

# PPKSXX-xx-xx

Synchronized RF driver for Pulse Pickers



TECHNICAL DATA SHEET 2015



## Product Overview

*These drivers have been designed in order to offer the highest possible performances in medium high speed Pulse Picking applications with repetition rates 1 to 50MHz. They aim to push down prices for OEM users, whilst retaining the highest achievable specifications.*

In this driver, the AM control of the pulse picker is phase locked on to the laser clock reference, in order to get the best possible stability from the pulse to pulse response of the Bragg cell. The carrier frequency of the driver is adapted to the AO pulse picker by selecting the convenient quartz.

It allows the user to choose any repetition rate he or she requires, by dividing the Reference Clock frequency of the laser oscillator by any integer (M) from 2 to 1022, or select multiples pulses (N) up to 1023, under the form N/M.

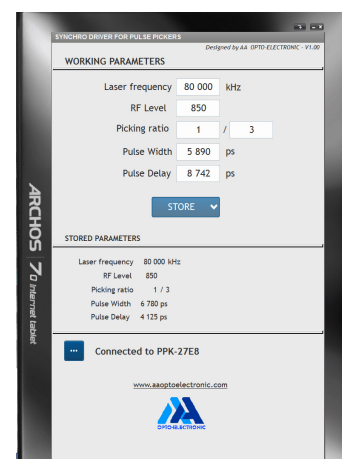
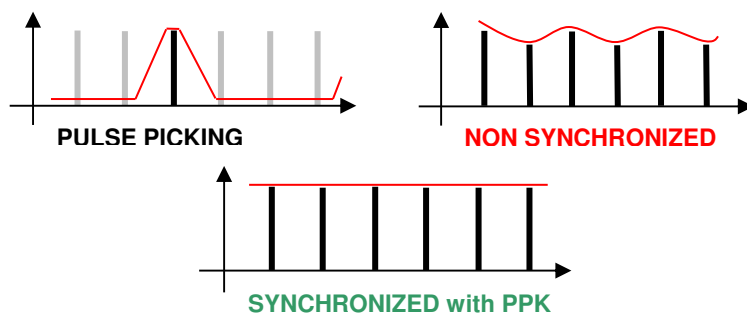
The driver's internal CPU and fast digital circuit uses FPGAs, which allows users to change and store different working parameters for the pulse picker such as pulse delay, window gate duration, repetition rate and RF power, through a remote control (LCD display) or via the RS232/USB protocol. A fast external analogue modulation input allows the user to vary the efficiency/power of the device in real time. A Trig input allows user to drive the system randomly with "pulse on demand" sequences.

This system is perfectly adapted to fibre pigtailed pulse pickers, but is equally suitable for use with AA's range of free space devices.



## Features

- High stability system with superior Pulse to Pulse Stability
- Dedicated to 1-50 MHz repetition rate lasers depending on model
- Input reference clock from Laser
- With Built-in High accuracy signal generator
- Including Digital delay and window gate adjustments
- Consecutive pulse extinction ration (CPEP) optimisation
- Remote control, USB, RS32 communication for set up
- RoHS compliant



AA OPTO-ELECTRONIC – [www.aaoptoelectronic.com](http://www.aaoptoelectronic.com)

AA Sa reserves the right to make changes to the products or information herein without notice. No liability is assumed as a result of their use or application.

AA Sa, 18, rue Nicolas Appert F-91898 ORSAY Tel: +33 (0)1 76 91 50 12 Fax: +33 (0)1 76 91 50 31 [www.aaoptoelectronic.com](http://www.aaoptoelectronic.com)

## Technical Specifications (Depending on the version)

### →Reference Input Signal from Laser

LASER Repetition Rate RR in [1-50] MHz – Level TTL/50 Ohms (On request=Peak Voltage max 5 Volts, min 100mV, duty cycle in [10-90%], nom 50 Ohms), SMA Connector,  $T_{RR}$ = Time between 2 Laser pulses =  $1/RR$  – SMA connector

### →Reference Output Signals from Driver

LSSO: Shaped Analog 0-3,5V/50 Ohms reference Output – Laser repetition Rate – SMA connector [1-50MHz]

