

AC伺服马达

AC SERVO MOTOR

伺服系统

Servo System

说明书

Manual



2012.5版



安全指示

1. 在安装或使用本产品时，使用者必须彻底并仔细阅读本操作手册。
2. 所有标上  符号之指示，必须特别注意或执行，否则可能会导致身体伤害。
3. 本产品须由受过正确训练的人员来安装或操作。
4. 为安全起见，禁止以延长线作电源座供应二项以上的电器产品使用。
5. 当连接电源线到电源座时，必须确定此电压低于 AC 250V，且符合标在马达铭牌上的指定电压。
※注意：电控箱电源规格如为 AC220V 时，请勿插接至 AC380V 的电源插座上，否则将出现异常且电机将无法动作。此时请立即关闭电源开关，重新检查电源。持续供应 380V 超过五分钟以上，将可能烧损电控箱上的保险丝 F2、电解电容（C58、C59）及电源模块 U14，而危及人身安全。
-  6. 请不要在日光直接照射的场所、室外及室温 45℃ 以上或 5℃ 以下的场所操作。
7. 请不要在暖气（电热器）旁、有露水的场所及在相对湿度 30% 以下或 95% 以上的场所操作。
8. 请不要在灰尘多的场所、具有腐蚀性物质的场所及有挥发性气体的场所操作。
9. 请注意电源线不要受压或过度扭曲。
10. 电源线的接地线须以适当大小的导线和接头连接到生产工厂的系统地线，此连接必须被永久固定。
11. 所有可转动的部分，必须以所提供的零件加以防范露出。
12. 在第一次开后，先以低速操作缝纫机并检查转动方向是否正确。
13. 在操作以下动作前，请先关闭电源：
 - 1) 在控制箱与马达上插或拔任何连接插头时。
 - 2) 穿针线时。
 - 3) 翻抬车头时。
 - 4) 修理或作任何机械上的调整时。
 - 5) 机器休息不用时。
14. 修理或高层次的保养工作，仅能由受过适当训练的机电技师来执行。
15. 所有维修用的零件，须由本公司提供认可，方可使用。
16. 请不要以不适当物体来敲击或撞击本产品及各装置。

保修期限

本产品保修期限为购买日期起一年内或出厂月份起两年内。

保修内容

本产品在正常情况且无人失误的操作下，于保修期间无偿的为客户维修使能正常操作。

但以下情况于保修期间将收取维修费用：

- 1、不当使用包括误接高压电源、将产品移做其它用途、自行拆卸、维修、更改、或不依规格范围使用、进水进油及插入异物于本产品。
- 2、火灾、地震、闪电、风灾、水灾、盐蚀、潮湿、异常电压及其它天灾或不当场所造成的损害。
- 3、客户购买后摔落本产品，或客户自行运输（或托付运输公司）造成的损害。

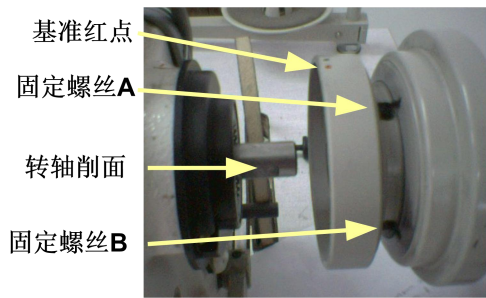
* 本产品在生产及测试上皆尽最大努力和严格控制使其达到高品质及高稳定的标准，但外部的电磁或静电干扰或不稳定的供应电源，仍可能对本产品造成影响或损害，因此操作场所的接地系统一定要确实做好，并建议用户安装故障安全防护装置（如漏电保护器）

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1 安装

1.1 定位器的安装与调整



- a) 定位器的安装：将定位器（同步器）套入车头皮带轮心轴或对接器（转接头）上。（如右图所示）
- b) 定位器的调整：调整时请先松开上盖壳固定螺丝，并取下定位器上盖壳。
- c) 上/下定位基准点调整：上/下定位时，绿点对准机头固定点，若有偏差则调整上/下定位小磁铁（参见参数模式 B【058.UA】/【059.DA】）



注意：调整前请确定已关掉电源开关后，再执行以上动作。

1.2: 控速器踏板拉力的调整

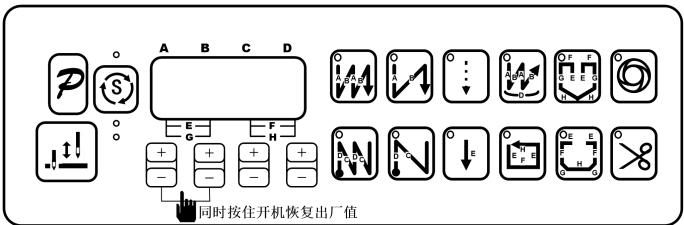
- A: 前踏拉力弹簧
- B: 后踏紧度制退的调整螺丝组
- C: 踏板旋臂拨杆挂钩孔

