USER MANUAL

ATEQ F CLASS

Version 1.15

www.ateq.com

Reference : UM-23100B-U

REVISION OF THE F CLASS USER MANUAL

Edition/ Revision	**Reference**	**Date** (week/year)	**Chapters updated**
First edition	UM-23100A-U	16/2003	-----
Second edition	UM-23100B-U	24/2005	Up dating the measurements characteristics in the preamble.

Recommendations for leak testing intruments

Precautions for the test environment

- Keep the test area as clean as possible.

Precautions for the operators

- **ATEQ** recommends that the operators using the instruments should have a suitable qualification and training with respect to the work bench requirements.

General precautions

- Read the user manual before using the instrument,
- all electrical connections to the instrument must be equipped with a safety system (fuse, circuit breaker…) appropriate to its needs and complying with the standards,
- to avoid electromagnetic interference, the cable connections to the instrument should be less than two meters in length,
- it is essential that the electrical main is earthed,
- disconnect the electrical connections to the equipment before maintenance,
- cut the air supply for any kinds of operation on the pneumatic assembly,
- do not open the instrument when it is powered up,
- avoid water spillage near of the instrument,
- **ATEQ** is at your disposal for any further information concerning the use of the instrument under maximum safety conditions.

We would like to bring to your attention that ATEQ will not be held responsible for any accident connected to the improper use of the instrument, to the work bench or to the lack of compliance with safety rules.

ATEQ, THE ASSURANCE OF A COMPETENT AFTER SALES SERVICE

■ THE ATEQ AFTER SALES SERVICE IS :

- a team of qualified technicians,
- a permanent telephone assistance,
- agencies close to you for faster reaction,
- a stock of spare parts available immediately,
- a car fleet for rapid intervention,
- a commitment to quality ...

■ THE OVERHAUL

ATEQ carries out the overhaul of your instruments at interesting prices.
The overhaul corresponds to the maintenance of the instrument (checking, cleaning, replacing of used parts) as part of preventive maintenance.
Preventive maintenance is the best way to guarantee reliability and efficiency. It allows the maintenance of a group of instruments in good operational order and prevent eventual break-downs.

■ MAINTENANCE KITS

The ATEQ After Sales Service proposes, two kits destined for the preventive maintenance of the pneumatic circuits of instruments.

■ CALIBRATION

This may be carried out on site or in our offices.
ATEQ is attached to the COFRAC and delivers a certificate following a calibration.

■ TRAINING COURSES

In the framework of partnership with our customers, ATEQ offers two types of training in order to optimise the usage and knowledge of our instruments. They are aimed at different levels of technician:

- method / control training,
- maintenance / upkeep training.

■ A TARGETED TECHNICAL DOCUMENTATION

A number of technical documents are at your disposal to allow you to intervene rapidly in the event minor breakdowns:

- problem sheets describing and offering solutions to the main pneumatic and electronic problems,
- several maintenance manuals.

■ A QUALITY GUARANTEE

The instruments are guaranteed for parts and labour in our offices:

- 2 years for leak detection equipment,
- 1 year for electrical tests to norms instruments,
- 1 year for the accessories.

Our After Sales Service is capable of rapidly answering all your needs and queries.

ATEQ recommends
to made realise by its departments
a revision and a calibration of the instruments
every year

PREFACE

Dear Customer,

You have just purchased an **ATEQ** instrument, we thank you for the trust you have placed on our brand. This instrument has been designed to ensure a long and unparalleled life expectancy, and we are convinced that it will give you complete satisfaction during many long years of operation.

In order to maximise the life expectancy and reliability of your **ATEQ** instrument, we recommend that you install this instrument on a secured workbench and advise you to consult this manual in order to familiarise yourself with the functions and capabilities of the instrument.

Our **ATEQ** After Sales Service centre can give you recommendations based on your specific operation requirements.

ATEQ

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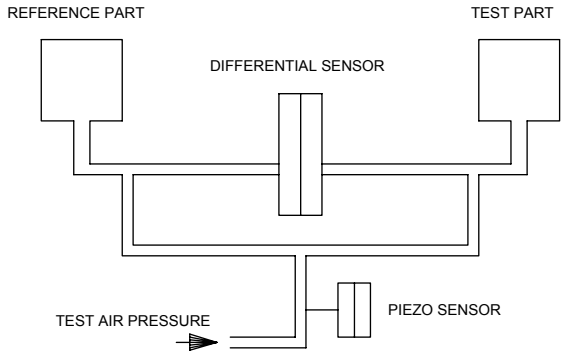
PREAMBLE

1. DEFINITION OF THE ATEQ F CLASS

The **ATEQ F CLASS** are compact air/air leak detectors used to test the air-tightness of parts on production lines. They are specially adapted for automatic and semi-automatic workbenches. 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	ACCURACY	maximum RESOLUTION
0 – 500 Pa	+/- (2,5% of the pressure + 1 Pa)	0,1 Pa

2.2. TEST PRESSURE MEASUREMENT

RANGE	ACCURACY	RESOLUTION Maximum
F. S. = 75 mbar*	+/- (1,5% of the pressure+ 0,2 hPa)	0,1 % F. S.
F. S. < 0,3 bar	+/- (1,5% of the pressure + 1 hPa)	0,1 % F. S.
0,3 ≤ F. S. ≤ 1 bar	+/- (1,5% of the pressure + 3 hPa)	0,1 % F. S.
1 < F. S. ≤ 5 bar	+/- (1,5% of the pressure + 7.5 hPa)	0,1 % F. S.
5 < F. S. ≤ 10 bar	+/- (1,5% of the pressure + 15 hPa)	0,1 % F. S.

** Spécifique (relatif)*

2.3. MECHANICAL PRESSURE REGULATION

5 kPa to 50 kPa / 20 kPa to 400 kPa / 50 kPa to 900 kPa

3. THE MAIN TYPES OF MEASUREMENTS

There are three measurement methods:

Direct measurement, indirect measurement and sealed component measurement. These three methods apply to measurements taken both under pressure and in vacuum conditions.

The configuration is determined by the application and must be carried out prior to the use of the instrument.

3.1. DIRECT/PRESSURE DROP MEASUREMENT

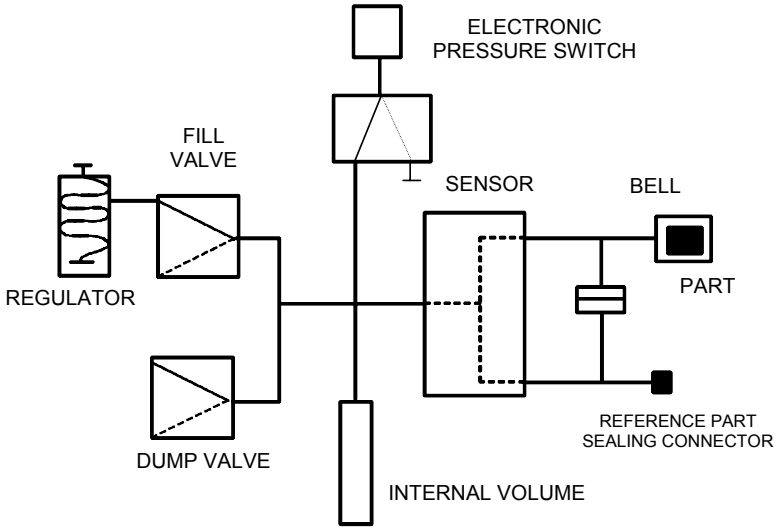
After filling the test and reference parts to the required pressure level, the **ATEQ F CLASS** measures the differential pressure between the two volumes which are separated by the equalisation valve.

At the end of a cycle, the **ATEQ** empties the components via the dump valve.

3.2. INDIRECT/ PRESSURE RISE MEASUREMENT

The test part is placed in a sealed bell and the **ATEQ F CLASS** is pneumatically connected to the bell. The part is externally pressurised (with up to 20 MPa or 200 bar), and the bell is lightly pressurised. In the event of a part leakage, the pressure in the bell will rise. This method allows certain parts to be tested at high pressure levels whilst avoiding the associated constraints. The **ATEQ F CLASS** only tests and measures the pressure in the bell. In the event of a large leak, electronic monitoring of the pressure in the bell will switch the instrument to safety.

