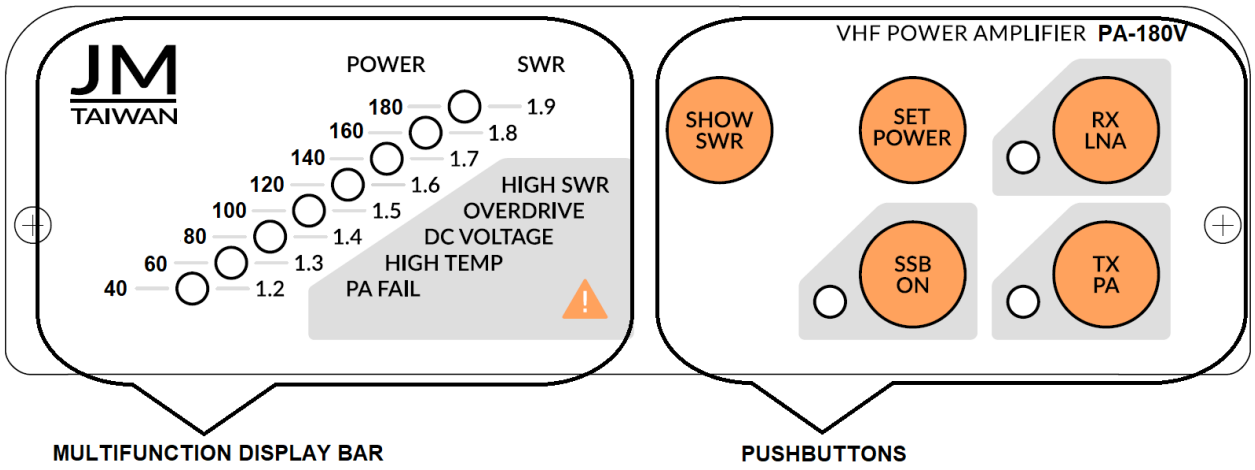
VHF POWER AMPLIFIER
PA-180V



User guide ver. 1.0



Multifunction display bar operating modes				
Mode	***Color***	***Type***	***Blink***	***Function***
Power measurement	Green	Bar-graph	No	Measures output power, 20Watt increments
Power setting display	Green	Bar-graph	Yes	Indicates actual power limit (60,100,140,180 W)
SWR measurement	Green	Dot	No*	Shows VSWR
Error indicator	Red	Dot(s)	No	Indicates error condition

* Blinks when under/overrange

Pushbuttons function	
Name	***Function***
RX LNA	Toggles operation of receiver pre-amplifier (LNA)
TX PA	Toggles operation of transmit power amplifier
SSB ON	Toggles SSB mode
SET POWER	Displays/changes transmit power limit
SHOW SWR	Enables SWR display

Turning amplifier on and off

Transmit power amplifier and receiver preamplifier functions are independent on each other. They can be toggled on/off by pressing the respective pushbuttons: RX LNA and TX PA. Once a function is enabled, the LED associated with the pushbutton will light up.
Amplifier is completely off when both LEDs are dark.

Changing power level

Transmit power amplifier is equipped with Automatic Level Control (ALC) loop. Preset power can be adjusted in 4 steps: 60W, 100W, 140W, 180W. The first pressing of the SET POWER button switches the amplifier into power setting mode. The multifunction display bar will blink, showing preset power level. The first pressing of the SET POWER button does not change the power level, but displays the actual setting. Subsequent pressing of the SET POWER button changes the power setting. Amplifier will exit the power setting mode if the SET POWER button is not pressed again within 2 seconds.

ALC is disabled in SSB mode. Transceiver's PEP must be adjusted correctly to control PA180V output power.

Turning SSB mode on/off

The SSB ON button toggles the SSB mode on/off. The current state is indicated by an associated LED. Once the SSB mode is enabled, the carrier sensing algorithm, time delays and power meter behaviour will change to address modulation properties.

Using external PTT input

The external PTT („external keying") mini jack socket is located on the rear panel. It allows the TX mode to be enabled by shorting the center conductor of the plug to the outer conductor (to ground). First, enable the TX PA function, by pressing the TX PA button. The associated LED will light up. Upon the first shorting of the external PTT, the amplifer enters external PTT mode of operation. The associated LED will start blinking.
In external PTT mode, the amplifier no longer reacts to the RF input signal from the transceiver. Instead, it goes into TX mode every time the external PTT signal has been applied. Once the SSB mode is enabled, the TX/RX transistion delays remain short. Power meter operates in the PEP mode.
The amplifier remains in the external PTT mode, until the TX PA button is pressed or the DC power is removed.

Measuring VSWR

This function allows to accurately measure antenna's VSWR. To enable VSWR measurement, press SHOW SWR button while transmitting. This mode will last as long as the amplifier is in transmit mode. The display will return to power measurement mode after releasing transceiver's PTT button.
The actual VSWR is represented by a single „moving dot”. The lowest reading is 1.20, below this value a respective LED will start blinking, indicating underrange. The highest reading is 1.90 and with a reading past 2.00 a different respective LED will begin to blink, signaling overrange.

Built in VSWR meter is of good quality, compensating for detector's nonlinearities. This makes measurement results fairly independent on output power. It also offers exceptional directivity with the residual VSWR reading around 1.10.

Error signalling

To signal an error in amplifier's operation, the LEDs on the multifunction display bar will change their color to red. Appearance of any error will deny the transmitting operation of the amplifier.

Error LED	***Meaning***	***Amplifier reaction***
HIGH SWR	Excessive VSWR (over 2.1) detected. Typically caused by a faulty antenna.	Deny transmitting, resume after PTT release
OVERDRIVE	Excessive input power (>10Watt)	Deny transmitting, resume after PTT release
DC VOLTAGE	DC supply voltage out of permissible range (10.5V to 14.8V)	Deny transmitting, resume after PTT release and voltage restoration
HIGH TEMP	Chassis temperature over 60 ºC	Deny transmitting, resume after cooling down
PA FAIL	Amplifier electrical failure	Deny transmitting, resume after PTT release

Specifications: Power amplifier				
Parameter	***Min.***	***Typ.***	***Max.***	***Remarks***
Frequency range	138 MHz		174 MHz	
Maximum output power	170Watt	185Watt	200 Watt	ALC limited in FM mode
Input power range	1 Watt		10 Watt	Between carrier detect and overdrive thresholds
Input power for full output		5 Watt		Frequency dependent
Bypass power			50 Watt	
Harmonics suppression	60 dBc			
Modulation	AM, FM, SSB			
Circuit type	2 MOS-FET, PUSH-PULL amplifiers combined			
Specifications: Receiver preamplifier				
In-band gain	18dB	21dB	24dB	138 MHz - 174 MHz
Out-of-band gain			19dB	@ 108 MHz
			8 dB	@ 88 MHz
			-50 dB	@ 30 MHz
Noise figure		2.4 dB	3 dB	
Specifications: General				
DC supply voltage	10.5 V	13.6 V	14.8 V	Operation at the low end of range will not yield specified maximum power
Transmit supply current		27 A	30 A	Transmitting at maximum power. Frequency dependent.
Standby supply current		8 mA		All functions OFF
		35 mA		TX PA enabled
		80 mA		RX LNA enabled
		88 mA		TX PA and RX LNA enabled
RF connector	N50			
Weight		1.15 kG		
Dimensions	H=50mm, W=125mm, L=210mm			

Output power, DC current v.s. Input power in SSB mode

