBLE POINT), as a high performance alarm device responding to the various alarm events, has the function satisfying the international standards, that is making the visible / audible alarm internally and the secondary alarm externally in case of detecting the abnormal signal.

The SA SERIES has two alarm circuits in one ALARM CARD and enables the installation space to reduce and has also the scalability up to 1,000 POINTS in maximum by using the extensible models.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh



LOAD CONSUMPTION TABLE (POWER SUPPLY : DC24V)

MODEL	SA-6PSM	SA-12PSM	SA-20PSM	SA-30PSM
TOTAL CURRENT CONSUMPTION	Below 92mA	Below 135mA	Below 190mA	Below 260mA
RECOMMENDED POWER SUPPLY WITH VISUAL LAMP(2W)	Above 1.0A	Above 1.7A	Above 2.7A	Above 4.1A

LOAD CONSUMPTION TABLE (POWER SUPPLY : DC24V)

MODEL	SA-6PSM	SA-12PSM	SA-20PSM	SA-30PSM
TOTAL CURRENT CONSUMPTION	Below 92mA	Below 135mA	Below 190mA	Below 260mA
RECOMMENDED POWER SUPPLY WITH VISUAL LAMP(2W)	Above 1.0A	Above 1.7A	Above 2.7A	Above 4.1A

MODEL DESCRIPTION

MODEL	DESCRIPTION
SA-20P-SM	DC-24V
ANN-DP-AL (SA-AL)	ALARM CARD

ELECTRICAL SPECIFICATIONS

POWER RATING		DC 24V
POWER VARIATION		DC 18~35V
TIMER	ACCURACY	Less than $\pm 1\%$
	SETTING	Flickering range [V/R] : 1~3T /sec. Alarm delay range [V/R] : 0~30sec.
INPUT SIGNAL	TYPE	"NO" or "NC" contact [select by dip s.w on each alarm card]
	LOOP CURRENT	Below 10mA per each point
	CABLE LENGTH	within 1000m [Above 0.75 SQ]
OUTPUT SIGNAL	VISUAL LAMP RATING	2W [max.]
	OUTPUT CONTACT FOR BUZZER	DC 30V 1.0A [resistive]
		DC 30V 0.4A [inductive p.f=0.4]
	EXTENSION ALARM	SA SERIES : SSR OUTPUT : DC 24V 0.2A [max.] SBGA SERIES : DC 24V 2A [resistive] 0.8 [inductive p.f=0.4] AC 120V 1A [resistive] 0.4 [inductive p.f=0.4]
SECONDARY ALARM		"NC" dry contact
INSULATION RESISTANCE		Above 200M Ω between live part and enclosure
SURGE TRANSIENT		1kV 50uVs line / line 0.5kV 50uVs line / line [IEC 1000-4-5 / 1995]

SBGA SERIES (SINGLE POINT)



TYPE APPROVAL : BV, GL, KR, LR

The group annunciator of SBGA SERIES(SINGLE POINT), as a high performance alarm device responding to the various alarm events, has the function satisfying the international standards, that is making the visible / audible alarm internally and the secondary alarm externally in case of detecting the abnormal signal.

The SBGA SERIES has the scalability up to 1,000 POINTS in maximum by using the extensible models.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc..

SBGA - 10P - 1WM

1WM Mast unit (with common card)
1WE Extension unit (without common card)

3P 3 Point alarm
6P 6 Point alarm
10P 10 Point alarm
15P 15 Point alarm

MODEL

DESCRIPTION

SBGA-6P-1WM

SBGA-10P-1WM

SBGA-15P-1WM

ANN-STD-COM

ANN-1WM-AL

SBA-6P-1WE

DC24V

COM CARD

ALARM CARD

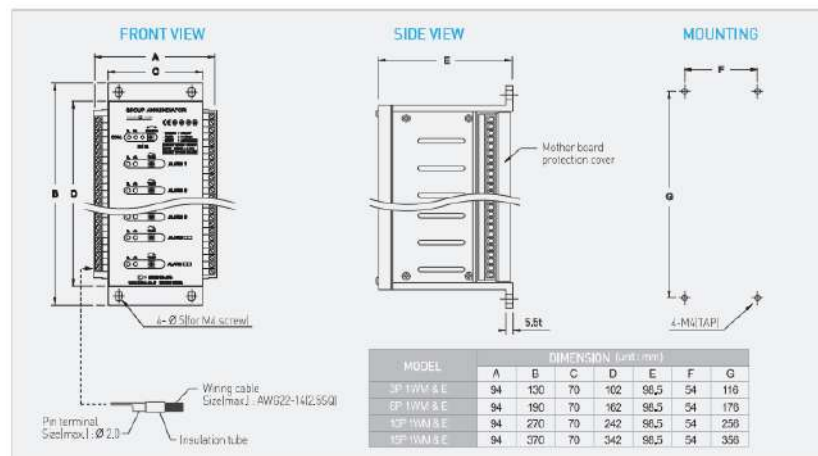
DC24V

ELECTRICAL SPECIFICATIONS

POWER RATING		DC 24V
POWER VARIATION		DC 18~35V
TIMER	ACCURACY	Less than $\pm 1\%$
	SETTING	Flickering range [V/R] : 1~3T /sec. Alarm delay range [V/R] : 0~30sec.
INPUT SIGNAL	TYPE	"NO" or "NC" contact [select by dip s.w on each alarm card]
	LOOP CURRENT	Below 10mA per each point
	CABLE LENGTH	within 1000m [Above 0.75 SQ]
OUTPUT SIGNAL	VISUAL LAMP RATING	2W [max.]
	OUTPUT CONTACT FOR BUZZER	DC 30V 1.0A [resistive]
		DC 30V 0.4A [inductive p.f=0.4]
	EXTENSION ALARM	SA SERIES SSR OUTPUT : DC 24V 0.2A [max.]
	SBGA SERIES	DC 24V 2A [resistive] 0.8 [inductive p.f=0.4] AC 120V 1A [resistive] 0.4 [inductive p.f=0.4]
SECONDARY ALARM		"NC" dry contact
INSULATION RESISTANCE		Above 200M Ω between live part and enclosure
SURGE TRANSIENT		1kV 50uVs line / line 0.5kV 50uVs line / line [IEC 1000-4-5 / 1995]