3.3. SEALED COMPONENT MEASUREMENT

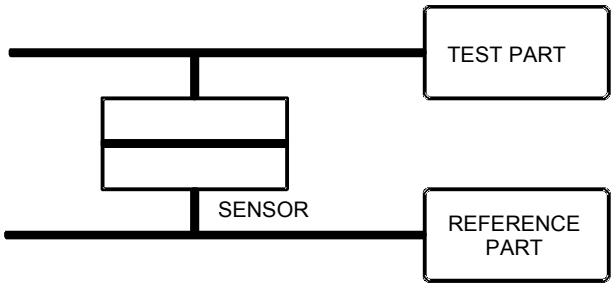


This test is for hermetically sealed parts, which can not be filled. They are placed inside a bell which is pressurised.

The first and the third measurements may be carried out in comparison with a **reference**, **without reference or in central zero.**

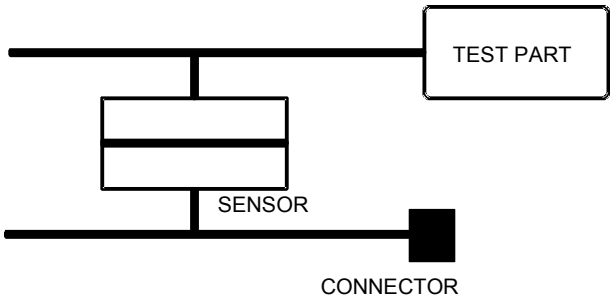
4. THE THREE TYPES OF TEST

4.1. TEST WITH REFERENCE



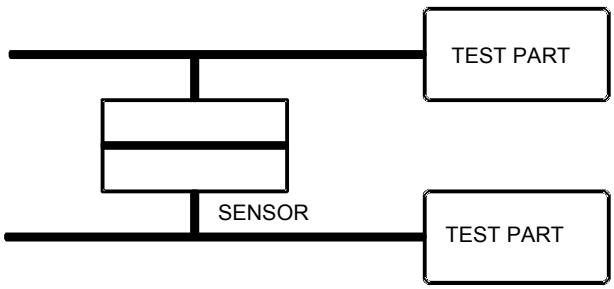
Measurement of a pressure variation between a test part and a reference part. The ideal measurement conditions are: part and reference part identical and identical **ATEQ** connections to both parts (identical lengths, diameters, and type of pipes). A measurement taken with a reference part saves time because the pressure equalisation is more rapid. It is valid for parts which cannot be deformed and which mimic thermal and mechanical effects.

4.2. TEST WITHOUT REFERENCE



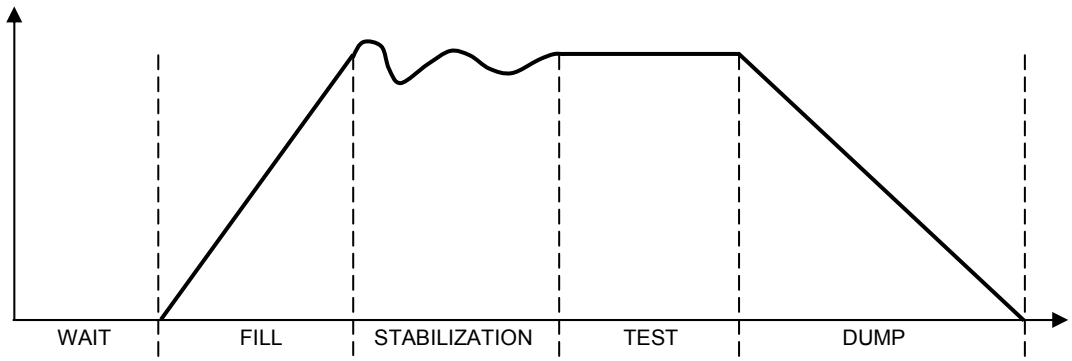
Measurement of a variation in pressure between a test part and a sealing connector on the reference side. A test without reference is not recommended unless parts with very small volumes are being tested. It is preferable always to have a certain volume on the reference side.

4.3. TEST WITH CENTRAL ZERO



It is possible to test two parts at the same time. One part is connected to the test side and the other to the reference side. The differential sensor measures the drop in pressure in one part in relation to the other. This method may be used when the number of bad parts is very low (generally less than 1%). The probability of having two bad parts at the same time is very low. This method is also used for deformable parts and parts with a constant temperature which is different from the ambient temperature. The central zero test offers a considerable time gain (two parts tested simultaneously).

5. DIRECT MEASUREMENT, PRESSURISATION



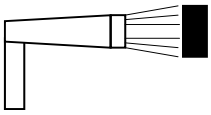
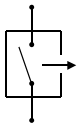
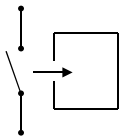
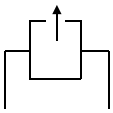
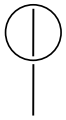
The measurement cycle consists of 5 phases:

	1	2	3	4	5	
Start	**Wait time**	**Fill time**	**Stabilization time**	**Test time**	**Dump time**	Cycle end

Start	cycle start
The **wait** time	The time during which the sealing connections are made to the test parts before the part is filled. The instrument may be fitted with the optional automatic connector. This valve is controlled for the duration of the cycle to enable the installation of the expandable joint connectors to be checked
The **fill** time	Pressurisation of the test and reference parts. At the end of the fill time, the **ATEQ** instrument checks the test pressure. If this is not correct, it will signal a test pressure fault.
The **stabilization** time	The test and reference parts are completely cut off from the air supply, but are pressurised to the test pressure level. Pressure and temperature will then stabilise between the two parts which communicate and act similarly. If the test pressure is incorrect (a large leak on one of the volumes) the test pressure will drop rapidly, the instrument will not move on to the test mode and will indicate a fault.
The **test** time	The test and reference parts are isolated from each other and the pressure sensor measures the difference in pressure between them. The signal is electronically assessed and displayed, the part is then diagnosed as good or bad.
The **dump** time	Return of the parts to the atmospheric.
Cycle end	Once the dump has been carried out, the instrument emits a cycle end signal and the automatic connector valve (optional) is deactivated. This valve can control one or more expandable connectors from the beginning to the end of the cycle.

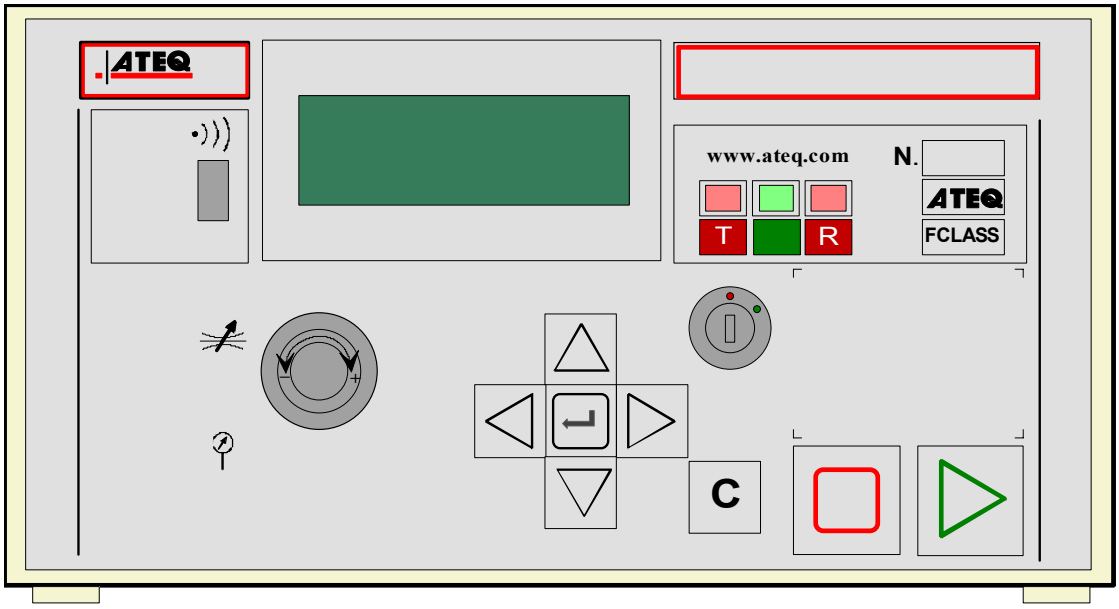
6. SYMBOLS PRESENTATION

Symbol	Name	Function
	Adjust leak connector	Pneumatic connector for the plugging of a calibrated leak (ruby kind) or an adjustable leak.
	Pressure connector	Pneumatic connector for the plugging of a manometer for an external checking of the pressure.
	Pressure supply	of the air supply from the 6 bar network.
	Test circuit supply	Pneumatic connector (according to option) for the plugging of a supplementary pneumatic supply, used in case of test pressure greater than 8 bar.
	Ground connector	Connector for the electric plugging to the ground.
	Automatic connector	Pneumatic connector for the driving of an external logic or pneumatic components (pneumatic sealing connector).
	Connector	Connector for pneumatic output.
	Connector	Connector for pneumatic input.
	Warning!	Read and respect the instructions of the user manual, before plugging and using the instrument.
	Remote control	Connector for the remote control.
	Printer	Connector for printer plugging.

