

PSC- Precision Speed Controller with IntelliClamp®

User manual



Our mission is to make surrounding reality inspiring for eyes and for ears. We follow the idea of Open Eyes Economy where customer satisfied of high quality product and service is more important than pure financial profit for manufacturer. Our goal is to offer novel, luxury things – things with a bit of creator's soul. Using those special things shall be a pleasure for its owner.

So, relax and spend a while with us...

Jacek Siwiński & Wiesław Zawada

PSC – Precision Speed Controller with InteliClamp®

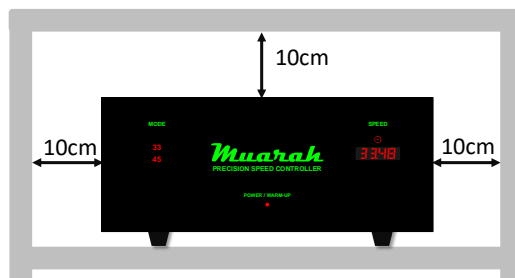
Precision Speed Controller of turntable motor has been created for music lovers who have keen hearing sense and do not accept vinyl record sound height fluctuation. It also gives possibility to comfortable electronic 33/45rpm speed change. With combination with our innovative InteliClamp® PSC offers real speed measurement and presentation to the user online. This is the first-ever such kind of product on the market!

Features:

- Elimination of wow caused by mains power supply frequency 50 Hz fluctuations. According to EU standards maximum frequency deviation can reach up to +2/-3Hz. It is equivalent to -60/+40Hz deviation of 1 kHz sound which human ear is sensitive the most. Audiophile ear can distinguish 2-3Hz frequency deviation (~0,1Hz of mains frequency deviation). PSC built in quartz stabilized 230V generator has frequency deviation less than 0.001Hz and is absolutely inaudible for human ear. Online measurements of European grid network are available with 30s latency on web page www.swissgrid.ch
- 50Hz hum elimination by turntable motor vibration reduction. Vibrations are reduced thanks to mains power supply THD lowering down to <2% when according to EU standards they can reach up to 8% in our houses.
- Possibility of turntable platter speed error correction. Such error is typical effect of belt ageing, belt type change, bearing oil viscosity dependence of temperature.
- Possibility of electronic 33/45 speed change by one button press
- Real platter speed measurement with 0,01rpm accuracy (InteliClamp® required)
- Real platter speed stabilization. In this mode PSC makes automatic continuous turntable motor speed correction to achieve accurate and stable platter speed (InteliClamp® required)

Connection

- 1) Carefully take PSC out of the shipping carton and plastic bag. Do not hold glass front panel by hand.
- 2) Place device in proper distance (minimum 10cm) from other electrical equipment like preamplifier to avoid electromagnetic interferences. Take care about proper ventilation because unit generates heat.
- 3) If PSC was taken from place with different temperature or humidity wait minimum one hour before next steps.
- 4) Connect turntable motor AC plug to PSC Output socket (depends on mode of operation – see next chapter). **WARNING!** PSC can be used only with turntables equipped with AC 230V/50Hz motor with maximum power less than 5W. In case of doubts please contact manufacturer.
- 5) Connect AC main power to PSC. **WARNING!** Main AC Power going to PSC should not be applied before previous steps.
- 6) PSC can work in one of 4 modes of operation:



Mode	Connection diagram	Elimination of wow caused by mains power supply frequency 50Hz fluctuation	motor vibration reduction	platter speed error correction („pitch“)	Fast electronic 33/45 speed change	Real platter speed measurement	Real platter speed stabilization
(A) Speed controller and speed meter		✓	✓		✓	✓	✓
(B) Frequency controller and speed meter		✓	✓	✓	✓	✓	
(C) Frequency controller		✓	✓	✓	✓	Using stroboscope	
(D) Speed meter					If available in turntable	✓	