LOAD CONSUMPTION TABLE (POWER SUPPLY : DC24V)

MODEL	SBGA-3P1WM	SBGA-6P1WM	SBGA-10P1WM	SBGA-15P1WM
TOTAL CURRENT CONSUMPTION	Below 95mA	Below 140mA	Below 200mA	Below 275mA
RECOMMENDED POWER SUPPLY WITH VISUAL LAMP(2W)	Above 0.5A	Above 1.0A	Above 1.5A	Above 2.0A



LINE FAULT DETECTOR

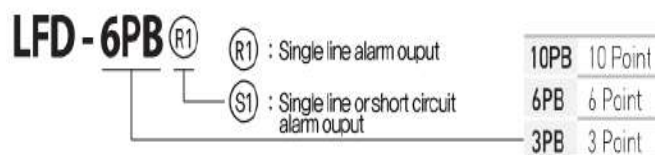


TYPE APPROVAL : BV

The line fault detector, as a device to monitor the open/short circuit of the cable of emergency system, is a alarm device to display the information of open/short circuit on it and to send the dry-contact signal output to external system in case the open/short circuit of the cable of the switching system occurs.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc..

MODEL	POWER RATING
LFD-3PB	DC24V
LFD-6PB	
LFD-10PB	



SPECIFICATIONS

POWER RATING		AC 100~240V 1Φ 50 / 60Hz
POWER VARIATION		AC 85~264V 1Φ 50 / 60Hz
INPUT SIGNAL	TYPE	R1 : "a" contact with resistor 1/2W 1kΩ S1 : 1/2W 10kΩ, 2pcs
	LOOP CURRENT	Below 10mA per each point
	CABLE LENGTH	Within 500m [Above 1.25 SQ]
OUTPUT SIGNAL	2NDARY ALARM OUTPUT	"1C" dry contact [DC 30V 1A / 125V AC 0.5A, p.f.=1] from common
	TRIPPING CONTACT	"1a" dry contact [DC 30V 5A / 250V AC 5A, p.f.=1] from alarm
FAULT ALARM DELAY TIME		2.5sec[±0.1sec]
2NDARY ALARM DELAY TIME		2.5sec[±0.1sec]
INSULATION RESISTANCE		Above 200MΩ between live part and enclosure
SURGE TRANSIENT		1kV 50uVs line / line 0.5kV 50uVs line / line [IEC 1000-4-5 / 1995]

MECHANICAL SPECIFICATIONS

ENCLOSURE [MATERIAL]		PC (Flame retardant) UL94 V-0 / TRIREX3025610 / G / F reinforced
EXTERNAL CONNECTION TERMINAL BLOCK	MATERIAL	Insulating material : PA / UL94 V-0 Terminal block : CuZn
	RATED VOLTAGE	250V (UL 1059, EN60998)
	WIRE SIZE [max.]	AWG22-14 (2.5 SQ)
	TEST VOLTAGE	2.0KV
	RATED TORQUE / SCREW SIZE	0.5Nm / M3
AMBIENT CONDITIONS	SPACING BETWEEN TERMINALS	5.0mm
	AMBIENT TEMP.	-10°C ~ +60°C
	STORAGE TEMP.	-20°C ~ +70°C
VIBRATION TEST	HUMIDITY	20% ~ 90%RH
		30Hz for 2hours (acceleration : ±0.7G)

ELECTRICAL SPECIFICATIONS

POWER RATING		AC 100 ~ 240V 1PH 50/60Hz
POWER VARIATION		AC 85 ~ 264V 1PH 50/60Hz
INPUT SIGNAL	TYPE	"a" contact with resistor 1/2W 1K ohm for 1 circuit
	LOOP CURRENT	Below 10mA per each point
	CABLE LENGTH	Within 500m (Above 1.25 SQ)
OUTPUT SIGNAL	2NDARY ALARM OUTPUT	"1C" dry contact (30VDC 1A / 125VAC 0.5A, p.f.=1) from common.
	TRIPPING CONTACT	"1a" dry contact (30VDC 5A / 250VAC 5A, p.f.=1) from alarm.
FAULT ALARM DELAY TIME		2.5sec (±0.1sec.)
2NDARY ALARM RECOVERY TIME		2.5sec (±0.1sec.)
INSULATION RESISTANCE		Above 200Megger ohms between live part and enclosure.
SURGE TRANSIENT		1KV 50uVs line / line 0.5KV 50uVs line / line (IEC 1000-4-5 / 1995)

LFD-6PB® (6 POINT ALARM)



- 1 COMMON SOURCE INDICATOR
3Ø LED (light up in green)
- 2 2NDARY ALARM INDICATOR
3Ø LED (light up in yellow)
- 3 LINE SOURCE INDICATOR
3Ø LED (light up in white)
- 4 LINE FAULT INDICATOR
3Ø LED (light up in red)
- 5 HEALTH INDICATOR
3Ø LED (light up in green)

GREEN : NORMAL
ORANGE : EMCY ON
RED : ABNORMAL (Detect card fail)