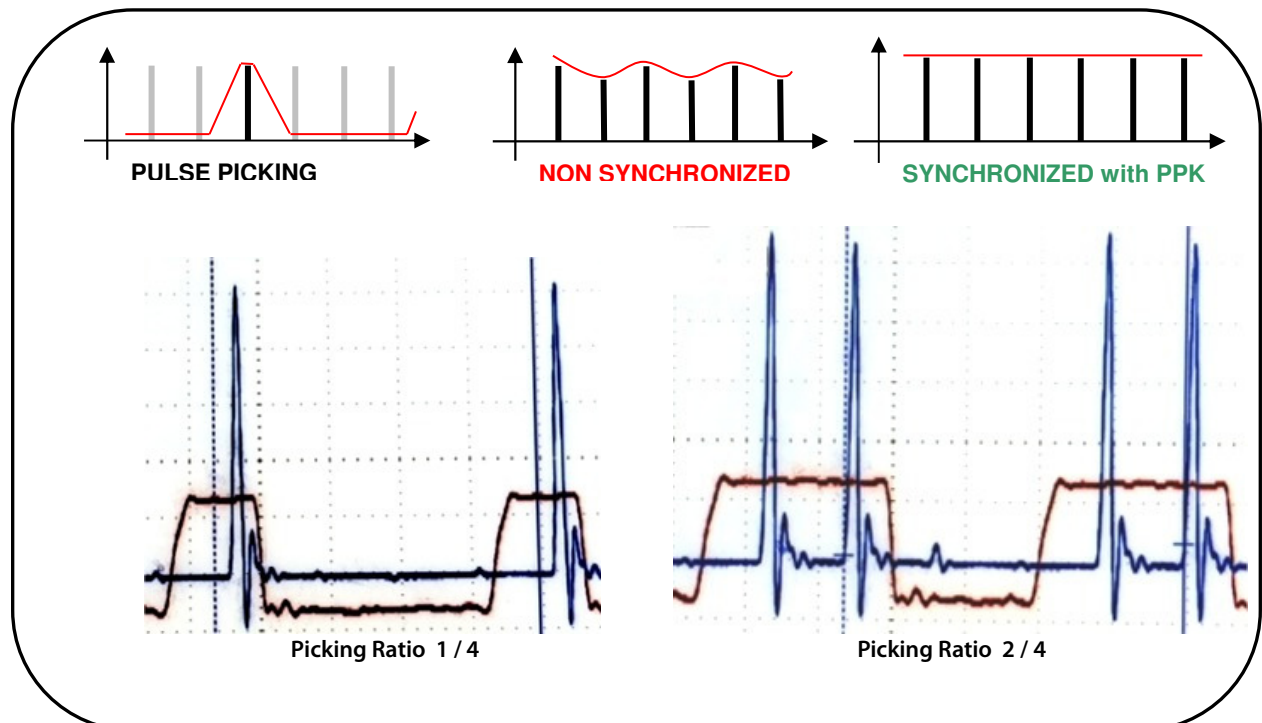
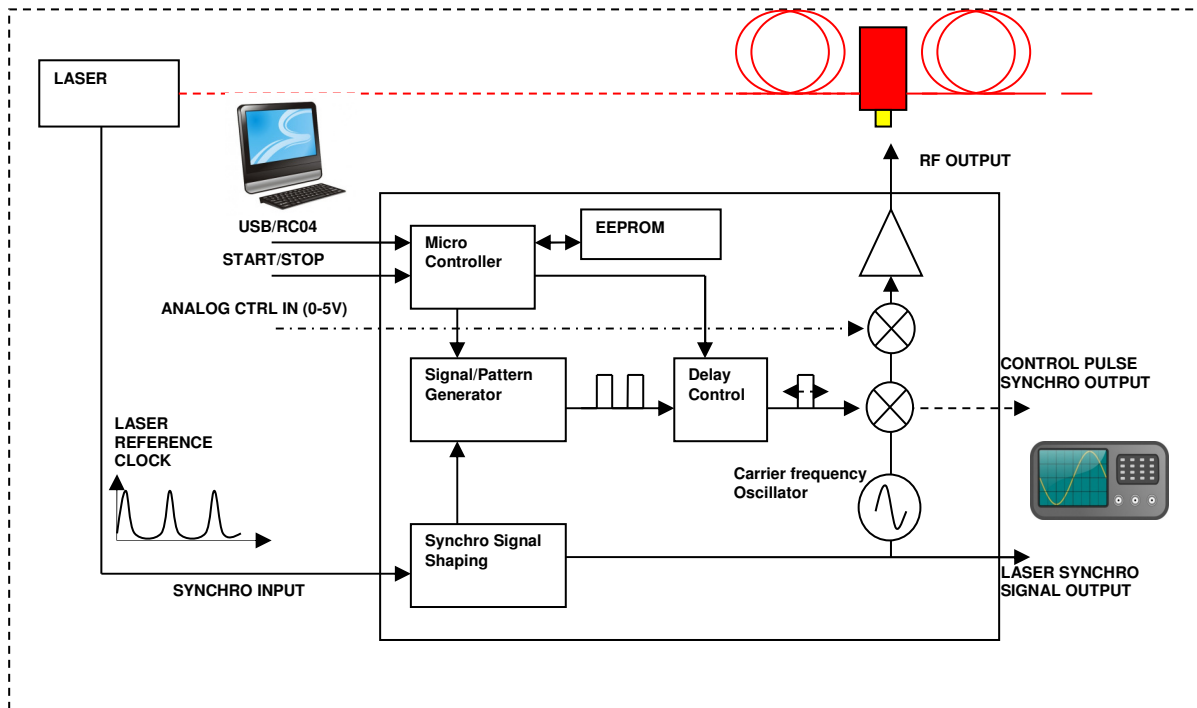
CPSO: Shaped Analog 0-3,5V/50 Ohms trig Output – AOM control signal – SMA connector