Symbol	Name	Function
	Bar code reader	Connector for bar code reader plugging.
	Output	Dry contact output.
	Input	Dry contact input.
	Infrared link	Infrared link, at this place there's the receiver and transmitter of the infrared link.
	Analogue output	Analogue output.
	Analogue input	Analogue input for the temperature sensor.

Chapter 1
INSTALLATION OF THE INSTRUMENT

1. APPEARANCE OF THE ATEQ F CLASS

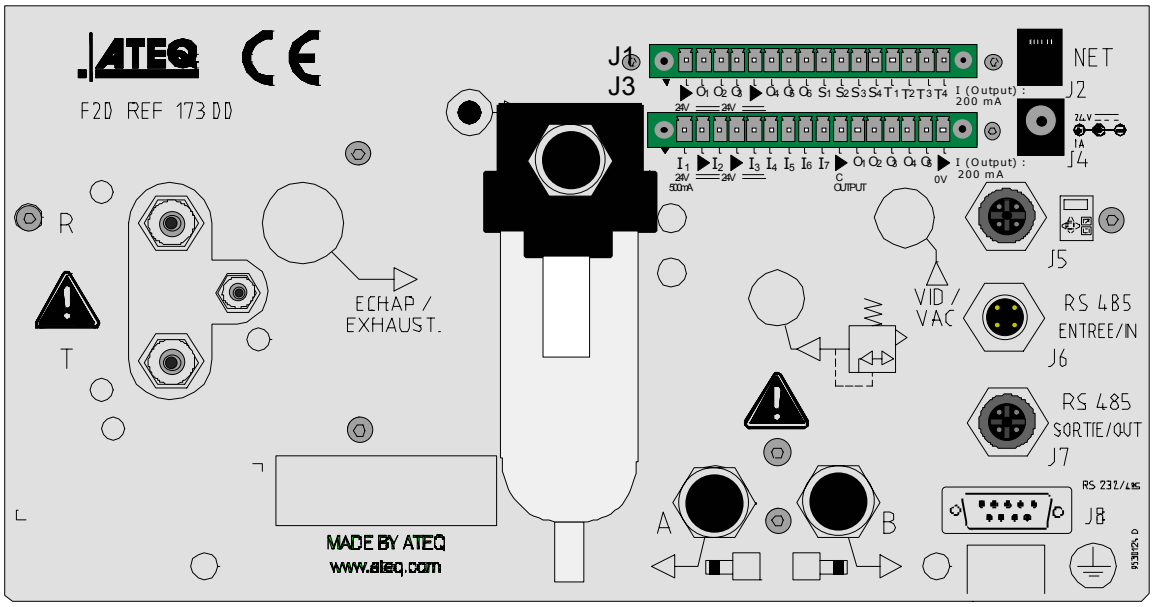


The **ATEQ F CLASS** is supplied in a moulded, painted sheet metal case and rests on four rubber feet. The upper cover is attached to the main body by two screws.

The shape of the case has been altered so that the instrument fits easily inside it. A power supply unit is supplied with the instrument.

2. INSTALLATION OF THE INSTRUMENT

2.1. LAYOUT OF CONNECTORS ON THE F CLASS CABINET



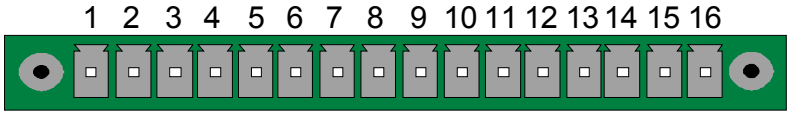
2.2. CONNECTOR DETAILS

2.2.1. Electrical connectors

The **ATEQ F CLASS** operate on a voltage of 24V DC either:

- ✓ using the 24V DC transformer supplied with the instrument,
- ✓ or via the networking cable when the instrument is a slave.

2.2.1. 1) J3 Connector (I/O inputs/outputs)



PIN 1	Reset (input 1)	INPUTS (activation by 24 V DC)
PIN 2	Common (+ 24 V DC)	
PIN 3	START (input 2)	
PIN 4	Common (+ 24 V DC)	
PIN 5	Input 3 (program selection)	
PIN 6	Input 4 (program selection)	
PIN 7	Input 5 (program selection)	
PIN 8	Input 6 (program selection)	
PIN 9	Input 7 (programmable input)	
PIN 10	Common	DRY CONTACT OUTPUT 60V AC / DC Max 200mA Max
PIN 11	Part OK output	
PIN 12	Test part default output	
PIN 13	Reference part default output	
PIN 14	Warning output	
PIN 15	Cycle end output	
PIN 16	0 V	

2.2.1. 2) Activating a program from the J3 connector inputs

To activate a program from the J3 connector inputs, you have to select pins 5 to 9 (one or more). Binary weight n + 1.

Pin combinations for program selection

Program number	Pin 5 (Input 3)	Pin 6 (Input 4)	Pin 7 (Input 5)	Pin 8 (Input 6)
1	0	0	0	0
2	1	0	0	0
3	0	1	0	0
4	1	1	0	0
5	0	0	1	0
6	1	0	1	0
7	0	1	1	0
8	1	1	1	0
9	0	0	0	1
10	1	0	0	1
11	0	1	0	1
12	1	1	0	1
13	0	0	1	1
14	1	0	1	1
15	0	1	1	1
16	1	1	1	1

2.2.1. 3) J3 Connector (I/O inputs/outputs) programmable input

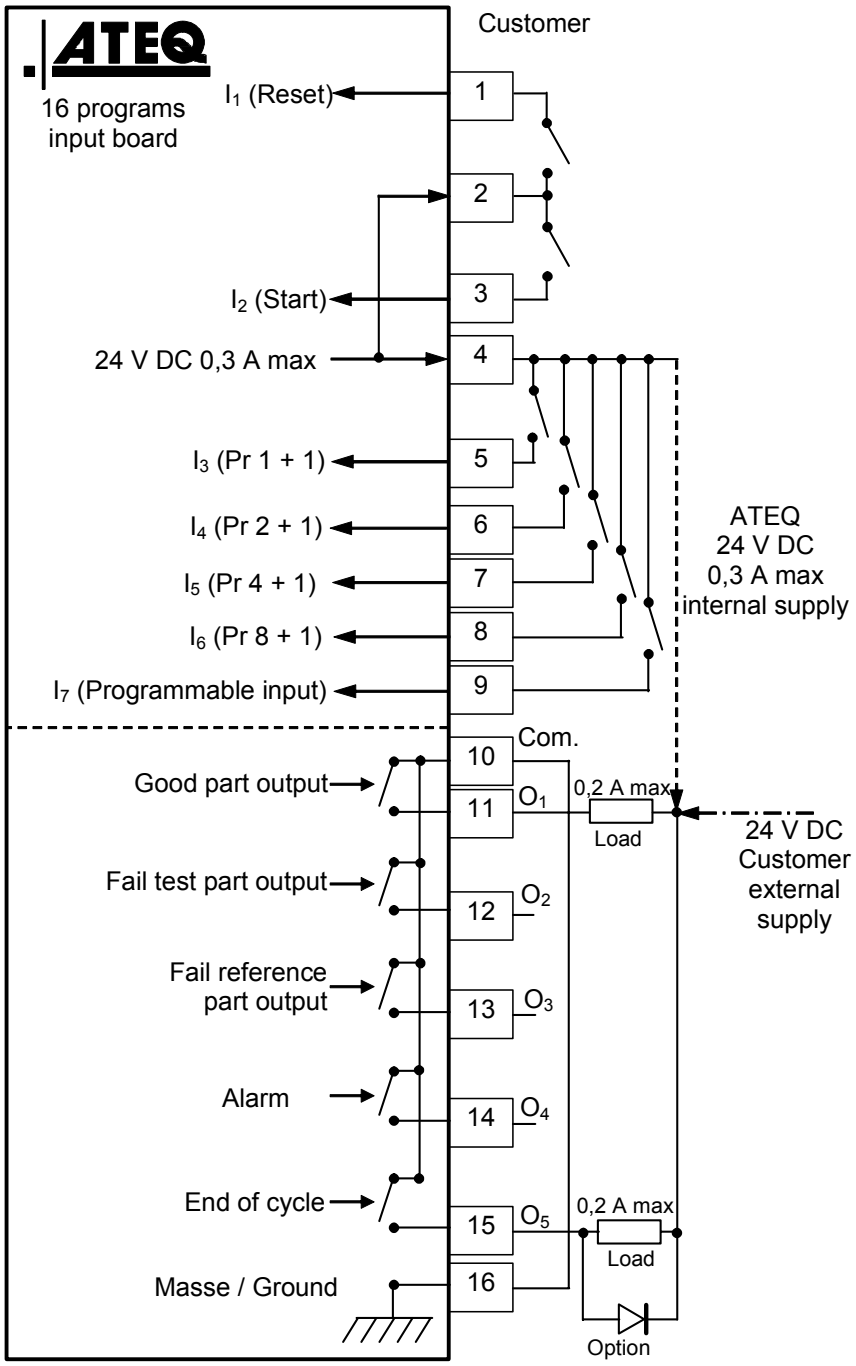
Input 7 (pin 9) can be parameterised in the **CONFIGURATION/PROGRAMM INPUT** menu.

