

承认书

SPECIFICATION FOR APPROVAL

产品名称 Product Name: 4 串锂电池保护系统/4S Series BMS

产品型号 Product Model: PCM-L04S100-F49(A-3)

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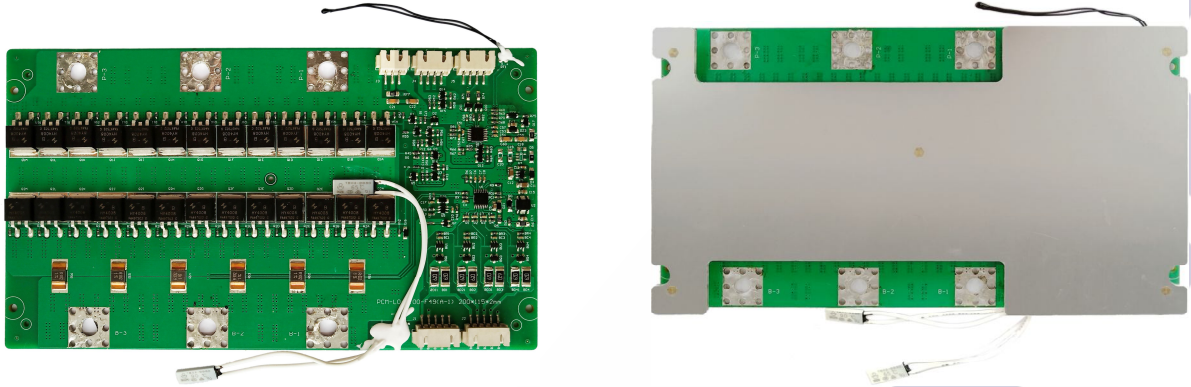
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二、简介 Brief Intruduction

PCM-L04S100-F49(A-3) 是专门针对锂离子电池组设计的保护管理系统,适用于 3-4 串 Li-ion、LifePO4 两种可充电类型的电池。

PCM-L04S100-F49(A-3) is a BMS specially designed for Li-Ion battery pack. It is suitable for 3-4S series Li-Ion and LiFePO4 rechargeable batteries.



特点 Features:

- 具有过充电、过放电、过电流、短路、温度等多重保护。(请见详细参数);
It has multifunctional safety protection of over charge, over discharge, over current, short-circuited, temperature(detailed as below parameters);

- 具有充电状态下电压平衡的功能;
It has balancing function under the state of charging;

- 环境温度 30°C. 100A 电流持续放电 2 小时以上, FET 温度小于 80°C.

The FET temperature is lower than 80°C after discharging for over 2hours at 100A under ambient temperature 30°C;

- 系统功耗 System power consumption:

1、 工作时 Working ≤200uA (+25°C)

● 额定参数 Nominal parameters:

项目 Item	适用端子 Terminals	额定值 Nominal value	单位 Unit
电池设计容量 Battery design capacity	PCM-L04S100-F49(A-3)	100000	mAH
充电电压 Charge voltage	P+, P-	14.4	V
持续充电电流 Continue charge current	P+, P-	<111	A
持续放电电流 Continue discharge current	P+, P-	<111	A
输入端子电压 Input voltage for terminals	B1,B2,B3,B4	5	V
内阻 Internal resistance	B-, P-	<5	mΩ
工作温度 Work temperature	-	-20 ~ +85	°C
存储温度 Storage tempertarue	-	-40 ~ +125	°C
工作湿度 work humidity	-	<75	%RH
存储湿度 Storage humidity	-	<85	%RH

三、详细参数 Detailed parameters

● 单节过压保护 Cell Overvoltage Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级过压保护 1 st Level Overvoltage	3850mV	3900mV	3950mV	0.8-2S	关闭充电 FET turn off the Charging FET	-
一级过压恢复 1 st Level Overvoltage release	3500mV	3600mV	3700mV	<5S	-	打开充电 FET turn on the Charging FET
二级过压保护 2 nd Level Overvoltage	-	-	-	-	-	-
二级过压恢复 2 nd Level Overvoltage release	-	-	-	-	-	-
三级过压保护 3 rd Level Overvoltage	-	-	-	-	-	-
三级过压恢复 3 rd Level Overvoltage release	-	-	-	-	-	-