∴踏板连接器有加装 VD 吸风系列装置时，建议将 A 与 C 改变安装如右图所示

一般安装示意图	有加装 VD 吸风装置时的安装示意图

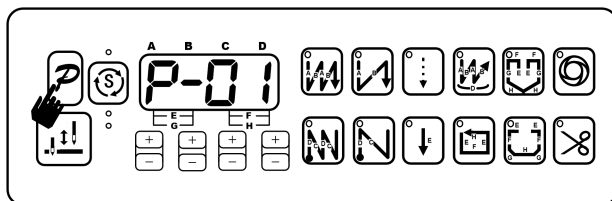
2 操作

2.1 恢复出厂模式（以下几款操作板操作相同在此以 QD286 为例）

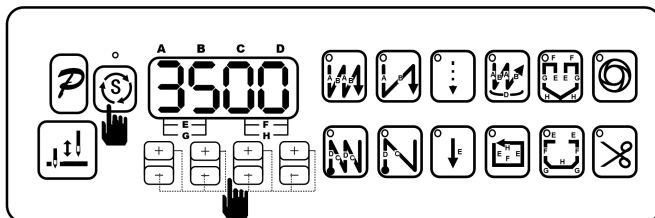


2.2 调整用户参数模式（以下几款操作板操作相同在此以 QD286 为例）

①一般模式下按  进入【用户参数区】 详见 **控制系统** 用户参数&技术员参数表。

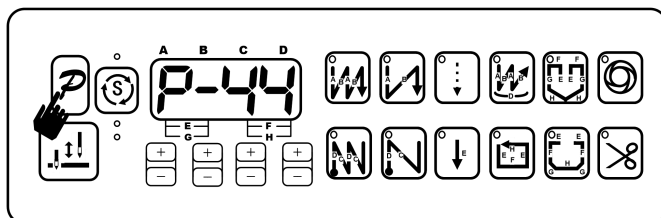


- ② 进入参数内容值；按“加”“减”更改内容值

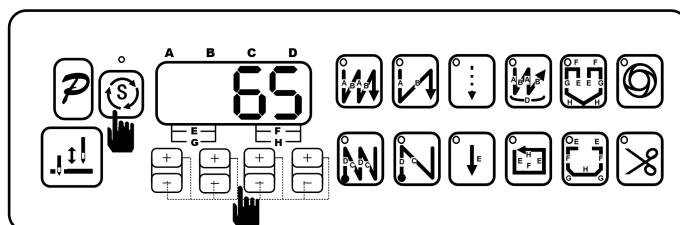


2.3 调整技术员参数模式（以下几款操作板操作相同在此以 QD286 为例）

- ① 按住 键开机进入【技术员参数区】

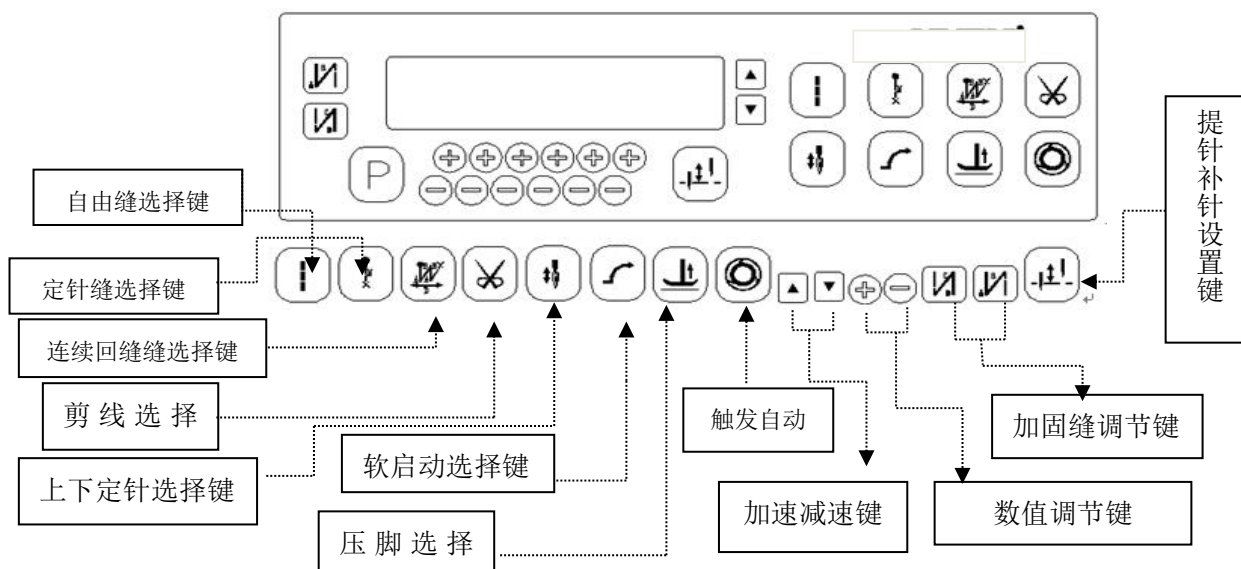


- ② 进入参数内容值；按“加”“减”更改内容值 详见 **控制系统** 用户参数&技术员参数表。

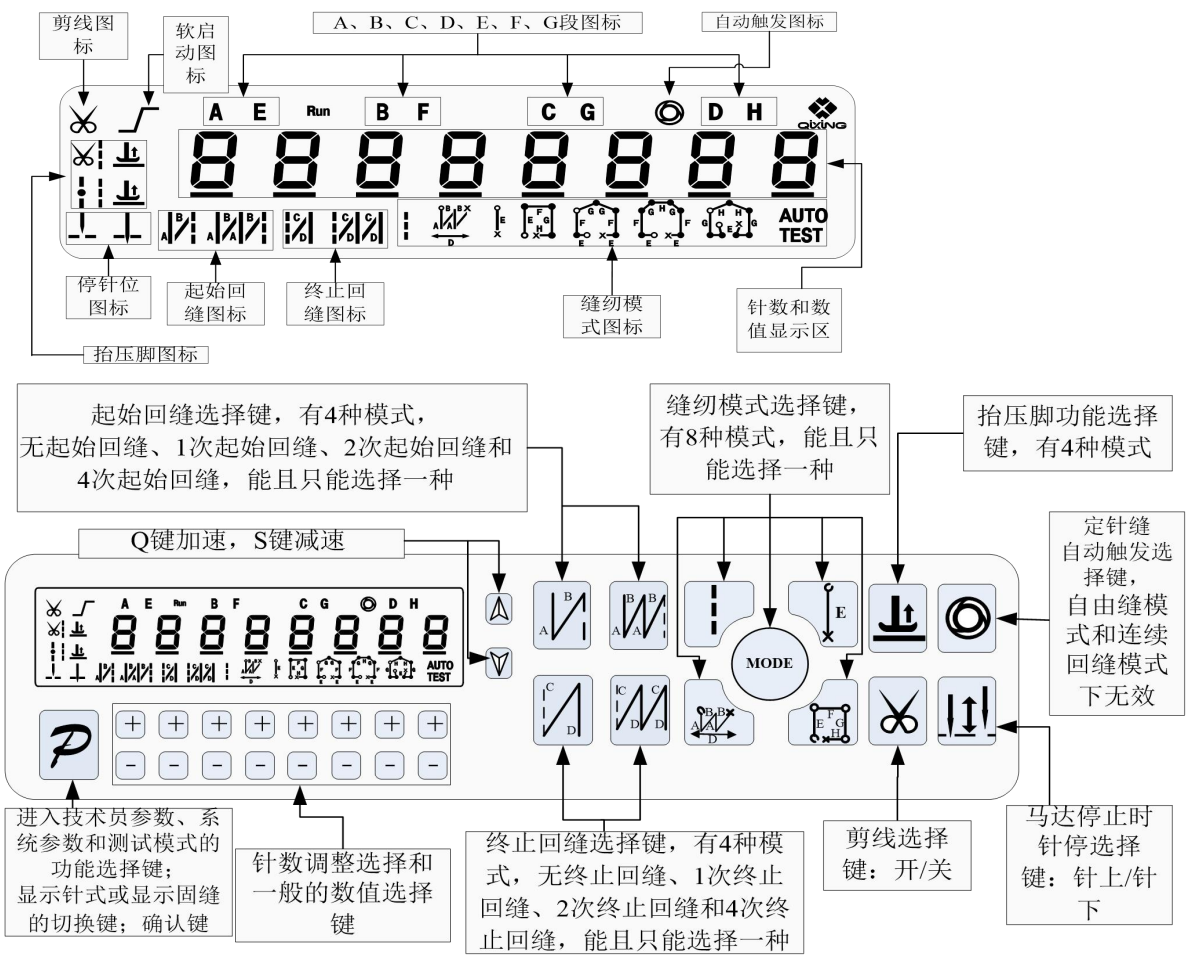


2.4 选针盒

2.4.1 选针盒 QD286B 界面

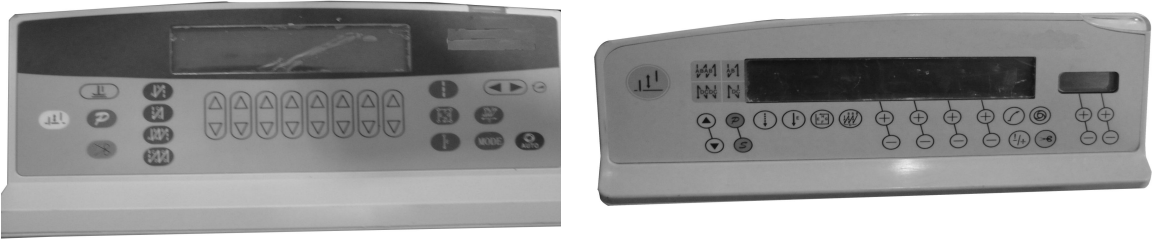


2.4.2 选针盒 QD287 液晶显示说明



注：此款按 键进入技术员参数

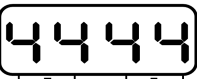
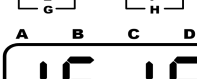
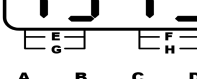
备注：以下三款于上面几款操作和按键说明一样

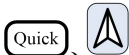


注：调时间操作长按 S 键，时间显示屏闪烁，按相应的加减键调时与调分，按 S 键确定。

2.5 选针盒按键功能说明

功能	按键	车缝动作说明
起始 / 终止回缝		执行『起始回缝』2 次
		执行『起始回缝』1 次

功能	按键	车缝动作说明
		执行『终止回缝』2 次
		执行『终止回缝』1 次
自由键		1. 一旦踏板前踏下就正常车缝，当踏板回到中立时，立即停止车缝。 2. 当踏板往后踏时，就自动完成切线 / 扫线等动作
连续回缝		一旦踏板前踩下，就自动执行来回的连续回缝动作，来回次数由 D 段设定。 ∴前踏之后即自动执行此功能到完成切线为止，中途不会停止车缝，除非将踏板作后踏解除动作
定针缝	 OR  OR  OR 	1. 当踏板往前踩下时，就执行 E, F 段或 G, H 段定针缝的针数。 2. 在任何一段车缝途中，一旦踏板回到中立时，即立即停止车缝，此时当踏板再次往前踏下，即开始执行 E, F 或 G, H 段未完成的针数。 3. 当参数【010.ACD】设定为 ON 时，在执行完最后一段 E, F 或 G, H 段针数后则自动连贯完成终止回缝或切线等动作。
针数设定选择/进入和存储内容值	    	A, B, C, D 等四键，其针数设定可选择从 1 到 9。 E, F, G, H 等四键，其针数设定可选择从 1 到 99。   代表 A = B = C = D = 4 针。   代表 E = F = 15 针。   代表 G = H = 15 针。 按此键.  可选择切换上段 A、B、C、D，中段 E、F，下段 G、H 的针数设定与窗口显示。 QD286 按此键  进入参数内容值，其内容值如经调整变更后，需按下  键予以储存确认，否则关掉电源后，变更的数值将会流失。
提针 / 补针		连续回缝除外，任何一种车缝中途停止时，按一下则作提针或往前补半针。 任何一种车缝终止未切线时，按一下则作提针或往前补半针。

功能	按键	车缝动作说明
触发自动 (AUTO)		1. 在自由缝的式样中： 按下此键蜂鸣器只会声响，但无功能 LED 灯亦不亮。 2. 在定针缝的式样中按下此键： a. 当踏板一经往前踩下触发，即自动执行 E, F 段或 G, H 段中所设定的针数，直到段内针数完成后始自动停止。 b. 再逐一触发踏板，即自动执行下一段所设定的针数直到自动完成切线、扫线等动作为止。
切线开关		设定使用或取消切线功能。
进入参数区功能键		1. 一般模式下按下[【P】进入参数模式 A 区(参数内容见 1.11 参数内容表) 2. 按住【P】开机进入参数模式 B 区 (参数内容见 1.11 参数内容表)
最高速设置		加速键：速度不大于技术员设置的最高速
		减速键：速度最小为 200 转/分钟
1、拍压脚 2、进入技术员模式键 (QD287 选针盒)		1、  图标亮时，切完线后压脚自动抬起。 2、  图标亮时，车缝中马达停止时压脚自动抬起。 3、2 个图标都亮时，切完线后和车缝中马达停止时压脚都自动抬起。 4、当 2 图标都不亮时，无自动抬压脚功能。
慢速启动		1:  图标亮了表示慢速起缝打开 2: 图标不亮表示慢速启动关闭
上下停针设置		1:  图标亮了表示停车时在上停针位 2:  图标亮表示停车时在下停针位

2.6 数码款操作说明

2.6.1 液晶显示字体与实际字体对照表

数字字体部分：

实际数值	0	1	2	3	4	5	6	7	8	9
液晶显示										

液晶画面的显示模式：

英文字体部分：

英文字母	A	B	C	D	E	F	G	H	I	J
------	---	---	---	---	---	---	---	---	---	---

液晶显示	A	b	C	d	E	F	G	H	.	J
英文字母	K	L	M	N	O	P	Q	R	S	T
液晶显示	t	L	n	n	o	P	q	r	S	r
英文字母	U	V	W	X	Y	Z				
液晶显示	U	u	8	11	P	≡				

