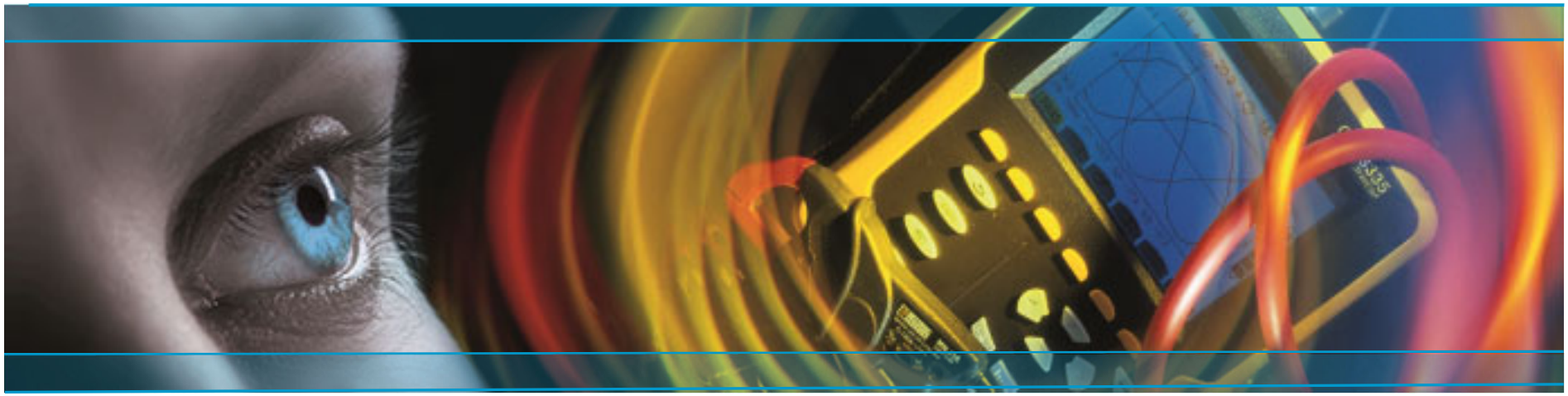
CHAUVIN ARNOUX

Test & Measurement Instruments

Portable and laboratory measurement



F402, F404, F406 & F604, F606

Clamp multimeters

D.Palanché – 03/2023

CHAUVIN ARNOUX GROUP

Mesurer pour mieux Agir

F400 and F600 Series clamp multimeters

(excluding Fxx7 model)

Upgrades

- Measurement of AC voltages from 50 mV to **1200 V rms** (1700 V peak); the current models are limited to 1000 V

- Measurement of DC voltages from 50 mV to **1700 V**; the current models are limited to 1000 V.

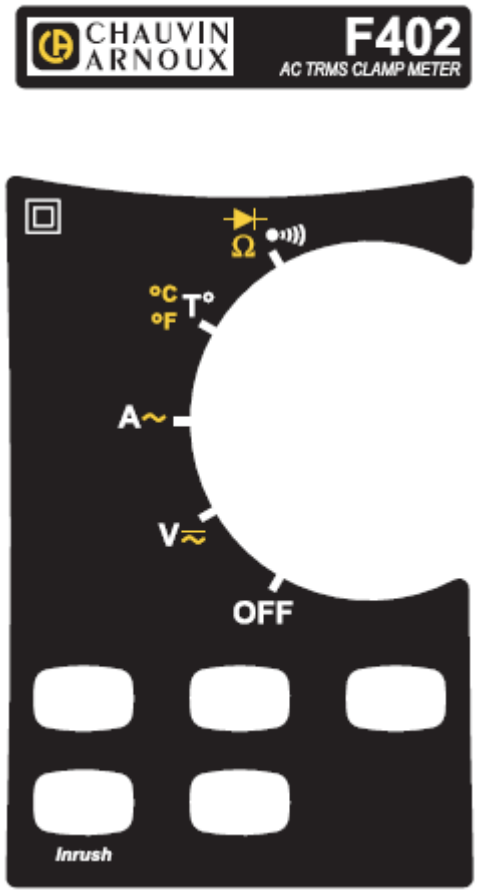
  Note: the power measurement ranges are also modified proportionally to the voltages.