● 单节欠压保护 Cell Undervoltage Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级欠压保护 1 st Level Undervoltage	1950mV	2000mV	2050mV	20-50mS	关闭放电 FET turn off the Discharging FET	-
一级欠压恢复 1 st Level Undervoltage release	2200mV	2300mV	2400mV	<5S	-	断开负载自动恢 Cut Load ,Auto release
二级欠压保护 2 nd Level Undervoltage	-	-	-	-	-	-
二级欠压恢复 2 nd Level Undervoltage release	-	-	-	-	-	-
三级欠压保护 3 rd Level Undervoltage						
三级欠压恢复 3 rd Level Undervoltage release						

● 充电过流保护 Overcurrent in Charge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级充电过流保护 1 st Level Overcurrent charge	-	-	-	-	-	-
一级充电过流恢复 1 st Level Overcurrent release	-	-	-	-	-	-
二级充电过流保护 2 nd Level Overcurrent charge	-	-	-	-	-	-
二级充电过流恢复 2 nd Level Overcurrent release	-	-	-	-	-	-
三级充电过流保护 3 rd Level Overcurrent charge	-	-	-	-	-	-
三级充电过流恢复 3 rd Level Overcurrent release	-	-	-	-	-	-

● 放电过流保护 Overcurrent in Discharge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级放电过流保护 1 st Level Overcurrent Discharge	270A	300A	330A	<300mS	关闭放电 FET turn off the Discharging FET	-
一级放电过流恢复 1 st Level Overcurrent release	-	-	-	-	-	断开负载自动恢 Cut Load ,Auto release
二级放电过流保护 2 nd Level Overcurrent Discharge	380A	430A	480A	<30mS	关闭放电 FET turn off the Discharging FET	-
二级放电过流恢复 2 nd Level Overcurrent release	-	-	-	-	-	断开负载自动恢 Cut Load ,Auto release
三级放电过流保护 3 rd Level Overcurrent Discharge	-	-	-	-	-	-
三级放电过流恢复 3 rd Level Overcurrent release	-	-	-	-	-	-
四级放电过流保护 4 th Level Overcurrent Discharge	-	-	-	-	-	-
四级放电过流恢复 4 th Level Overcurrent release	-	-	-	-	-	-
五级放电过流保护 5 th Level Overcurrent Discharge	-	-	-	-	-	-
五级放电过流恢复 5 th Level Overcurrent release	-	-	-	-	-	-

六级放电过流保护 6 th Level Overcurrent Discharge	-	-	-	-	-	-
六级放电过流恢复 6 th Level Overcurrent release	-	-	-	-	-	-

● 放电短路保护 Short Circuit in Discharge Protection

测试条件：4 串 100Ah 电池组,外部短路 (P+, P-)。

Test conditions: 4 series 100Ah battery pack, external short circuit (P+, P-)

安全等级 Safety level	最小值 Min	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级短路保护 1 st Level Short circuit protection	580A	-	≤ 800uS	关闭放电 FET turn off the Discharging FET	-
一级短路恢复 1 st Level Short circuit release	-	-	-	-	解除短路,自动恢复 short circuit Release, Auto recovery
二级短路保护 2 nd Level Short circuit protection	-	-	-	-	-
二级短路恢复 2 nd Level Short circuit release	-	-	-	-	-
三级短路保护 3 rd Level Short circuit protection	-	-	-	-	-
三级短路恢复 3 rd Level Short circuit release	-	-	-	-	-