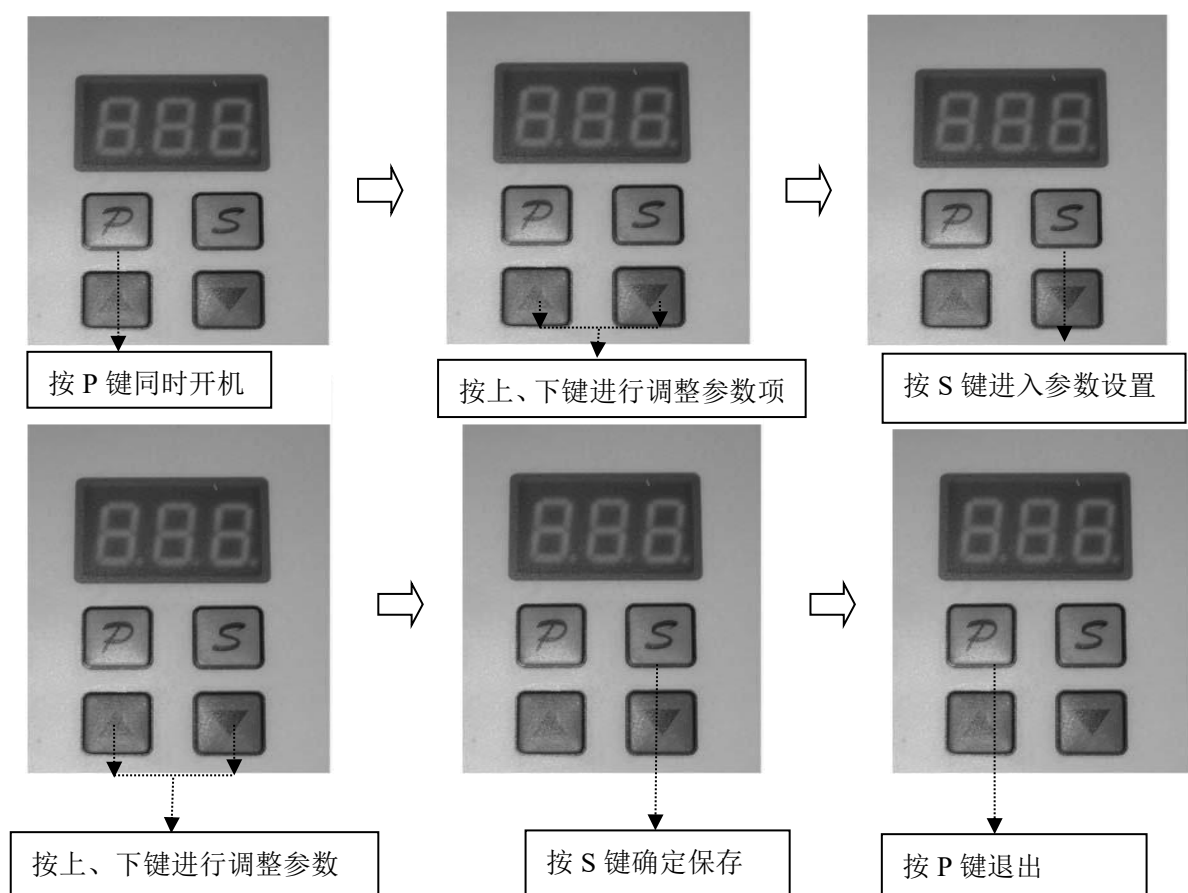
2.6.2 按键说明

进入和存储内容值		进入参数内容值，其内容值如经调整变更后，需按下  键予以储存确认，
进入参数区功能键		一般模式下按下[【P】]进入用户参数模式 (参数内容见 1.11 参数内容表) 按住 【P】 开机进入技术员参数模式(参数内容见 1.11 参数内容表)
设置数值递增/参数递增		1、A、B、C、D、E、F、G、H 的设置针数增加 2、参数选择区内当参数递增键 3、参数内容区内当设定数值递增键
设置数值递减/参数递减		1、A、B、C、D、E、F、G、H 的设置针数减少 2、参数选择区内当参数递减键 3、参数内容区内当设定数值递减键

2.6.3 恢复出厂设置



2.6.4 进入技术员模式及修改保存



3. 用户参数&技术员参数

3.1 用户参数

参数项目内容	中文说明	范围	初始值	设定键别	内容值名称说明与备注
P01	最高转速 (spm)	100~7500	3700	⊕ ⊖	车缝时的最高转速设定
P02	加速曲线调整 (%)	1~100%	80	⊕ ⊖	控速器爬升斜率设定 斜率值愈大, 速度愈陡; 斜率值愈小, 速度愈慢
P03	针停定位选择 UP: 上 DN: 下	UP / DN	DN	⊕ ⊖	同按键面板上之快速功能键 UP: 上停针 DN: 下停针
P04	起始回缝速度 (spm)	200~2200	1800	⊕ ⊖	前段回缝 (起始回缝) 时的速度设定
P05	终止回缝速度 (spm)	200~2200	1800	⊕ ⊖	后段回缝 (终止回缝) 时的速度设定
P06	连续回缝速度 (spm)	200~2200	1800	⊕ ⊖	连续回缝时的速度设定
P07	慢速起缝速度 (spm)	200~1500	400	⊕ ⊖	慢速起缝时的速度设定
P08	慢速起缝针数 (针)	0~99 针	4	⊕ ⊖	慢速起缝时的针数设定, 每一单位代表半针
P09	自动定针缝速度 (spm)	200~4000	3700	⊕ ⊖	定针缝【034.SMP】设定在 A 状态的速度设定 (或选针盒 AUTO 键有按下时的速度设定)

参数项目内容	中文说明	范围	初始值	设定键别	内容值名称说明与备注
P10	定针缝后自动执行终止回缝功能（不补针功能设定）	ON / OFF	ON		车缝途中停止，进行补针时机： 注意：【011.RVM】必须设定在 B 时，始有效 ON：不补针（定针缝时，可自动连贯动作 CD 功能） OFF：要补针（无法连贯执行 CD 功能）
P11	手按回缝时功能模式选择	J / B	J		手按车头回缝开关动作时机： J：JUKI 方式（在车缝中或中途停止时具有动作） B：BROTHER 方式（在车缝中始有动作）
P12	起始回缝运动模式选择	A / M	A		起始回缝段，倒退电磁线圈动作时机： A：轻触踏板，即自动执行起始回缝 M：受踏板控制，可任意停止
P13	起始回缝结束点操作模式选择	CON / STP	CON		CON：起始回缝段完成后，自动连续下一段功能 STP：起始回缝段针数完成后自动停止
P14	慢速启动	ON / OFF	Off		加全功能选针盒下始有效 ON：慢速启动功能开启 OFF：慢速启动功能关闭
P15	起始回缝功能 A 段针数之设定	1~15 针	3		在无外加选针盒下，且须【014.SBT】设定在 ON 状态始有效 起始回缝 A、B 段的针数设定
P16	起始回缝功能 B 段针数之设定	1~15 针	3		
P17	起始回缝功能来回次数之设定	1~4 回	2		在无外加选针盒下，且须【014.SBT】设定在 ON 状态始有效 起始回缝来回次数设定
P18	起始回缝补偿 1	0~31	10		①0 → 15 动作逐步延迟 ②16 → 31 动作逐步提前 ③0 比 16 的动作要延迟
P19	起始回缝补偿 2		11		
P20	终止回缝运动模式选择	A/M	M		终止回缝段，倒退电磁线圈动作时机： A：车缝后踏板全后踏，即自动执行终止回缝 M：受踏板控制，可任意停止
P21	终止回缝功能选择	ON / OFF	ON		在无外加选针盒下始有效 ON：终止回缝功能开启 OFF：终止回缝功能关闭
P22	终止回缝功能 C 段针数之设定	1~15 针	3		在无外加选针盒下，且须【021.EBT】设定在 ON 状态始有效 终止回缝 C、D 段针数数设定
P23	终止回缝功能 D 段针数之设定	1~15 针	3		
P24	终止回缝功能来回次数之设定	1~4 回	2		在无外加选针盒下，且须【021.EBT】设定在 ON 状态始有效 终止回缝来回次数设定
P25	终止回缝补偿 3	0~31	10		①0 → 15 动作逐步延迟

参数项目内容	中文说明	范围	初始值	设定键别	内容值名称说明与备注
P26	终止回缝补偿 4		11		②16→31 动作逐步提前 ③0 比 16 的动作要延迟
P27	终止回缝时 C 段自动在+1 针	ON / OFF	ON		终止回缝时 C 段自动再加 1 针 ON: 有效 OFF: 无效
P28	连续回缝运动模式选择	A/M	A		连续回缝段, 倒退电磁线圈动作时机: A: 轻触踏板, 即自动执行连续回缝 M: 受踏板控制, 可任意停止
P29	连续回缝功能选择	ON / OFF	OFF		在无外加选针盒下始有效 ON: 连续回缝功能开启 OFF: 连续回缝功能关闭
P30	连续回缝针数设定	1~99 针	4		在无外加选针盒下, 且须【029.BAR】设定在 ON 状态始有效。 连续回缝来回针数设定
P31	连续回缝来回次数设定	1~15 次	4		在无外加选针盒下, 且须【029.BAR】设定在 ON 状态始有效。 连续回缝来回次数的设定
P32	连续回缝补偿 5	0~31	10		①0→15 动作逐步延迟 ②16→31 动作逐步提前 ③0 比 16 的动作要延迟
P33	连续回缝补偿 6		11		
P34	定针缝运动模式选择	A / M	M		A: 轻触脚踏板, 即自动执行定针缝动作 M: 受脚踏板控制, 可任意停止与启动
P35	定针缝功能设定	ON / OFF	OFF		在无外加选针盒下始有效 ON: 定针缝功能开启 OFF: 定针缝功能关闭
P36	定针缝段数选择 P1	1~250 针	00		在无外加选针盒下始有效: 且须【035. PM】设定在 ON 状态下, 始能执行各段所设定的针数 (P1~P4 段于出厂时已被预设 15 针)
P37	拨线出力功能设定 (夹线器力道设置)	ON / OFF (0—10)	ON (7)		ON: 有扫线动作 (0 无夹线动作) OFF: 无扫线动作 (1-10 力道逐步增大)
P38	切线出力功能设定	ON / OFF	ON		ON: 有切线动作 OFF: 无切线动作
P39	车缝途中停止时, 压脚出力选择 UP: 上 DN: 下	UP / DN	DN		同按键面板上之快速功能键 UP: 车缝停止时, 自动抬起压脚 DN: 车缝停止时, 不自动抬压脚 (由踏板后踏控制)
P40	切完线停止时, 压脚出力选择 UP: 上 DN: 下	UP / DN	DN		同按键面板上之快速功能键 UP: 切完线后, 自动抬起压脚 DN: 车切完线后, 不自动抬压脚 (由踏板后踏控制)
P41	车缝完成件数显示	0~9999	0		自动累计完成件数
P42	车缝速度显示		0		自动显示车缝时的转速状况 (速度值仅供参考)
P43	马达转动方向设定 (正反转)	CW / CCW	CCW		CW: 顺时针方向 CCW: 逆时针方向