- Modifications of the order of functions on the selection switch.
  - This change mainly involves repositioning the "ohm/continuity/…" setting currently placed bewteen the Volts and Ampères.
    In cases where the cables are connected to a voltage, as is often the case for power measurements; if you want to measure the voltages, current values and power values successively, you currently have to switch, on a live circuit) via the ohm position, leading to activation and premature ageing of the elements used to protect this function.

  - Conditioning in standard "Chauvin Arnoux" box.

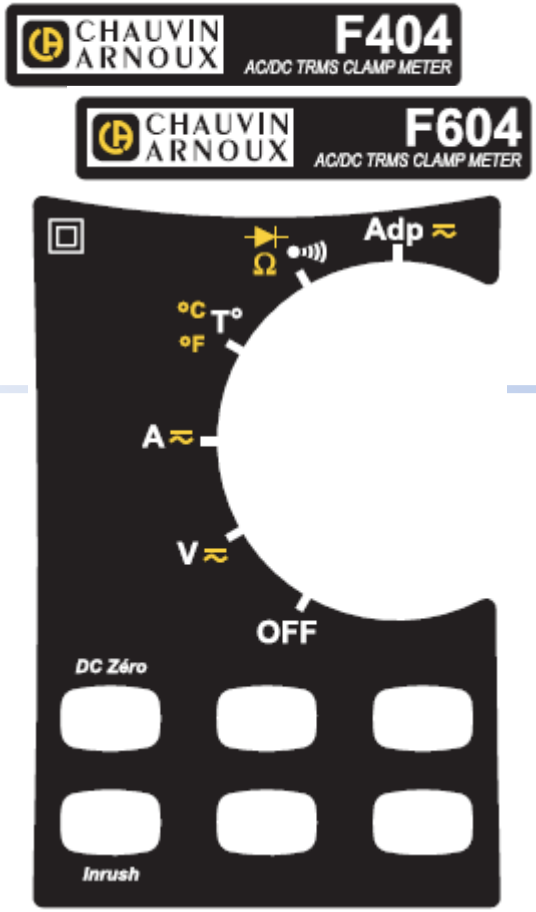
Replacing…

~~F401~~ ➔F402



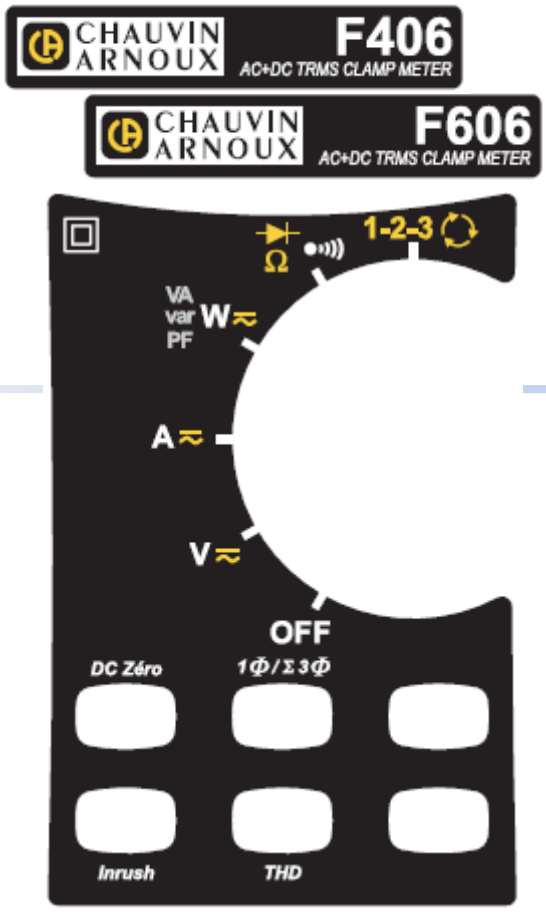
~~F403~~ ➔ F404

~~F603~~ ➔ F604



~~F405~~ ➔ F406

~~F605~~ ➔ F606



Key points

Voltage measurement: **1200 V AC** and **1700 V DC** or peak
Current measurement: up to 2000 A AC and 3000 A DC