The programmable functions available on this input are all the specials cycle:

- ✓ Program selection.
- ✓ Regulator 1 adjust request.
- ✓ Infinite fill request.
- ✓ Auto zero piezzo request.
- ✓ Calibration learn request.
- ✓ Calibration check request.
- ✓ ATR learn request.
- ✓ Volume calculation request.

Some possibilities appear only if the function is used.

2.2.1. 4) J3 Connector (I/O inputs/outputs) drawing



***Note**: The 24V power supply must be provided by the internal power supply of the ATEQ instrument (0,3A maximum) **OR** through an external power supply provided by the customer.*

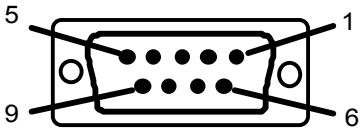
2.2.1. 5) J4 Connector

Used for connection of the power supply.

The voltage must be 24 V DC with minimum current 1.25 A.

The instrument can be supplied from the J3 connector relay board on the 24 V DC pin.

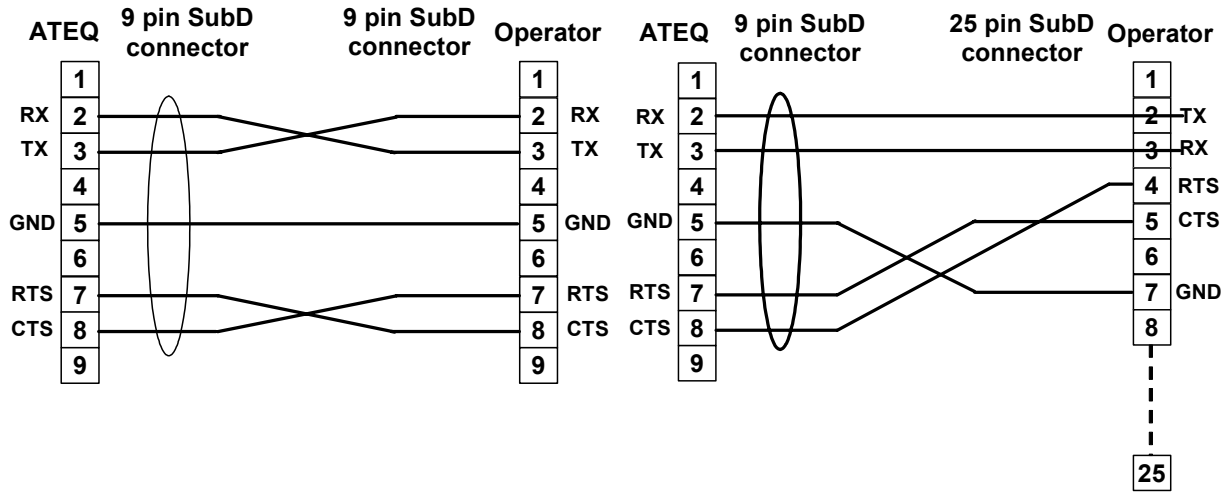
2.2.1. 6) J8 Connector (RS232)



Used for connection of a printer, a bar-code reader, a PC or a memory module.

PIN 1	Not used	PIN 6	Not used
PIN 2	RXD Data reception	PIN 7	RTS (Request to send)
PIN 3	TXD Data emission	PIN 8	CTS (Clear to send)
PIN 4	Not used	PIN 9	Not used
PIN 5	Earth		

2.2.1. 7) Examples of RS232 cables



2.2.2. Pneumatic connectors

Pneumatic connectors can be on the front or rear panels of the **F CLASS** instrument. On the **F CLASS** instrument the connectors are only on the underside.

These pneumatic outputs may take on the functionalities shown below depending on the configuration requested when the instrument was purchased.

"Automatic connector A" output	"Automatic connector B" output
Automatic connector A	Automatic connector B
Automatic connector A	Marking (output code 1 used)
Automatic connector A	External dump (output code 2 used)
Marking (output code 1 used)	Dump (output code 2 used)

2.2.2. 1) Automatic connector A

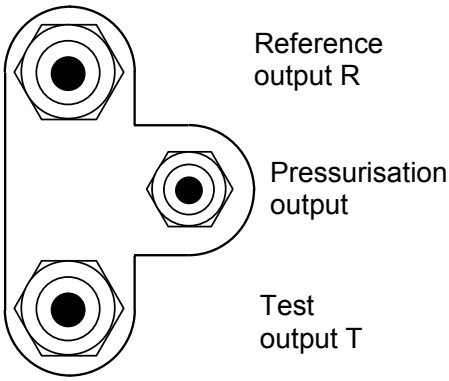
Used for connection of an automatic pneumatic connector.

2.2.2. 2) Automatic connector B

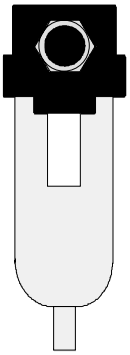
Used for connection of a second automatic pneumatic connector.

2.2.2. 3) Pneumatic inputs/outputs

These outputs enable parts to be connected (test, reference). Depending on their position on the **F CLASS** case (front or rear panel), the test and reference outputs may be reversed. The pressurisation output is used for the addition of **ATEQ** accessories (Y valve).



2.2.2. 4) Pneumatic supply



Air supply is via the filter located on the rear panel of the instrument.

It is essential that the air supplied is clean and dry. Even though there is a filter, supplied with the instrument, the presence of dust, oil or impurities may cause malfunction.

When the instrument is working in vacuum conditions, impurities must be prevented from being drawn into its interior. For this purpose we strongly recommend that a suitable airtight filter is installed between the test part and the instrument. This filter can be supplied by **ATEQ**.

The presence of impurities, oil or humidity in the air may cause deterioration which will not be covered by the guarantee.

In accordance with ISO standard 8573-1 concerning classes of compressed air for measurement instruments in an industrial environment:

ATEQ recommends:

- Grain size and concentration CLASS 1 (0.1 µm and 0.1 mg/m^3)
- Dew point under pressure CLASS 2 (- 40° dew)
- Maximum concentration of oil CLASS 1 (0.01 mg/m^3)

ATEQ recommends the installation:

- of an air dryer to provide dry air at less than - 40° dew point,
- of a 25 micron and 1/100 micron double filter.