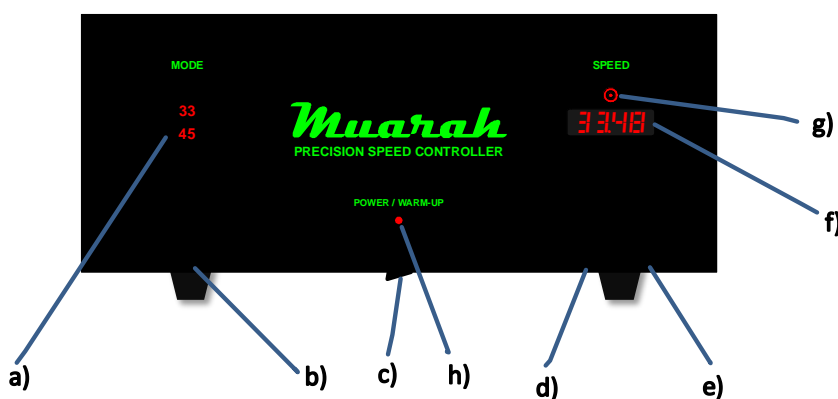
Operation

MODE A – SPEED CONTROLLER & SPEED METER

This is the most advanced and recommended mode of operation that utilizes all features of combination of PSC and IntelliClamp®. Device stabilizes real platter speed measured by IntelliClamp® and presents actual speed on front panel display. Platter speed is automatically tuned to nominal 33.33 or 45 rpm and maintained in very high precision. Manual speed correction is not possible in this mode. When IntelliClamp® is taken out of turntable platter PSC will change operation mode to (C). Then speed error (platter speed difference between case when turntable motor is connected to PSC and case when is connected directly to mains AC outlet) will be displayed on front panel.

Course of action:

- 1) Set turntable belt in 33.33rpm position
- 2) Place IntelliClamp® on turntable platter spindle
- 3) Turn on the motor
- 4) Turn on PSC using (c) switch.
- 5) After worm up phase (ca. 4sec) output signal (230V) is powered on.
- 6) Using (b) switch choose required nominal speed 33 or 45 rpm. Display (a) informs about nominal speed chosen.
- 7) Change operation mode to **Auto On** by simultaneous short pressing (d) and (e) switch.
- 8) In a few seconds radio transmission indicator (g) will go on. Display (f) will present real platter speed measured online. Pulse light of (g) indicator indicates PSC is in AUTO ON mode and stabilizes turntable platter speed to exact 33.33 or 45.00 rpm accordingly.
- 9) After 5 to 15 seconds the platter reaches nominal speed and since that moment speed is stabilized by PSC. All settings are kept in PSC memory and will be recovered during next turning on so time to reach the stable speed will be shorter.



MODE B – FREQUENCY CONTROLLER & SPEED METER

In that mode of operation PSC stabilizes only 230V motor power supply frequency what is directly translated to motor speed stabilization but not turntable platter. Real platter speed measured online by IntelliClamp® is presented on front panel display. Although frequency is stable platter speed can change due to reasons described in the manual introduction. It can be corrected manually. When IntelliClamp® is taken out of turntable platter PSC will change operation mode to (C). Then speed error (platter speed difference between case when turntable motor is connected to PSC and case when is connected directly to mains AC outlet) will be displayed on front panel.

Course of action:

- 1) Set turntable belt in 33.33rpm position

- 2) Place IntelliClamp® on turntable platter spindle
- 3) Turn on the motor
- 4) Turn on PSC using (c) switch.
- 5) After worm up phase (ca. 4sec) output signal (230V) is powered on
- 6) Using (b) switch choose required nominal speed 33 or 45 rpm. Display (a) informs about nominal speed chosen.
- 7) Change operation mode to **AUTO OFF** by simultaneous short pressing (d) and (e) switch.
- 8) In a few seconds radio transmission indicator (g) will go on. Display (f) will present real platter speed measured online.
- 9) Manual speed correction can be made using switches: (d) – SLOWER and (e) – FASTER.

MODE C – FREQUENCY CONTROLLER

Most of controllers available on the market work in that mode of operation. PSC stabilizes only 230V motor power supply frequency what is directly translated to motor speed stabilization but not turntable platter. Front panel display presents frequency error as difference between output frequency and 50Hz or 67.5Hz for 33 and 45 setting accordingly recalculated for rpm. In that mode real platter speed is undetermined and can change due to reasons described in the manual introduction. Real platter speed can be verified using stroboscope light and stroboscope disc. It can be corrected manually. Then speed error (platter speed difference between case when turntable motor is connected to PSC and case when is connected directly to mains AC outlet) will be displayed on front panel.

Course of action:

- 1) Set turntable belt in 33.33rpm position
- 2) Turn on the motor
- 3) Turn on PSC using (c) switch.
- 4) After worm up phase (ca. 4sec) output signal (230V) is powered on
- 5) Using (b) switch choose required nominal speed 33 or 45 rpm. Display (a) informs about nominal speed chosen.
- 6) Display (f) presents theoretical speed error based on assumption that turntable is mechanically ideal and resulting speed is exactly 33.33rpm for 50Hz and 45rpm for 67.5Hz of power supply.
- 7) Using stroboscope light and stroboscope disc or using embedded turntable stroboscope make necessary corrections using switches: (d) – SLOWER and (e) – FASTER. Stable stroboscope disk bars mean nominal speed is achieved.

MODE D – SPEED METER

In that mode of operation PSC displays real platter speed measured by IntelliClamp®. Speed correction can be made in turntable itself if available.