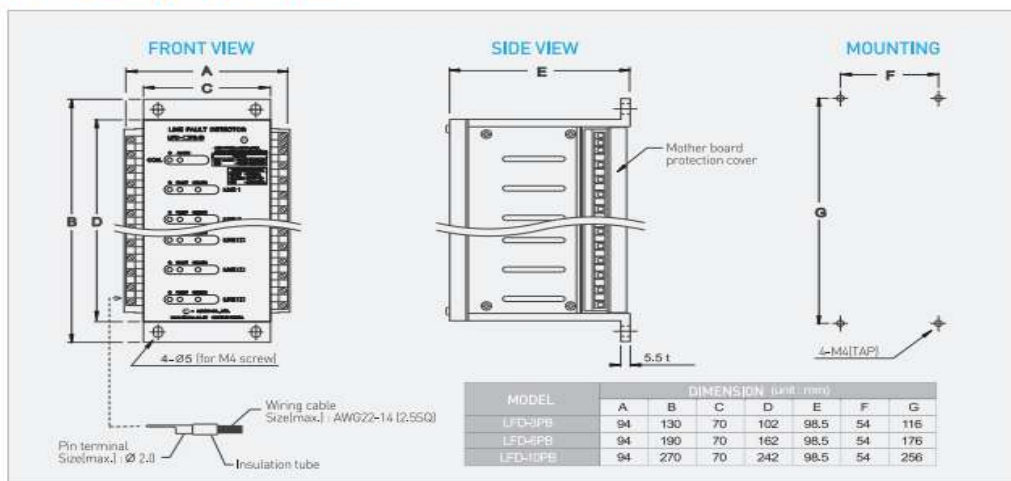
- 6 EXTERNAL CONNECTION T.B
(UL-1059, EN60998)
- 7 MODEL NAME
- 8 RATING

- AUX. POWER : AC100-240 V
- ALARM : CONTINUOUS AFTER 2.5 SEC.

OUTPUT

- 2ND ALARM : 1C DRY CONTACT
- TRIP : 1a DRY CONTACT

ORDERING INFORMATION



VOLTAGE SENSOR



Width : 22.2mm DIN, JIS standard satisfaction

Detection LINE Voltage
DC: 0 ~ 199V, 0 ~ 99mV
AC: 0 ~ 120V

Voltage sensor, as a device to detect accurate voltage/current, is a slim type embedding MICOM. The setting time is convenient and accurate by using a digital switch compared with the VR type. It enables the setting voltage to keep accurate under the change of vibration/temperature. The slim voltage sensor enables the panel to reduce its size and weight.

The voltage sensor (SBV-24A) is interlock device to supply stable power and it can be applied to accurate voltage detection machinery of marine and industrial plant.. It is formed into 2 type of DIN and JIS so users can simply select one of both types.

ORDERING INFORMATION

SBV - 24H

24A	Input signal rating : AC 0~120V
24L	Input signal rating : DC 0~99mV
24H	Input signal rating : DC 0~99V
110H	Input signal rating : DC 100~199V

MODEL	VOLTAGE RATING
SBV-24A1	AC100-120V

SPECIFICATIONS

INPUT POWER SOURCE	RATING	DC 24V(24L / 24H / 110H)	AC 110V or 220V (24A)
	VARIATION	80~120% of rating	±20% of rating
	CONSUMPTION	1.0W [max]	AC 110 / 220V 3.0W [max]
	SURGE TRANSIENT	2kV 50uVs line / earth : 1kV 50uVs line / line [IEC 1000-4-5/1995]	2kV 50uVs line / earth : 1kV 50uVs line / line [IEC 100-4-5/1995]
VOLTAGE SETTING SPECIFICATIONS	SETTING ACCURACY	Less than ±0.1V [SBV-24H] Less than ± 0.1mV [SBV - 24L] Less than ±0.5V [SBV-110H]	Less than ±1%
	SETTING METHOD	adjusting : The Value [00~99] can be set by digital push switch and the Value [+0.5] can be set by connecting T.B #8 to #9	Range : 4 modes are selectable by 2DIP switch Voltage ranges are as follows. [AC 100V, AC 110V, AC 115V, AC 120V] adjusting : Value [60~99] can be set by two digital switch on front side.
CONTACT CAPACITY	SWITCHING VOLTAGE	DC 24V 8.0A [resistance] 3.2A [inductive p.f=0.4] AC 250V 8.0A [resistance] 3.2A [inductive p.f=0.4]	
	MECHANICAL LIFE	1000 x 10 ⁴ cycles	
	ELECTRICAL LIFE	10 x 10 ⁴ cycles	
INSULATION RESISTANCE		Above 100MΩ between live parts and enclosure [Test voltage : DC 500V]	
DIELECTRIC STRENGTH		2.5kV between power input circuit and enclosure for 1min.	
ENCLOSURE	MATERIAL	PC[polycarbonate] - Flame retardant [UL94 V-0] - TRIREX3025G10 / Glass fiber reinforced	
	DIELECTRIC STRENGTH	31kV / mm	
EXTERNAL CONNECTION T.B	MATERIAL	Terminal : CuZn, Insulating material : PA	Terminal : Brass [Zn plating], Bolt: Steel [Ni plating]
	SCREW SIZE	M3	M3.5
	SPACING	5.0mm	10mm
AMBIENT CONDITIONS	AMBIENT TEMPERATURE RANGE	-10 ~ +55°C	
	STORAGE TEMPERATURE RANGE	-25 ~ +80°C	
	HUMIDITY	45~85% R.H	
VIBRATION TEST		5~25Hz [displacement : ± 1.6mm] 25~1000Hz [acceleration : ± 4G [390us]	
SHOCK RESISTANCE		10G [KS M3501 / ASTM D256]	

COUNT RELAY



Count relay, as a device to protect the overheated damage of reactor caused by frequent operation of motor in the circuit with reactor starting method, has the function that can set up the limit time for start of motor, the number of start and the non-operating time for reactor cooling.

As special features, the exterior materials have high insulation level, light weight, fire retardant, shock resistant and chemical resistant characteristics to endure the harsh environment such as shipyard, power plant, steelworks, petrochemical complex and water power plant etc..