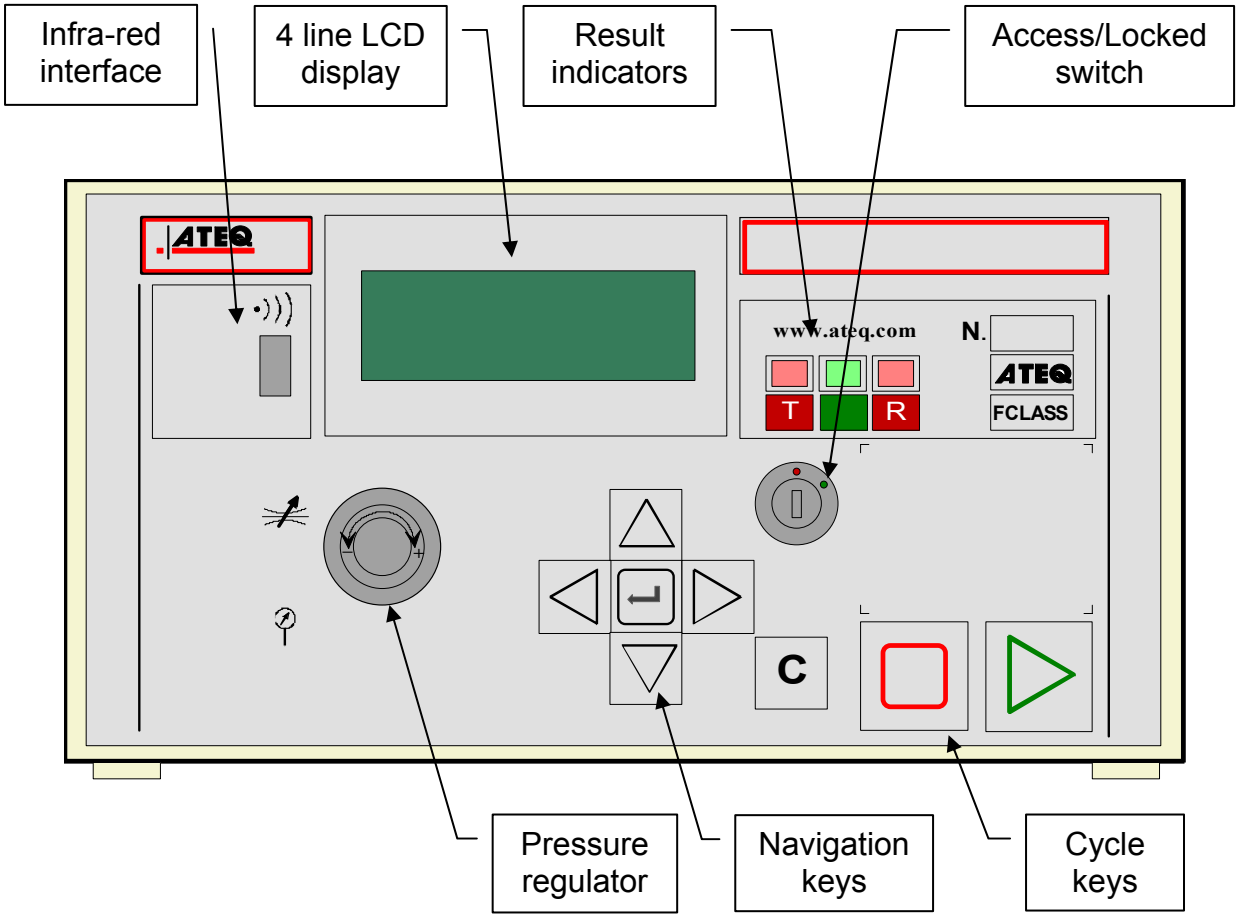
Optimisation of operation:

The supply pressure must always be between 4 and 8 bar to ensure that the pneumatic distributors operate with optimum efficiency.

When a mechanical regulator is used, the supply pressure must be a minimum of 100 kPa (1 bar) greater than test pressure with a minimum of 400 kPa (4 bar).

Chapter 2
USER INTERFACES

1. APPEARANCE OF F CLASS FRONT PANEL



2. DESCRIPTION OF THE KEYBOARD KEYS

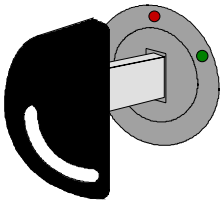
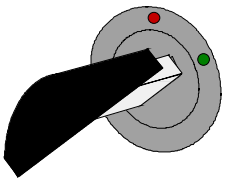
2.1. CYCLE KEYS

KEY	FUNCTION
▷	**START** key Starts a measurement cycle
▢	**RESET** key Stops a cycle in progress

2.2. NAVIGATION KEYS

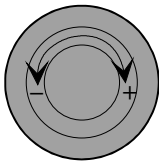
KEY	FUNCTION	KEY	FUNCTION
△	Scroll up or increase numerical values	◁	Not used
▽	Scroll down or decrease numerical values	▷	Not used
↵	**ENTER** key Opening a menu Entering a parameter Confirmation of a parameter	C	« **C** » for **CANCEL** Return to the previous menu or function Escape without modifying a parameter

3. LOCKABLE SWITCH

POSITION	FUNCTION
	**LOCKED** position. Access to adjustable parameters not possible.
	**ACCESS** position. Adjustable parameters may be accessed.

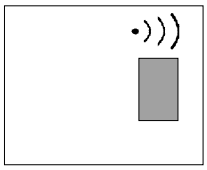
***Note**: whatever position the key is in (**LOCKED** or **ACCESS**), test cycles can be started and stopped.*

4. REGULATOR



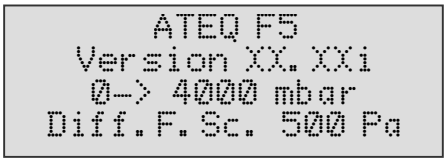
Used to adjust the test pressure

5. INFRA-RED INTERFACE



Not used.

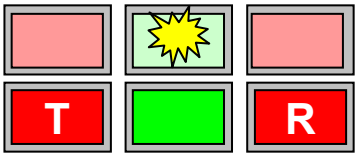
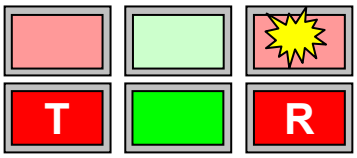
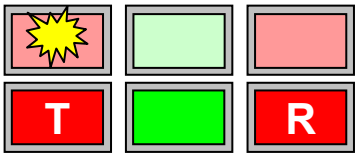
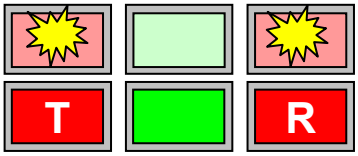
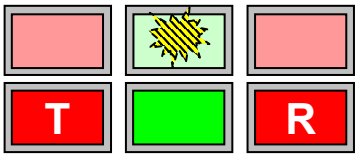
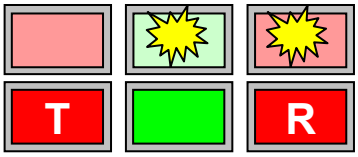
6. 4 LINE LCD DISPLAY



Used to display measurements and adjustable parameters. In the example opposite, XX.XXi represents the program version for the instrument.

7. FUNCTIONS OF THE INDICATOR LIGHTS

The  symbol represents an indicator which is lit.

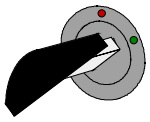
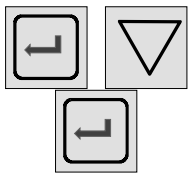
Test part OK indicator	
Reference side BAD part indicator	
Test side BAD part indicator	
Warning	
Sleep (intermittently flashing indicator)	
Recoverable parts (indicators continuously lit)	

Chapter 3
START-UP AND SETTINGS

1. POWERING-UP THE ATEQ F CLASS

Supply the apparatus with 24 V DC. When powered up the instrument:	
displays version and the full scale of the sensors…	ATEQ F5 Version XX.XXi 0-> 4000 mbar Diff. F. Sc. 500 Pa
…then displays the main menu.	RUN/Pr:001 PRESS = 0.000 bar READY

2. CREATION OF A TEST PROGRAM

To modify the parameters, turn the key to the **ACCESS** position.		RUN/Pr:001 PRESS = 0.000 bar READY
To access the main menu, press **ENTER**. In the main menu, place the cursor in front of the **PARAMETERS** menu. Confirm with the **ENTER** key.		MAIN MENU RUN PROG. : --- ▶PARAMETERS SPE CYCLE :Disabled
The **PARAMETERS** menu is used to manage test programs. ☞If the various programs to be created have different parameters, they must be created one by one. ☞If the programs have identical parameters, a base program can be created and then the Copy-Paste function can be used to duplicate the program as many times as is necessary.		PARAMETERS ▶Copy-Paste Pr :001 ---------- Pr :002 ----------

2.1. CHOICE OF THE PROGRAM NUMBER

Position the cursor in front of the chosen program number and confirm with the **ENTER** key.	▽ ↵	PARAMETERS Copy-Paste ▶Pr :001 ---------- Pr :002 ----------

2.2. TEST TYPE SELECTION

Four types of test are available.