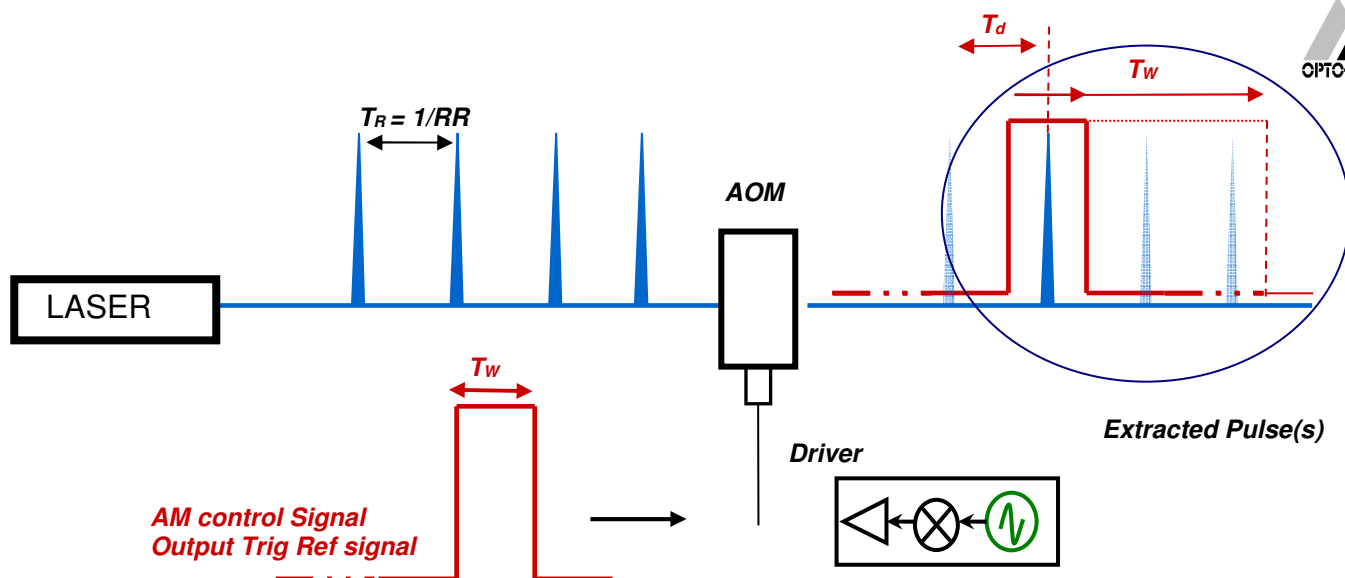
### Internal Pulse generator – Picking control

Number of picked pulses	N / M, N pulses picked out of M pulses, N in [1-1022], M in [2-1023]
Optical window gate duration	$T_w$ , Adjustable as: $T_w = N \cdot T_{RR} + T_A$ $T_A$ =Time Adjust in [0-yy ns] by typ steps of 1 ns (yy is version dependent)
Pulse Delay time	$T_D$ , Adjustable in [0-zz ns] by typ steps of 1 ns (zz is version dependent)
Start/Stop control	SSTI: E/D, Enable/Disable digital signal TTL level (1=OFF), TRIG INPUT Response time nom 10 ns