SBCR - 203

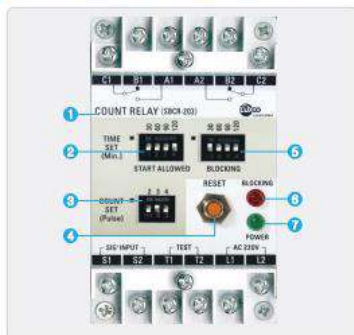
103	AC 110V
203	AC 220V
D24	DC 24V
D48	DC 48V
D103	DC 110V

MODEL	POWER INPUT RATING
SBCR-203	AC176-264V

ORDERING INFORMATION

MODEL	SBCR-103	SBCR-203	SBCR-D24	SBCR-D48	SBCR-D103
POWER INPUT RATING	AC85-135V 50/60Hz	AC176-264V 50/60Hz	DC18-30V	DC36-60V	DC88-135V
POWER CONSUMPTION	3VA(max.)				
INPUT SIGNAL	"a" or "b" contact selectable				
START ALLOWED TIMER SETTING RANGE	Run mode 4 step (30-60-90-120min.) Test mode 4 step (1-2-3-4min.)				
BLOCKING TIMER SETTING RANGE	Run mode 4 step (30-60-90-120min.) Test mod 4 step (1-2-3-4min.)				
COUNT PULSE SETTING RANGE	3 step (2-3-4 cycle)				
SHIFT TIME	1 sec. / cycle				
OUTPUT CONTACT RATING (2c)	30VDC 5.0A (resistive) 3.0A (inductive p.f=0.4) 250VAC 5.0A (resistive) 2.0A (inductive p.f=0.4)				
DIELECTRIC STRENGTH	2.5KV between all terminals and enclosure				
ENCLOSURE	MATERIAL PC (polycarbonate) - Flame retardant (UL94 V-0) - TRIREX3025G110 / Glass fiber reinforced				
	DIELECTRIC STRENGTH 31KV / mm				
AMBIENT TEMPERATURE RANGE	-20°C ~ +45°C				

GENERAL SPECIFICATIONS



- 1 Model No. ----- COUNT RELAY (SBCR-103 / 203 / D24 / D48 / D103)
- 2 Start allowed timer setting ----- 4 step (30-60-90-120min.) Select by dip switch
- 3 Limited starting cycle ----- 3 step (2-3-4 cycle) Select by dip switch
- 4 Reset button ----- push button switch
- 5 Blocking timer setting ----- 4 step (30-60-90-120min.) Select by dip switch
- 6 Blocking indicator ----- LED (light up in Red)
- 7 Power indicator ----- LED (light up in Green)

BATTERY CHARGER



TYPE APPROVAL: BV
Detection LINE Voltage
DC: 24V, 110V

The controller of battery charger has two kinds of series of BCC-24 and ACM, and automatically executes floating charge and equalizing charge. It charges with high accuracy of $\pm 1.5\%$ in voltage, high efficiency and low ripple.

As the alarm circuit and the control circuit are integrated in one module that is attached on the front door, it is convenient for users to operate and to maintain.

As special features, the real time status for the product is discernable by watching the output voltage and the output current with the wide angle analog meter on the front door. And the perfect insulation between input and output is realized by applying the isolation transformers.



MODEL	POWER INPUT RATING
BCC-24E	24V

ORDERING INFORMATION

■ BCC - 24 E (R2): 3Phase, Half Bridge Type

E	EQUALIZING CHARGE
F	FLOATING TYPE CHARGE
T	TRICKLE CHARGE
24	NOMINAL OUTPUT VOLTAGE : DC24V
48	NOMINAL OUTPUT VOLTAGE : DC48V