The **PARAMETERS** menu gives access to four possible types of test : leak test (**LEAK TEST**), pressure test (**BLOCAGE**), desensitised mode test (**D. MODE**) and an operator test (**OPERATOR**); see the following paragraph for explanations. Put the cursor in front of the required test type and confirm with the **ENTER** key.	▽ ↵	PARAM/TYPE ▶LEAK TEST BLOCKAGE D MODE

2.2.1. Leak test

The leak test is most suitable for measuring small leaks (pressure drop). The following formula is used to convert a leak expressed in units of flow to a drop in pressure:

$$\Delta P\ (Pa/s) = \frac{F\ (cm^3/min)}{0{,}0006 \times V\ (cm^3)}$$

F(cm^3/min)	=	Leak flow	V (cm^3)	=	volume of the test part
0.0006	=	constant	ΔP (Pa/s)	=	pressure drop

Example :

Part which has dP/dt = 50 Pa/s			Part which has dP/dt = 1 Pa/s		
Test	Pa/s	Pa	Test	Pa/s	Pa
1 s	50	50	1 s	1	1
2 s	50	100	2 s	1	2
3 s	50	150	3 s	1	3
.	.	.	.	.	.
.	.	.	.	.	.
n s	50	nx50	n s	1	n

The choice of working in Pa or in Pa/s depends on the application.

In all events, it must not be forgotten that the full scale of the sensor in Pa or Pa/s is limited to 50 or 500 Pa depending on the instrument configuration.

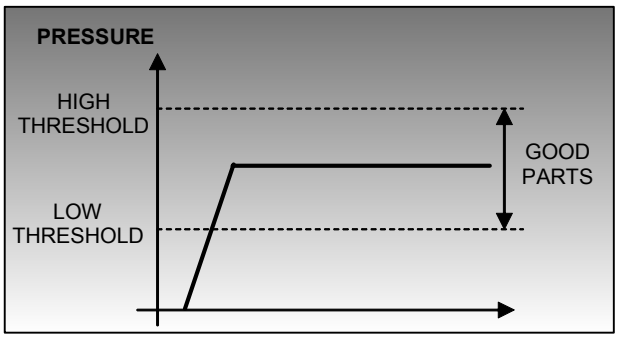
2.2.2. Blockage test mode

The blockage mode is used for rough measurement of a flow, based on measurement of back pressure.

The standard pressure limits are used to classify the result as good or bad. The cycle only contains the fill phase and the reading is carried out during this phase.

If the pressure measured is below the minimum limit, then the flow is too large.

If the pressure measured is in excess of the maximum limit, then the flow is too small.



2.2.3. Desensitised mode test

This mode is used for the measurement of large leaks, when the reject level required is above 500 Pa.

The unit used during the reading of the pressure drop in desensitised mode is the unit which is used for the display of the test pressure (identical resolution). The limits will also be indicated in this unit.

☞Calibration may not be used in this mode.

2.2.4. Operator mode test

This type of test means that the operator can carry out operations on the part whilst under test, then to confirm these operation using a "**START**" key if the operator test is good, or **"RESET"** key if the test is fail.

2.3. PARAMETER SETTINGS

Once the test type is chosen, the test cycle parameters must be set.

The procedure to follow for setting the test parameters is identical in each case.

Example: Coupling time A.

First, position the cursor in front of the chosen parameter using the navigation keys (here, Coupl. A).	△ ▽	PARAM/pr001 TYPE : LEAK TEST ▶COUPL. A: 00.00 s FILL : 00.00 s
Then, confirm with the **ENTER** key. The cursor will move to the right of the display.	↵	PARAM/pr001 TYPE : LEAK TEST COUPL. A: 00.00 s◀ FILL : 00.00 s
Modify the value using the navigation keys.	△ ▽	PARAM/pr001 TYPE : LEAK TEST COUPL.A : 00.03 s◀ FILL : 00.00 s
Once the value is modified, confirm with the **ENTER** key.	↵	PARAM/pr001 TYPE : LEAK TEST ▶COUPL.A : 03.00 s FILL : 00.00 s
To move on to the next parameter, use the navigation keys.	△ ▽	PARAM/pr001 TYPE : LEAK TEST COUPL. A: 03.00 s ▶FILL : 00.00 s
To exit from the menu, use the **CANCEL** key.	**C**	PARAMETERS Cut-Paste Pr:001 LEAK ▶Pr:002 LEAK

2.3.1. Coupling time

Coupling times A and B are start of cycle parameters. If there is no automatic connector, Coupling time A is part of the cycle.

If an instrument is fitted with an automatic connector, Coupling time A delays the pressurisation of the test part by allowing the activation of a first cycle connector at the test start. Coupling time B allows the activation of a second automatic connector. These Coupling times ensure better stabilisation of the seals placed on the test part.

☞Set this parameter using the method described in paragraph 2.3.

2.3.2. Fill time

This is the time allowed for the pressurisation of the part to be tested. It must not be too long (waste of time) or too short (the pressure in the component is at risk of not being sufficient due to drops in pressure caused by temperature changes).

To determine the appropriate fill time, it is necessary to set the **Fill Time** in order to make it **Too Long** (TTLR), then to shorten it until a drop in pressure occurs due to thermal effects.

Determine the TTLR by using the following formula :

$$TTLR = \sqrt[4]{\text{volume in cm}^3 \text{ x test pressure in mbar}}$$

- ✓ Carry out a cycle. When the instrument switches to the stabilisation period, the pressure must remain stable.
- ✓ A pressure drop (since there will be no fall in pressure due to thermal effects) signifies the presence of a large leak; check the test part and the pneumatic assembly components, then start again.
- ✓ If the pressure remains stable, the part does not contain a large leak and the fill time is too long. Shorten it progressively by carrying out cycles until a drop in pressure is noticeable.
- ✓ As soon as a fall in pressure due to thermal effects appears, the fill time has become too short. Increase it slightly.

☞Set this parameter using the method described in paragraph 2.3.

2.3.3. Stabilisation time

This time is used to equalise the pressure between the **TEST** and **REFERENCE** components.

Two phenomena may interfere with the equalisation :

✓ **Different pipes**

The first phenomenon that may appear is a pressure variation between the components, caused by thermal effects. In actual fact, if the connection pipes are different (length or diameter) the target pressure will be reached faster in the part with the most favourable set-up. If the differential sensor switches to measurement too early, the instrument will indicate the presence of a large leak.

✓ **Different volumes**

The second phenomenon which may appear is a pressure difference between the components due to their differing volumes.

In effect, if, at the end of the fill time, the volumes are different, the component with the smaller volume will stabilise faster. If the differential sensor switches to measurement too early, the instrument will indicate a large leak.

- ✓ To determine the correct stabilisation time, it is necessary to set a long time so that the reading at the end of the test time is equal to zero.
- ✓ Set the stabilisation time to four times the length of the fill time.
- ✓ Carry out a cycle. When the instrument switches to the test period, the pressure must remain at zero.

- ✓ If there is a drop in pressure, there is a small leak present. Check the test part and the pneumatic connections, then start again.
- ✓ If the pressure is stable, the part does not contain a small leak and the stabilisation time is therefore too long. Progressively shorten and carry out cycles (wait one minute between each cycle) until you see the appearance of a drop in pressure. This indicates that the stabilisation time has become too short. Increase it slightly.

☞Set this parameter using the method described in paragraph 2.3.

2.3.4. Test time

The test time depends on the programmed reject level and operation mode

In the dP/dt (Pa/s) mode, the variation in measured pressure is due to the drift in the pressure drop. .

In the dP (Pa) mode, the pressure variation measured is the total of the pressure drop over the whole test time. This mode is more unstable, but is more sensitive. The instrument totals all the variations occurring due to variations in volume or temperature over the whole test time.

☞Set this parameter using the method described in paragraph 2.3.

2.3.5. Dump time

The instrument will as default propose a dump time of zero. This must be set by carrying out several tests.

☞Set this parameter using the method described in paragraph 2.3.

2.3.6. Pressure units

The different units are bar, mbar, PSI, Pa, kPa, Mpa.

☞ Set this parameter using the method described in paragraph 2.3.

2.3.7. Maximum fill

This function is used to set a maximum limit for the fill pressure. A warning is triggered if this limit is exceeded.

⚠ When test time is infinite, the maximum fill pressure monitoring is inoperative. Care should therefore be taken to avoid excess pressure being applied to the part during the test.

☞ Set this parameter using the method described in paragraph 2.3.

2.3.8. Minimum fill

This function is used to set a minimum limit for the fill pressure. A warning is triggered if this limit is not reached.

☞ Set this parameter using the method described in paragraph 2.3.