### Parameters set-up

Method of control	RC04 (Remote control, Android), USB, RS232
Adjustable parameters by user	N, M, $T_w$ , $T_D$ , Max RF power level, Store
Store	Parameters stored in EEPROM, Automatic reload of stored parameters
Carrier frequency	MHz 40, 80, 110, 180, 200, 250 Adapted to laser/AO device
Power supply	VDC 24 - Option : 110-230VAC
Output RF Power	W 1, 2, 4W max other power with external power amplifier
Rise time / Fall time	ns < 3 @200MHz, Internal pulse generator
Modulation input control / External	ACI: Analog 0-5Volts/1KOhms - Rise/Fall time nom 10ns, Dynamic 40dB
Extinction ratio	dB >50 (internal pulse generator)
Output impedance	$\Omega$ 50
V.S.W.R.	< 1.5/1
Input connectors	DB15
Output connectors	SMA, RF power
Size	mm <sup>3</sup> 207 x 99 x 26.1, Option 110-230VAC: Rack 19", 1U
Weight	kg Nom 0.6, Option 110-230VAC: 4 kgs
Heat Exchange	Conduction through baseplate, Option 110-230VAC: standalone
Operating temperature	°C 10 – 40 -Attention, for best stability of the system, it is recommended to operate in a +/- 1 °C environment
Maximum Case temperature	°C 50

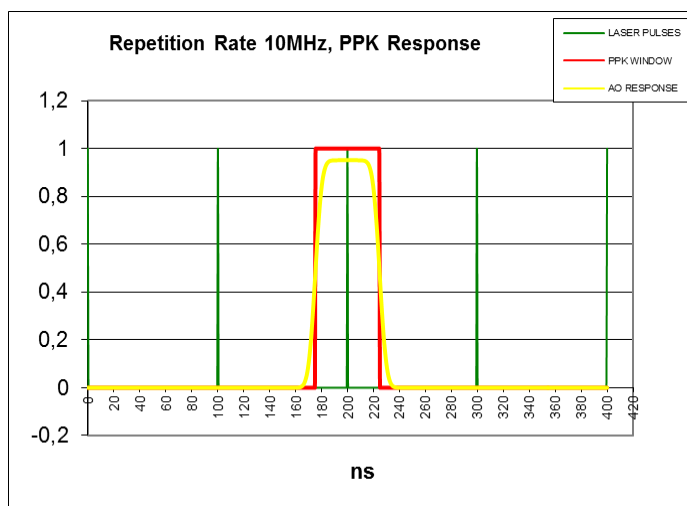
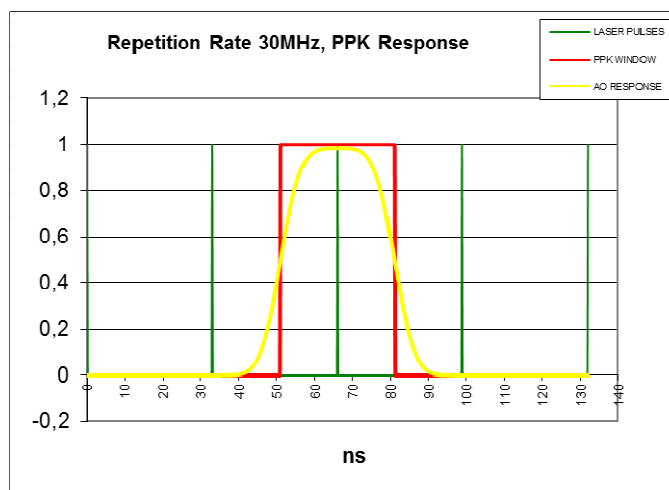




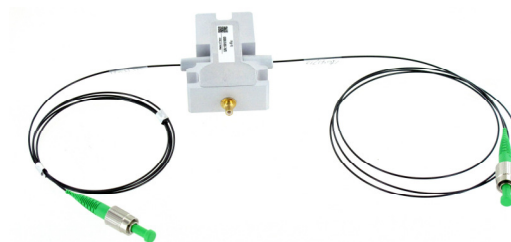
### PIN connections

Pin 2: CONTROL PULSE SYNCHRO OUTPUT  
 Pin 3: LASER SYNCHRO PULSE OUTPUT  
 Pin 4: START & STOP TRIG INPUT  
 Pin 7: ANALOG CONTROL INPUT

Pin 9, 10, 11: GROUND  
 Pin 13, 14, 15: POWER SUPPLY (+24VDC)