BATTERY CHARGER CONTROLLER

■ ACM-1 (R2): 3Phase, Full Bridge Type

1	NOMINAL OUTPUT VOLTAGE DC110V
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AUTOMATIC CHARGER MONITOR

FUNCTION

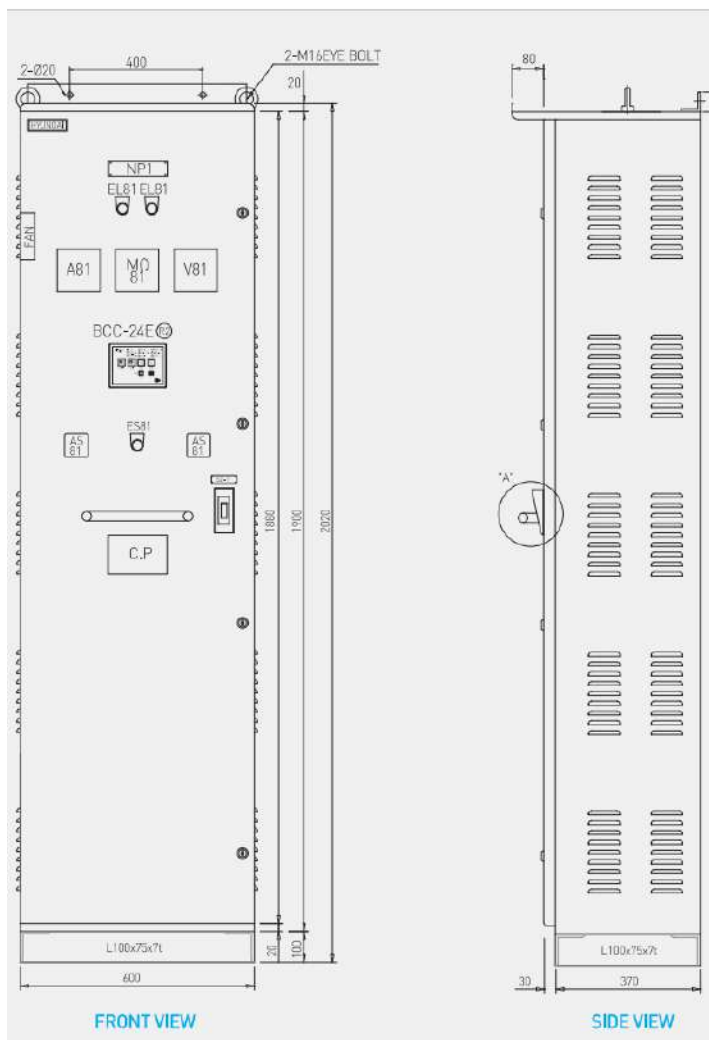
CONTROLLER MODEL	CONTROL SYSTEM	INDICATION & SIGNAL
ACM-1 (R2)	- LAMP TEST - FLOATING / TRICKLE MODE - DC VOLTAGE ADJUST - BUZZER STOP - ALARM RESET - DC OUTPUT CURRENT ADJUST	- SOURCE LAMP
		- ALARM - - CONTROL SOURCE FAIL - RECTIFIER POWER FAILURE - CHARGER OVER VOLTAGE - LOW INSULATION - FAN FAIL - BATTERY DISCONNECTING - BATTERY DISCHARGING - BATTERY UNDER VOLTAGE
BCC-24E (R2) / 24F (R2)	- LAMP TEST - FLOATING / EQUALIZING MODE (BCC-24E (R2)) - DC VOLTAGE ADJUST - BUZZER STOP - ALARM RESET - DC OUTPUT CURRENT ADJUST	- SOURCE LAMP
		- ALARM - - CONTROL SOURCE FAIL - RECTIFIER POWER FAILURE - CHARGER OVER VOLTAGE - LOW INSULATION - FAN FAIL - BATTERY DISCONNECTING - BATTERY DISCHARGING - BATTERY UNDER VOLTAGE

1) LAMP TEST : WHEN THIS BUTTON IS PRESSED, ALL LAMP WILL LIGHT UP. 2) ALARM RESET : WHEN THIS BUTTON IS PRESSED, ALARM WILL RESET.

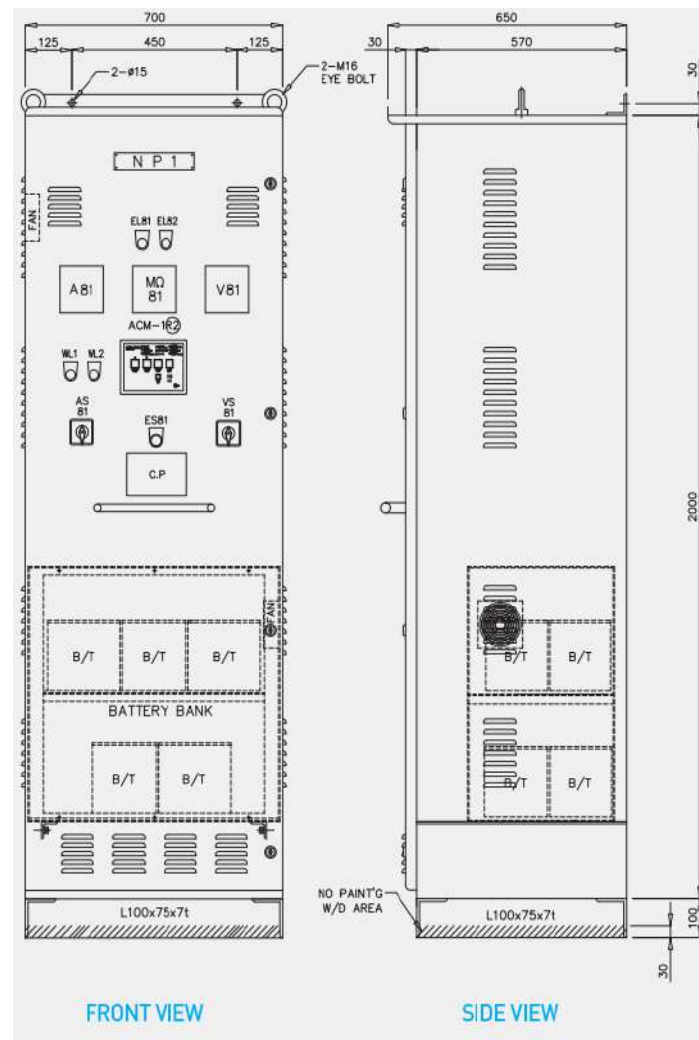
CONSTRUCTION AND ENVIRONMENT SPECIFICATIONS

ENCLOSURE	MATERIAL	PC(Flame retardant) UL94 V-0 / THREXIC(2SG10 / G/G (Reinforced))
	DIELECTRIC STRENGTH	21KV/mm
TEMPERATURE / HUMIDITY	COLOR	Black (maker standard)
	AMBIENT TEMPERATURE	-20°C ~ +55°C
IP GRADE : FRONT SIDE PROTECTION	STORAGE TEMPERATURE	-20°C ~ +85°C
	HUMIDITY	45% ~ 85% R.H
EXTERNAL CONNECTION T.B	PUSH BUTTON WITH LAMP	IP 44
	LED LAMP	IP 44
MATERIAL	INSULATING MATERIAL	PBT
	FLAMMABILITY CLASS	UL-94 V-0
	CONTACT PIN	Cu
	WIRE SIZE(max.)	2.5mm ²
	SPACING BETWEEN TERMINALS	5.0mm
	TEMPERATURE RANGE	-40°C ~ +115°C

(DC 24V CHARGER PANEL)