3.2 技术员参数内容表

参数项目内容	中文说明	范围	初始值	设定键别	内容值名称说明与备注
P44	车头皮带轮之尺寸 (mm)	50~200	15		随车头机型码之设定, 已预置车头皮带轮尺寸
P45	马达皮带轮轮之尺寸 (mm)	50~150	65		随车头机型码之设定, 已预置马达皮带轮尺寸
P46	切线后, 反转提针角度的功能选择	ON / OFF	OFF		ON: 切完线后, 自动作反转的功能 (角度由【047.TR8】调整决定) OFF: 无作用
P47	切线后, 反转提针角度的调整	50~200	160		切完线后, 由针上算起以反向运转作提针的角度调整
P48	低速 (定位速度) (spm)	200~300	230		定位速度设定
P49	切线速度 (spm)	200~300	300		调整切线周期时的电机速度
P50	压脚全额初始出力的动作时间 (ms)	10~990	250		压脚开始动作时, 全额出力的动作时间
P51	压脚出力动作的周期信号 (%)	10~90	30		压脚动作时, 以周期性省电输出, 避免压脚发烫
P52	延迟马达起动, 保护压脚下放时间	10~990	120		踩下时延迟起动时间, 以配合压脚放下之确认
P53	半后踏取消抬压脚功能	ON / OFF	ON		ON: 半后踏时, 无抬压脚出力 OFF: 半后踏时, 有抬压脚出力
P54	切线动作时间 (ms)	5~100	15		切线时序所需的动作时间
P55	拨 / 扫线 (或吹风) 动作时间 / (夹线器动作角度)	10~990 (1-360)	30 (270)		拨 / 扫时序的动作时间 (夹线器松开定位角度)
P56	开电后自动找上定位	ON / OFF	ON		ON: 开启电源后, 自动找到上定位信号后停止 OFF: 无作用
P57	车头最高速度限制 (spm)	100~7500	3700		最高速度总限制 ∴【0.01.H】速度值受此控制
P58	上定位调整	40~180	40		上定位调整, 数值减少时会提前停针, 数值增加时会延迟停针
P59	下定位调整	40~180	50		下定位调整, 数值减少时会提前停针, 数值增加时会延迟停针
P60	测试速度 (spm)	100~7500	2000		设置测试速度
P61	A 项测试	ON / OFF	OFF		A 项测试选项, 设定后将按【060.TV】所设定之速度持续运行
P62	B 项测试	ON / OFF	OFF		B 项测试选项, 设定后将按【060.TV】所设定之速度执行启动-车缝-停车-剪线的循环

P63	C 项测试	ON / OFF	OFF		C 项测试选项，设定后将按【060. TV】所设定之速度执行无定位功能的启动-车缝-停车的循环
P64	测试 B、C 导通时间	1~250	20		B、C 项测试中，设置导通时间
P65	测试 B、C 停车时间	1~250	20		B、C 项测试中，设置停车时间
P66	机头保护开关检测	0~2	1		0: 不检测，1: 检测零信号，2: 检测正信号
P67	剪线保护开关检测	ON / OFF	OFF		0: 不检测，1: 检测

3.3 夹线方面的参数：

夹线方面的参数					
P37	(夹线器力度设置)	(0-10)	(7)		(0 无夹线动作) (1-10 力道逐步增大)
P55	夹线器松开动作角度	1-360	270		夹线器松开时定位角度
P69	夹线器启夹动作角度	1-360	100		夹线器启夹时定位角度

4 错误代码表：

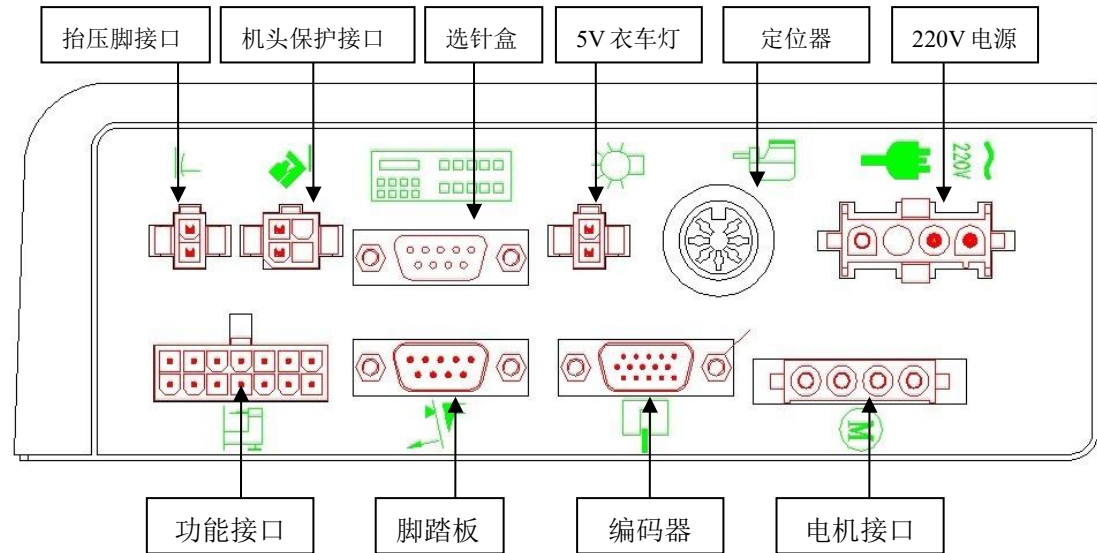
4.1 错误信息显示码一览表

错误码	内容	对策
E1	电力模块错误代码 不正常过电流或过电压发生 刹车用铝壳电阻或 F1 保险丝异常发生	模块驱动出力与机头出力将全部关闭 等待电源重新开启/复位 (请仔细检查电源板各项机能)
E7	a) 马达插头配线接触不良导致不转。 b) 定位器信号异常。 c) 车头机构死锁或马达皮带异物卷入卡死。 d) 加工物过厚，马达扭力不足无法贯穿。 e) 模块驱动出力异常。	模块驱动出力与车头出力将全部关闭。 等待电源重新开启/复位。 (请检查车头是否卡住或定位器、马达、模块驱动等信号是否异常)
E8	连续手动倒缝超过 15 秒	模块驱动出力与车头出力将全部关闭。 等待电源重新开启/复位。
E9	定位器信号异常	检查上下定位信号是否正常，或皮带轮是否太松了
E11	电源开启即自动找上定位，但定位器有插入控制箱，针上信号无法输出。	自动进入无定位器模式，且切线、扫线、上定位等以及所有定针缝样式缝制功能亦无效。 马达可正常操作 (请检查定位器是否异常)。

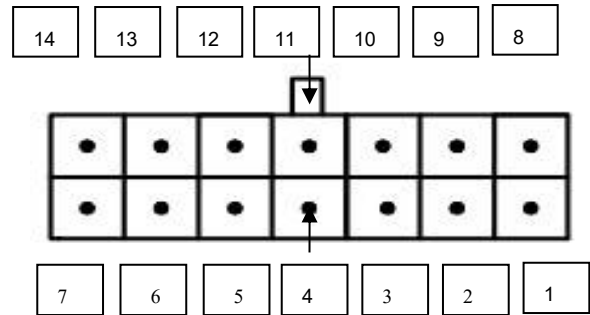
参数项目内容	中文说明	范围	初始值	设定键别	内容值名称说明与备注
E12	电源开启时，未插入定位器。				自动进入无定位器模式运作，且切线、扫线、上定位等以及所有定针缝式样缝制功能亦无效。马达可正常操作。 (请检查定位器是否忘记插入或异常)
E14	编码器信号异常				检测编码器信号是否正常，或更换编码器
E15	电力模块不正常过流保护				模块驱动出力与机头出力将全部关闭。 等待电源重新开启/复位。(请仔细检查电源板各项机能)
E16	剪线开关没到正确位置				检查剪线机构是否回到正确位置
E17	机头保护开关没到正确位置				检查机头是否掀开，机头开关是否损坏

5 端口示意图

5.1 各个端口名称：



5.2 14P 功能端口对应表



剪线电磁铁	扫线		5V 衣车灯	手动倒缝	倒缝电磁铁	抬压脚
1	2	3(无作用)	4 (地)	5	6	7

8	9	10 (地线)	11 (+5V)	12	13	14
---	---	---------	----------	----	----	----

Safety Instruction

1. Users are required to read the operation manual completely and carefully before installation or operation.

2. All the instruction marked with sign  must be observed or executed; otherwise, bodily injuries might occur.

3. The product should be installed and pre-operated by well trained persons.

4. For perfect operation and safety, it is prohibited that using extension cable with multi-outlet for power connection.

5. When connecting power supply cords to power sources, it is necessary to make sure that the power voltage is lower than 250 VAC and matches the rated voltage indicated on the motor's name plate.

