

ATEQ F28 LIGHT

(Photo no contractual)

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Reference: MR-328LTN-U

REVISIONS OF THE ATEQ F28Light USER MANUAL

Due to continuing improvements, the information contained in this user manual, the features and design of this device are subject to be changed without prior notice.

<u>Edition/Revision</u>	<u>Reference</u>	<u>Date</u> Week/Year	<u>Chapters up dating</u>
First edition	MR-328LTA-U	28/2015	-----
Second edition	MR-328LTB-U	30/2015	Updating Node and Group addresses switch.
Third edition	MR-328LTC-U	40/2015	Updating the Network connection to Ethernet.
Fourth edition	MR-328LTD-U	42/2015	Updating for IP addresses configuration.
Fifth edition	MR-328LTE-U	47/2015	Add automatic calibration process, remove indirect measurement.
Sixth edition	MR-328LTF-U	48/2015	Minor texts and explanations changes, add auto-calibration alarms.
Seventh edition	MR-328LTG-U	01/2016	Add auto-calibration alarms conditions and measurement curves for F28Light Demo software.
Eighth edition	MR-328LTH-U	02/2016	Change Standard Temperature 0°C to 20°C.
Ninth edition	MR-328LTI-U	04/2016	Add and update information on "Accessories and characteristics" chapter.
Tenth edition	MR-328LTJ-U	08/2016	General recast. Update F28Light Control Ethernet Software information (v1.5.0.3). Add M12 connector for External Regulator option. Update error codes.
Eleventh edition	MR-328LTK-U	10/2016	Update error codes.
Twelfth edition	MR-328LTL-U	11/2016	Update accuracy characteristics and update optional M12 connector 24V supply.
Thirteenth edition	MR-328LTM-U	12/2016	Update status and alarms codes.
Fourteenth edition	MR-328LTN-U	45/2017	Add IP addresses resetting.

Quick start manual

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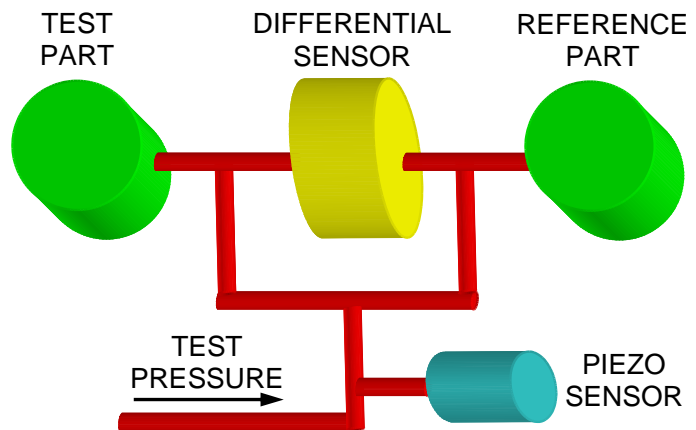
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PREAMBLE

1. DEFINITION OF THE ATEQ F28 LIGHT

The **ATEQ F28 Light** is a compact air/air leak detector used to test the air-tightness of parts. The method used is based on the measurement of a small variation or drop in differential pressure between the test and reference parts, when both are filled to an identical pressure.



2. MEASUREMENT CHARACTERISTICS

2.1. PRESSURE DROP MEASUREMENT

RANGE	STANDARD ACCURACY*	RESOLUTION Maximum
0 – 50 Pa	+/- (1.5% Reading + 0.5 Pa)	0.01 Pa
0 – 500 Pa	+/- (1% Reading + 1 Pa)	0.1 Pa
0 – 5000 Pa	+/- (1% Reading + 10 Pa)	1 Pa

RANGE	OPTIONAL ACCURACY* (Laboratory accuracy)	RESOLUTION Maximum
0 – 50 Pa	+/- (1% Reading + 0.5 Pa)	0.01 Pa
0 – 500 Pa	+/- (0.5% Reading + 1 Pa)	0.1 Pa
0 – 5000 Pa	+/- (0.5% Reading + 10 Pa)	1 Pa

*Accuracy: Linearity + Repeatability + Hysteresis.

2.2. TEST PRESSURE MEASUREMENT

RANGE	STANDARD ACCURACY	RESOLUTION Maximum
All F.S. from vacuum to 20 bar	1% maximum of the F.S.	0.1 % F.S.

F.S. = Full Scale.

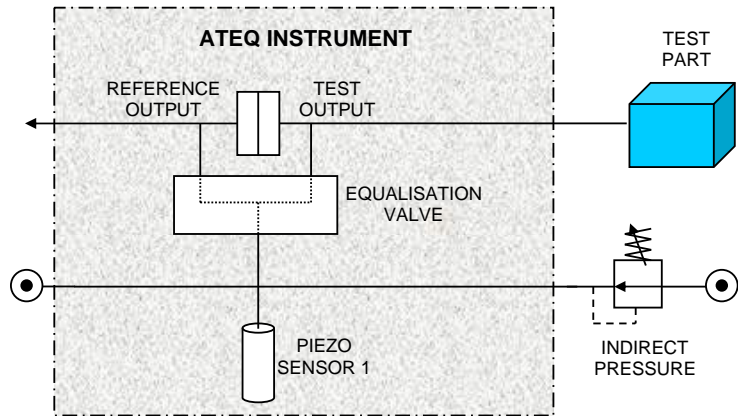
3. THE MAIN TYPES OF MEASUREMENT

Direct measurement, indirect measurement and sealed component measurement.

3.1. DIRECT MEASUREMENT

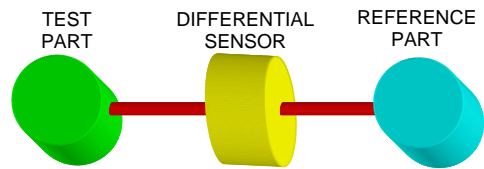
The **ATEQ** instrument is connected to the part to test, the part is filled with the regulator (can be replaced by the auto fill mode).

If the part leaks, the pressure in will decrease and will be detected by the **ATEQ** instrument.

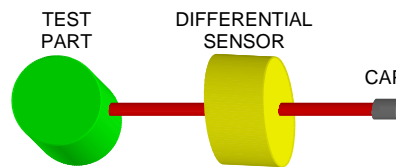


3.1.1. The three types of direct test

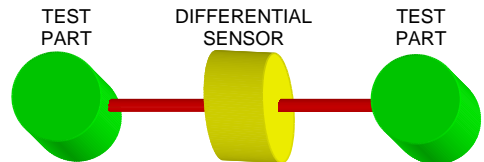
Test with reference: measurement of a pressure variation between a test part and a reference part.



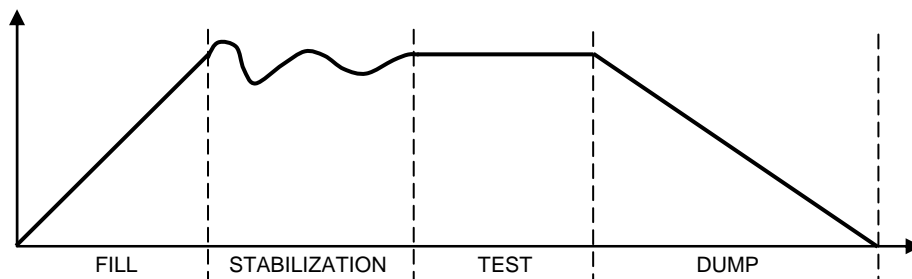
Test without reference: measurement of a variation in pressure between a test part and a sealing connector on the reference side.



Test with central zero: test of two parts at the same time. One part is connected to the test side and the other to the reference side.



3.1.2. Direct measurement



The direct measurement cycle consists of 5 phases:

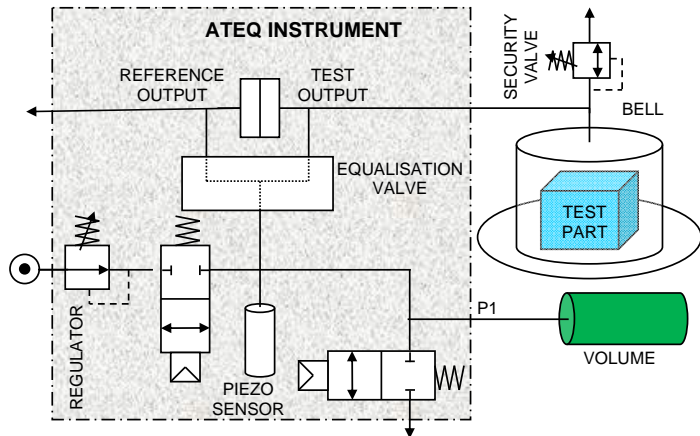
	1	2	3	4	
Start	Fill time	Stabilization time	Test time	Dump time	Cycle end

3.2. SEALED COMPONENTS

3.2.1. Principle

The sealed component mode is designed for leak measurement on sealed parts. The solution is to enclose the part in a sealed bell, to fill this bell and to measure the pressure drop in the part.

The external volume is connected to the pressurization port of the instruments valve.



Part transfer: The previously-filled internal volume ($P_{start} \times V1$) is opened to the chamber volume ($V2$), obtaining $P_{end} \times V2$. Through monitoring, the instrument detects large leaks. If the part has a large leak, the final pressure is lower than with a pass part. Two limits (min. and max.) given as a percentage of the P_{end}/P_{start} ratio are used to detect large leaks.

The solution is based on the relationship: $P_{start} \times V1 = P_{end} \times V2$

If the part is leaking, the final volume will be greater so the final pressure will be lower. To define ratio min and max, cycles with pass and fail parts must be carry on.

Example:

- $P_{start} = 1.00$ bar.
- P_{end} (Part OK) = 0.5 bar.
- P_{end} (part No OK) = 0.4 bar.

So $P_{min} = 0.45$ bar then ratio min = $0.45/1 = 0.45$ (End ratio min parameter).

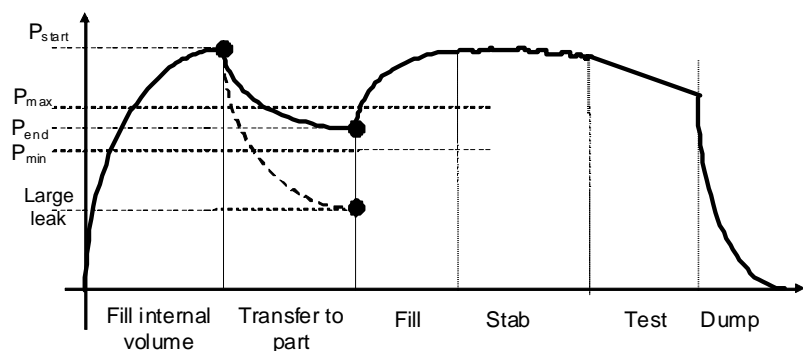
And $P_{max} = 0.55$ bar then ration max = $0.55/1 = 0.55$ (End ratio max parameter).

We use ratio min and max instead of **End P_{min}** and **End P_{max}** because those last parameters depend on P_{start} , so according to regulation reject levels could change at each cycle.

Standard mode carries out a first cycle to identify large leaks and then adds a second cycle at nominal pressure to check for small leaks.

3.2.2. Sealed component measurement

The sealed components measurement cycle consists of 7 phases:



	1	2	3	4	5	6	
Start	Fill volume time	Transfer time	Fill time	Stabilization time	Test time	Dump time	Cycle end

INSTALLATION

1. APPEARANCE OF THE ATEQ F28 LIGHT



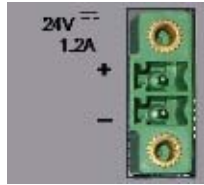
Do not use the Ground terminal.

2. ELECTRICS CONNECTORS

2.1. POWER SUPPLY CONNECTORS

The **F28Light** device has no power switch and works as soon as it is plugged in.

Following the option selected, the power supply is of two means.



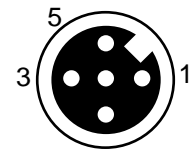
Supply the device with 24V DC – 1.2A on the connector. Connect by using the following mean:

- 24V DC (+).
- 0V (-).



Supply the device with 24V DC – 1.2A on the M12 (5 pins) connector. Connect by using the following mean:

- 1: 24V DC (+).
- 3: 0V (-).
- 5: Ground (Do not use).



24 V DC power supply (option):

Power supply reference:

MEANWELL GS25E24-P1J

AC/DC Switching adaptor with phoenix (2 pins), see connector above.



Power supply characteristics:

INPUT: 100-240V AC, 50/60Hz, 0.7A

OUTPUT: 21-27V DC, 1.19-0.92A

(SET AT 24V DC, 1.04A)

25W MAXIMUM

Plug the MEANWELL power supply (2 pins side) to the device terminal, and then plug the power supply in an appropriate outlet.

2.2. NETWORK CONNECTOR



Ethernet connector for network connection.

2.3. POWER AND COMMUNICATION STATUS LED



When **LED** is on, it indicates the device is powered on, when flashing (frequency = 1 s) indicates the network communication status is OK.

2.4. EXTERNAL ELECTRONIC REGULATOR (OPTION)



M12 Female connector for driving an optional external electronic regulator.

3. PNEUMATIC CONNECTORS

3.1. PNEUMATIC SUPPLY

Air supply is via the two connectors.

6 bar / 600 kPa +/-15%, the air pressure source must be dry and clean.



The "**PILOT PRESS.**" connector is the supply for the valve drive.

The supply pressure must always be between 4 and 8 bar (400 kPa and 800 kPa).



The "**TEST PRESS.**" connector is to supply the device with the regulated test pressure. No connector if the device is with an optional pressure regulator built-in for direct measurement.

Adjust the pressure to the value of your test pressure.

If the "**Auto-Fill**" function is used, it must adjust the pressure at:

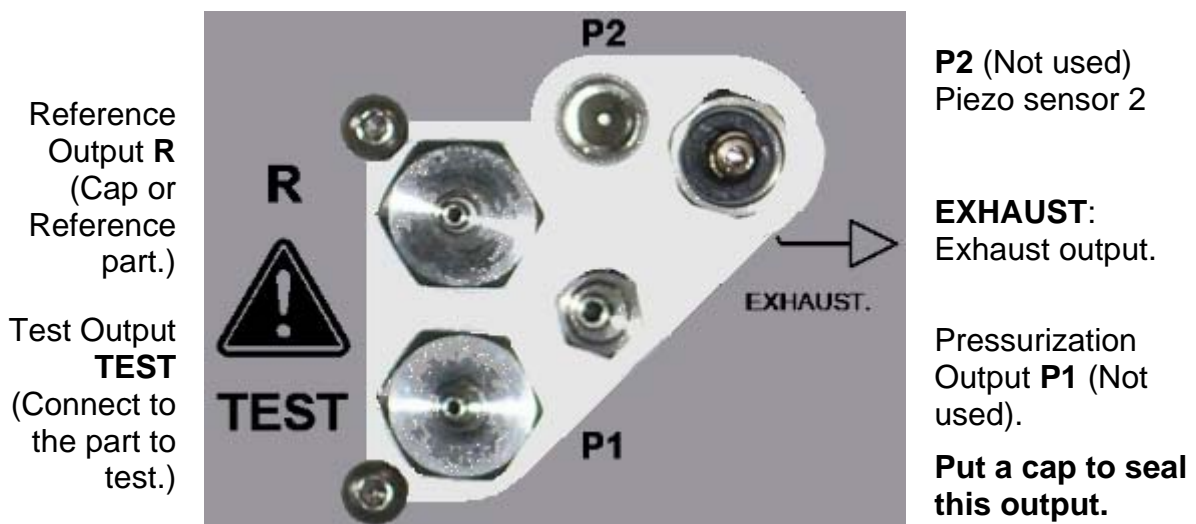
$$P_{\text{supply}} > P_{\text{test}} + 0.5\text{bar}$$

3.2. PNEUMATICS TEST OUTPUTS

These outputs enable parts to be connected (test, reference and/or bell).