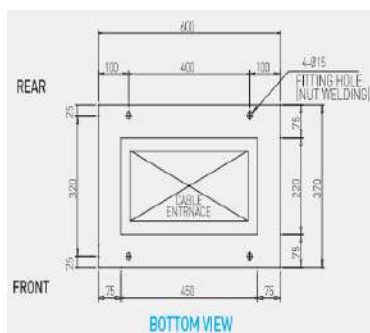


(DC 110V CHARGER PANEL)



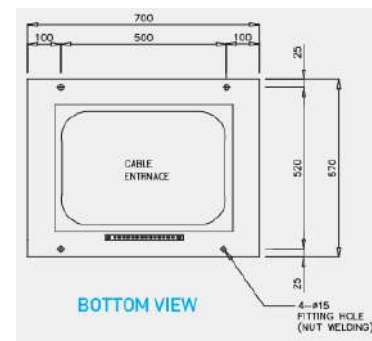
NOTE

1. PAINT'G : MUNSELL CODE. 7.5 BG 7/2
2. PANEL SIZE : 600(W) x 400(D) x 2000(H)
3. SIDE & REAR & TOP : STEEL 1.6t
4. DOOR : STEEL 2.3t
5. FRAME : STEEL 3.2t
6. Q'TY : 1SET
7. WEIGHT : ab. 350kg
8. "A" : BRACKET HANDLE (ACRILONITRILE BUTADIENE STYRENNE)



NOTE

1. PAINT'G : RAL7032(HAMMERTON)
2. BATTERY TYPE : 12V-40Ah(ESH40-12) x 9BLOCK MAINTENANCE FREE TYPE(LEAD-ACID)
3. PANEL TYPE : 700(W) x 600(D) x 2100(H)
4. SIDE & REAR & TOP : STEEL 1.6t
5. DOOR : STEEL 2.3t
6. FRAME : STEEL 3.2t
7. WEIGHT : ab. 400kg



POWER SUPPLY UNIT



Output Voltage
NOMINAL DC 24V

The power supply unit is a device to convert the AC power to DC power. It supplies DC 24V power by converting the single/three phase AC power, and can be used for whole industry.

As special features, it can supply constant power by using battery in case of AC black-out.

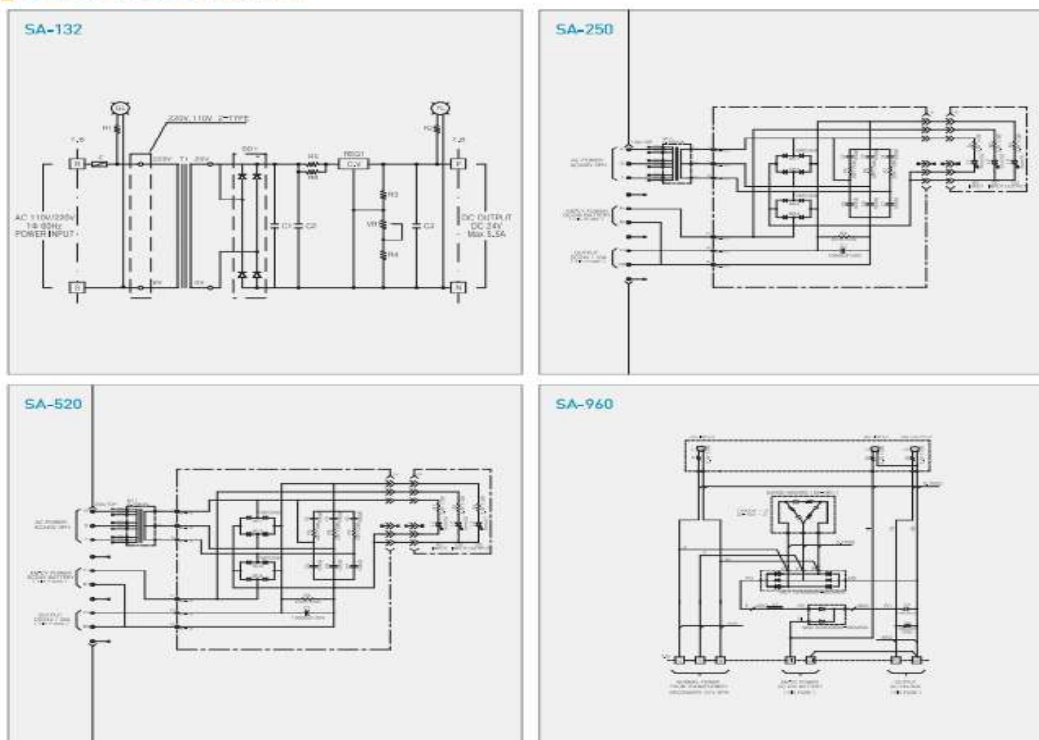
For user's convenience, the status of input/output is displayed on the front side of the unit.

SPECIFICATIONS

MODEL	INPUT	OUTPUT	SIZE(mm)	TRANSFORMER
SA-132	AC220V 1PH 60Hz	DC24V 5.5A	W163 X H225 X D130	INTERIOR
SA-250	AC440V 3PH 60Hz	DC24V 10A	W180 X H250 X D170	INTERIOR
SA-520	AC440V 3PH 60Hz	DC24V 20A	W180 X H300 X D180	INTERIOR
SA-960	AC220V 3PH 60Hz	DC24V 40A	W204 X H310 X D160	EXTERIOR

MODEL	INPUT	OUTPUT
SA-132	AC220V 3PH	DC 24V 5.5A
SA-250	AC440V 3PH	DC 24V 10A
SA-520	AC440V 3PH	DC 24V 20A
SA-960	AC220V 3PH	DC 24V 40A

SCHEMATIC DIAGRAM



AUTO BATTERY CHARGER UNIT



ACU-24V/10A

- Only the Battery charging.
- If the Battery is not connected, the output voltage does not occur.
- Battery mis-connecting protection : Abnormal Alarm

The auto battery charger unit is a device having the auto charge function of DC24V.