※**Attention:** If the Control Box is AC 220V system, please don't connect the Control



Box to AC 380V power outlet. Otherwise, the error will occur and motor will not work. If that happens, please turn off the power immediately and check the power voltage.

6. Don't operate in direct sun light, outdoors area and where the room temperature is over 45°C or below 5°C.

7. Please avoid operating near the heater at dew area or at the humidity below 30% or above 95%.

8. Don't operate in area with heavy dust, corrosive substance or volatile gas.

9. Avoid power cord being applied by heavy objects or excessive force, or over bend.

10. The earth wire of power cord must be connected to the system ground of the production plant by proper size of conductions and terminals. This connection should be fixed permanently.

11. All the moving portions must be prevented to be exposed by the parts provided.

12. Turing on the machine in the first time, operate the sewing machine at low speed and check the correct rotation direction.

13. Turn off the power before the following operation:

- 1) Connecting or disconnecting any connectors on the control box or motor.
- 2) Threading needle.
- 3) Raising the machine head.
- 4) Repairing or doing any mechanical adjustment.
- 5) Machines idling.

14. Repairs and high level maintenance work should only be carried out by electronic technicians with appropriate training.

15. All the spare parts for repair must be provided or approved by the manufacturer.

16. Don't use any objects or force to hit or ram the product.

Guarantee Time

Warranty period of this product is 1 year dated from purchasing, or within 2 years from ex-factory date.

Warranty Detail:

Any trouble found within warranty period under normal operation, it will be repaired free of charge. However, maintenance cost will be charged in the following cases even if within warranty period:

1. **Inappropriate use, including: wrong connecting high voltage, wrong application, disassemble, repair, modification by incompetent personnel, or operation without the precaution, or operation out of its specification range, or inserting other objects or liquids into the product.**
2. **Damage by fire, Earth quake, lighting, wind, flood, salt corrosive, moisture, abnormal power voltage and any other damage cause by the natural disaster or by the inappropriate environments.**
3. **Dropping after purchasing or damage in transportation by customer himself or by customer's shipping agency**

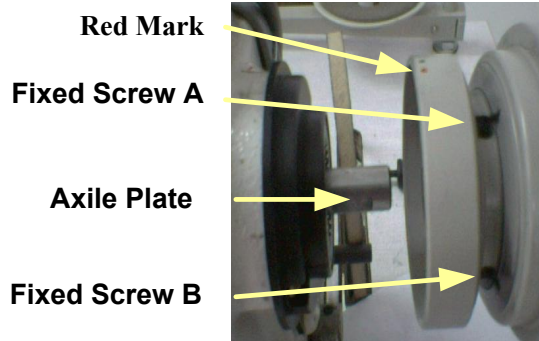
Note: We make our best effort to test and manufacture the product for assuring the quality. However, it is possible that this product can be damaged due to external magnetic interference and electronic static or noise or unstable power source more than expected; therefore the grounding system of operate area must guarantee the good earth and it's also recommended to install a failsafe device. (Such as residual current breaker).

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1 Installation

1.1 Installation and Adjustment of Synchronizer



- Installation: Mount the synchronizer onto the flange of machine pulley and fasten the rotor by fixed screws so that no vibration is found at rotating.
- Adjustment: Release the fixed screws on the top shell and remove the top shell.
- Needle Up/Down Positioning Adjustment: Aim the green mark toward the fixed point on the machine head. If it is not accurate, adjust the location magnets of Needle Up/Down. (Refer to Parameter Mode B [058. UA] / [059.DA])



Attention: Make sure the power is off before the installation.

1.2: Speed Control Unit Adjustment

Spring A: Downward force adjustment

Bolt B: Heeling back force adjustment

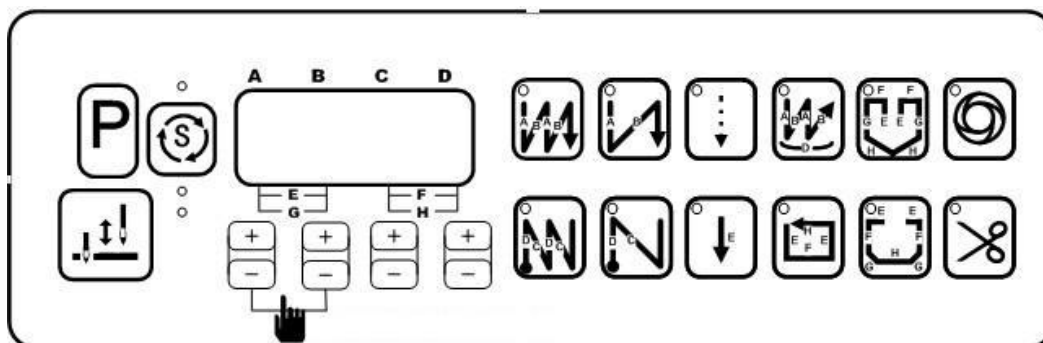
Hole C: Pedal stroke adjustment

In case of connecting with an air switch on the pedal rod to activate a Venturi Device, please shift the position for A and C as shown below.

For General Application	For Venturi Device Attached
A line drawing of the speed control unit mechanism. It shows a spring (A) at the bottom, a bolt (B) at the top, and a hole (C) on the right side. The spring is connected to a lever that controls the pedal stroke.	A line drawing of the speed control unit mechanism with a Venturi device attached. The spring (A) and hole (C) are shifted to different positions compared to the general application diagram to accommodate the Venturi device.

2 Operation

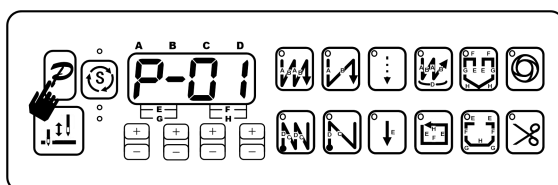
2.1 Reset Factory Defaults (all the operation panels have the same process, take QD286 for example)



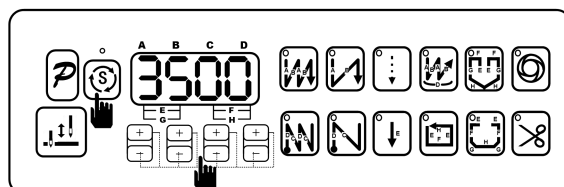
Press and hold the two keys, then turn on the power in the same time will reset the system.

2.2 Users' parameter adjustment (all the operation panels have the same process, take QD286 for example)

① Press the  enter into **【Users' parameter】** under the normal mode. See the control system users' parameter & technician parameter table.

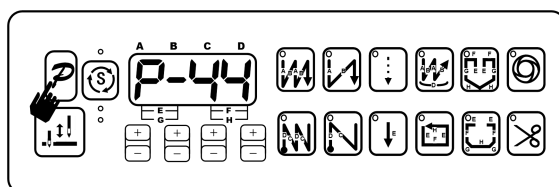


② Press  enter into the parameter value; press “plus” “minus” key to change the value.

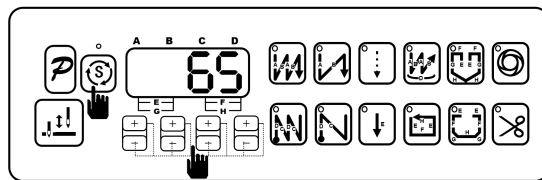


2.3 Technician parameter adjustment (all the operation panels have the same process, take QD286 for example)

① Press the  and turn on the power to enter into **【Technician parameter】**

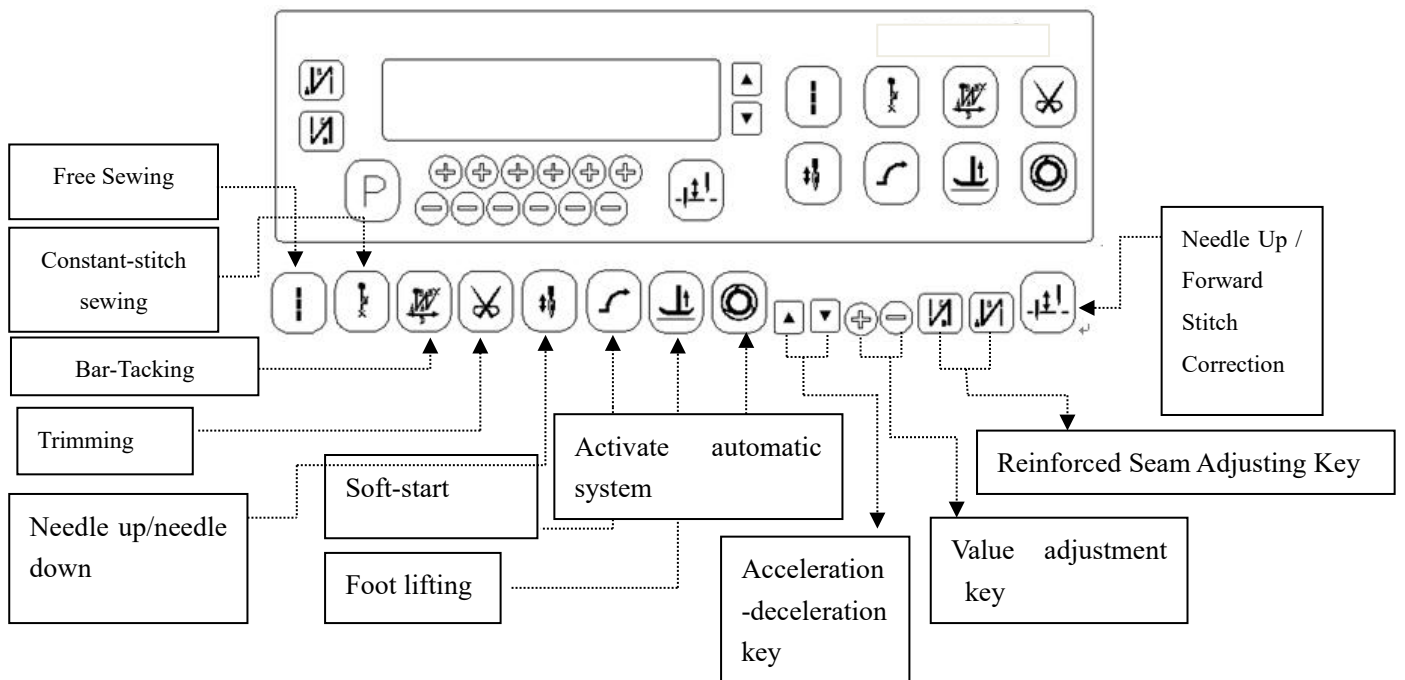


② Press  enter into the parameter value; press “plus” “minus” key to change the value. For details, see the control system users' parameter & technician parameter table.