3.2.1. Direct measurement connections

Standard valve:

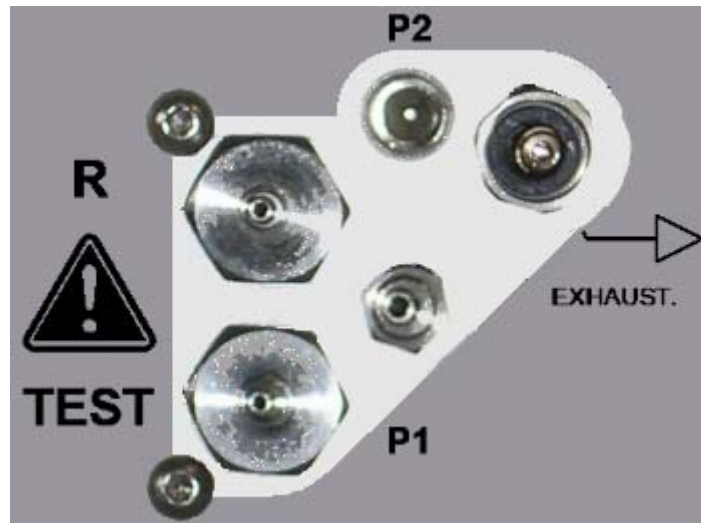


3.2.2. Sealed components measurement connections

Standard valve:

Reference Output **R** (cap or Reference part.)

Test Output **TEST** (connect to the part to test.)



P2 (not used).

EXHAUST:
Exhaust output.

Pressurization Output **P1**, to connect a volume.

INSTALLATION AND NETWORK

1. USER INTERFACES

In most cases, the user's software is developed by the customer. Example and documentation are available for C++, C#.net, VB.net and Labview. An **ATEQ** software, **F28LightControlEth** is available for testing the heads.

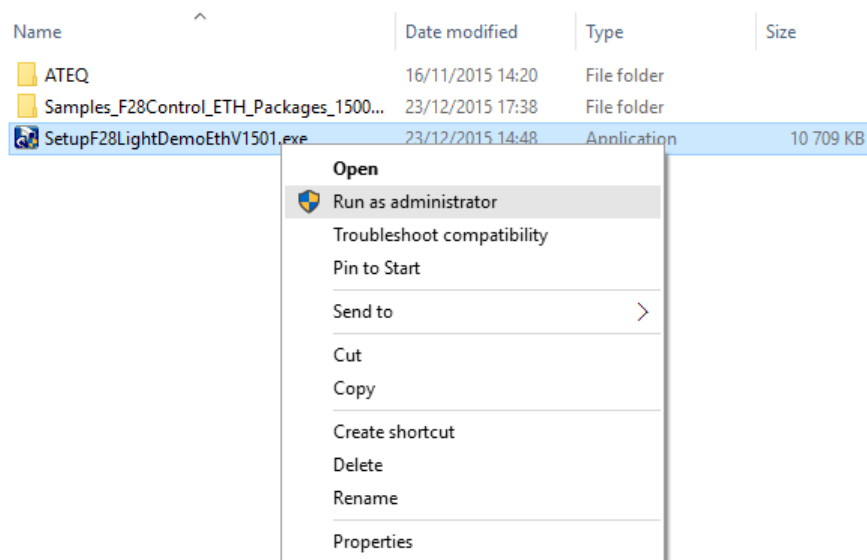
The interface with the device is only done with customer software through the ATEQ DLL (F28LightControl.dll).

1.1. INSTALLATION

Double click on the **SetupF28LightControlEthV15XX.exe** file and follow the instructions.

The installation of this software must be in Administrator mode.

If you're not in Administrator mode, once select the **SetupF28LightControlEthV15XX.exe** file, do right click and select "Run as administrator".



Note: XX is the version of the software that may change.

2. NETWORK CONFIGURATION (ETHERNET)

By default, each head is configured with DHCP mode for IP address management. If no router is connected to the network, the head will automatically (after 30 seconds) get the **192.168.1.200** IP fixed address.

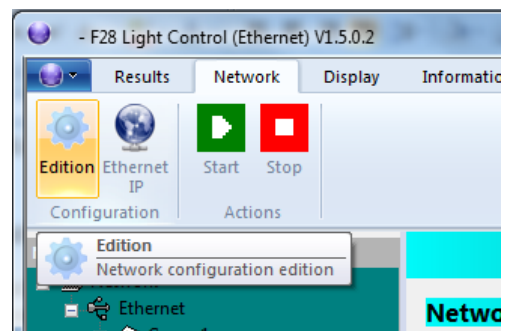
Then configure a different IP address to each head and the groups, this is to avoid any communication conflict.

For IP and group configuration, please use the "**F28 Ethernet Configuration**" software.

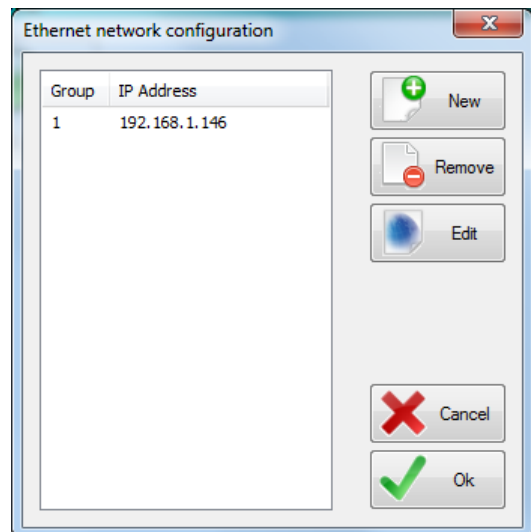
2.1. IP NETWORK MANAGEMENT

The network must be configured with the **F28LightControlEth.exe** software. This configuration is to declare the IP's heads and the group.

To start the software, double click on the **F28LightControlEth** icon.



Select the "**Network**" tab, and then click on the "**Edition**" button.



The following window appears.

All the heads declared in the network are displayed.

Configure each head (one line by head) like the following model:

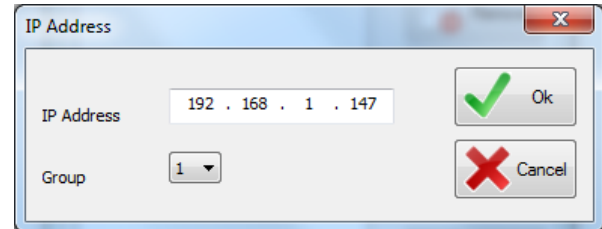
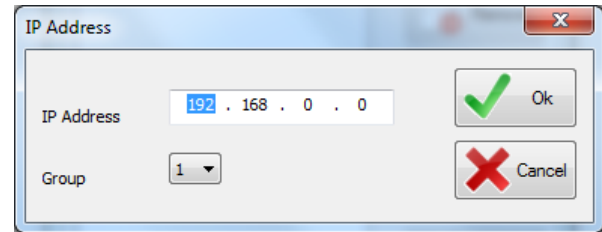
0.A.192.168.1.X

Group	192.168	1	X
Group: this is to put a head into a defined group (1 to 15)	Private network class; always set to these values to 192.168.	Under group always set to 1	This value must be different for each head in the network.

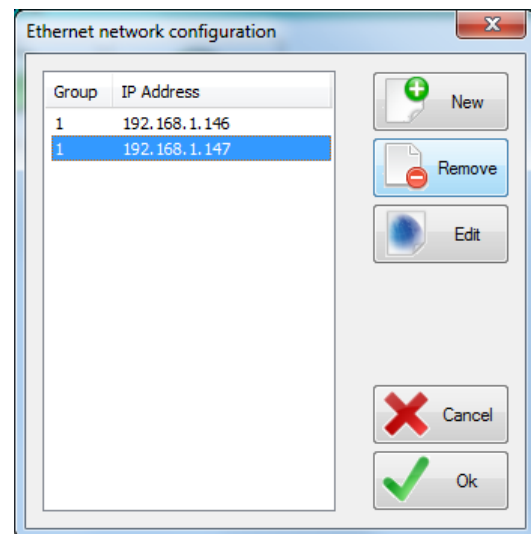
To had a head's IP click on the "New" button.



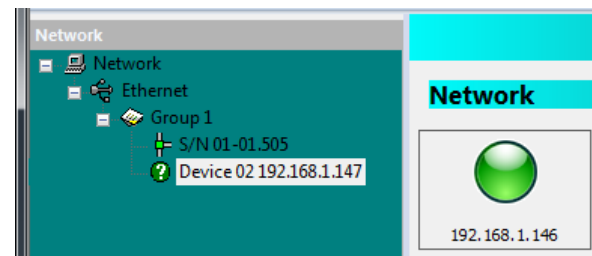
Enter a new IP address, select in the pick list the group of the head and click on the "OK" button.



The added IP address is displayed in the window.



The software is waiting for the new head connection in the network.

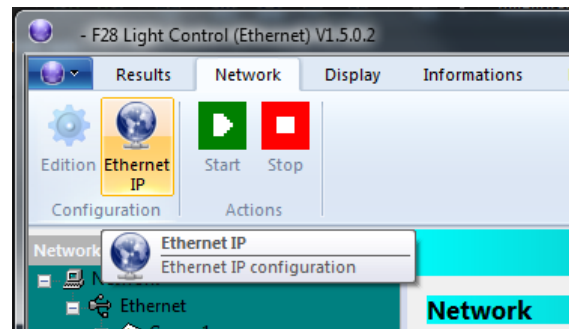


2.2. HEADS ETHERNET CONFIGURATION

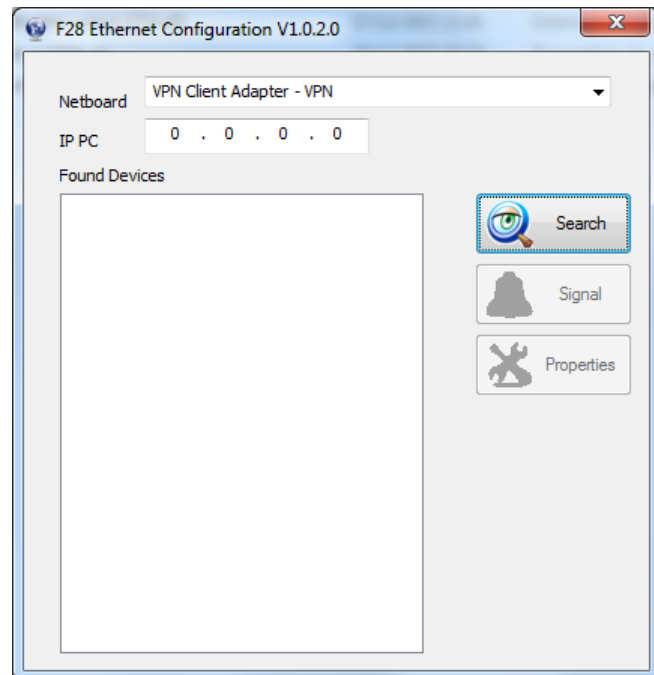
To start the software, double click on the **F28LightControlEth** icon.



Select the **"Network"** tab, and then click on the **"Ethernet IP"** button.

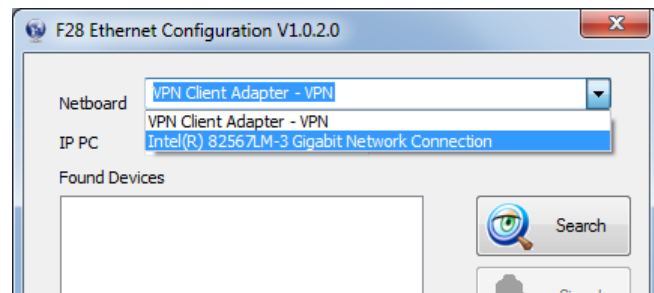


The following window appears.

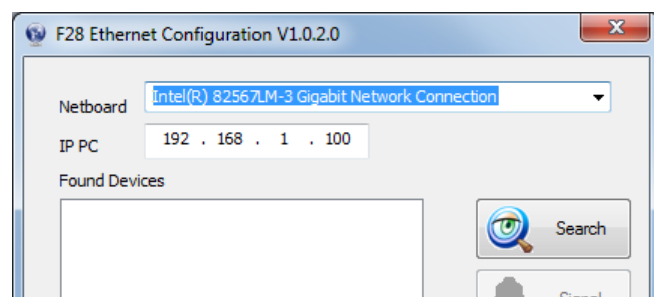


In the **"Netboard"** field, select the Ethernet Network board to scan.

If several Ethernet boards are installed in the PC, they are displayed in this pick list.



Once selected, the IP address of the PC Master is displayed (IP PC field).

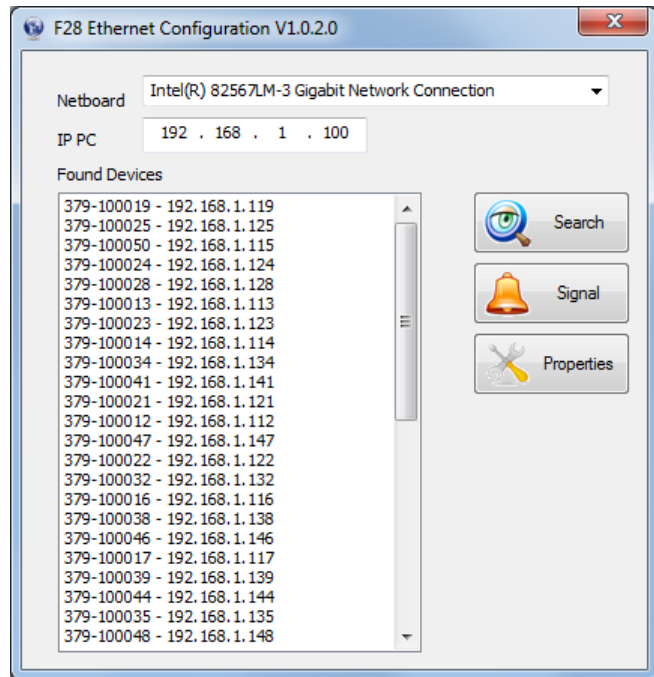


Click on the "**Search**" button to scan the network.

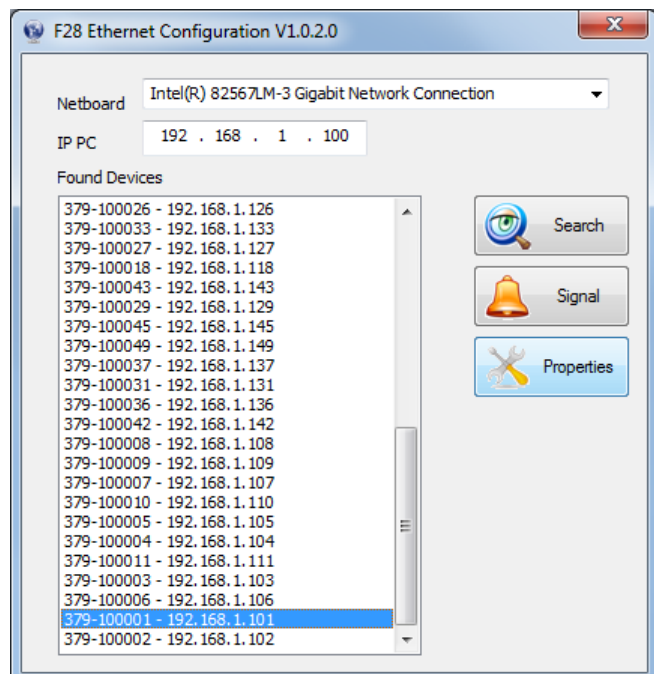


Once scanned, the IP's heads are displayed.

If a head is connected for the first time, the 192.168.1.200 IP address appears.