2.3.9. Filling instruction

This function gives the user the option not to have to adjust the test pressure manually using the regulator. Simply set the test pressure value and the instrument adjusts it automatically. This function can be used with a mechanical regulator (regulator with an adjustable knob) or an electronic regulator (no adjustment).

2.3.9. 1) Setting

Simply set the regulator to a pressure which is higher than test pressure. When target fill pressure is reached, the air supply is automatically cut off and the instrument moves into stabilisation mode.

2.3.10. Reject unit

Pa, Pa/s, (High Resolution) Pa, (High Resolution) Pa/s, Cal-Pa, Cal-Pa/s, cm^3/min, cm^3/s, cm^3/h, mm^3/s.

If a unit of flow is selected, two parameters will be added to the program:

- ✓ the choice of the flow calculation basis, in Pa or Pa/s
- ✓ the volume of the test part (+pipes).

There is a special “calc volume” cycle which enables the volume of a part to be estimated, and there is a special "Cal learn" cycle to determine a basic unit of flow. (see chapter 4 paragraph 3.6 "volume calculation" and paragraph 3.7 "manual calibration").

***Note:** high resolution enables an extra figure to be displayed (i.e. 1/10 Pa)*

☞ Set this parameter using the method described in paragraph 2.3.

2.3.11. Test reject

This function is used to set a limit level below which the part is considered to be bad.

☞ Set this parameter using the method described in paragraph 2.3.

2.3.12. Reference reject

This function is used to set a limit level below which the reference part is considered to be bad.

***Note**: when the reference reject value is zero, the program allows for the absolute value of the test reject (for example : if the test reject is 10 Pa, and the reference reject value equal to zero, the program takes the reference reject to be – 10 Pa).*

☞ Set this parameter using the method described in paragraph 2.3.

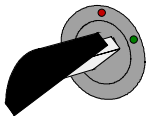
2.3.13. Functions

The **FUNCTION** menu gives access to additional parameters which must first be activated in the **CONFIGURATION** menu and then the **EXTENDED MENU** .

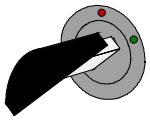
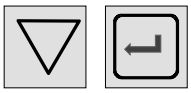
If no additional parameters are confirmed in the **EXTENDED MENUS** , the **FUNCTION** menu will be empty when selected.

To activate these parameters, refer to chapter 4 paragraph 2.

3. DUPLICATION OF A TEST PROGRAM

To modify the parameters, turn the key to the **ACCES** position.		
Starting from the main menu, position the cursor in front of the **PARAMETERS** function.	△ ▽	MAIN MENU RUN PROG.: 001 ▶PARAMETERS SPE CYCLE : Disabled
Confirm with the **ENTER** key. The cursor will appear in front of the Copy-Paste function. Confirm the function again using the **ENTER** key.	↵ ↵	PARAMETERS ▶Copy-Paste Pr : 001 ENGINE Pr : 002 HEAD
Next, confirm the **COPY** function**.**	↵	PARAM/Copy-Paste ▶COPY : Pr --- PASTE : Pr ---
Display the number of the program to be copied using the navigation keys. (In this case, program no.1). Confirm using the **ENTER** key.	△ ▽ ↵	PARAM/Copy-Paste COPY : Pr 001 ◀ PASTE : Pr ---
Placer the cursor in front of Paste.	△ ▽	PARAM/Copy-Paste COPY : Pr 001 ▶PASTE : Pr ---
Confirm with the **ENTER** key. Assign a number to this new program using the navigation keys (For example no.3).	↵ △ ▽	PARAM/Copy-Paste COPY : Pr 001 PASTE : Pr 003 ◀
Confirm with the **ENTER** key, The display confirms that the program has been copied.	↵	COPY IN PROGRESS
The program no.1 parameters have now been copied into program no.3 parameters. In this example program no.3 is an exact copy of program n°1.		PARAM/Copy-Paste COPY : Pr 001 ▶PASTE : Pr 003
Press the **CANCEL** key twice to return to the main menu.	C C	MAIN MENU ▶PARAMETERS SPE CYCLE: Disabled CONFIGURATION

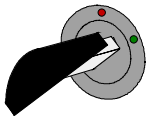
4. DELETING A PROGRAM OR A PROGRAM NAME

To modify the parameters, turn the key to the **ACCES** position.		
Position the cursor in front of **PARAMETERS** function. Confirm with the **ENTER** key.		MAIN MENU RUN PROG.: 001 ▶PARAMETERS SPE CYCLE : Disabled
Position the cursor in front of the program number or the program name to be deleted.		PARAMETERS Copy-Paste ▶Pr: 001 ENGINE Pr: 002 HEAD
Confirm once to enter the program.		PARAM/Pr001 ▶TYPE : LEAK WAIT A: 00.00 s WAIT B: 00.00 s
Confirm a second time to gain access to the delete menu. There are two possibilities : delete the program name or delete the whole program.		M/Pr001/TEST TYPE ▶Delete name Program reset
1°) Confirm a third time. The name of the program is deleted.		PARAMETERS ▶Copy-Paste Pr: 001 ---------- Pr: 002 HEAD
2°) Place the cursor in front of Program reset.		M/Pr001/TEST TYPE Delete name ▶Program reset
Confirm with the **ENTER** key. The program is then deleted.		PARAMETERS ▶Copy-Paste Pr: 001 ---------- Pr: 002 HEAD

***Note**: if the operation "delete program" is done in first, then the program name is deleted too.*

5. STARTING A CYCLE

5.1. CHOICE OF THE PROGRAM TO BE RUN

Position the key in the **ACCESS** position.		
Starting from the main menu, place the cursor in front of the **RUN PROG.** function.	△ ▽	MAIN MENU ▶RUN PROG.: 001 PARAMETERS SPE CYCLE : Disabled
Confirm with the **ENTER** key.	↵	MAIN MENU ▶RUN PROG.: 001 PARAMETERS SPE CYCLE : Disabled
Display the number of the program required by scrolling through the numbers with the navigation keys.	△ ▽	MAIN MENU RUN PROG. : 004 ◀ PARAMETERS SPE CYCLE : Disabled
Confirm your choice with the **ENTER** key.	↵	MAIN MENU ▶RUN PROG. : 004 PARAMETERS SPE CYCLE : Disabled

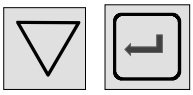
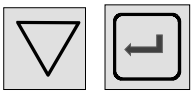
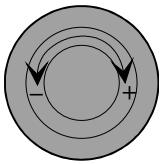
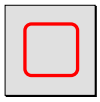
5.2. SETTING THE TEST PRESSURE

5.2.1. Manual setting with a mechanical regulator

Position the cursor in front of the **SPE CYCLE** function and confirm with the **ENTER** key.		SPE CYCLE ▶Disabled Regulator adjust Infinite Fill
Next, position the cursor in front of Regulator adjust and confirm with the **ENTER** key.		SPE CYCLE Disabled ▶Regulator adjust Infinite fill
The display confirms that the special cycle has been selected.		MAIN MENU RUN PROG. : 001 PARAMETERS ▶SPE CYCLE : Regul
Press the **START** key to launch a special cycle.		RUN/Pr: 001 PRESS = 355.5 mbar REGULATOR 1 ADJUST
Set the test pressure by using the regulator.		RUN/Pr: 001 PRESS = 1000 mbar REGULATOR 1 ADJUST
Once the pressure is set, press the **RESET** key to stop the special cycle.		RUN/Pr: 001 PRESS = 0.000 bar READY

5.2.2. Setting a filling instruction using an mechanical regulator

To access the filling instruction function, it must first be activated in the expanded menus before the test program is created. Refer to chapter 4 paragraph 2.1 "**EXTENDED MENUS**" and paragraph 2.1.1 "**Activation of additional functions**". Then refer to paragraph 2.1.3.7 "**Fill mode**". If the instrument is fitted with two regulators also refer to paragraph 2.1.3.9 "**Fill regulator**" to identify which of the two regulators is the fill regulator.		
When the special functions have been activated, return to the test program and select the **FUNCTION** menu. Confirm using **ENTER**.		PARAM/PR001 Test FAIL :000 Ref. FAIL :000 ▶FUNCTIONS
Then place the cursor in front of "**KIND FILL**". Validate with "**ENTER**" key.		PARAM/Pr001/FUNCTION ▶Pre-FILL : No FILL MODE : No
Validate the function in display "**Yes**" using up and down arrows. Validate with "**ENTER**" key.		PARAM/Pr001/FUNCTION ▶Pre-FILL : Yes FILL MODE : No
The display indicate in which kind of fill is selected. Validate with "**ENTER**" key.		PARAM/Pr001/FUNCTION ▶P.FILL MODE : STAND
Then place the cursor in front of **INSTRUCTION** and confirm using **ENTER**.		CT/Pre-F/P.FILL MODE STANDARD ▶INSTRUCTION BALISTIC
Confirm again using **ENTER**.		/FONCT/FILL /I. FILL ▶I. Fill : 1.00
Set a target value for the fill (the unit for the target point is that of the unit of pressure).		/FONCT/FILL /I. FILL I. Fill : 1.00 ◀