● 温度保护 Temperature protection

1、充电过温保护 Overtemperature in Charge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级充电过温保护 1 st Level Overtemperature(Battery)	62°C	65°C	68°C	5S	关闭充电 FET turn off the Charging FET	-
一级充电过温恢复 1 st Level Overtemperature release	42°C	45°C	48°C	10S	-	打开充电 FET turn on the Charging FET
二级充电过温保护 2 nd Level Overtemperature(Battery)	-	-	-	-	-	-
二级充电过温恢复 2 nd Level Overtemperature release	-	-	-	-	-	-
三级充电过温保护 3 rd Level Overtemperature(Battery)	-	-	-	-	-	-
三级充电过温恢复 3 rd Level Overtemperature release	-	-	-	-	-	-
四级充电过温保护 4 st Level Overtemperature(FET)	85°C	90°C	95°C	5S	关闭充电 FET turn off the Charging FET	-
四级充电过温恢复 4 st Level Overtemperature release	55°C	60°C	65°C	10S	-	打开充电 FET turn on the Charging FET
五级充电过温保护 5 st Level Overtemperature(FET)	-	-	-	-	-	-
五级充电过温恢复 5 st Level Overtemperature release	-	-	-	-	-	-
六级充电过温保护 6 st Level Overtemperature(FET)	-	-	-	-	-	-
六级充电过温恢复 6 st Level Overtemperature release	-	-	-	-	-	-

2、充电低温保护 Undertemperature in Charge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
充电低温保护 Undertemperature	-	-	-	-	-	-
充电低温恢复 Undertemperature release	-	-	-	-	-	-

3、放电过温保护 Overtemperature in Discharge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
一级放电过温保护 1 st Level Overtemperature(Battery)	62°C	65°C	68°C	5S	关闭放电 FET turn off the Discharging FET	-
一级放电过温恢复 1 st Level Overtemperature release	42°C	45°C	48°C	10S	-	打开放电 FET turn on the Discharging FET
二级放电过温保护 2 nd Level Overtemperature(Battery)	-	-	-	-	-	-
二级放电过温恢复 2 nd Level Overtemperature release	-	-	-	-	-	-
三级放电过温保护 3 rd Level Overtemperature(Battery)	-	-	-	-	-	-
三级放电过温恢复 3 rd Level Overtemperature release	-	-	-	-	-	-
四级放电过温保护 4 st Level Overtemperature(FET)	85°C	90°C	95°C	5S	关闭放电 FET turn off the Discharging FET	-
四级放电过温恢复 4 st Level Overtemperature release	55°C	60°C	65°C	10S	-	打开放电 FET turn on the Discharging FET
五级放电过温保护 5 st Level Overtemperature(FET)	-	-	-	-	-	-
五级放电过温恢复 5 st Level Overtemperature release	-	-	-	-	-	-
六级放电过温保护 6 st Level Overtemperature(FET)	-	-	-	-	-	-
六级放电过温恢复 6 st Level Overtemperature release	-	-	-	-	-	-

4、放电低温保护 Undertemperature in Discharge Protection

安全等级 Safety level	最小值 Min	典型值 Typical	最大值 Max	延时 Delay	保护模式 Protected Mode	恢复模式 Release Mode
放电低温保护 Undertemperature	-	-	-	-	-	-
放电低温恢复 Undertemperature release	-	-	-	-	-	-