Clamping diameter: up to 60 mm
TRMS [AC] (2) (4) (6), [DC] (4) (6) or [AC+DC] (6) **acquisition**
True*InRush* concept (measurement of overcurrents) on the entire range
IP54
CAT III 1500V / CAT IV 1000V

Large backlit 10,000-count display
Automatic AC / DC detection
Max 100 ms, Peak 1ms (6)
RELative and differential functions on all measurements. (6)

Resistance, continuity and frequency measurements
Temperature measurement (2&4)
Power measurements (6)
Improved 2-wire phase rotation with processor (6)

Resistance to falls from up to 2m
3-year warranty

(2) : Fx02 models
(4) : Fx04 models
(6) : Fx06 models

F400 Series
Markets / Applications / Users

Markets: LV electricity, medium power

- Local generation of electricity
  - Solar, power back-up, electrical generator sets, etc.
- LV electrical energy distribution
  - Photovoltaic
  - Supply or distribution of electrical energy to end users (Installation or industrial, tertiary or individual private equipment)
- Production of third-party energy sources
  - Steam, hot water
  - Pressure (liquids or gas)
- Industries
  - Transport of raw materials or other materials
  - Electrochemistry: Electrolysis
  - Electrometallurgy
  - Heating: curing, melting, vaporization, drying
  - Welding
  - Press & die-stamping
- Transport
  - Rail networks, tramways
  - Elevators, lifting

Applications:

- Maintenance
- Inspection or monitoring
- Diagnostics or sizing
- Adjustment
- Connection

Users:

- Staff authorized for LV live-line work

F600 Series
Markets / Applications / Users

LV electricity, high power
- HV/LV electrical energy distribution
  - Generation
  - Transmission
  - Supply or distribution of electrical energy
  - Photovoltaic
- Chemical industries
  - Production or manufacture of gas (electrolysis)
  - Distillation (heating)
- Petrochemicals industry
  - Cracking
  - Transport of raw materials or other materials
- Metallurgy
  - Electrolysis
    - E.g. Aluminium: 15 MWh for 1 tonne
  - Foundries
  - Transport of raw materials or other materials, elevators and industrial lifting systems
  - Mines, boreholes, etc.
- Transport
  - Rail networks, tramways, elevators, voltage monitoring on railways

Applications:
- Maintenance
- Inspection or monitoring
- Diagnostics or sizing
- Connection

Users:
- Staff authorized for LV live-line work

The offer: 3 True RMS ranges!

		F201	F402	F203	F404	F604	F205	F406	F606	F407	F607
Display resolution		6000 cts	10,000 counts	6,000 cts	10,000 counts		6,000 cts	10,000 counts		10,000 counts	
Measurements displayed		x1		x1			x1			x3	
Display backlighting		●		●			●			●	
Acquisition method		AC TRMS		AC / DC TRMS			AC / DC / AC + DC TRMS			AC / DC / AC + DC TRMS	
Auto AC/DC (V or/and A)		●		●			●			●	
A	**AC**	600 A	1000 A	600 A	1,000 A	2,000 A	600 A	1,000 A	2,000 A	1,000 A	2,000 A
	DC			900 A	1,500 A	3,000 A	900 A	1,500 A	3,000 A	1,500 A	3,000 A
	AC+DC						900 A peak	1,500 A peak	3,000 A peak	1,500 A peak	3,000 A peak
V	**AC**	1,000 V	1,200 V	1,000 V	1,200 V	1,200 V	1,000 V	1,200 V	1,200 V	1,000 V	1,000 V
	DC	1,000 V	1,700 V	1,000 V	1,700 V	1,700 V	1,000 V	1,700 V	1,700 V	1,000V	1,000 V
	AC+DC						1,000 V	1,700V peak	1,700V peak	1,000 V	1,000 V
Hz		●		●			●			●	
Ω / •))) / →|		●		●			●			●	
T°(°C/°F)		●		●							
Adapter function				●							
2-wire phase rotation							●				
W,var,VA,PF (1F ¤ S3F)							●			●	
THDf / THDr								●		●	
Harm0 ... Harm25										●	
Min / Max (100 ms)		●		●			●			●	
Peak (1.5 ms)							●			●	
True InRush		●		●			●			●	
RELative funct. (ΔX & ΔX/X)							●				
DataLog / PC Soft / LV / apk										●	
IP54			●		●			●		●	
IEC/EN 61010 IEC/EN 61010-2-033		600V CAT IV	1000V CAT IV 1500V CAT III	600V CAT IV	1000V CAT IV 1500V CAT III		600V CAT IV	1000V CAT IV 1500V CAT III		1000V CAT IV	