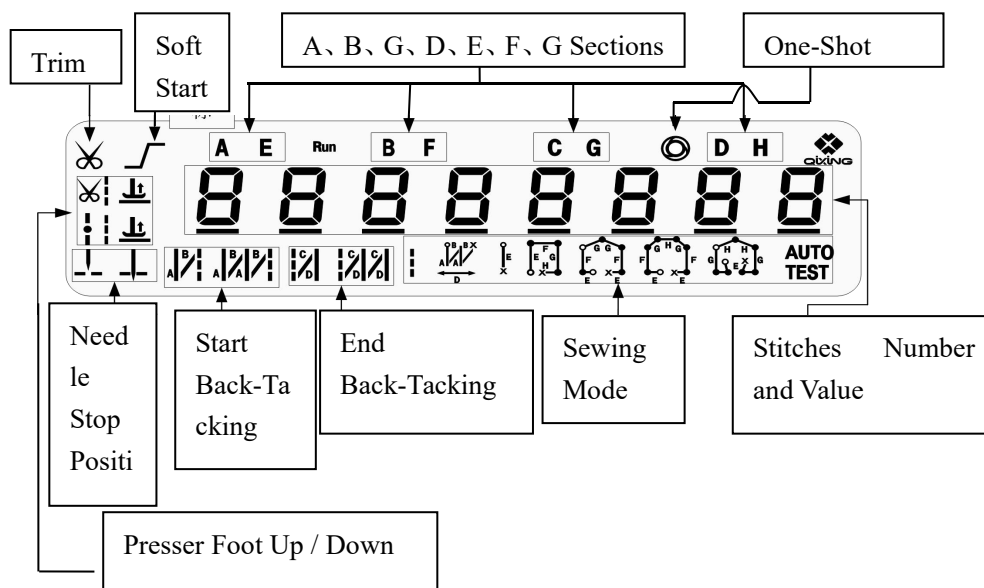


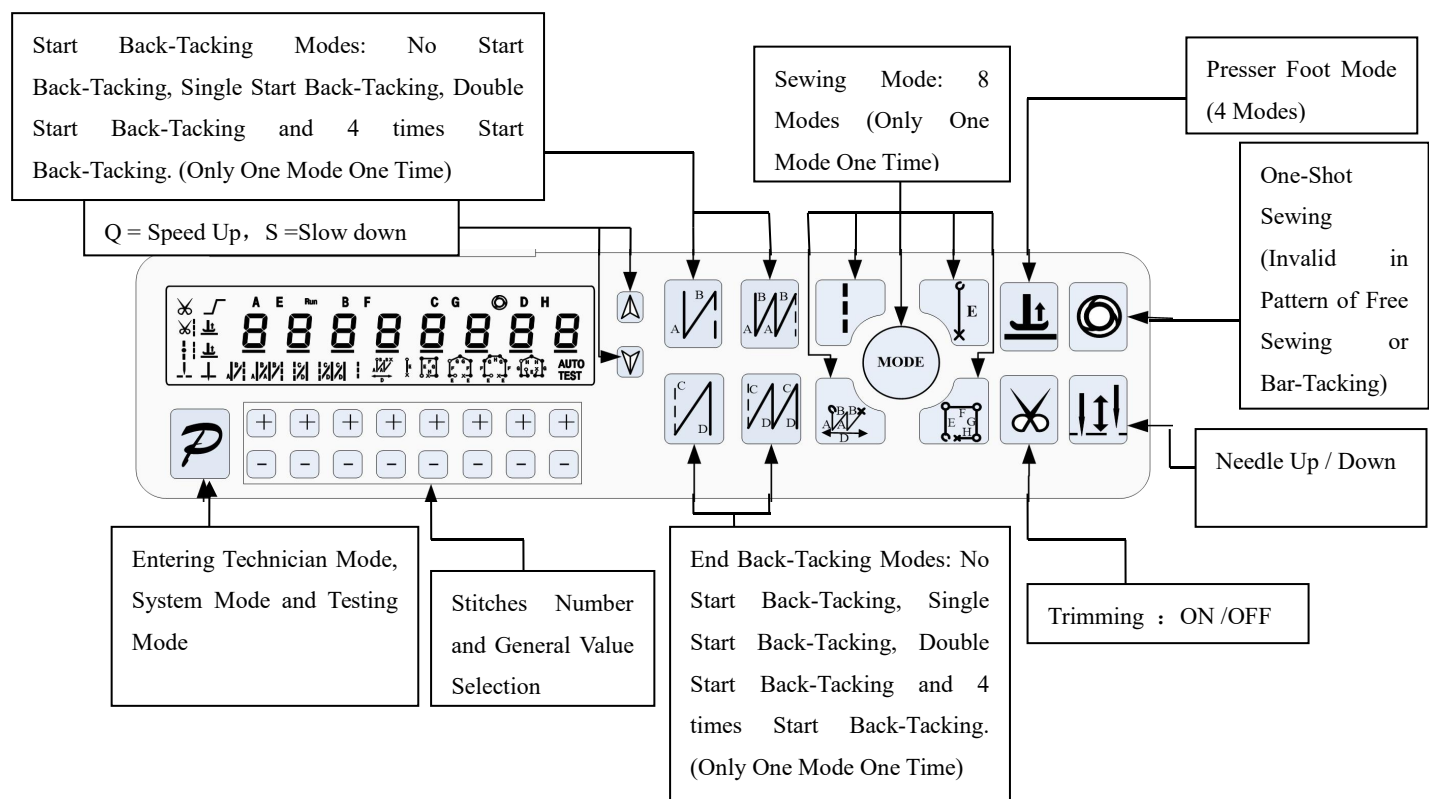
2.4 Operation Panel

2.4.1 Operation Panel QD286B Interface



2.4.2 Operation Panel QD287 LCD Screen





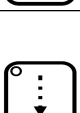
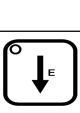
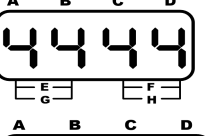
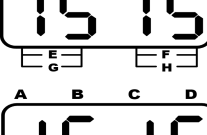
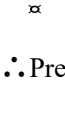
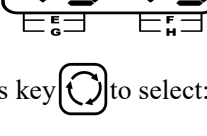
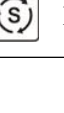
Note: This Type press  Key to Enter Technician Parameter

Remark: The below 3 items operation and key same as the above items.



2.5 Operation Panel Keys Function

Function	Key	OPERATION OF SEWING MACHINE
Start /End Back-Tacking Selection		Double start back-tacking

Function	Key	OPERATION OF SEWING MACHINE
		Single start back-tacking
		Double end back-tacking
		Single start back-tacking
Free Sewing		- As the treadle is toed down, machine will start sewing. Once the treadle returns to neutral, machine will stop immediately. - As the treadle is heeled back, machine will automatically start trimming cycle.
Bar-Tacking		Once the treadle is toed down, all the seams of Bar-Tacking will be completed with D times, and then the thread will automatically be trimmed. Note: When the Bar-Tacking Sewing starts, will not stop until the trimming cycle finished, except for the treadle heeled back to cancel the action.
Constant-Stitch Sewing	 OR  OR  OR 	- As the treadle is toed down, Constant-Stitch Sewing E,F,G or H performs section by section. - Once the treadle returns to neutral intermediately in any section, machine will stop immediately. When the treadle is toed down again, the balance stitches of E, F, G or H goes on. - If the parameter 【010.ACD】 is set ON, machine will automatically go on to start trimming cycle or End Back-Tacking at the end of last section E, F, G or H
Stitch Setting Selection	  	A, B,C, D: stitch setting range in 1 - 9 E, F, G, H: stitch setting range in 1 - 99   A = B = C = D =4 stitches   E = F = 15 stitches   G = H = 15 stitches ∴ Press key  to select: Top: A,B,C,D Middle: E,F Bottom: G, H QD286, Press  key to enter parameter value, if the parameter has been

Function	Key	OPERATION OF SEWING MACHINE
		changed, press  key to save; otherwise, the changed parameter will be lost after turning off the power.
Needle Up / Forward Stitch Correction		1. In Free sewing, one touch of the key will correct half-stitch. 2. In Constant-Stitch sewing (In bar-tacking sewing, it acts as needle up.) If sewing stops intermediately in one section, one touch of key will raise the needle to up position. If it stops at the end of section, one touch of key will correct one stitch forward.
One-Shot Sewing Selection		1. In Free sewing: One touch of this key makes beep sound without any function also LED does not light up. 2. In Constant-Stitch Sewing: a) One shot to the pedal, stitches number of E, F, G or H will be automatically performed. b) Toe down the pedal again and again to finish the rest sections until it finish pattern.
Trimming Selection		Enable or disable the trimming cycle.
Enter parameter value Selection		1. In [Normal Mode], press  key to enter [Parameter Mode A] (See 1.11 Parameter Table). 2. Press and hold  key, then turn on the power to enter [Parameter Mode A] (See 1.11 Parameter Table).
Maximum Sewing speed Setting	 	Speed up key: the speed should not lower than the value set by technician.
	 	Slow down key: the minimum speed is 200r/m
1 Presser Foot 2 Key to enter the technician mode (QD287 operation panel)		1、 LED ON=Presser Foot automatically goes up after trimming. 2、 LED ON=Presser Foot automatically goes up after motor stops. 3、Two icons are both LED ON= Presser Foot automatically goes up after trimming and motor stops. 4、Two icons are both LED OFF=Presser Foot is inactive.
Soft Start		1:  LED ON = Soft start is turn on.