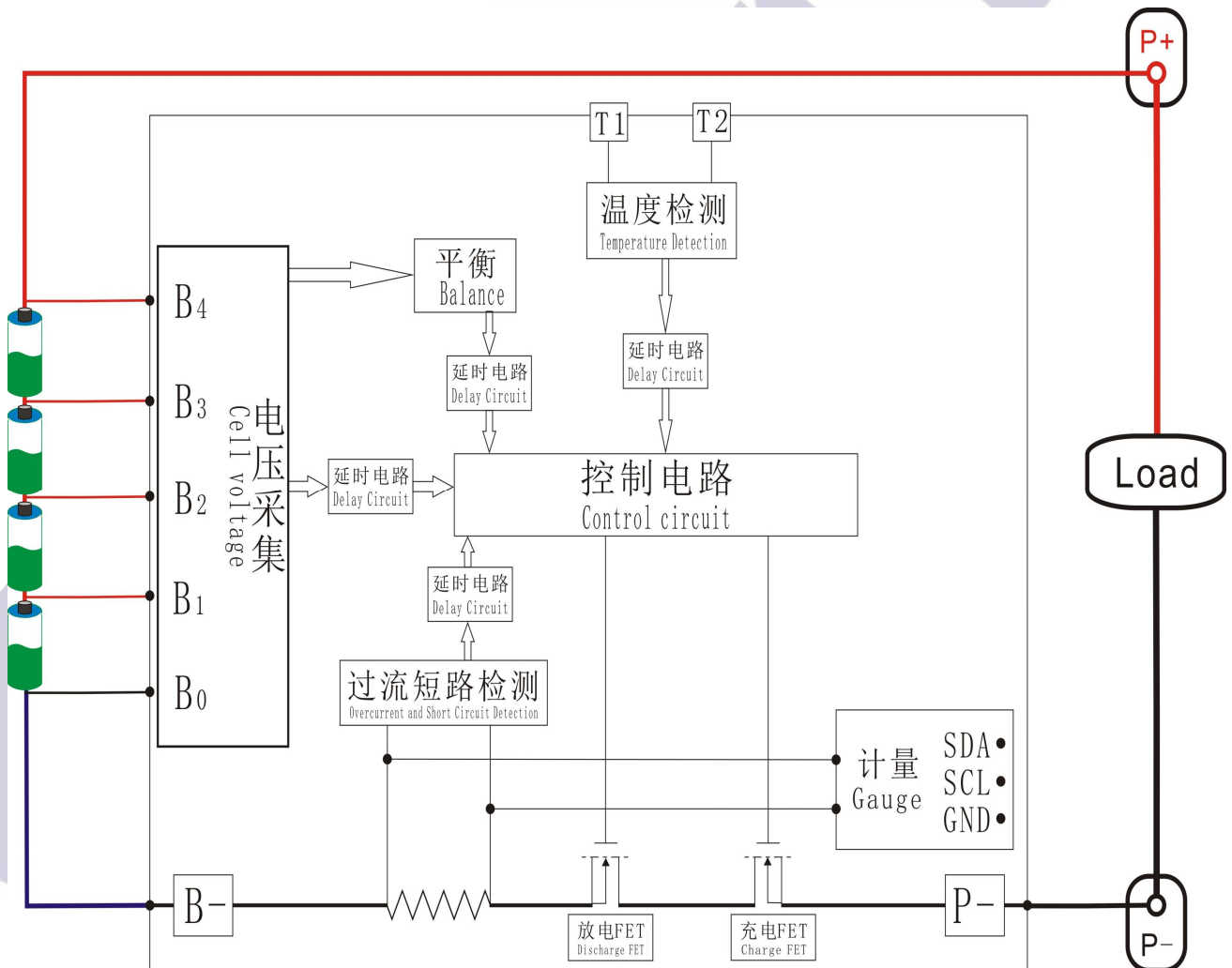
● 单节平衡 Cell Balancing

电量平衡功能只在充电状态下且每一串电芯之间的电压差达到设定值时才会启动，平衡启动后会对电压高的电芯进行放电，当电压差低于设定值时平衡关闭。

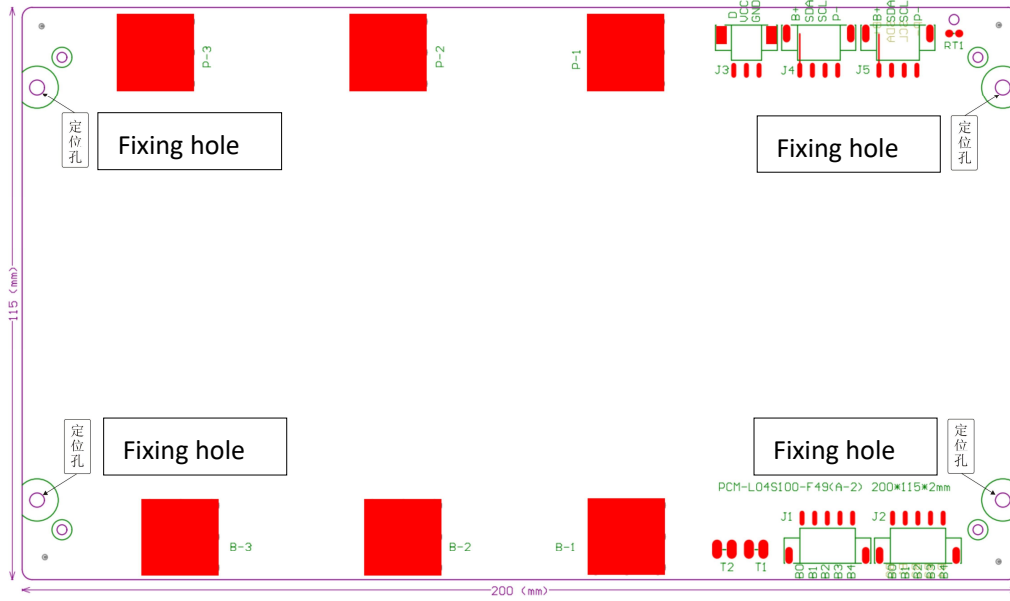
Charge balancing function should be started only when cells voltage difference reached setting value. It will discharge higher voltage cell and balancing function will stop when cells voltage difference lower than setting value.