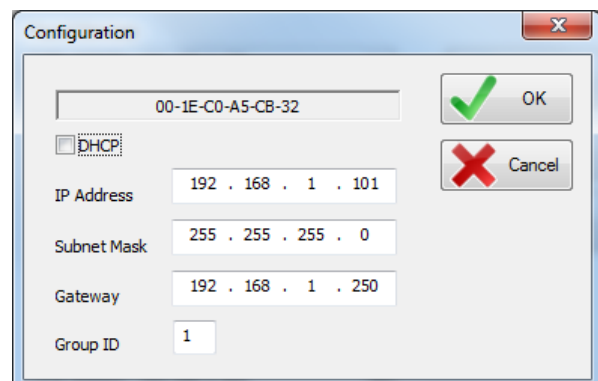


Select a head and then click on the "**Properties**" button.



The configuration Window appears.

- Uncheck the DHCP option,
- Enter a **IP address** (each head must have a different address),
- >Enter a **Subnet Mask** (255.255.255.0 in general)
- Enter a **Gateway** (ask your network administrator),
- Enter a **Group**, this will install the device into the specified group for configuration and run.



The "**Signal**" button will make flashing the communication LED on the device; this is to physically locate it in the network.



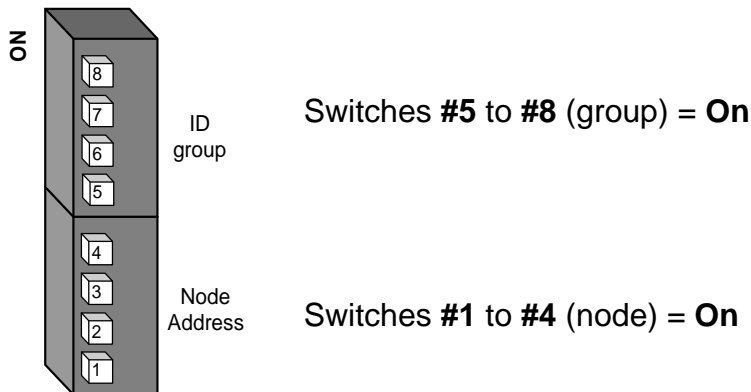
2.3. IP ADDRESS LOSS

If the IP address is lost or not recoverable, the communication between the device and the PC in the network is impossible.

To recover the communication, you must reset the IP address assignment, to be able to give another one.

2.3.1. Until 521.41E version board

For that, with the device powered off, set all the "Address" and the "Group" switches to 1.



Then power on the device for a few seconds and power off, the IP address is reset.

Set the switches as shown in the paragraph 2 and do the process to recover and set the IP address.

2.3.2. Since 521.41E version board included

Since the 521.41E new board version, a **Reset key** is available to recover the default IP address configuration, see chapter 5.1 "IP address configuration".

This Reset key is located in the front panel, near the 24V DC connector.

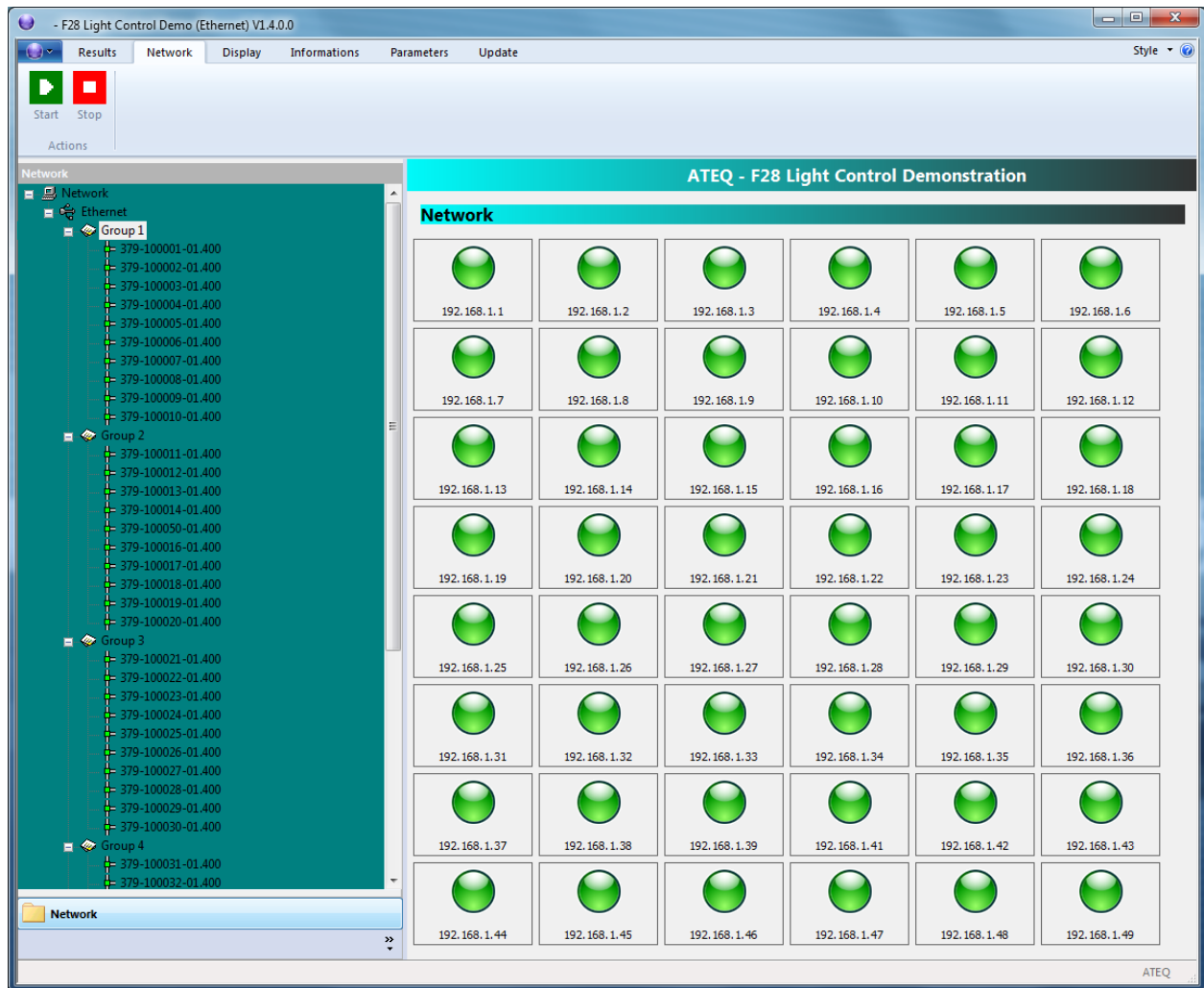
Please follow this process:

1. Switch off the device,
2. Press and hold for 5 seconds the Reset key during switching on the device,
3. Wait for 20s, the IP default configuration is set again (192.168.1.200 in DHCP mode).



2.4. NETWORK CONFIGURATION

To check the network and the heads connected.



The head is connected and its IP address is displayed and / or the last test is **"Pass"**.



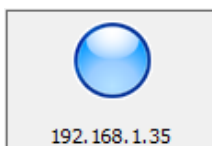
The head is **not connected**.



The head has an **"Alarm"**.



The last test is **"Fail"**.



The head is **running** a test cycle.

SOFTWARE USE

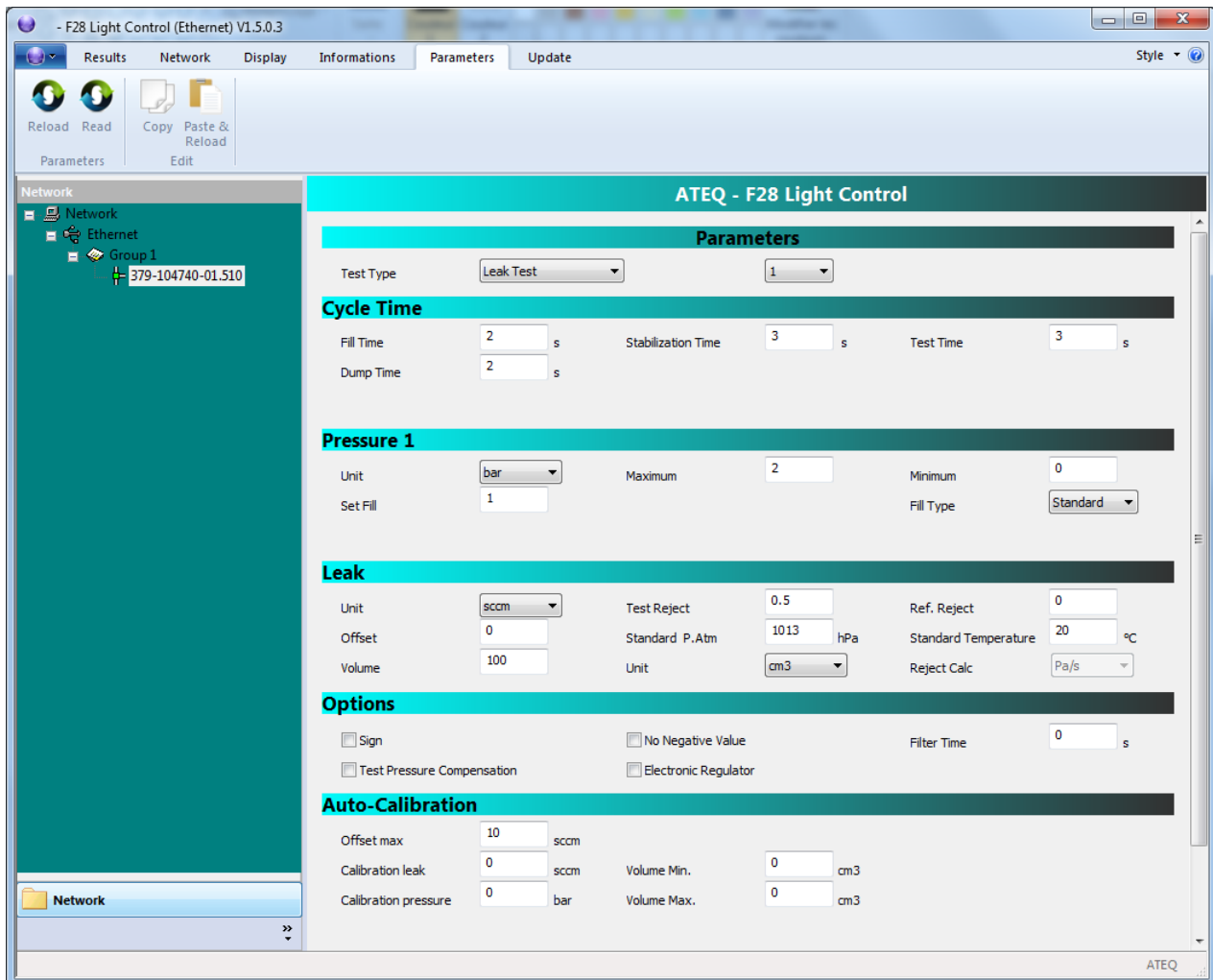
1. START THE SOFTWARE

Double click on the **F28LightControlEth.exe** file and the software is displayed.

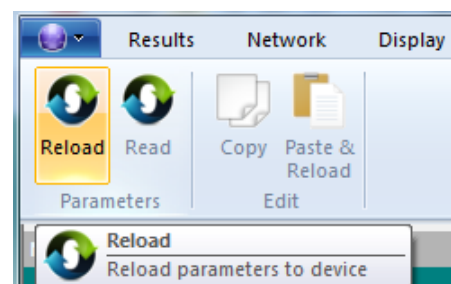


2. HEAD PARAMETERS SETTING

To set the F28 Light heads, select the "**Parameter**" tab. enter all the parameters you into each field.

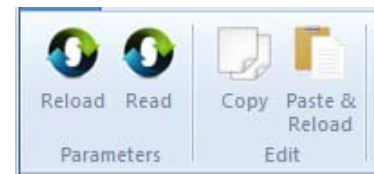


Once all the parameters are entered in the fields, click on the "**Reload**" button to upload them into the device(s).

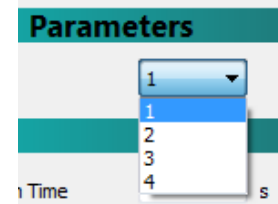


3. PARAMETERS TAB

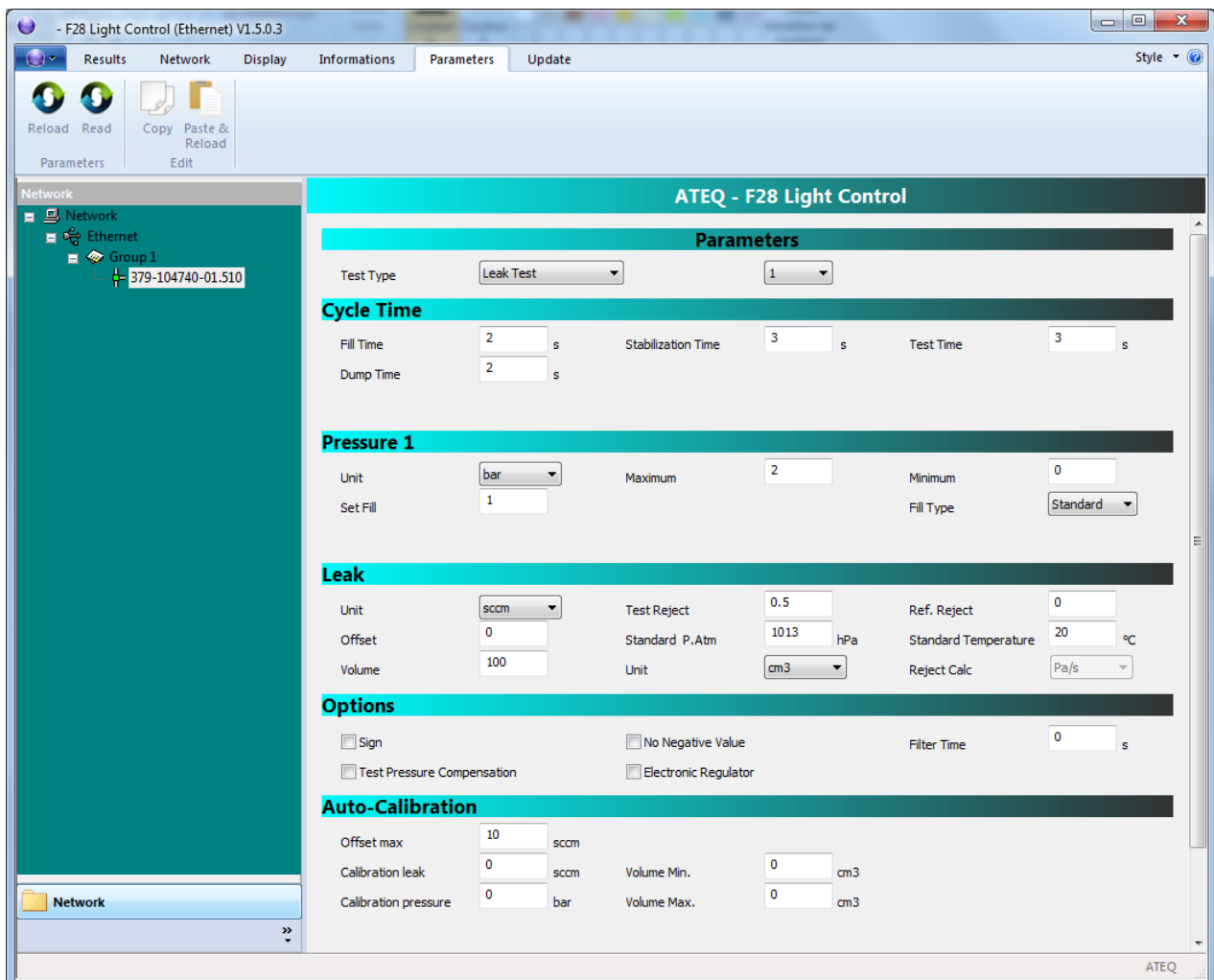
It's possible to copy a set of parameters to paste it into a second set, once pasted the parameters are automatically reloaded into the F28Light device.



A new feature allows to create 4 programs and record them into the PC, when select a new one, the program is automatically reloaded into the F28Light device.