Function	Key	OPERATION OF SEWING MACHINE
		2: LED OFF= Soft start is turn off.
Upper lower stitch stop setting		1:  LED ON indicate stopping machine at the upper stop needle position. 2:  LED ON indicate stopping machine at the lower stop needle position.

2.6 Digital types Display

2.6.1 Comparison Table of LCD Display Fonts and Actual Fonts

Arabic Numerals:

Actual	0	1	2	3	4	5	6	7	8	9
Display										

LCD Screen Display Mode:

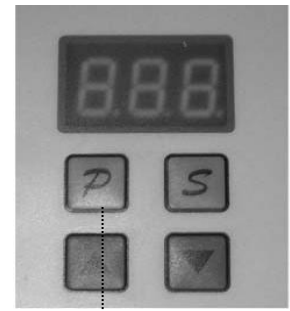
English Alphabet:

Actual	A	B	C	D	E	F	G	H	I	J
Display										
Actual	K	L	M	N	O	P	Q	R	S	T
Display										
Actual	U	V	W	X	Y	Z				
Display										

2.6.2 Keys Definitions

Enter and save the value		Enter to the parameter value, press  key for confirmation and save if the parameter value adjustment.
Enter parameter value selection		In the normal mode press 【P】 enter to the Users' parameter (see parameter in 1.11 parameter table) Press 【P】 turn on the power enter to the Technician Mode (see the parameter in 1.11 parameter table)
Value Increment Key		1. A、B、C、D、E、F、G、H section, increase the number of setting stitch . 2. Increase the parameter in Parameter selection. 3. Increase the setting value in Parameter value.
Value Decrement Key		1. A、B、C、D、E、F、G、H decrease the number of setting stitch . 2. Decrease the parameter in Parameter selection. 3. Decrease the setting value in Parameter value.

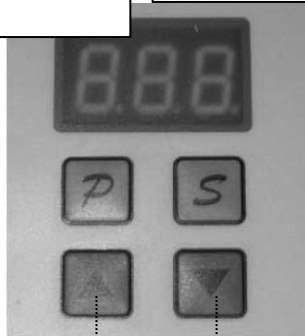
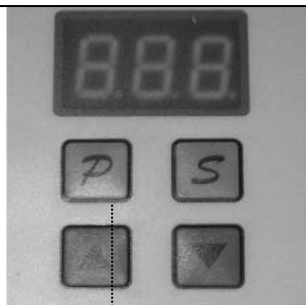
2.6.3 Restore to factory setting



Press [up] and [down] at the same time turn on the machine

Press S key to confirmation

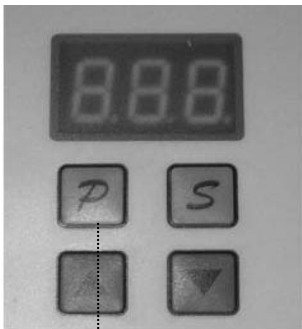
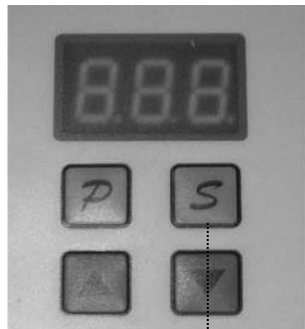
Press P key to Exit



Press P key turn on the machine

Press [up][down] to adjust parameter

Press S key enter to parameter setting



Press [up] [down] to adjust parameter

Press S key to confirmation and save

Press P Key to Exit

3 Control System (Users' parameter & Technician parameter)

3.1 Users' Parameter

Parameter Code	Parameter Function	Range/unit	Default	Key	Description
P01	Maximum Sewing Speed (spm)	100~7500	3700	+	Maximum speed of machine sewing
P02	Speed Curve Adjustment (%)	1~100%	80	+	The speed controller climbing slope setting. The large of slope value = the fast of the speed. The small of slope value = the slow of the speed.
P03	Needle UP/DOWN	UP / DN	DN	+	UP: Needle Stops at Up Position DN: Needle Stops at Down Position

Parameter Code	Parameter Function	Range/unit	Default	Key	Description
P04	Start Back-Tacking Speed (spm)	200~2200	1800		Start Back-Tacking Speed Adjustment
P05	End Back-Tacking Speed (spm)	200~2200	1800		End Back-Tacking Speed Adjustment
P06	Bar-Tacking Speed (spm)	200~2200	1800		Repeat Bar-Tacking Speed Adjustment
P07	Soft Start Speed (spm)	200~1500	400		Soft Start Speed Adjustment
P08	Stitch Numbers for Soft Start (SLS)	0~99 Stitches	4		Soft Start Stitches Setting (one unit = half stitch)
P09	Automatic Constant-Stitch Sewing Speed (spm)	200~4000	3700		Constant-Stitch sewing speed 【034.SMP】 is set at A(or when one shot signal is active)
P10	Automatic End Back-Tacking Sewing(Can invalidate the stitch correction function)	ON / OFF	ON		The Stitch-Correction is valid in sewing stop. Note: Valid only when the 【0.11.RVM】 must set on B ON: Invalid (Constant-Stitch sewing, it can automatic continue action as CD function) OFF: Valid (Can't continue execute CD function)
P11	Back-Tacking Mode Selection	J / B	J		Press Back-Tacking switch by hand: J : JUKI Mode (it will activate when machine is stopped or running) B: BROTHER Mode (It will activate only the machine is running)
P12	Start Back-Tacking Mode Selection	A / M	A		Start Back-Tacking, reverse solenoid action: A : One shot to pedal, it will automatic execute Start Back-Tacking. M: Pedal-controlled and motor can stop arbitrarily
P13	Mode Selection at the end of Start Back-Tacking	CON / STP	CON		CON: At the end of Start Back-Tacking, machine continues sewing if pedal pressed or START signal on (standing operation) STP: At the end of Start Back-Tacking, machine stops
P14	Soft Start	ON / OFF	Off		Add with full-function operation panel is valid. ON: Soft start function is turn on. OFF: Soft start function is turn off.
P15	Setting Stitches A of Start Back-Tacking	1~15 Stitches	3		Valid only when operation panel disconnected and 【014.SBT】 must set on 【ON】 Start Back-Tacking Stitches Setting of A B Segment.
P16	Setting Stitches B of Start Back-Tacking	1~15 Stitches	3		
P17	Setting Turns of Start Back-Tacking	1~4 Times	2		Valid only when operation panel disconnected and 【014.SBT】 must set on 【ON】 Setting the turn times of Start Back-Tacking
P18	Stitch Balance for Start Back-Tacking 1	0~31	10		①0 → 15The action gradually delay ②16 → 31The action gradually advance ③The action of 0 delay than 16
P19	Stitch Balance for Start Back-Tacking 2		11		
P20	Mode Selection for End Back-Tacking	A/M	M		End Back-Tacking, reverse solenoid action: A: Pedal full heeling ,it will automatic execute end Back-Tacking M: Pedal-controlled and motor can stop arbitrarily

Parameter Code	Parameter Function	Range/unit	Default	Key	Description
P21	End Back-Tacking Function Selection	ON / OFF	ON		Valid only when operation panel disconnected ON: End Back-Tacking function is turn on. OFF: End Back-Tacking function is turn off.
P22	Setting Stitches C of End Back-Tacking	1~15 Stitches	3		Valid only when operation panel disconnected and 【021.EBT】 must set on 【ON】 End Back-Tacking Stitches Setting of C D Segment.
P23	Setting Stitches D of End Back-Tacking	1~15 Stitches	3		
P24	Setting Turns of End Back-Tacking	1~4 Times	2		Valid only when operation panel disconnected and 【021.EBT】 must set on 【ON】 Setting the turn times of End Back-Tacking
P25	Stitch Balance for End Back-Tacking 3	0~31	10		①0 → 15 The action gradually delay ②16 → 31 The action gradually advance ③The action of 0 delay than 16
P26	Stitch Balance for End Back-Tacking 4		11		
P27	Adding 1 Stitch to C Segment of End Back-Tacking	ON / OFF	ON		Adding 1 Stitch to C Segment of End Back-Tacking ON: Valid OFF: Invalid
P28	Mode Selection for Bar-Tacking	A/M	A		Bar-Tacking, reverse solenoid action: A: One shot to pedal, it will automatic execute Bar-Tacking. M: Pedal-controlled and motor can stop arbitrarily
P29	Bar-Tacking Function Selection	ON / OFF	OFF		Valid only when operation panel disconnected ON: Bar-Tacking Function is turn on. OFF: Bar-Tacking Function is turn off.
P30	Setting Stitches of Bar-Tacking	1~99 Stitches	4		Valid only when operation panel disconnected and 【029.BAR】 must set on 【ON】 Bar-Tacking Stitches Setting
P31	Setting Turns of Bar-Tacking	1~15 Times	4		Valid only when operation panel disconnected And 【029.BAR】 must set on 【ON】 Setting the turn times of Bar-Tacking
P32	Stitch Balance for Bar-Tacking 5	0~31	10		①0 → 15 The action gradually delay ②16 → 31 The action gradually advance ③The action of 0 delay than 16
P33	Stitch Balance for Bar-Tacking 6		11		
P34	Mode Selection for Constant-Stitch Sewing	A / M	M		A: One shot to pedal, it will automatic execute Constant-Stitch M: Pedal-controlled and motor can stop arbitrarily
P35	Constant-Stitch Sewing Function Selection	ON / OFF	OFF		Valid only when operation panel disconnected ON: Constant-Stitch Function is turn on. OFF: Constant-Stitch Function is turn off.
P36	Setting Stitches for Section P1 of Constant-Stitch Sewing	1~250 Stitches	00		Valid only when operation panel disconnected And 【035. PM】 must set on 【ON】 (The stitch number for section P1 ~ P4 is set at 15 stitches of factory defaults)
P37	Wiper Function Selection (Pressure setting of the Thread Clamp Device)	ON / OFF (0—10)	ON (7)		ON: Wiper Valid (0 No Action) OFF: Wiper Invalid (1-10 The pressure gradually increased)
P38	Trimmer Function Selection	ON / OFF	ON		ON: Trimmer Valid OFF: Trimmer Invalid
P39	Presser Foot UP / Down at intermediate stop	UP / DN	DN		UP: Presser foot goes up automatically DN: Presser foot keeps down (Controlled by heeling pedal)
P40	Presser Foot UP / Down after Trimming	UP / DN	DN		UP: Presser foot goes up automatically DN: Presser foot keeps down (Controlled by heeling pedal)