## PPKS Versions



### Fiber Pigtailed Pulse Pickers

Model	Laser Repetition rate	Carrier frequency	Delay Range	Pulse width range	AO Models Fiber pigtailed
<b>PPKAc250-B-xx-20</b>	75-85 MHz	Adapted to RR	20ns (0.1ns)	20ns (0.1ns)	MT250-IR6-Fio-PM-Ic
<b>PPKA250-B-xx-20</b>	40-75 MHz	250 MHz	25ns (0.1ns)	15ns (0.1ns)	MT250-IR6-Fio-PM-Ic
<b>PPKS250-B-xx-128</b>	5-60 MHz	250 MHz	200ns (1ns)	56ns (1ns)	MT250-IR6-Fio-PM-Ic
<b>PPKS200-B-xx-128</b>	5-55 MHz	200 MHz	200ns (1ns)	56ns (1ns)	MT200-IR10-Fio-PM-Ic
<b>PPKS200-B-xx-640</b>	0,82-30 MHz	200 MHz	1224ns (5ns)	56ns (5ns)	MT200-IR10-Fio-PM-Ic
<b>PPKS80-B-xx-640</b>	0,93-20 MHz	80 MHz	1080ns (5ns)	200ns (5ns)	MT80-IR30-Fio-PM-Ic2 MT80-FIR40-Fio-PM

xx=30: 1 watt version  
xx=34: 2.5 watts version  
xx=36: 4 watts version

Other carrier frequencies on request.



### Free Space

Model	Laser Repetition rate	Carrier frequency	Delay Range*	Pulse width range	AO Models Free space
<b>PPKAc250-B-xx-20</b>	75-85 MHz	Adapted to RR	20ns (0.1ns)	20ns (0.1ns)	MT250-A0.12-1064
<b>PPKA250-B-xx-20</b>	40-75 MHz	250 MHz	20ns (0.1ns)	20ns (0.1ns)	MT250-A0.12-1064
<b>PPKS250-B-xx-128</b>	0,1-60 MHz	250 MHz	128ns (1ns)	128ns (1ns)	MT250-A0.12-1064
<b>PPKS200-B-xx-128</b>	0,1-55 MHz	200 MHz	128ns (1ns)	128ns (1ns)	MT200-A0.4-1064
<b>PPKS80-B-34-640</b>	0,1-20 MHz	80 MHz	640ns (5ns)	640ns (5ns)	MT80-A1-1064 MT80-A0.4-2000

\*Main delay range obtained by laser beam translation inside pulse picker

xx=30: 1 watt version  
xx=34: 2.5 watts version  
xx=36: 4 watts version

Other carrier frequencies on request.

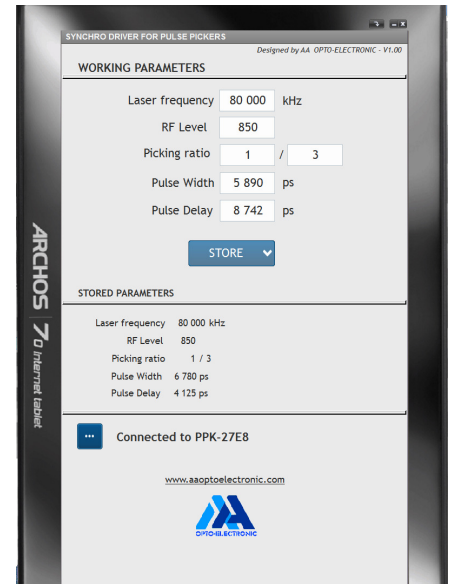


Bluetooth®



The new remote control RC04 is based on a contactless protocol type bluetooth. This allows user to adjust and modify set up of the PPK driver at any time, in any configuration, even when the system is embedded inside a box or a rack. Remote control is based on a tablet using Android protocol. A special App has been developed by AA OPTO-ELECTRONIC in order to modify the PPK parameters such as:

- Laser repetition rate
- Max RF power level
- Picking ratio
- Pulse delay
- Pulse width
- Mode OFF, CW, PULSE PICKING (PP)