3.1. LEAK TEST (DIRECT MEASUREMENT)



3.1.1. Parameters (Direct measurement)

Main parameters to configure:

Test type:	Leak test.
-------------------	------------

Cycle Time

Fill Time	<input type="text" value="2"/>	s	Stabilization Time	<input type="text" value="3"/>	s	Test Time	<input type="text" value="3"/>	s
Dump Time	<input type="text" value="2"/>	s						

Fill time:	Time to fill the part to the test pressure.
Stabilization time:	Time to equalize the pressure between the TEST and REFERENCE components.
Test time:	Leak measurement time, it depends of the reject level value.
Dump time:	Time for the part to return to atmospheric pressure. Dump time by default is zero.

Pressure 1

Unit	<input type="text" value="mbar"/>	Maximum	<input type="text" value="4000"/>	Minimum	<input type="text" value="-1000"/>
Set Fill	<input type="text" value="2000"/>	Fill Type	<input type="text" value="Standard"/>		

Unit:	Pressure unit (bar, mbar, PSI, Pa, kPa, MPa).
Maximum:	Maximum level of the fill pressure.
Minimum:	Minimum level of the fill pressure.
Set Fill:	Instruction test pressure that the device will automatically regulate if there's electronic regulator and instruction for test compensation options.
Fill type:	<p>Standard or Automatic, mode following the configuration of the device.</p> <ul style="list-style-type: none"> ➤ Auto Fill mode: mode used with an internal calibrated jet to pressurize the part to test. It allows getting a ramp fill mode and once the "Set fill" test pressure instruction is reached, the fill is stopped and the fill time continues until its end. ➤ Ramp mode: mode used with an electronic regulator option, the pressure will increase by following a ramp. ➤ Instruction mode: when the set fill pressure is reached, the cycle jump automatically from the fill step to the stabilization step.

Leak			
Unit	sccm	Test Reject	0.5
Offset	0	Standard P.Atm	1013 hPa
Volume	100	Unit	cm3
		Ref. Reject	0
		Standard Temperature	20 °C
		Reject Calc	Pa/s

Unit (Leak):	Leak unit displayed. If a flow unit is selected, one parameter is added (volume).
Maximum (Test):	Maximum reject leak, above this level the test part is declared fail.
Minimum (Reference):	Minimum reject leak, above this level the reference part is declared fail. Note: when the reference reject value is 0, the device takes into account the absolute value of the symmetrical test reject.
Offset:	Value to subtract to the final result.
Standard P atm:	The measurements depend on the atmospheric pressure. The device recalculates the results according to the Patm parameter entered.
Standard temperature:	The measurements depend on the ambient temperature. The instrument recalculates the results according to the temperature parameter entered.
Volume Value:	Value of the volume (with flow unit selected).
Unit (Volume):	Unit for the volume.

Options		
<input type="checkbox"/> Sign	<input type="checkbox"/> No Negative Value	Filter Time <input type="text" value="0"/> s
<input type="checkbox"/> Test Pressure Compensation	<input type="checkbox"/> Electronic Regulator	

Sign:	To reverse the result sign, this option must be checked for vacuum or indirect tests.
No negative value:	The measurement display becomes zero when the result is negative.
Filter time:	Performs an average over the set measurement time; this filters out fluctuations on measured values.
Test pressure compensation:	This function allows the conversion of the results to a defined pressure instruction. When this function is activated, the instrument recalculates the results according to the instruction pressure. The measurement results won't take in account pressure variations
Electronic regulator	This function is to validate if an electronic regulator is connected to the device.

Auto-Calibration					
Offset max	10	sccm			
Calibration leak	0	sccm	Volume Min.	0	cm3
Calibration pressure	0	bar	Volume Max.	0	cm3

Offset max:	Maximum Offset allowed for auto-calibration.
Calibration leak:	Value of the master leak that will be connected to the device for the volume measurement.
Calibration pressure:	This parameter is the pressure applied when the leak was calibrated.
Volume Min.:	Minimum reject for the calculated volume. If the calculated Volume is below the minimum volume " Volume Min. " parameter, an alarm is triggered.
Volume Max.	Maximum reject for the calculated volume. If the calculated Volume is over the maximum volume " Volume Max. " parameter, an alarm is triggered.

3.2. SEALED COMPONENTS

The screenshot shows the ATEQ - F28 Light Control software interface. The main window is titled "ATEQ - F28 Light Control" and displays the "Parameters" section for a "Sealed Component" test. The interface includes a navigation pane on the left with "Network" and "Ethernet" options. The main content area is divided into several sections:

- Parameters:** Test Type is set to "Sealed Component" and "1".
- Cycle Time:** Fill Time (2 s), Dump Time (2 s), Stabilization Time (3 s), Fill Volume (0 s), Test Time (3 s), and Transfert (0 s).
- Pressure 1:** Unit is "bar", Maximum (2), Minimum (0), Set Fill (1), End Ratio Max. (0), End Ratio Min. (0), and Fill Type is "Standard".
- Leak:** Unit is "sccm", Test Reject (0.5), Standard P.AtM (1013 hPa), Ref. Reject (0), Offset (0), Volume (100), Unit (cm3), Standard Temperature (20 °C), and Reject Calc (Pa/s).
- Options:** Includes checkboxes for "Sign", "Test Pressure Compensation", "No Negative Value", and "Electronic Regulator", along with a "Filter Time" (0 s).
- Auto-Calibration:** Offset max (10 sccm), Calibration leak (0 sccm), Calibration pressure (0 bar), Volume Min. (0 cm3), and Volume Max. (0 cm3).

3.2.1. Parameters sealed components

Main parameters to configure:

Test type:	Sealed Components.
-------------------	--------------------

Cycle Time

Fill Time	<input type="text" value="2"/> s	Stabilization Time	<input type="text" value="3"/> s	Test Time	<input type="text" value="3"/> s
Dump Time	<input type="text" value="2"/> s	Fill Volume	<input type="text" value="0"/> s	Transfert	<input type="text" value="0"/> s

Fill volume:	Time to fill the volume connected to the P1 port (Pressurization Output) to the test pressure. This volume (V1) is filled to a pressure P_{start} .
Transfer time:	Time to transfer the pressure from the pressurized volume to the test part.
Fill time:	Time to fill the part to the test pressure.
Stabilization time:	Time to equalize the pressure between the TEST and REFERENCE components.
Test time:	Leak measurement time, it depends of the reject level value and the work mode programmed.
Dump time:	Time to back the part to the atmospheric pressure. Dump time by default is zero.

Pressure 1

Unit	<input type="text" value="mbar"/>	Maximum	<input type="text" value="4000"/>	Minimum	<input type="text" value="-1000"/>
Set Fill	<input type="text" value="2000"/>	End Ratio Max.	<input type="text" value="0"/>	Fill Type	<input type="text" value="Standard"/>
		End Ratio Min.	<input type="text" value="0"/>		

Unit (Pressure):	Pressure unit (bar, mbar, PSI, Pa, kPa, MPa).
Maximum:	Maximum level of the fill pressure.
Minimum:	Minimum level of the fill pressure.
Set Fill:	Instruction test pressure that the device will automatically regulate if there's electronic regulator and instruction for test compensation options.
Fill type:	Standard or Automatic, mode following the configuration of the device. <ul style="list-style-type: none"> ➤ Auto Fill mode: mode used with an internal calibrated jet to pressurize the part to test. It allows getting a ramp fill mode and once the "Set fill" test pressure instruction is reached, the fill is stopped and the fill time continues until its end. ➤ Ramp mode: mode used with an electronic regulator option, the pressure will increase by following a ramp. ➤ Instruction mode: when the set fill pressure is reached, the cycle jump automatically from the fill step to the stabilization step.
End ratio Max.:	Ratio calculated by the $P_{start}/End P_{max}$ calculation, see preamble §3.2 "Sealed components".
End ratio Min.:	Ratio calculated by the $P_{start}/End P_{min}$ calculation, see preamble §3.2 "Sealed components".

Leak			
Unit	sccm	Test Reject	0.5
Offset	0	Standard P.Atm	1013 hPa
Volume	100	Unit	cm3
		Ref. Reject	0
		Standard Temperature	20 °C
		Reject Calc	Pa/s

Unit (Leak):	Leak unit displayed. If a flow unit is selected, two parameters are added (volume and reject calculation).
Maximum:	Maximum level for the test part is fail.
Minimum:	Minimum level for the test part is fail.
Offset:	Value to add to the final result.
Standard P atm:	The measurements depend on the atmospheric pressure. The device recalculates the results according to the Patm parameter entered.
Standard temperature:	The measurements depend on the ambient temperature. The instrument recalculates the results according to the temperature parameter entered.
Volume Value:	Value of the volume (with a flow unit selected).
Volume Unit:	Unit for the volume.
Reject Calc:	Not available.

Options	
<input type="checkbox"/> Sign	<input type="checkbox"/> No Negative Value
<input type="checkbox"/> Test Pressure Compensation	<input type="checkbox"/> Electronic Regulator
	Filter Time <input type="text" value="0"/> s

Sign:	To reverse the result sign, this option must be checked for vacuum or indirect tests.
No negative value:	The measurement display becomes zero when the result is negative.
Filter time:	Performs an average over the set measurement time; this filters out fluctuations on measured values.
Test pressure compensation:	This function allows the conversion of the results to a defined pressure instruction. When this function is activated, the instrument recalculates the results according to the instruction pressure. The measurement results won't take in account pressure variations
Electronic regulator	This function is to validate if an electronic regulator is connected to the device.



The instrument allows variations in input pressure. This is why the instrument uses maximum and minimum ratio parameters, instead of End P1 max and min because they can vary at each cycle.

During the test cycle, if the volume is greater (large leak), the **Fail Part** and **End of Cycle** outputs are activated. If the volume is reduced (problem with the fixture) the **Alarm** and **End of Cycle** outputs are activated.

Auto-Calibration			
Offset max	<input type="text" value="10"/>	scm	
Calibration leak	<input type="text" value="0"/>	scm	Volume Min. <input type="text" value="0"/> cm3
Calibration pressure	<input type="text" value="0"/>	bar	Volume Max. <input type="text" value="0"/> cm3

Offset max:	Maximum Offset allowed for auto-calibration.
Calibration leak:	Value of the master leak that will be connected to the device for the volume measurement.
Calibration pressure:	This parameter is the pressure applied when the leak was calibrated.
Volume Min.:	Minimum reject for the calculated volume. If the calculated Volume is below the minimum volume " Volume Min. " parameter, an alarm is triggered.
Volume Max.	Maximum reject for the calculated volume. If the calculated Volume is over the maximum volume " Volume Max. " parameter, an alarm is triggered.

3.1. LEAK DESENSITIZED

The screenshot shows the 'ATEQ - F28 Light Control' software interface. The 'Parameters' tab is active, and the 'Leak Desensitized' test type is selected. The configuration is as follows:

- Test Type:** Leak Desensitized (1)
- Cycle Time:** Fill Time: 2 s, Stabilization Time: 3 s, Test Time: 3 s, Dump Time: 2 s
- Pressure 1:** Unit: bar, Maximum: 2, Minimum: 0, Set Fill: 1, Fill Type: Standard
- Leak Desensitized:** Unit: sccm, Test Reject: 0.5, Ref. Reject: 0, Offset: 0, Standard P.AtM: 1013 hPa, Standard Temperature: 20 °C, Volume: 100, Unit: cm3, Reject Calc: Pa/s
- Options:** Sign (unchecked), Test Pressure Compensation (unchecked), No Negative Value (unchecked), Electronic Regulator (unchecked), Filter Time: 0 s
- Auto-Calibration:** Offset max: 10 scm, Calibration leak: 0 scm, Calibration pressure: 0 bar, Volume Min.: 0 cm3, Volume Max.: 0 cm3

3.1.1. Parameters (Desensitized)

Main parameters to configure:

Test type:	Leak Desensitized.
-------------------	--------------------

Cycle Time

Fill Time s Stabilization Time s Test Time s

Dump Time s

Fill time:	Time to fill the part to the test pressure.
Stabilization time:	Time to equalize the pressure between the TEST and REFERENCE components.
Test time:	Leak measurement time, it depends of the reject level value.
Dump time:	Time for the part to return to atmospheric pressure. Dump time by default is zero.

Pressure 1

Unit Maximum Minimum

Set Fill Fill Type

Unit:	Pressure unit (bar, mbar, PSI, Pa, kPa, MPa).
Maximum:	Maximum level of the fill pressure.
Minimum:	Minimum level of the fill pressure.
Set Fill:	Instruction test pressure that the device will automatically regulate. Remind: the input pressure must be at least greater than 50 kPa (0.5 bar) of the test pressure.
Fill type:	Standard or Automatic, mode following the configuration of the device. Auto Fill mode is used with an internal calibrated jet to pressurize the part to test. It allows getting a ramp fill mode and once the " Set fill " test pressure instruction is reached, the fill is stopped and the fill time continues until its end.

Leak Desensitized

Unit	sccm	Test Reject	0.5	Ref. Reject	0
Offset	0	Standard P.Atm	1013 hPa	Standard Temperature	20 °C
Volume	100	Unit	cm3	Reject Calc	Pa/s

Unit (Leak):	Leak unit displayed. If a flow unit is selected, one parameter is added (volume).
Maximum (Test):	Maximum reject leak, above this level the test part is declared fail.
Minimum (Reference):	Minimum reject leak, above this level the reference part is declared fail. Note: when the reference reject value is 0, the device takes into account the absolute value of the symmetrical test reject.
Offset:	Value to subtract to the final result.
Standard P atm:	The measurements depend on the atmospheric pressure. The device recalculates the results according to the Patm parameter entered.
Standard temperature:	The measurements depend on the ambient temperature. The instrument recalculates the results according to the temperature parameter entered.
Volume Value:	Value of the volume (with flow unit selected).
Unit (Volume):	Unit for the volume.

Options

<input type="checkbox"/> Sign	<input type="checkbox"/> No Negative Value	Filter Time	0 s
<input type="checkbox"/> Test Pressure Compensation	<input type="checkbox"/> Electronic Regulator		

Sign:	Do not use this function.
No negative value:	Do not use this function.
Filter time:	Performs an average over the set measurement time; this filters out fluctuations on measured values.
Test pressure compensation:	This function allows the conversion of the results to a defined pressure instruction. When this function is activated, the instrument recalculates the results according to the instruction pressure. The measurement results won't take in account pressure variations
Electronic regulator	This function is to validate if an internal electronic regulator is installed into the device.