Charging can be simply done in any place that needs battery and also can be safely done.

As special features, the protection circuit is added only to operate under the condition of connection of battery, and not to operate in case of wrong connection except battery as well as reverse connection of battery.

For user's convenience, the charging voltage/current are displayed on the front side of the unit.

SPECIFICATIONS

INPUT SPECIFICATION	NORMAL VOLTAGE	AC 220V 1PH 60Hz
	VARIATION	Rated 10% (±10%)
OUTPUT SPECIFICATION	NORMAL VOLTAGE	DC 24V
	RATED VOLTAGE	20 ~ 30V(R)
	MAXIMUM CURRENT	DC 10A (MAX)
ENCLOSURE	MATERIAL	STEEL 1.6T
	DIELECTRIC STRENGTH	2.5KV between input terminal and enclosure
	COLOR	BLACK (MAKER STANDARD)
TEMPERATURE	AMBIENT TEMPERATURE	-20 ~ +55°C
	STORAGE TEMPERATURE	-20 ~ +85°C
HUMIDITY	HUMIDITY	45 ~ 85%RH
TERMINAL CONNECTION T.B	INSULATION MATERIAL	PC
	FLAMMABILITY CLASS	UL-94V-0
	CONTACT PIN	BRASS
	WIRE SIZE (MAX)	1.5 ~ 4.0mm ²
	SPACING BETWEEN TERMINALS	mm
SIZE	SIZE	170 X 260 X 170 mm
WEIGHT	WEIGHT	10kg
SPACING BETWEEN TERMINALS	SPACING BETWEEN TERMINALS	15.00 mm
NAME PLATE	NAME PLATE	EMBOSSING COLOR PLATE

ORDERING INFORMATION

ACU-24V / 10A

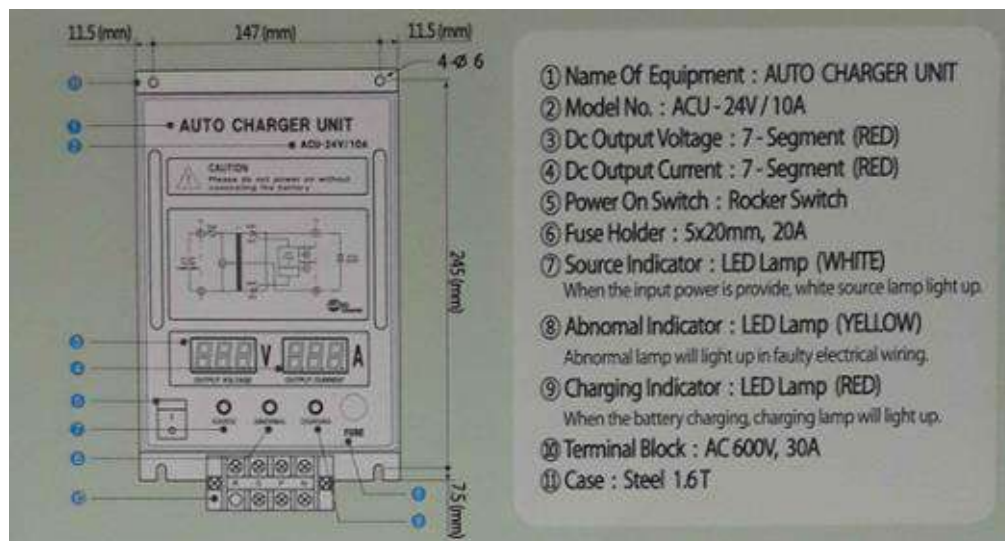
OUTPUT CURRENT - 10A
OUTPUT VOLTAGE - DC 24V
AUTO CHARGER UNIT

MODEL

ACU-24V 10A

NORMAL VOLTAGE

AC220V 1PH



Energy Storage System (ESS)



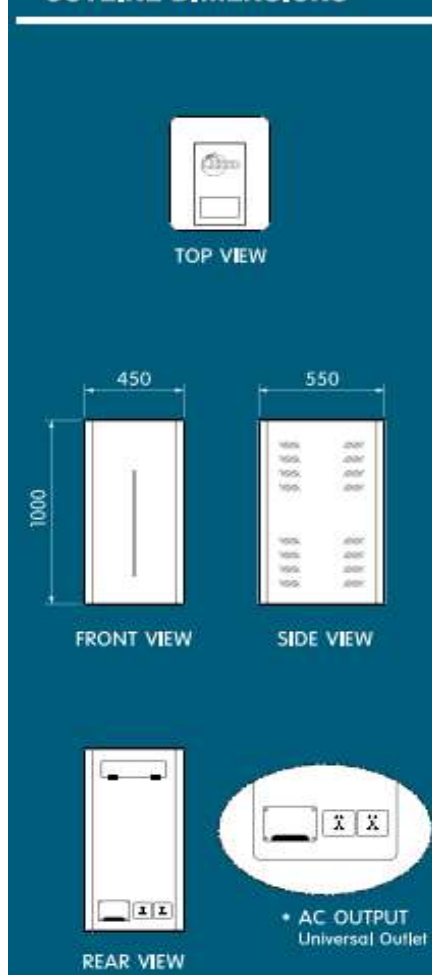
ESS(Energy Storage System) consists of MPPT-based DC-DC converter, bidirectional DC-DC converter, bidirectional inverter and battery. DC power generated by solar module and AC input power supplied from grid are consumed in the load as well as stored in the battery. By storing the surplus energy, the ESS can supply the energy when it is needed. Therefore, the ESS can play a role on UPS

ESS (Energy Storage System) consists of MPPT-based DC-DC converter, bidirectional DC-DC converter, bidirectional inverter and battery. DC power generated by solar module and AC input power supplied from grid are consumed in the load as well as stored in the battery. By storing the surplus energy, the ESS can supply the energy when it is needed.