Name	Cell Balance Threshold	Cell Balance Window	Cell Balance Min	Cell Balance current	Cell Balance Interval
Charge Algorithm	voltage \geq 3600mV	50mV	25mV	116 \pm 10mA	20S

● 原理框图 Schematic block diagram



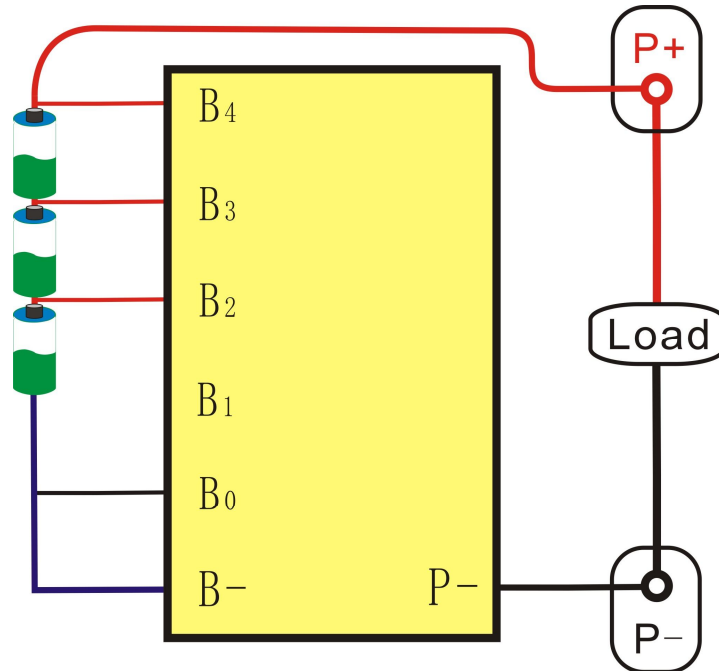
● PCB 端口分布与定义 PCB Port distribution and definition