Auto-Calibration

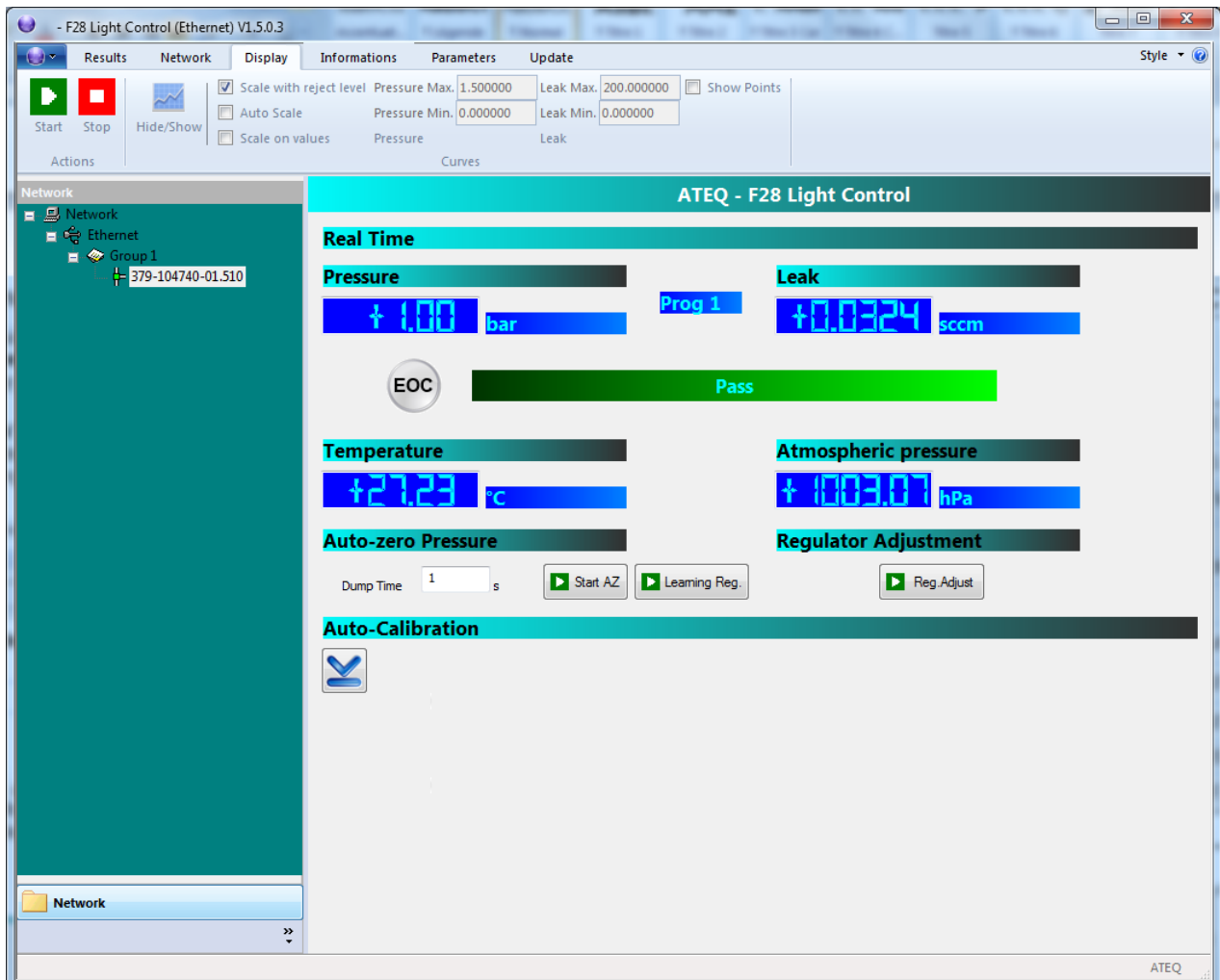
Offset max	<input type="text" value="10"/>	sccm			
Calibration leak	<input type="text" value="0"/>	sccm	Volume Min.	<input type="text" value="0"/>	cm3
Calibration pressure	<input type="text" value="0"/>	bar	Volume Max.	<input type="text" value="0"/>	cm3


Offset max:	Maximum Offset allowed for auto-calibration.
Calibration leak:	Value of the master leak that will be connected to the device for the volume measurement.
Calibration pressure:	This parameter is the pressure applied when the leak was calibrated.
Volume Min.:	Minimum reject for the calculated volume. If the calculated Volume is below the minimum volume " Volume Min. " parameter, an alarm is triggered.
Volume Max.	Maximum reject for the calculated volume. If the calculated Volume is over the maximum volume " Volume Max. " parameter, an alarm is triggered.


4. HEADS TEST CONTROL (DISPLAY TAB)

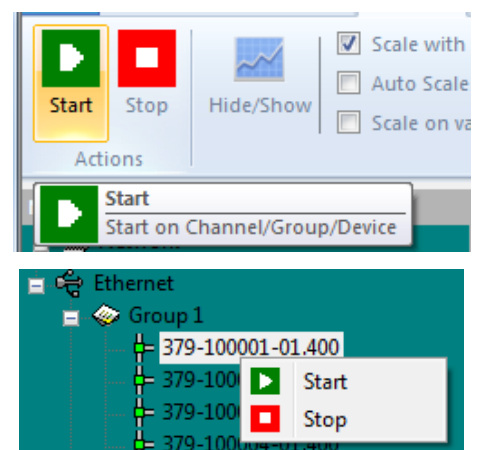
To use the test cycles network, select the "**Display**" tab.

This tab displays all needed about the selected device and the real time information.

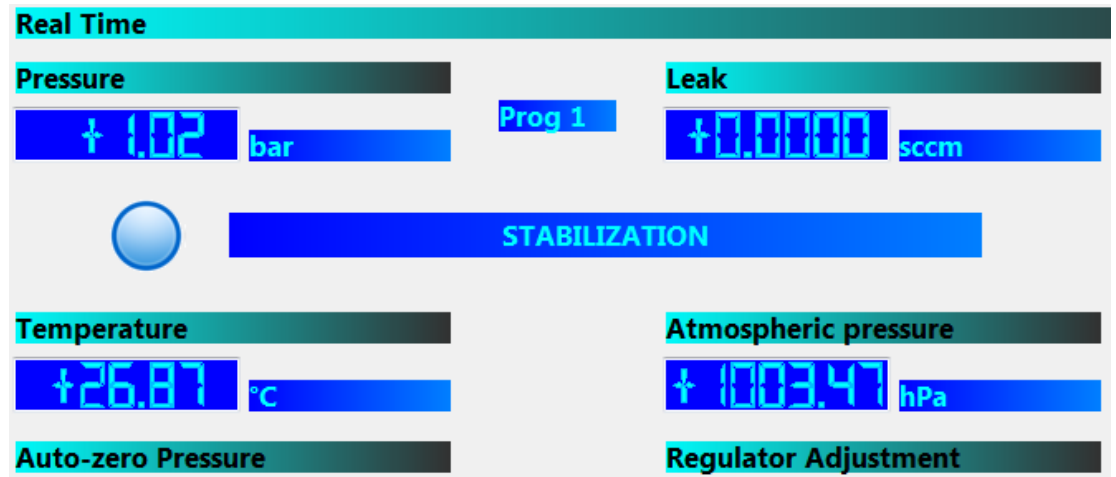


Start the test cycle with two ways, click on the start button on the top left hand of the window, or after selecting the head in the network window, make appear the contextual menu by right clicking, and then click on the "**Start**"  button.

Same operation for stopping the cycle with the "**Stop**"  button.



During the cycle, the steps and the real time measurements are displayed.



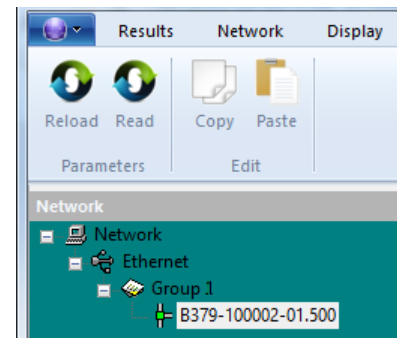
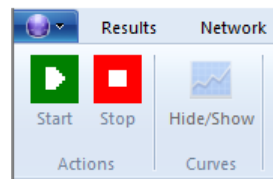
Prog 1

The running program number is displayed.

4.1. MEASUREMENT CURVES

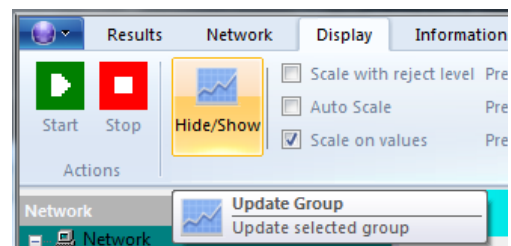
To display the curves window, the **head** must be selected in the **network tree**.

If one of the "Network", "Ethernet" or "Group X" option is selected in the network tree the curves displaying function won't work.



In these cases, the "Hide/Show curves" button is gray.

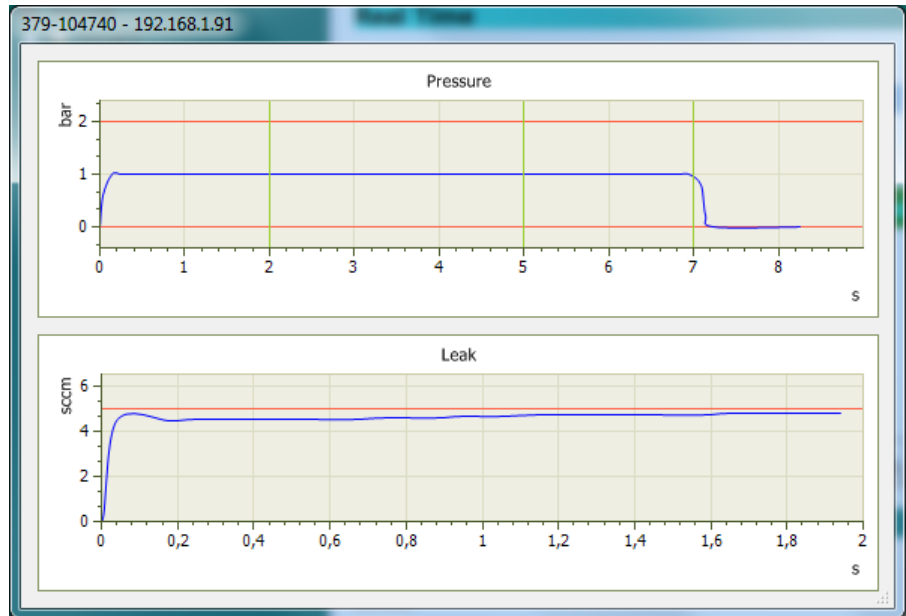
Select the "Display" tab, and then click on the "Hide/Show curves" button. If all conditions are met, this button is available.



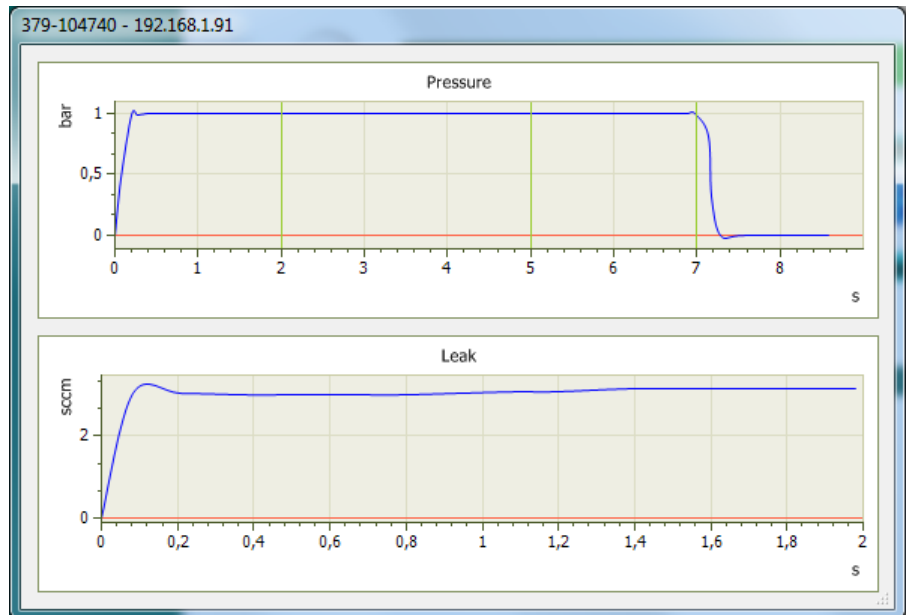
Press on the "Start" button to run a test cycle. The curves "Pressure" and "Leak" are display in real time.



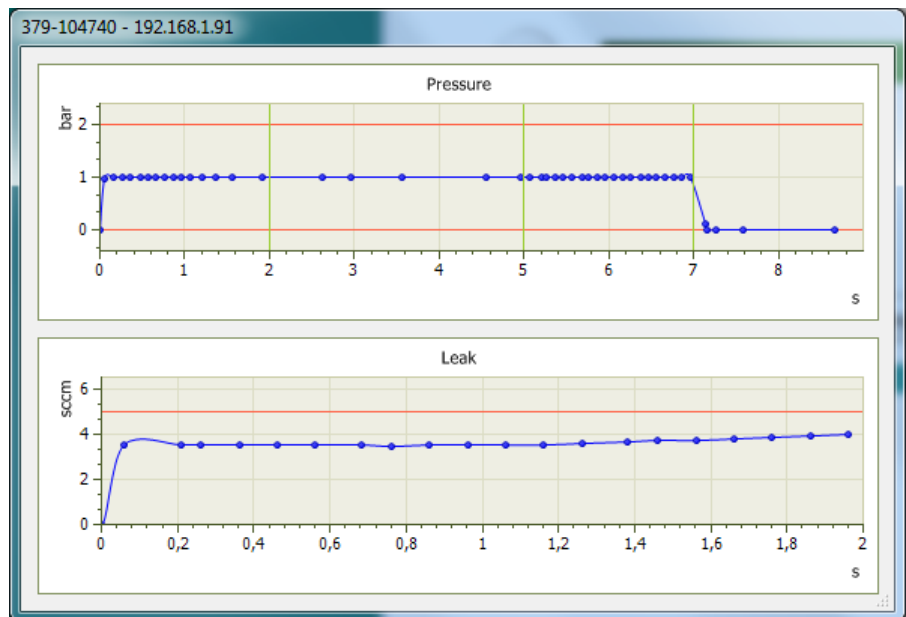
Curves with
 Scale with reject level
 option checked.



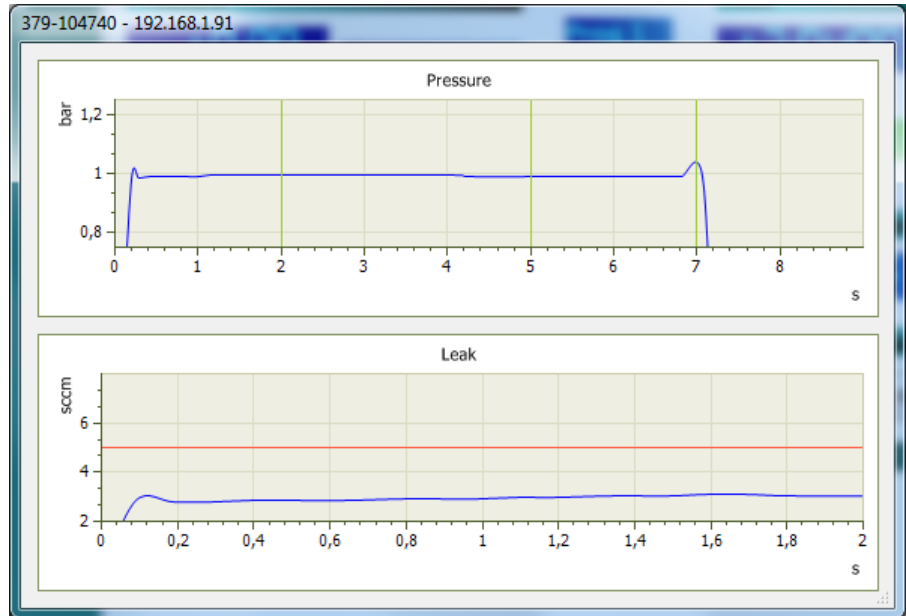
Curves with
 Auto Scale
 option checked.



Curves with
 Scale with reject level
 and Show Points
 options checked.