SPECIFICATIONS

MODEL	EH5000DC2-10K	
SYSTEM SPECIFICATION	Rated Power	5000VA
	Energy Capacity	10kWh
	Efficiency	More than 90%
	THD	Less than 5%
	Input Voltage	150 ~ 450VDC
SOLAR INPUT	Normal Voltage	220VDC
	Initial Feeding Voltage	150VDC
	Max. Input Current	37A
AC INPUT	Input Voltage	230VAC $\pm$ 10%
OUTPUT	Rated Voltage	220/230VAC $\pm$ 10%
	Frequency	50/60Hz $\pm$ 0.1Hz
BATTERY DATA	Type	Lithium Battery
	Voltage	200VDC
	Capacity (recommend)	50Ah (200V*5EA), 1S5P
	Max. Charging Current	20A
	Battery Back-up Time	2Hours @5000VA
ENCLOSURE	Operating Temperature	-10 ~ 45°C
	Relative Humidity	Less than 90%
	Cooling	Fan Cooling
	Protections	Over Voltage, Under Voltage, Over Current
	Dimensions (WxHxD)	450 x 1000 x 550(mm)
	Weight (Battery excluded)	100kg

OUTLINE DIMENSIONS



Solar Module



LUXCO MULTI CRYSTALLINE MODULE

Cell Type Multi Crystalline Silicon
Cell Dimensions 156 x 156 mm² (6 x 6 in²)

Type Specification

Type	module	P MAX	Efficiency(%)	Remark
72Cell Series	LXP-4L330E2	330	17.03	LXP-4LxxxE1/2(330~345Wp)
	LXP-4L335E2	335	17.29	
	LXP-4L340E1	340	17.55	
	LXP-4L345E2	345	17.81	

Mechanical Characteristics

Cell Type	Multi Crystalline Silicon
Cell Dimensions	156.75 x 156.75mm ² (6X6in ²)
No.of Cells and Connections	72(6x12)connected in Series
Weight	22.5kg
Operating Temperature	-40 to +80°C
Connector Type	MC4 compatible
Junction Box	IP67 grade
Output Cable	2 x 1200mm / 2 x 47.2inch length
Fire Resistance Rating	Class C
Application Class	Class A
Structural Load	5400 Pa

Electrical Characteristics

Characteristics	Unit	260	265	270
Rated Power at STC(P _{max})	W	260	265	270
Max.Power Voltage (V _{mp})	V	30.4	30.5	30.6
Max.Power Current (I _{mp})	A	8.56	8.59	8.83
Open Circuit Voltage (V _{oc})	V	37.9	38.0	38.1
Short Circuit Current (I _{sc})	A	9.03	9.17	9.32
Efficiency	%	15.90	16.21	16.51
Maximum System Voltage	VDC	1,000(TUV)		
Maximum Series Fuse Rating	A	15		
Maximum Series Diode Rating	A	15		
Power Tolerance	W	0~5W		



Positive Tolerance

0~+5W Positive power sorting



Max 5,400 Pa Mechanical Load
Guaranteed until 5,400 Pa



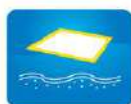
Ice ball 23m/s

Guaranteed until 23m/s



Chemical Resistance

Effective in the chemical area such as farms



Corrosion Resistance

Effective in the ocean



Linear Warranty

10 years 91% power warranty,
25 years 82% power warranty.

* Module specifications are subject to change without notice.

* STC (Standard Test Conditions) :25°C, 1000W/m², AM1.5

* The electrical properties measured and determined by LUXCO at its sole and absolute discretion.





LUXCO MONO CRYSTALLINE MODULE

Cell Type Mono Crystalline Silicon
Cell Dimensions 156.75 x 156.75 mm² (6 x 6 in²)

Type Specification

Type	module	P MAX	Efficiency(%)	Remark
72Cell Series	LXS-4L350C6	350	18.06	LXS-4LxxxC6(350~360Wp)
	LXS-4L355C6	355	18.32	
	LXS-4L360C6	360	18.58	

Mechanical Characteristics

Cell Type	Mono Crystalline silicon
Cell Dimensions	156.75X156.75 mm ²
No.of Cells and Connections	72(6x12)connected in Series
Weight	22.5kg
Operating Temperature	-40 to +80°C
Connector Type	MC4 compatible
Junction Box	IP67 grade
Output Cable	2 x 1200mm / 2 x 47.2inch length
Fire Resistance Rating	Class C
Application Class	Class A
Structural Load	5400 Pa

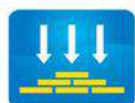
Electrical Characteristics

Characteristics	Unit	350	355	360
Rated Power at STC(P _{max})	W	350	355	360
Max.Power Voltage (V _{mp})	V	39.4	39.8	40.2
Max.Power Current (I _{mp})	A	8.89	9.92	9.00
Open Circuit Voltage (V _{oc})	V	47.1	47.3	47.5
Short Circuit Current (I _{sc})	A	9.55	9.56	9.57
Efficiency	%	18.06	18.32	18.58
Maximum System Voltage	VDC	1,000		
Maximum Series Fuse Rating	A	15		
Maximum Series Diode Rating	A	15		
Power Tolerance	W	0~5W		



Positive Tolerance

0~+5W Positive power sorting



Max 5,400 Pa Mechanical Load
Guaranteed until 5,400 Pa



Ice ball 23m/s
Guaranteed until 23m/s



Chemical Resistance

Effective in the chemical area such as farms



Corrosion Resistance

Effective in the ocean



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10 years 91% power warranty,
25 years 82% power warranty.

* Module specifications are subject to change without notice.

* STC (Standard Test Conditions) :25°C, 1000W/m², AM1.5

* The electrical properties measured and determined by LUXCO at its sole and absolute discretion.