Course of action:

- 1) Place IntelliClamp® on turntable platter spindle
- 2) Turn on the motor in required mode 33 or 45rpm
- 3) Turn on PSC using (c) switch.

- 4) Using (b) switch set nominal speed 33 or 45 rpm according to turntable settings. Display (a) informs about nominal speed chosen.
- 5) In a few seconds radio transmission indicator (g) will go on. Display (f) will present real platter speed measured online.
- 6) Using stroboscope light and stroboscope disc or using embedded turntable stroboscope make necessary corrections in turntable itself if available. Stable stroboscope disk bars mean nominal speed is achieved.

PSC and IntelliClamp® pairing

- 1) If other IntelliClamp® than originally provided with PSC will be used special pairing procedure has to be performed before using it.
- 2) Remove battery from battery holder of IntelliClamp®
- 3) Read and write down two sign code placed on holder under IntelliClamp® battery
- 4) Turn off PSC. Then turn it on with pressed switch (b). Release it after 1s
- 5) **Code** message will be displayed on front panel and after a while the code of currently paired IntelliClamp®
- 6) Using (d) and (e) switches set the code as was previously noted.
- 7) Confirm settings using switch (b).

General instructions

- 1) Each time PSC is turned on the worm-up procedure is performed. It takes ca. 4sec before output signal (230V) is provided to output socket. POWER/WARM-UP (h) red indicator flashes during warm-up phase.
- 2) In case of temporary platter stop is required (e.g.: record side change) turntable embedded motor switch should be used if available. Turn off PSC using switch (c) only if complete turntable power off is desired. All settings are kept in PSC memory and will be recovered during next turning on
- 3) Most of turntable embedded stroboscope lights are powered directly from AC mains. Due to AC mains frequency fluctuation (as was described in manual introduction) the result of measurement using such stroboscope can be inaccurate.
- 4) To save battery life IntelliClamp® detects immobility state and automatically goes to „sleep” mode after several seconds. To „wake” him up again it should be gently shaken. If it went to sleep on turntable platter it can be hard to wake him up by only starting platter rotation. In that case it should be gently knocked by finger from the top.
- 5) In case IntelliClamp® measurement results are out of range expected by PSC for chosen nominal speed setting **Err** message will be displayed on front panel. To solve this problem change the nominal speed using switch (b). If it doesn't help set PSC in MODE C (IntelliClamp® not used) and set the speed pitch to „0” (zero). Then place IntelliClamp® on platter again. If problem still exists please contact Muarah Audio service.

IntelliClamp® battery replacement

- 1) Battery (CR2032 alkaline type) has to be replaced when message **bAtE** is displayed on front panel in **(A) (B) or (D)** modes of operation or when IntelliClamp® will stop functioning (e.g.: wrong measurement results are displayed from time to time)

- 2) To replace battery unscrew InteliClamp® enclosure.



- 3) The battery has to be lever up by small, thin screwdriver

- 4) Only brand new CR2032 alkaline battery of prime quality shall be used.
- 5) For transportation battery shall be removed from InteliClamp® to avoid discharging.

Maintenance

- 1) PSC stainless steel cover should be regularly dusted off. Gently wipe fingerprints from the surface by soft cotton cloth soaked with spirit.
- 2) Front glass panel can be wiped using soft cotton cloth and glass cleaner.
- 3) Gently wipe fingerprints from the InteliClamp® surface by soft cotton cloth.
- 4) When you plan not to use InteliClamp® for a longer period of time (over 3 months) remove battery from holder.

Important safety instructions!

- 1) **WARNING!!!** Motor with power grater then maximum depicted on PSC rear panel less than 5W. Using PSC with motor of power grater then maximum depicted on PSC rear panel or DC motor can destroy controller and motor. Please consult any doubts with PSC manufacturer.
- 2) On any account should PSC cover be opened!

Parameters

• Nominal speed	33.33, 45.00 rpm
• Output	230V (5W max), <2% THD ^(Note 1)
• Output frequency stability	< +/-0.00005%
• Output frequency error	< 0.0005%
• Speed measurement accuracy	+/- 0.01 rpm
• Pitch control	+/-2rpm with 0.01rpm resolution
• Automatic speed regulation accuracy (in AUTO mode with IntelliClamp®)	33.33, 45.00rpm +/-0.01 rpm
• Wireless band connection PSC – IntelliClamp®	ISM 868MHz
• Dimensions (width/length/height)	21cm/35cm/11cm
• PSC weight	3.1kg
• IntelliClamp® dimensions (diameter/height)	78mm/52mm
• IntelliClamp® weight	570g
• Power consumption	< 20VA ^(Note 1)
• IntelliClamp® battery lifetime	approx. 4 months (one record listened per day)

Note 1: Parameters can vary for PSC versions dedicated to some 3rd party turntables