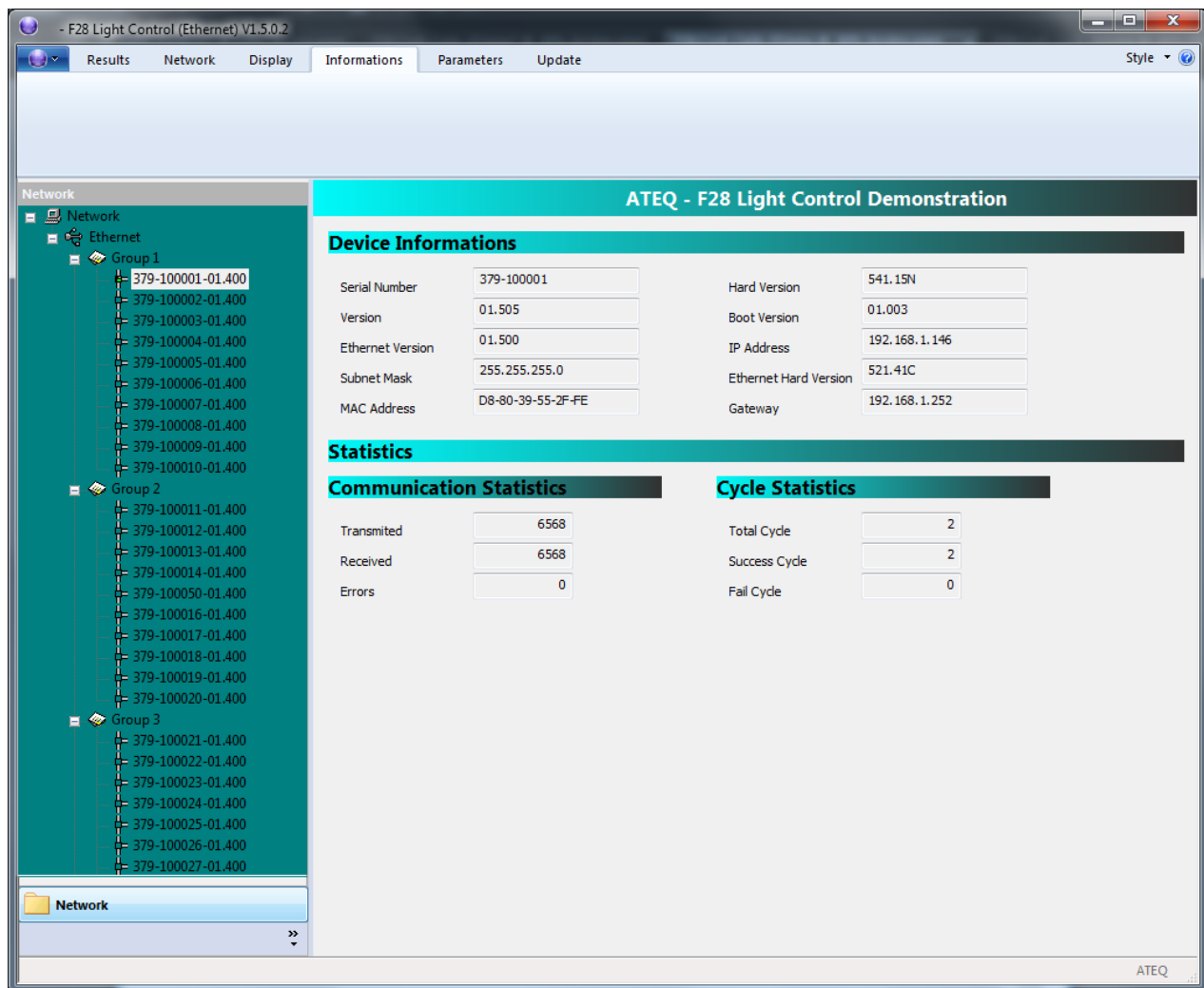


Curves with
 Scale on values
option checked with the
below values.



Pressure Max.	1.250000	Leak Max.	8.000000
Pressure Min.	0.750000	Leak Min.	2.000000
Pressure		Leak	

5. INFORMATION TAB



The "Device Information" window displays all the characteristics of the selected head, versions, IP address etc...

Device Informations	
Serial Number	379-100001
Version	01.505
Ethernet Version	01.500
Subnet Mask	255.255.255.0
MAC Address	D8-80-39-55-2F-FE
Hard Version	541.15N
Boot Version	01.003
IP Address	192.168.1.146
Ethernet Hard Version	521.41C
Gateway	192.168.1.252

The "Communication Statistics" window allows checking the communication between the head and the software, the "Transmitted" and "Received" numbers must grow regularly, the "Errors" number may stay to 0 or stay small.

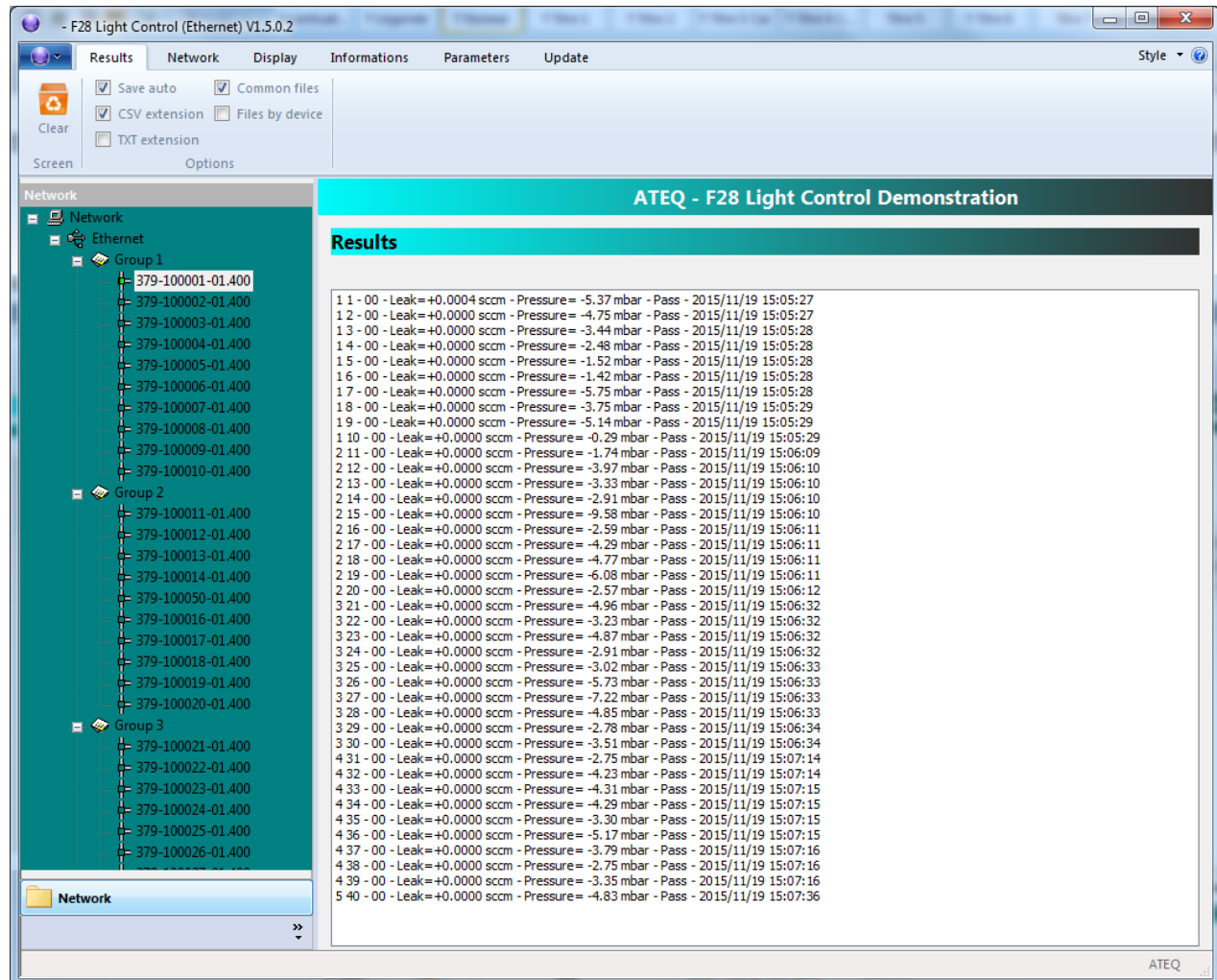
Communication Statistics	
Transmitted	6568
Received	6568
Errors	0

The "Cycle Statistics" window displays the test cycle results number, total cycle, pass cycles and fail cycles.

Cycle Statistics	
Total Cycle	2
Success Cycle	2
Fail Cycle	0

6. RESULTS TAB

The results tab displays the last results of the measurements of the selected head.



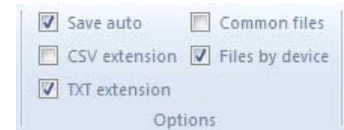
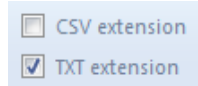
Clear the result window by clicking on the "Clear" button.

Folder: **C:\ATEQ\F28LightDemoEth\Results** (automatic installation) or the "Results" folder where the "F28DemoEth.exe" file is installed (manual installation).

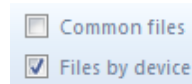


The "Save auto" option, if checked, will save automatically all the results in a file, one by day, which can be read with "Excel©" or "LibreOffice Calc" softwares.

The format of the result file can be in CSV or TXT files, following the users' preferences.



The results can be recorded into a common file or several files, one by device.

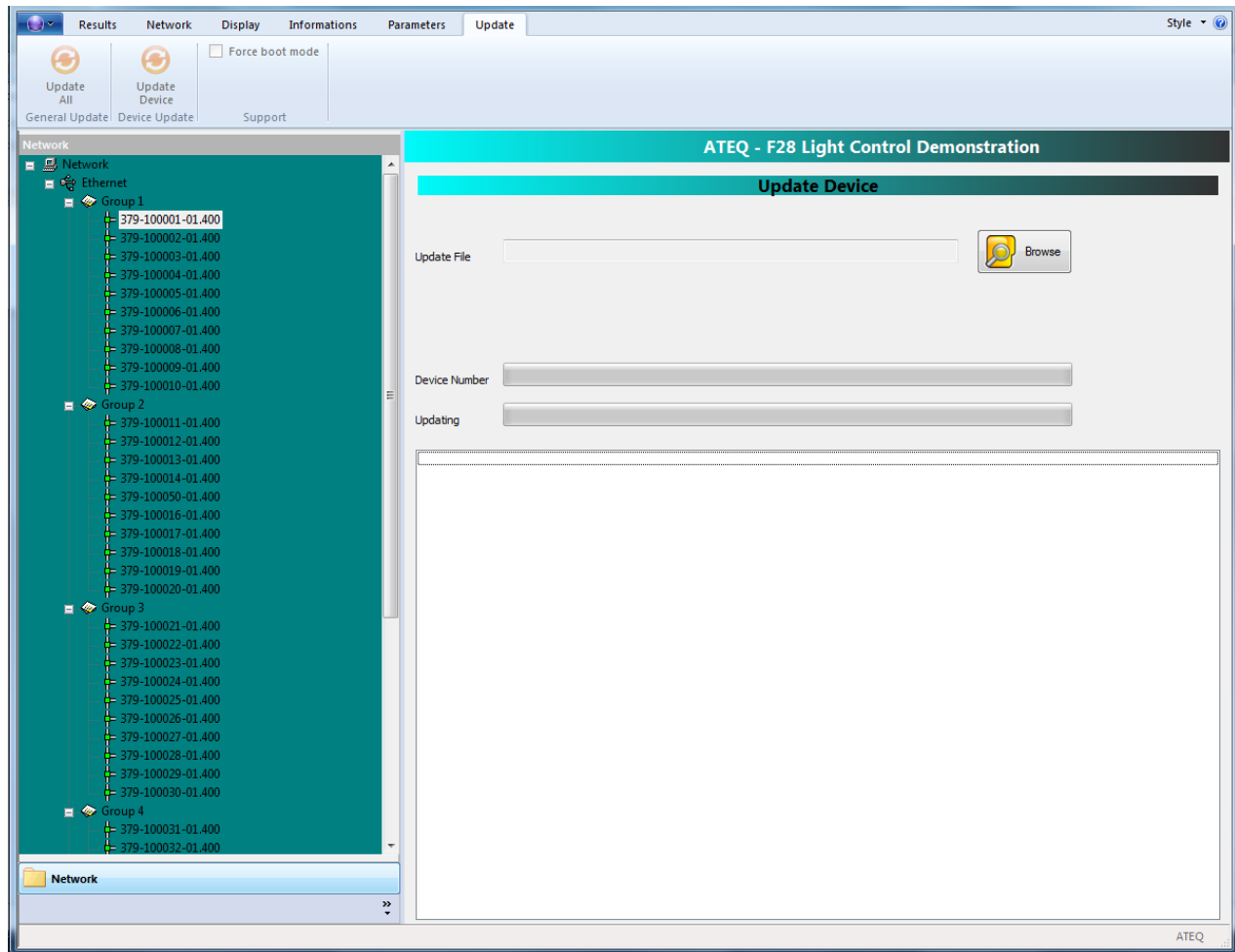


Example of CSV results file, **Res_20151109.csv** (Res_YYYYMMDD.csv):

	A	B	C	D	E	F	G	H	I	J	K	L
1	Serial Nb	IP Address	Group	Module	Status	Leak	Unit	Pressure	Unit	Date	Time	
2		192.168.1.146	1	1	Pass	0.00	Pa	0.24	mbar	01/02/2016	11:35:38	
3		192.168.1.146	1	1	Pass	0.00	Pa	1.14	mbar	01/02/2016	11:47:56	
4		192.168.1.146	1	1	PRESSURE TOO LOW	399.9999	sccm	0.00	bar	01/02/2016	16:27:08	
5		192.168.1.146	1	1	Pass	-0.0056	sccm	-0.13	mbar	01/02/2016	16:27:53	
6		192.168.1.146	1	1	Pass	0.0000	sccm	0.00	mbar	01/02/2016	16:28:08	
7		192.168.1.146	1	1	Pass	-0.0063	sccm	0.00	mbar	01/02/2016	16:28:22	
8		192.168.1.146	1	1	Pass	0.0017	sccm	0.00	mbar	01/02/2016	16:29:10	
9												
10												

7. UPDATE TAB

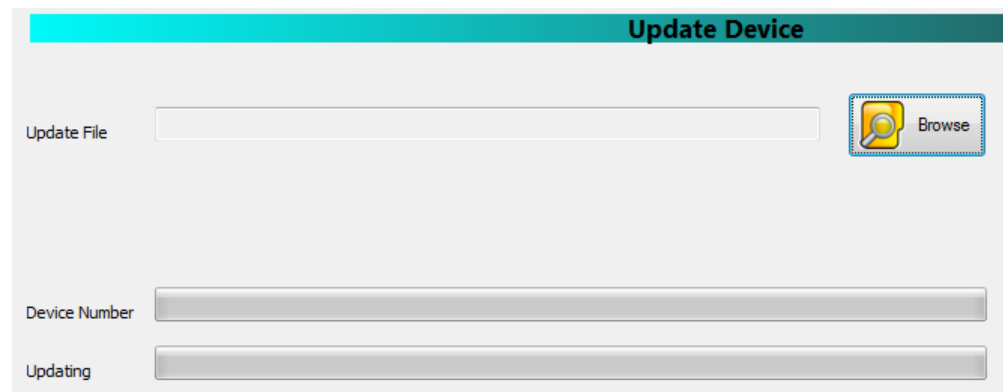
To update the firmware's heads, select the "**Update**" tab.



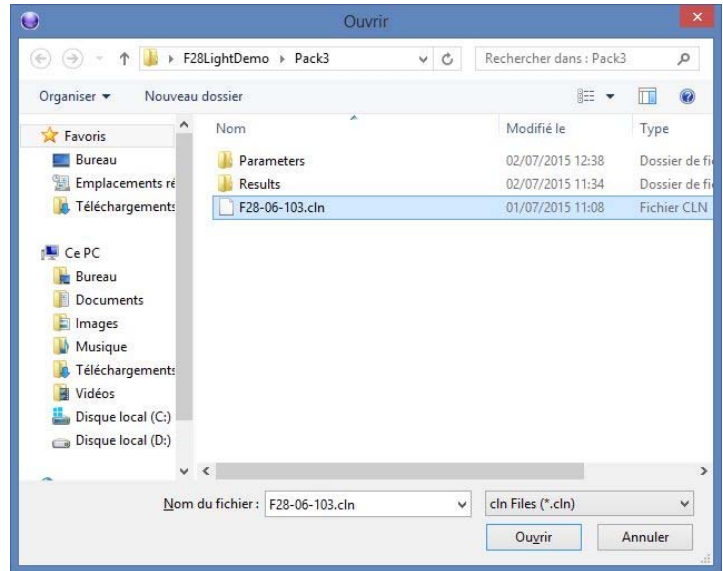
In the **Update** tab, click on the



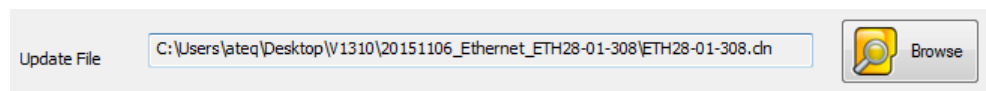
button to select the update file.