Professional, effective & ideal for the field - 1

Features which you expect from a Chauvin Arnoux instrument:

Safety

- For measuring instruments, the CE conformity mark entails product design constraints concerning both the electrical and mechanical specifications.
  The F400 and F600 propose the highest level specified by the IEC 61010 standard: **1000 V in CAT IV** and thus **1500V in CAT III.**

- To maintain optimum safety over time, the models in the **F400 and F600 Series have been designed to guarantee IP54 ingress protection** against dirt, dust, etc., which may affect any professional tool and eventually modify the specifications.

- There is a **shockproof belt to protect the clamp casing** against risks linked to falls and shocks.

Professional, effective & ideal for the field - 2

Ergonomics

- A **single hand** is sufficient to hold the clamp and directly access the main measurements. The **flush-mounted rotary selector** with **moulding to improve grip** can be used for precise selection, even when wearing safety gloves.
- Even when the conditions are difficult in terms of access or lighting, the clamps remain **easy to read**. These clamp multiemters are equipped with a **top-of-the-range backlit LCD screen** offering the best contrast and viewing angle with this technology.
- Thanks to its **automatic recognition** of the type of signal (**AC or DC**) when measuring the current or voltage, the measurement is performed immediately.
- The clamps are equipped with a **deactivatable automatic power-off system** which **optimizes the life span of the batteries**.

Measurement quality

- A **fast 12-bit TRMS digital acquisition system** offering high measurement quality whatever the form and type of the signal.
  When combined with their **large bandwidth and high crest factor**, these clamps provide precise, accurate measurements.

Measuring functions - 1

Standard functions

- All the model offer voltage measurements up to 1200 V AC / 1700 V DC, as well as resistance measurements, continuity with buzzer and semiconductor junction testing (diode).

F402, F404 & F604

- For temperature measurement with a K thermocouple, these clamp multimeters are equipped with an electronic system for "cold junction compensation" which helps to improve the accuracy of the measurement.
  A new safety connector avoiding any confusion with a mains socket is now supplied with the adapter or sensor delivered as original equipment.

- The Adapter function lets you **extend the possibilities** off an F404 or F604 clamp multimeter by connecting any measurement probe with voltage output and a transformation ration in "powers of 10".
  A clever paramterization systel allows you to **read the measurement of the quantity directly**.
  - Example of use: Addition of an A100 or MA100

F406 & F606

- When determining the phase order (phase rotation) with instruments based on resistive or capacitive technologies, the use of protective accessories (gloves, shoes, insulating mats, etc.) or isolating transformers may caise detection and sensitivity problems.
  The F406 and F606 models check the phase order **by means of a microprocessor which removes these constraints**, offering **correct detection in all situations**.

Analyses and Diagnostics - 1

Successful operation = Relevant diagnosis

Depending on the models, these clamp multimeters offer a number of analytical functions.

The **MIN and MAX measurements are true root mean square (TRMS) values calculated over a period of 100 ms**. They represent the range of the variations of the electrical quantity measured. These are the values used to size an installation, a cable diameter, a thermal protection device (fuse, disconnecting switch, etc.).

The **Peak+ and Peak- values calculated over a 1 ms period**, during the positive or negative ½ period of the signal respectively, can be used to characterize the distortion of the waveform of the quantity measured. In the case of a sinusoidal power source, high values of these two quantities reveal changes in the behaviour of the installation and, in some cases, malfunctions.

The TrueInRush function offers innovation on all the models.