Parameter Code	Parameter Function	Range/unit	Default	Key	Description
P41	Display the sewing finished quantity	0~9999	0		Counting the finished-sewing quantity
P42	Sewing Speed Display		0		Displaying the current sewing speed (the speed only for reference)
P43	Setting Direction of Motor Rotation	CW / CCW	CCW		CW: Clockwise CCW: Counter Clockwise

3.2 Technician Parameter Table

Parameter Code	Parameter Function	Range/unit	Default	Key	Description
P44	Machine's Pulley Dimension (mm)	50~200	15		Setting machine pulley size
P45	Motor's Pulley Dimension (mm)	50~150	65		Setting motor pulley size
P46	Motor stops with a reverse angle after trimming	ON / OFF	OFF		ON: It will automatic as reverse function after trimming (angle adjustment according to the parameter 【047.TR8】 OFF: No Function
P47	Adjustment of reverse angles after trimming	50~200	160		Adjusting at reverse direction after trimming
P48	Low (Positioning) Speed (spm)	200~300	230		Setting Positioning Speed
P49	Trimming Speed (spm)	200~300	300		Adjusting trimming speed
P50	Full-On Time Setting for Foot Lifter (ms)	10~990	250		Timing adjustment for Full-On time of Automatic Foot Lifter actives.
P51	Duty-Cycle Setting for Foot Lifter (%)	10~90	30		Adjustment for Duty-Cycle of Foot Lifter (Fine tuning can reduce the over-heating)
P52	Running-Delay Time Setting	10~990	120		Running-Delay time adjustment for Automatic Foot Lifter
P53	Cancel Foot Lifting when Half-Heeling the Pedal	ON / OFF	ON		ON : Pedal half heeling without foot lifting function. OFF : Pedal half heeling with foot lifting function
P54	Trimming Time (ms)	5~100	15		Trimming sequence time setting
P55	Setting Wiper Timing (Clamp action angle)	10~990 (1-360)	30 (270)		Wiper sequence setting (The Thread Clamp Device position angle of release)
P56	Needles Goes Up Automatically as Power turned on	ON / OFF	ON		ON : Power turned on, needle goes up position automatically OFF: No Function.
P57	Maximum Sewing Speed Limiter (spm)	100~7500	3700		Maximum speed setting ∴ 【0.01.H】Speed value controlled by this
P58	Up Position Adjustment	40~180	40		Up Position Adjustment The needle will advance stop when the value decreased. The needle will delay stop when the value increased.
P59	Down Position Adjustment	40~180	50		Down Position Adjustment The needle will advance stop when the value decreased. The needle will delay stop when the value increased.

P60	Testing Speed (spm)	100~7500	2000		Setting testing speed
P61	Testing A	ON / OFF	OFF		Option of Testing A, after setting press 【060. TV】 to set the speed keep running.
P62	Testing B	ON / OFF	OFF		Option of Testing B, after setting press 【060. TV】 to set the speed execute the cycle of Start – Sewing –Stop - Trimming
P63	Testing C	ON / OFF	OFF		Option of Testing C, after setting press 【060. TV】 to set the speed execute the cycle of Start – Sewing –Stop without positioning function
P64	Running Time of Testing B and C	1~250	20		Setting running time of testing B and C
P65	Stop Time of Testing B and C	1~250	20		Setting stop time of testing B and C
P66	Machine Protection Switch Testing	0~2	1		0: Disable, 1: Testing zero signal, 2: Testing positive signal
P67	Trimming Protection Switch Testing	ON / OFF	OFF		0: Disable, 1: Enable

3.3 The Parameter of the Thread Clamp Device:

The parameter of the Thread Clamp Device					
P37	(Pressure setting of the Thread Clamp Device)	(0—10)	(7)		(0 : No Action) (1-10:The pressure increase gradually)
P55	The Thread Clamp release angle	1-360	270		The positioning angle of release
P69	Clamp start action angle	1-360	100		The positioning angle of starting clamp

4 Error Code List:

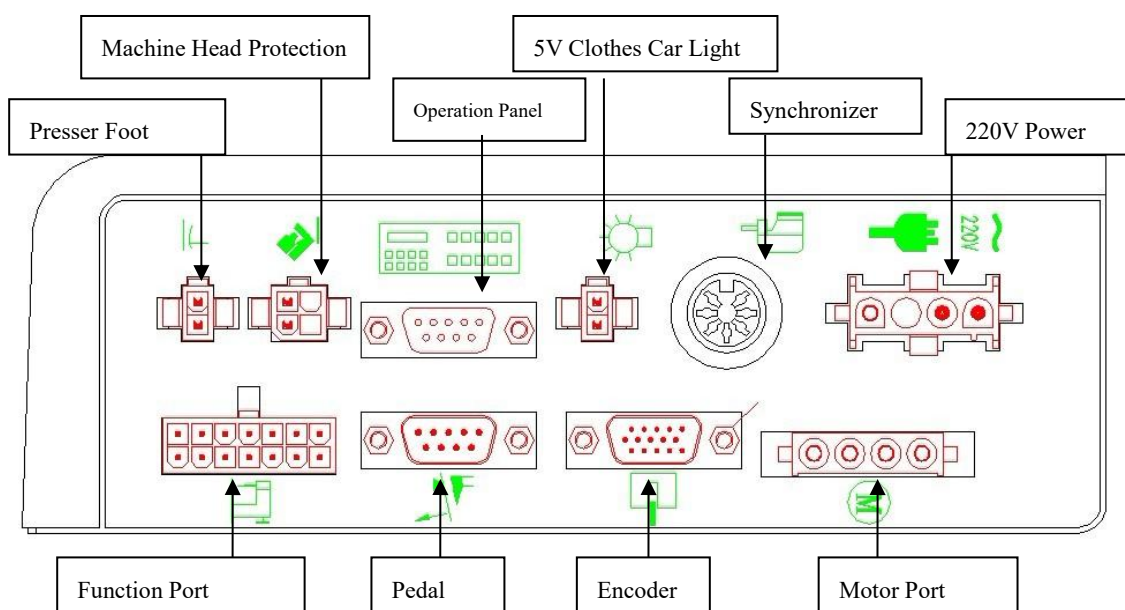
4.1 Error Code and Measurement

Error Code	Problem	STATUS / MEASUREMENT
E1	Power Module is faulty. Abnormal over current or voltage. Resistor is damaged or F1 fuse is blown.	System will be shut down until the power resets on. Please check the power board in detail.
E7	a) Bad connection at the motor connector. b) Synchronizer signal error c) Machine locked or object stuck in the motor pulley. d) Sewing material is too thick. e) Module output is abnormal.	System will be shut down until the power resets on. Please check the motor connectors, synchronizer situation and machine situation.

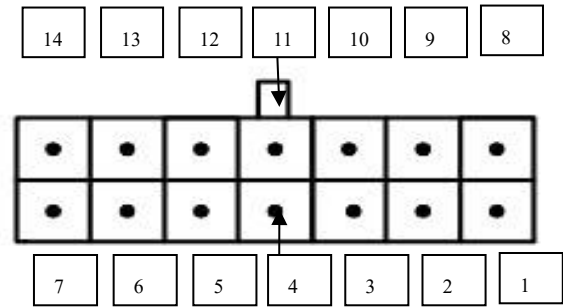
Parameter Code	Parameter Function	Range/ unit	Default	Key	Description
E8	Manual Back-Tacking lasts for 15 sec.				System will be shut down until the power resets on.
E9	Synchronizer signal error.				Please check the positioning signal or the condition of pulley.
E11	Auto Needle Up is malfunction as power on.				Motor still can run, but it automatically starts the clutch mode. All constant-stitch sewing pattern and trimmer /wiper function is invalid. Please check the synchronizer.
E12	Power is turned on without the synchronizer signal.				Motor still can run, but it automatically starts the clutch mode. All constant-stitch sewing pattern and trimmer /wiper function is invalid. Please check the synchronizer.
E14	Encoder signal error.				Please check the encoder signal or change the encoder.
E15	Abnormal over current protection for Power Module.				System will be shut down until the power resets on. Please check the power board in detail.
E16	Trimmer switch error.				Please check the trimmer switch whether turn in the correct position.
E17	Machine head switch error.				Please check if the machine head whether raised or if the machine head switch is damaged.

5 Outline Diagram

5.1 The Name of the each Port:



5.2 14P Function Port Table



Trimming Solenoid	Wiper		5V Clothes Car Light	Manual Back-Tacking	Back-Tacking Solenoid	Presser Foot
1	2	3 (No function)	4(GND)	5	6	7
8	9	10 (Earth Wire)	11 (+5V)	12	13	14