Select the last **.cln** file and click on **Open**.

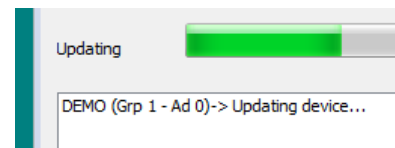


Then click on the **"Update All"** or **"Update Device"** button.



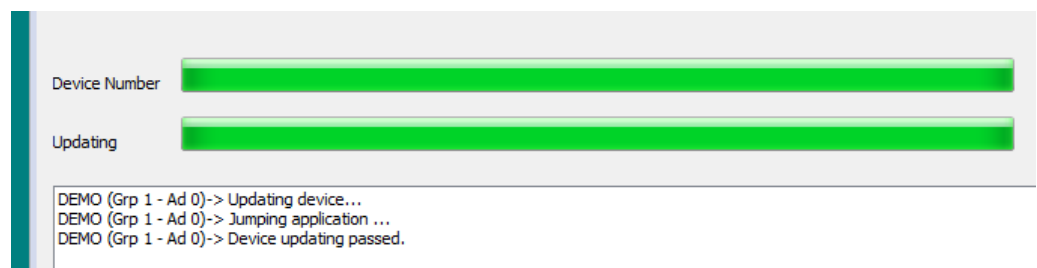
- **"Update All"** button will start a general update of all the heads in the network.
- **"Update Device"** button will start an update to the selected head only.

During the updating, the 2 progress bar **"Device Number"** and **"Updating"** move.



At the end of the updating, the **"Device Number"** progress bar is complete.

Congratulations, your devices are updated!




CALIBRATION PROCESS

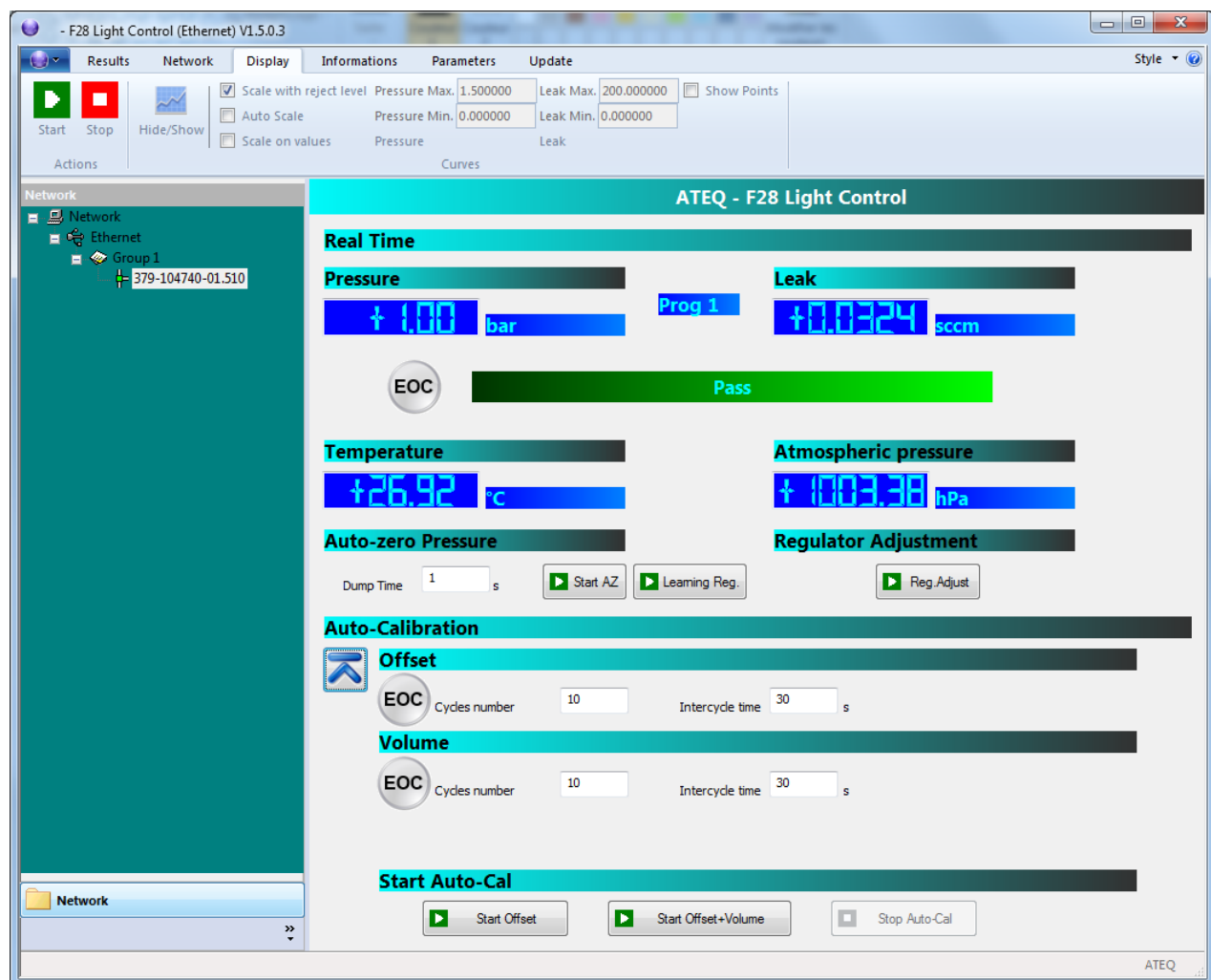
1. PRINCIPLE

This process is to calibrate the device in its environment. It allows adjusting the offset and the complete test volume.

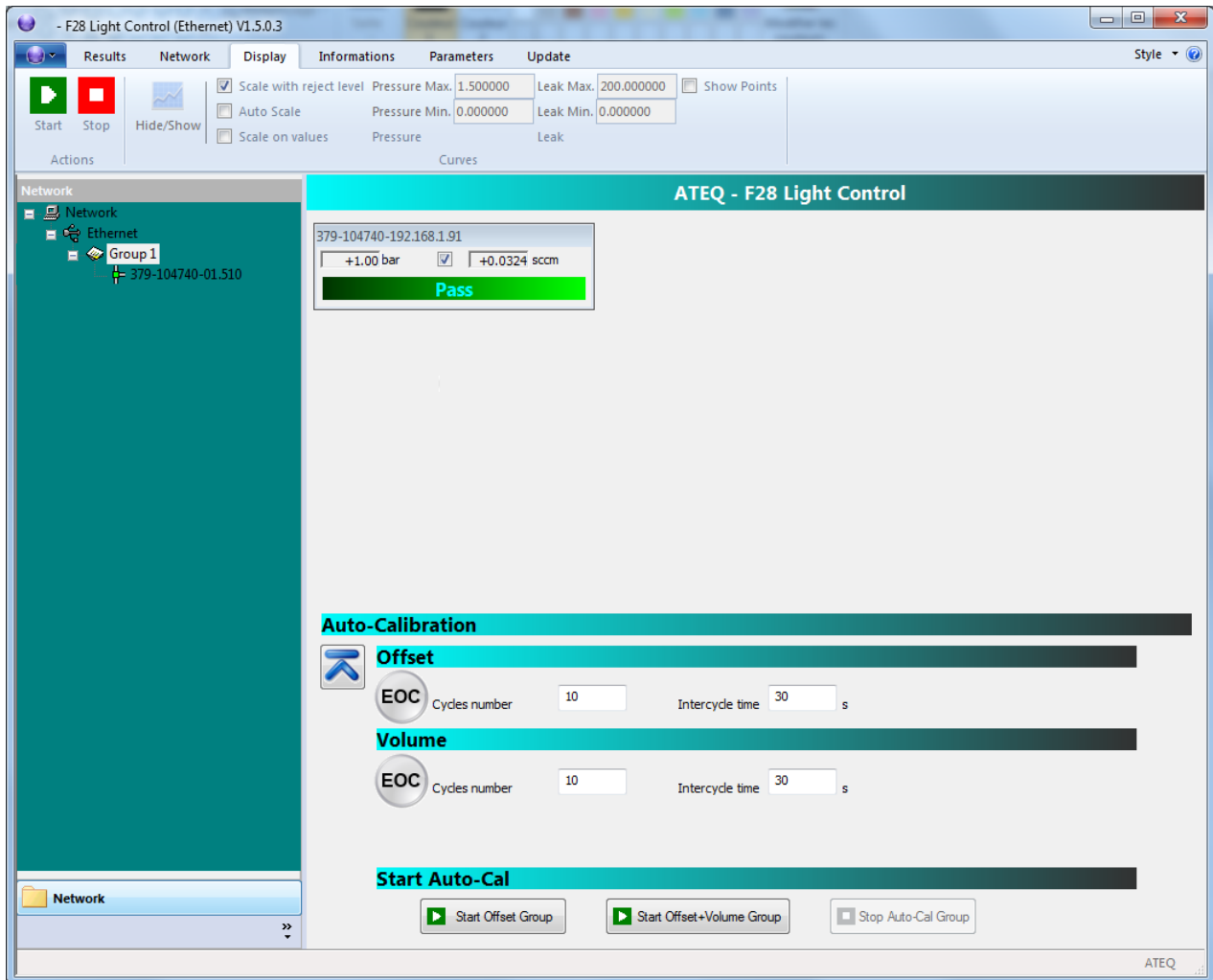
First, in the "**Display**" tab, make appear the Calibration window, click on the  button.

If the button is gray, it seems that all the conditions are not met, see the § 2.3. "**Auto-Calibration conditions**" below. 

Following the mode, it appears the window with two calibration modes: **Offset** and **Offset + Volume**. Two means: Auto-calibration for one device or for a group of devices.



One F28Light device selected



Group selected

The **Offset** mode will carry on an offset calibration; the **Offset + Volume** mode will carry on the offset calibration and then the volume measurement. In SCCM unit only.

The light  shows the current cycle status at any time.

Blue = Cycle in progress.



EOC = End of Cycle.



Orange = Alarm.



2. CALIBRATIONS PROCESSES

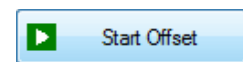
2.1. OFFSET CALIBRATION

This first cycle calculates the "**Offset**" parameter.

Select the "**Display**" tab, the "**Cycle number**" is the number of calibration cycles that will be carry on, for the result, the software take in account the half last results for its mean, for example, if the parameter is 10, the results 6 to 10 will enter in the calculation of the mean.

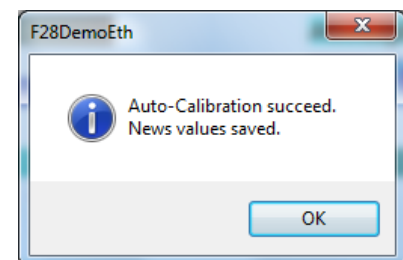
The parameter "**Intercycle time**" is the time of standing by between two measurements cycles.

Click on the "**Start Offset**" button. The Offset calibration cycle will run.



The results are displayed in the "**Results**" tab at each end of cycle until the last one.

At the end of the process, the message of successful calibration appears.



The mean of the second half of the results (in our example the 5 lasts results) is calculated and the parameter is sent to the device.

2.1. OFFSET AND VOLUME CALIBRATIONS (SCCM UNIT ONLY)

Select the **"Display"** tab, the **"Cycle number"** of the **"Offset"** section is the number of calibration cycles that will be carry on, for the result, the software take in account the half last results for its mean, for example, if the parameter is 10, the results 6 to 10 will enter in the calculation of the mean.

The **"Cycle number"** of the **"Volume"** section is the number of volume measurements cycles that will be carry on.

The screenshot shows two sections: **Offset** and **Volume**. Each section has a circular **EOC** button, a text input for **Cycles number** (both set to 10), and a text input for **Intercycle time** (both set to 30 s).

The number of cycles for the **"Offset"** calibration and for the **"Volume"** measurement can be different.

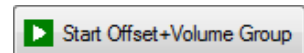
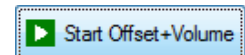
The parameter **"Intercycle time"** is the time of standing by between two measurements cycles.

The **"Calibration leak"** parameter is the value of the master leak that will be connected to the device for the volume measurement.

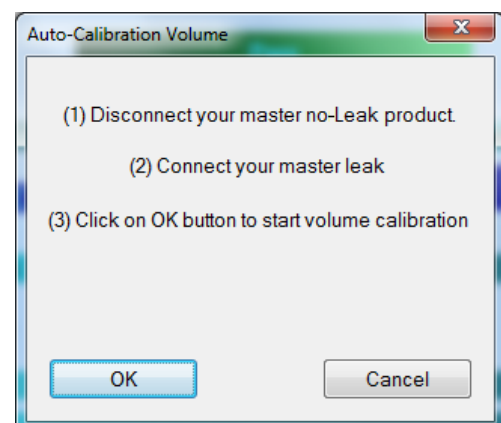
The **"Calibration pressure"** parameter is the pressure applied when the leak was calibrated.



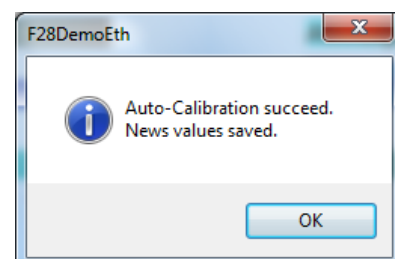
Click on the **"Start Offset + Volume"** button. The Offset calibration cycle will run followed by the Volume measurement.



When the **"Offset"** calibration is finished, the software prompts you to connect the master leak and then click on the **"OK"** button. The **"Volume"** measurement will start.



At the end of the process, the message of successful calibration appears.



The results are displayed in the "Results" tab.

Results	
11-00 - Leak= +8.30 Pa/s - Pressure=147.25 mbar - Pass - 2015/11/16 14:27:20	
11-00 - Leak= +7.90 Pa/s - Pressure=147.14 mbar - Pass - 2015/11/16 14:27:33	
11-00 - Leak= +8.00 Pa/s - Pressure=146.75 mbar - Pass - 2015/11/16 14:27:46	
11-00 - Leak= +7.80 Pa/s - Pressure=147.19 mbar - Pass - 2015/11/16 14:27:59	
11-00 - Leak= +7.90 Pa/s - Pressure=146.98 mbar - Pass - 2015/11/16 14:28:12	
11-00 - Leak= +7.70 Pa/s - Pressure=146.37 mbar - Pass - 2015/11/16 14:28:25	
11-00 - Leak= +7.70 Pa/s - Pressure=146.06 mbar - Pass - 2015/11/16 14:28:38	
11-00 - Leak= +7.70 Pa/s - Pressure=146.47 mbar - Pass - 2015/11/16 14:28:51	
11-00 - Leak= +7.80 Pa/s - Pressure=145.98 mbar - Pass - 2015/11/16 14:29:04	
11-00 - Leak= +7.90 Pa/s - Pressure=146.81 mbar - Pass - 2015/11/16 14:29:17	
11-00 - Leak= +106.20 Pa/s - Pressure=142.89 mbar - Pass - 2015/11/16 14:30:04	
11-00 - Leak= +105.50 Pa/s - Pressure=142.73 mbar - Pass - 2015/11/16 14:30:17	
11-00 - Leak= +105.40 Pa/s - Pressure=142.78 mbar - Pass - 2015/11/16 14:30:30	
11-00 - Leak= +105.20 Pa/s - Pressure=142.52 mbar - Pass - 2015/11/16 14:30:43	
11-00 - Leak= +105.50 Pa/s - Pressure=142.78 mbar - Pass - 2015/11/16 14:30:56	
11-00 - Leak= +105.40 Pa/s - Pressure=142.47 mbar - Pass - 2015/11/16 14:31:09	
11-00 - Leak= +105.30 Pa/s - Pressure=143.02 mbar - Pass - 2015/11/16 14:31:22	
11-00 - Leak= +105.40 Pa/s - Pressure=143.08 mbar - Pass - 2015/11/16 14:31:35	

The calculated "Offset" calibration (mean of the second half of the results) and the measured volume are sent to the parameters' device.