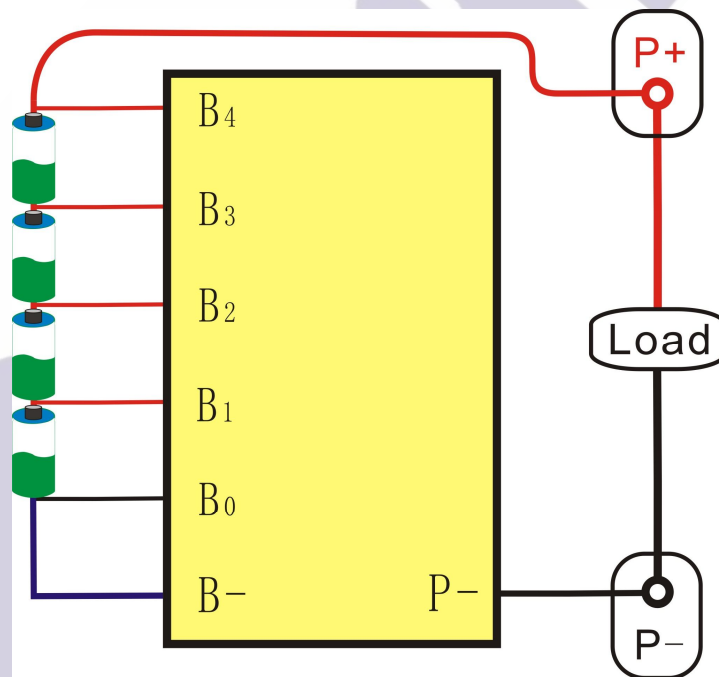
符号 Terminal No	描述 Descriptions
B-1.B-2.B-3	主电流回路负极，连接电池 1 的负极 (100A 电流工作时,3 个端子必需要连线) Negative pole for main circuit to be connected with negative pole of Cell1 (For 100A working current, all three terminals should be wired).
B0	电池 1 的负极连接端子 Negative terminal for cell1
B1	电池 1 的正极连接端子、电池 2 的负极连接端子 Positive terminal for Cell1 and negative terminal for cell2
B2	电池 2 的正极连接端子、电池 3 的负极连接端子 Positive terminal for cell2 and negative terminal for cell3
B3	电池 3 的正极连接端子、电池 4 的负极连接端子 Positive terminal for cell3 and negative terminal for cell4
B4	电池 4 的正极连接端子、电池 5 的负极连接端子 Positive terminal for cell4 and negative terminal for cell5
B+	外接拓展设备供电正极 output positive terminal
P-1.P-2.P-3	充放电负极连接端子 (100A 电流工作时,3 个端子必需要连线) Negative terminals for charge/discharge (For 100A working current, all the three terminals should be wired)
J1.J2	电池电压采样接线端口 Terminals for battery voltage detection
T1	MOSFET 温度检测器 Terminal for MOSFET temperature detection device
T2	电池温度检测器 terminal for battery temperature detection device

● 电池连接示例图 Example diagram and physical diagram of battery connection

3 串电池连接示例 Example of 3S battery connection diagram



4 串电池连接示例 Example of 4S battery connection diagram



注意： PCB 与电芯连接时请按如下顺序连接 B-→B1→B2→B3→B4
如果不按此顺序连接有可能会造成管理系统损坏的风险。

Note: the connection between cells and PCB should be followed this order:

B-→B1→B2→B3→B4, Or It will caused potential damage to the BMS if not go by this connection order

保修条款 Warranty clause

本产品的保修期为 12 个月，在这期间正常使用下损坏的由思玛泰克科技有限公司提供服务，以下任一种情况损坏的，不在保修范围：

The warranty period of this product is 12 months, during which, any damage under normal usage should be within warranty service by smartec Technology Co., Ltd. Any damage caused by below abnormal conditions should be not covered by the Warranty policy.

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- 2、 使用环境条件超过了规格 The use of environmental conditions exceeds the specifications
- 3、 擅自拆装和维修 Unauthorized disassembly and maintenance
- 4、 人为蓄意之破坏 human deliberate destruction
- 5、 进水或受潮 water or dampness
- 6、 不可抗拒的自然因素 irresistible natural factors
- 7、 **PCB** 条码损坏或撕毁 PCB bar code damage or tear

重要通知 Important notifications

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