## USB – RS232 Software

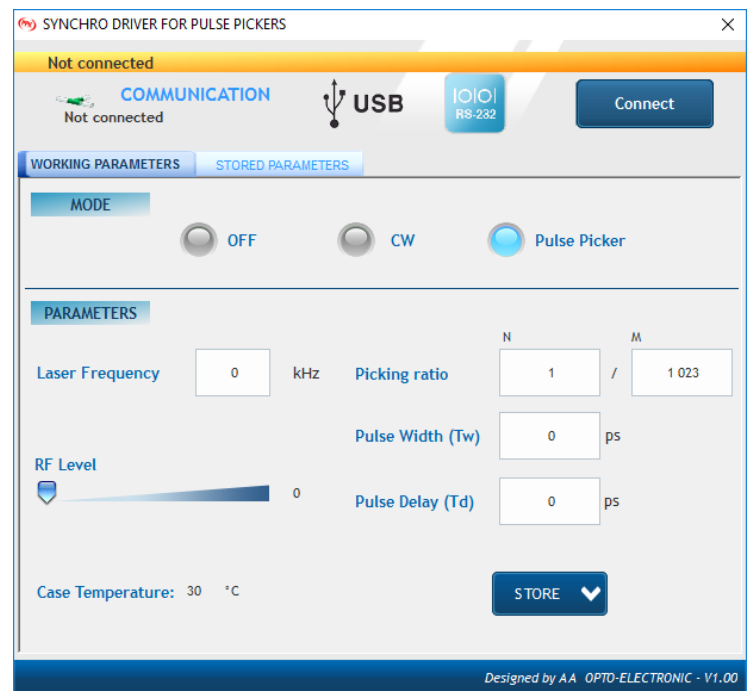


The PPK driver can be controlled through USB or RS232 (57600 bauds) communication from a computer. Parameters which can be adjusted are:

- Laser repetition rate
- Max RF power level
- Picking ratio
- Pulse delay
- Pulse width

AA Opto-Electronic provides user with a fast protocol to be directly integrated in the user program. With only one command, one complete profile can be adjusted (Picking ratio, Delay, Duration). This allows user speed and smooth control with rapid interactions with the driver.

A SDK will be provided in order that user can create its own TPI (Third Party Interface) or GUI (Graphical User Interface). AA also provides a PC software for lab operation.



**ATTENTION:** Performances of your driver is highly related to the quality of the input REFERENCE CLOCK signal.

In case of a noisy REFERENCE signal, driver may have difficulties to perform a good synchronization of the signals and this may lead to some instability of the response.

In case of instability, you can change the parameters adjustments in order to improve stability, or improve the reference clock signal.

Technical drawing of a rectangular metal enclosure (PPKA) showing three views: Front View (F), Top View (E), and Isometric View (A).


**Front View (F):** Shows the front panel with dimensions: Total width 199, Total height 99. The panel features a central connector (RJ45) and two side connectors (D-sub). Dimensions for the connectors and panel thickness are provided: 28.95, 28.85, 59.725, 28.475, 38, 23, 11, 16.4, 4, 13.5, 72, 13.5, 207.

**Top View (E):** Shows the top of the enclosure with dimensions: Total width 199, Total height 99. The panel features a central connector (RJ45) and two side connectors (D-sub). Dimensions for the connectors and panel thickness are provided: 28.95, 28.85, 59.725, 28.475, 38, 23, 11, 16.4, 4, 13.5, 72, 13.5, 207.

**Isometric View (A):** Shows the 3D perspective of the enclosure, highlighting the front panel, top, and side panels. The front panel features a central connector (RJ45) and two side connectors (D-sub).

**Table:**

Nom:	Date:	Cotes après traitement sauf contre indications	Tolérances:
Vérif.			±0.1mm
Nom:	MOREAU C.		±1°
Dess.	Date: 08/02/2016		√ 3.2µm
Matière:			
Traitement /Finition:			
Titre: Dossier assemblage PPKA			
0	Création	08/02/16	C.M
Ind.	Description	Date	Visa
N° 1MODK15001.0055		Ech:	
Plan Vue d'ensemble		Page 1/1	

				Nom: <u>Vérif.</u>	Cotes après traitement sauf contre indications	Tolérances: ±0.1mm ∠ ±1°
				Date:		
				Nom: <b>MOREAU C.</b>	Cotes après traitement sauf contre indications	Tolérances: ∠ ±1°
				Date: <b>08/02/2016</b>		
				Matière:		√ 3.2µm
				Traitement /Finition:		
				Titre: <b>Dossier assemblage PPKA</b>		
0	Création	08/02/16	C.M	N° <b>1MODK15001.0055</b>	Ech:	
Ind.	Description	Date	Visa	Plan <b>Vue d'ensemble</b>	Page 1/1	