Leak			
Unit	<input type="text" value="sccm"/>	Maximum	<input type="text" value="1000"/>
Offset	<input type="text" value="0.071"/>	Standard P.Atm	<input type="text" value="1013"/> hPa
Volume	<input type="text" value="16.9328"/>	Unit	<input type="text" value="cm3"/>
		Minimum	<input type="text" value="0"/>
		Standard Temperature	<input type="text" value="20"/> °C
		Reject Calc	<input type="text" value="Pa/s"/>



The master leak used must be calibrated at the test pressure (Pressure instruction)

2.2. AUTO-CALIBRATION ALARMS

An alarm can be triggered if the following conditions appear:



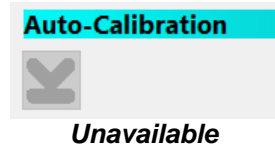
- the calculated **offset** is over the maximum offset "**Offset max**" parameter configured (Calc offset > Offset max),
- the calculated **Volume** is below the minimum volume "**Volume Min.**" parameter configured (Calc vol < Vol min),
- the calculated **Volume** is over the maximum volume "**Volume Max.**" parameter configured (Calc vol > Vol max),
- the **Leak Differential Pressure** is below the **Offset Differential Pressure x 5** (DPleak < DPOffset x 5).

Auto-Calibration			
Offset max	<input type="text" value="0.071"/>	sccm	
Calibration leak	<input type="text" value="0.5"/>	sccm	Volume Min. <input type="text" value="2"/> cm3
Calibration pressure	<input type="text" value="0.5"/>	bar	Volume Max. <input type="text" value="10"/> cm3

2.3. AUTO-CALIBRATION CONDITIONS

To have the Auto-Calibration option available, it's important to consider the following conditions.

If these conditions are not respected, the Auto-Calibration function will be gray, its parameters can't be configured and the cycle can't be carried on.

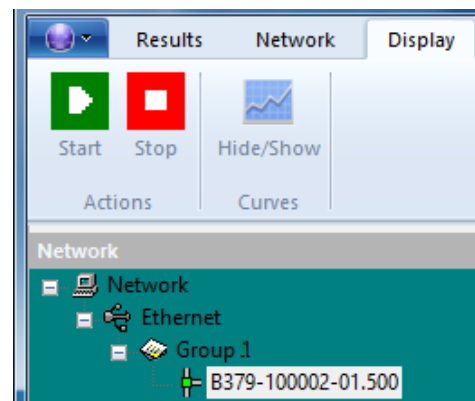


The Auto-Calibration function is under the "Display" tab.

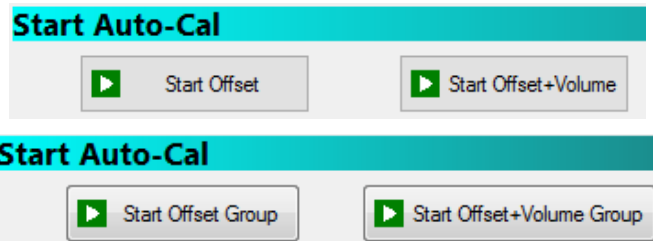


The **head** or a **Group** must be selected in the **network tree**.

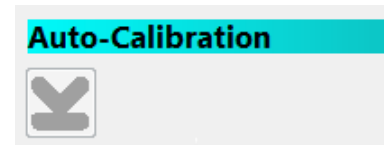
If one of the "Network" or "Ethernet" option is selected in the network tree the Auto-Calibration option is not available.



If all conditions are met, the "Start Offset" and "Start Offset + Volume" buttons are available.



The Auto-Calibration function is not available for configuration or starting. Please check the conditions.



OPERATIONNAL PROBLEMS AND ERROR CODES

1. IN CASE OF OPERATION DOUBT

If a test machine begins to detect too many fail parts (more than three consecutively), it is advisable to carry out a **check on the whole unit**. The quality of the manufacture and operation of the leak detector should be the last things considered.

There is a possibility that the seals may be cut by shavings or worn by repetitive squashing. This can be prevented by regular servicing and replacement of the seals.

If all the other checks do not resolve the problem, the instrument's circuit may be checked.

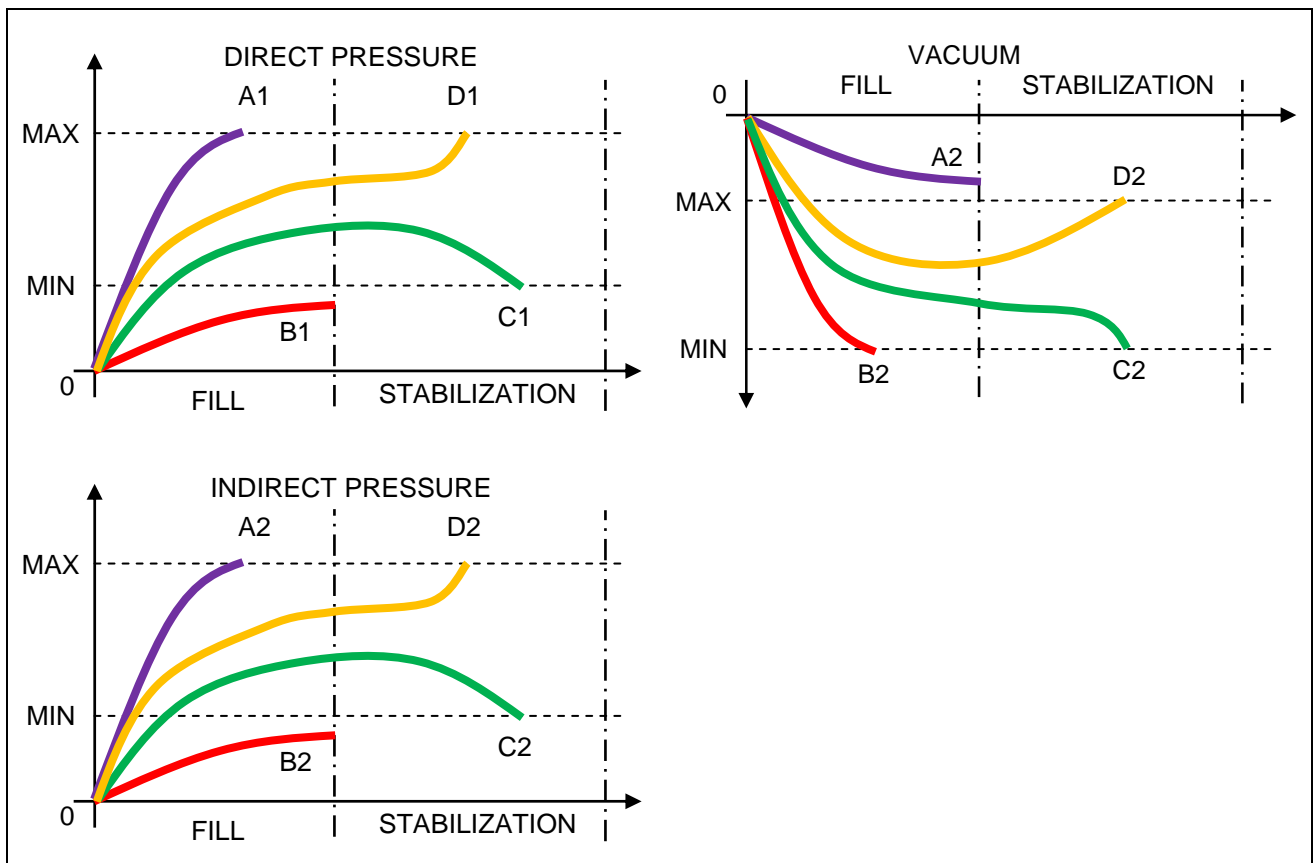
ATEQ does not accept any liability in regard to calibrations and settings to its instruments which are not carried out by its own personnel.

2. RESULT STATUS AND ALARMS

Element	Data type	Code value	Description		Leak result value*
ucStatus	UCHAR	0	STATUS_GOOD_PART	Pass part	Value
		1	STATUS_TEST_FAIL_PART	Test fail part. Not used (Reject level at 999)	Value
		2	STATUS_REF_FAIL_PART	Reference fail part	Value
		3	STATUS_ALARM_EEEE	Large leak on Test side, over full scale	Value
		4	STATUS_ALARM_MMMM	Large leak on Reference side, over full scale	Value
		5	STATUS_ALARM_PPPP	Pressure over the maximum pressure range (Tester error)	-399.99
		6	STATUS_ALARM_MPPP	Pressure below the minimum pressure range (Tester error)	-399.99
		7	STATUS_ALARM_OFFD_FUITE	Differential sensor auto-zero error (Tester error)	-399.99
		8	STATUS_ALARM_OFFD_PRESSION	Piezo sensor auto-zero error (Tester error)	-399.99
		9	STATUS_ALARM_PST	Over maximum pressure (pressure too high)	-399.99
				if "Sign" is checked (vacuum or indirect test)	Value
		10	STATUS_ALARM_MPST	Below minimum pressure (pressure too low)	Value
				if "Sign" is checked (vacuum or indirect test)	-399.99
		11	STATUS_ALARM_CS_VOLUME_PETIT	Fail Sealed components volume too small (Tester error)	-399.99
		12	STATUS_ALARM_CS_VOLUME_GRAND	Fail Sealed components volume too large (Tester error)	-399.99
		13	STATUS_ALARM_ERREUR_PRESS_CALIBRATION	Calibration pressure error (Tester error)	-399.99
		14	STATUS_ALARM_ERREUR_LEAK_CALIBRATION	Calibration leak error (Tester error)	-399.99
		15	STATUS_ALARM_ERREUR_LINE_PRESS_CALIB	Calibration line pressure error (Tester error)	-399.99
16	STATUS_ALARM_APPR_REG_ELEC_ERROR	Electronic regulator learning fail	-399.99		
17	STATUS_ALARM_TEST_PART_LARGE_LEAK	Large leak on Test side Alarm (no value)	+998.00		
18	STATUS_ALARM_REF_SIDE_LARGE_LEAK	Large leak on Reference side Alarm (no value)	-399.99		

Element	Data type	Code value	Description	Leak result value*	
		19	STATUS_ALARM_P_TOO_LARGE_FILL <i>See diagrams below</i>	Over maximum pressure (pressure too high). Case A1	-399.99
			If "Sign" is checked (vacuum or indirect test) and over max pressure. Case A2	+999.00	
		20	STATUS_ALARM_P_TOO_LOW_FILL <i>See diagrams below</i>	Pressure Below min pressure (pressure too low). Case B1	+999.00
			If "Sign" is checked (vacuum or indirect test) and below min pressure. Case B2	-399.99	
21		STATUS_ALARM_JET_CHECK_FAIL	Jet Check out of limits (Jet air supply out of limits or Jet damaged).	-399.99	
22		STATUS_ALARM_JET_CHECK_PASS	Jet Check special cycle succeed	-399.99	

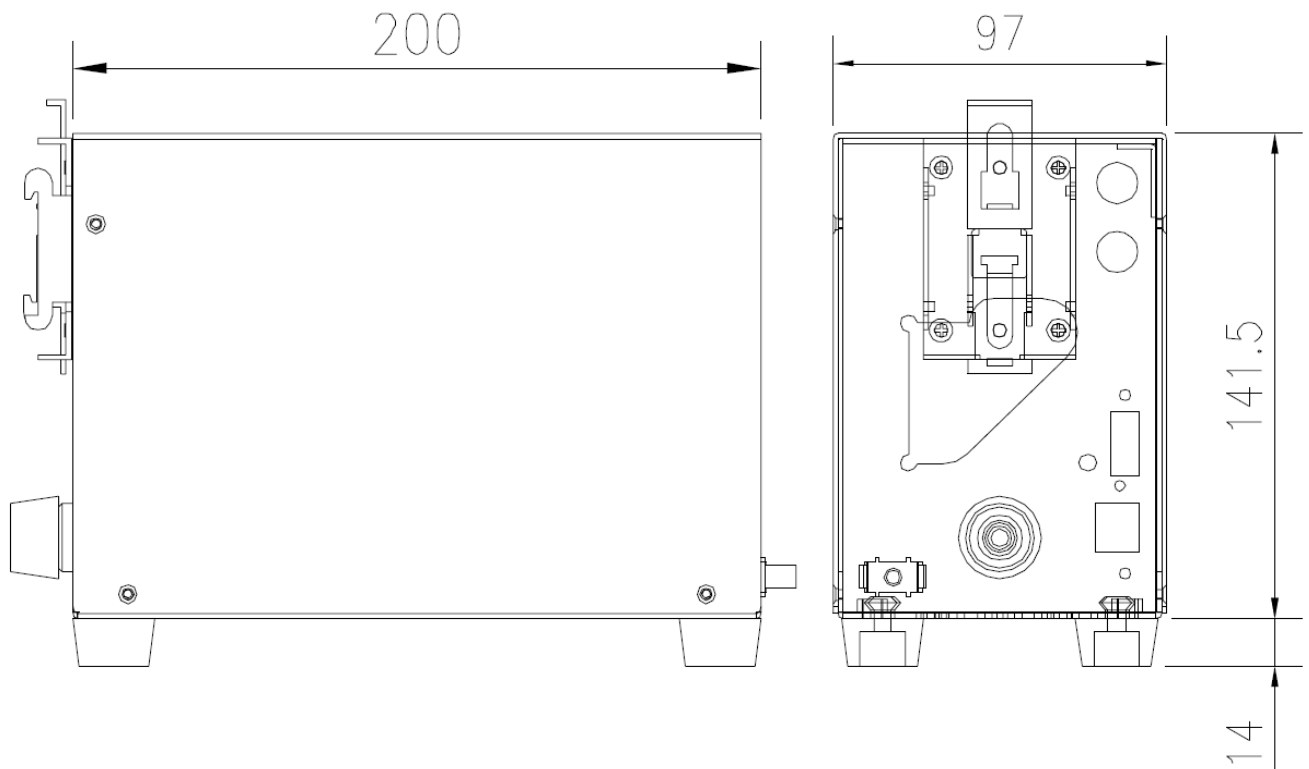
*The "Leak result value" is sent in the result frame, these specific values are only available from the 1.500 DLL version.



ACCESSORIES AND CHARACTERISTICS

1. TECHNICAL CHARACTERISTIC OF THE F28 LIGHT

Case dimensions H x L x D (mm):	141.5 x 200 x 97
Overall dimensions (mm):	155.5 x 225 x 97
	24 V DC – 1.2 A
Electric power supply:	The F28Light device has no power switch and works as soon as it is plugged in.
Overvoltage category:	II
Protection:	Device protection level IP2.
Pneumatics connections:	2.7/4
Weight:	about 3.5 kg (7.7lb)
Running temperature:	+5°C to +45°C (+41°F to 113°F)
Storage temperature:	0°C to +60°C (32°F to 140°F)
Running altitude:	Up to 2000m (6500 feet)
Relative humidity	80% at 31°C (87°F) and 50% at 40°C (104°F)



2. OPTIONAL ACCESSORIES

Master leaks: the master leaks are used to check the device calibration.

Micrometer valve and **Leak Calibrator** (CDF).

Filtration kit.

24 V DC power supply (option):

The **F28Light** device has no power switch and works as soon as it is plugged in.



Power supply reference:

MEANWELL GS25E24–P1J

AC/DC Switching adaptor with phoenix (2 pins),
see connector above.

Power supply characteristics:

INPUT: 100-240V AC, 50/60Hz, 0.7A

OUTPUT: 21-27V DC, 1.19-0.92A

(SET AT 24V DC, 1.04A)

25W MAXIMUM

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