One recurrent issue is the correct sizing of electrical installations in terms of both the conductors and the protective systems implemented. Inappropriate sizing of either will cause dysfunctions (outages, untimely tripping of protective devices, etc.) or even more serious problems (premature ageing of insulating materials, heating of the conductors leading to a risk of short-circuits, fire, etc.).

The TrueInRush function offers genuine innovations because it makes it easy to analyse the simple case of a single engine starting up or the activation of an installation powering a fleet of machines in operation.

Overcurrents usually occur when an installation or machine is started up, but also when they are heavily solicited. The clamp automatically determines the type of signal and the level of current in the installation, adapts the algorithm and the measurement function to capture the next overvoltage.

Analyses and Diagnostics - 2

By measuring the **Total Harmonic Distortion (THD),** you may reveal the need to oversize the installations or, on the contrary, implement filtering solutions.

The F406 and F606 models propose the 2 methods defined in the IEC 61000-4-7 standard:

THD f : Total Harmonic Distortion in relation to the fundamental
THD r : Total Harmonic Distortion in relation to the True RMS value of the signal

With the **ΔREL** relative measurement function, the F406 and F606 models enable users to monitor the variations of the quantity measured.

Comparison with a known reference base or with a quantity of reference is often a good way of obtaining a quick assessment and analysis.

ΔX : The differential measurement (X-Ref) will be use to quantify the difference numerically,

ΔX/X: the relative measurement in % (X-Ref / Ref) will let you place the quantity in its context, expressed proportionally to the value of reference; this means a given value may appear negligible or significant.

The ΔREL function is a genuine innovation applicable simultaneously to all the types of measurement, as well as to the analysis functions (Min, Max, Peak- and Peak+).

- Examples: Phase balance, transport via successive conveyor belts, ventilation

To order (F400 Series)

F402 (Ref. P01120942)
F404 (Ref. P01120944):

- 1 black PVC cable with Ø4mm isolated elbowed male banana plug/Ø4mm isolated straight male banana plug, length 1.5 m, CAT IV 1000V 15A, bi-material.
- 1 red PVC cable with Ø4mm isolated elbowed male banana plug/Ø4mm isolated straight male banana plug, length 1.5 m, CAT IV 1000V 15A, bi-material.
- 1 test probe/Ø4mm isolated female plug, CAT IV 1000V 15A, bi-material, black.
- 1 test probe/Ø4mm isolated female plug, CAT IV 1000V 15A, bi-material, red.
- 1 wire thermocouple with built-in Ø4mm isolated banana connector, spacing 19 mm.
- 4 x 1.5V AA alkaline batteries.
- 1 Quick Start Guide on paper x 5 languages (User's Manuals available online)
- 1 bag pre-equipped for MultiFix
- 1 Chauvin Arnoux cardboard box

F406 (Ref. P01120946):

- = F402
- - ~~1 wire thermocouple with built-in Ø4mm isolated banana connector, spacing 19 mm.~~
- + 1 black crocodile clip, CAT IV 1000V

To order (F600 Series)

F604 (Ref. P01120964):

- 1 black PVC cable with Ø4mm isolated elbowed male banana plug/Ø4mm isolated straight male banana plug, length 1.5 m, CAT IV 1000V 15A, bi-material.
- 1 red PVC cable with Ø4mm isolated elbowed male banana plug/Ø4mm isolated straight male banana plug, length 1.5 m, CAT IV 1000V 15A, bi-material.
- 1 test probe/Ø4mm isolated female plug, CAT IV 1000V 15A, bi-material, black.
- 1 test probe/Ø4mm isolated female plug, CAT IV 1000V 15A, bi-material, red.
- 1 wire thermocouple with built-in Ø4mm isolated banana connector, spacing 19 mm.
- 4 x 1.5V AA alkaline batteries.
- 1 Quick Start Guide on paper x 5 languages (User's Manuals available online)
- 1 bag pre-equipped for MultiFix
- 1 Chauvin Arnoux cardboard box

F606 (Ref. P01120966) :

- = F604
- - ~~1 wire thermocouple with built-in Ø4mm isolated banana connector, spacing 19 mm.~~
- + 1 black crocodile clip, CAT IV 1000V