Confirm using ENTER. **<u>From now on, when the instrument is carrying out a cycle, it will stop the fill when the target point is reached</u>**		/FONCT/FILL /I. FILL ▶I. Fill : 2.00
Then the mechanical regulator must be set. Return to the main menu using the **CANCEL** key. (Several successive pushing).		MAIN MENU RUN PROG : 001 ▶PARAMETERS SPE CYCLE : Disabled
Place the cursor before the **SPE CYCLE** function and confirm using **ENTER**.		SPE CYCLE ▶Disabled Regulator adjust Regul. 2 Adjust
Then place the cursor before Regulator adjust and confirm using **ENTER**.		SPE CYCLE Disabled ▶Regulator adjust. Regul. 2 Adjust
The display confirms that the special cycle has been selected.		MAIN MENU RUN PROG : 001 PARAMETERS ▶SPE CYCLE : Regul.
Press the **START** key to start the special cycle		RUN/Pr: 001 PRESS = 0.5 bar REGULATOR 1 ADJUST
Turn the regulator wheel to pressurise. Take the pressure value above the target point.		RUN/Pr: 001 PRESS = 2.5 bar REGULATOR 1 ADJUST
When the pressure has been set, press the **RESET** key to stop the special cycle		RUN/Pr: 001 PRESS = 0.000 bar READY

6. STARTING A MEASUREMENT CYCLE

Press the **START** key to start a measurement cycle.		RUN/Pr: 004 PRESS =0.500 bar READY
The cycle phases are displayed on the LCD window : **WAIT,** **FILL,** **STAB,** **TEST,** **DUMP.**		RUN/Pr: 004 PRESS =1.00 bar STABILISATION

7. STOPPING A CYCLE

Press the **RESET** key to stop the measurement. The display "**READY**" indicates that the instrument is ready to perform a new measurement test.		RUN/Pr: 004 PRESS =0.500 bar READY

Chapter 4
FUNCTIONS OF THE INSTRUMENT

1. MENU STRUCTURE

MAIN MENU		Under menu 1		Under menu 2		Under menu 3		Under menu 4
CYCLE PROG.	>	1 to 16						
v								
PARAMETERS	>	Copy Paste	>	Copy				
v		v		Paste				
v		v						
v		Programs 01 to 16	>	Leak	>	Type: leak	>	Reset name
v				v		Wait A		Delete program
v				v		Fill		
v				v		Stabilisation		
v				v		Test		
v				v		Dump		
v				v		Pressure unit	>	Bar > MPa > kPa > Pa > PSI > mbar
v				v		Maximum fill		
v				v		Minimum fill		
v				v		Filling instruction		
v				v		Reject unit	>	Pa > Pa/s > Pa(HR) > Pa(HR)/s > Cal-Pa > Cal-Pa/s > cm^3/mn > cm^3/s > cm^3/h > mm^3/s
v				v		Test reject		
v				v		Reference reject		
v				v		Functions	>	See note
v				v				
v				Blockage	>	Type: blockage	>	Reset name
v				v		Wait A		Delete program
v				v		Fill		
v				v		Dump		
v				v		Pressure unit	>	Bar > MPa > kPa > Pa > PSI > mbar
v				v		Maximum fill		
v				v		Minimum fill		
v				v		Filling instruction		
v				v		Functions	>	See note
v				v				
v				Desensitise	>	Type: desensitise	>	Reset name
v				v		Wait A		Delete program
v				v		Fill		
v				v		Stabilisation		

v		v		Test		
v		v		Dump		
v		v		Pressure unit	>	Bar > MPa > kPa > Pa > PSI > mbar
v		v		Maximum fill		
v		v		Minimum fill		
v		v		Reject unit	>	Pa > Pa/s > Pa(HR) > Pa(HR)/s > cm^3/mn > cm^3/s > cm^3/h > mm^3/s
v		v		Test reject		
v		v		Reference reject		
v		v		Functions	>	See note
v		v				
v		Operator	>	Type: operator	>	Delete
v				Wait A		Reset name
v				Test		
v				Functions	>	See note
v						
SPECIAL CYCLES	>	Disabled				
v		Regulator adjust				
v		Infinite fill				
v		Piezzo reset				
v		ATR learn				
v		Volume calculation				
v		CAL learn				
v		CAL check.				
v		Calibration check by volume				
v						
CONFIGURATION	>	Extended menus	>	Name		
v		v		Cycling		
v		v		Automatic connector		
v		v		Calibration check		
v		v		ATR0		
v		v		ATR1		
v		v		ATR2		
v		v		Pre-fill mode		
v		v		Fill mode		
v		v		End cycle		
v		v		Mini valve		
v		v		recoverable limit		
v		v		Peak hold		
v		v		reference volume		
v		v		Volume calculation		
v		v				

v	automatic auto zero piezzo	>	Yes / No			
v	v					
v	Hour	>	Hour			
v	v		Minute			
v	v		Day			
v	v		Month			
v	v		Year			
v	v					
v	Printer	>	RS Parameters	>	Speed	> 4800 > 9600 > 19200 > 28800 > 38400 > 57600 > 115200
v	v		v		Serial port	> 1st-7bit-="0" > 1st-7bit-="1" > 1st-7bit-even > 1st-7bit-odd > 1st-8bit-without >1st-8bit-="0" > 1st-8bit-="1" > 1st-8bit-even > 1st-8bit-odd >
v	v		v			
v	v		Frame	>	Pressure	
v	v		v		Personalisation	
v	v		v		Time keeping	
v	v		v		Before results	
v	v		v		After results	
v	v		v		Inter line	
v	v		v			
v	v		Sending conditions	>	All	
v	v		v		Good part	
v	v		v		Fail test part	
v	v		v		Fail reference part	
v	v		v		Alarm	
v	v		v		Pressure fault	
v	v		v		Recoverable	
v	v		v		Calibration	
v	v		v			
v	v		Export			
v	v		v			
v	v		Print parameters			
v	v					
v	Security	>	Yes / No			
v	v					
v	Light	>	Mode	>	Continuous	
v	v		v		Manual	
v	v		v		Automatic	
v	v		v			
v	v		Intensity	>	00 to 07	
v	v					

v		v		
v		Configuration I/O	>	Program selection
v		v		Regulator adjust
v		v		Infinite fill
v		v		Auto zero piezzo
v		v		ATR learn
v		v		Volume calculation
v		v		CAL learn
v		v		CAL check
v		v		Calibration check
v		v		
v				
SERVICE	>	Parameters	>	Save
v		v		Restore
v		v		Reset
v		v		
v		Sensors	>	Pressure
v				Leak
v				
RESULTS	>	Program		
v		v		
v		Statistics	>	Program
		v		Total
v		v		Good part (OK)
v		v		Fail test part
v		v		Fail reference part
v		v		Recoverable
v		v		Calibration
v		Reset		
v		Print		
v				
LANGUAGE	>	English		
v		French		
v				
STAND BY	>	Now		
		v		
		Power on time	>	Hour
		v		Minute
		v		
		Power off time	>	Hour
				Minute
				Delay

***Note**: the parameters which appear in **EXTENDED MENUS** will be found in the **FUNCTION** menu when they are activated.*

1.1. "FUNCTIONS" MENU WHEN ACTIVATED

MAIN MENU		Under menu 1		Under menu 2		Under menu 3		Under menu 4
FONCTION	>	Cycling	>	Inter cycle				
		v		All				
		v		Good part				
		v		Test fail Part				
		v		Reference fail Part				
		v		Alarm				
		v		Pressure fault				
		v		Recoverable				
		v		Calibration				
		v						
		Automatic connector	>	Wait A				
		v		Wait B				
		v						
		ATR 0 > ATR 1 > ATR 2	>	Begin				
		v		Transient				
		v		Drift				
		v						
		Pre fill	>	Kind of pre fill	>	Standard	>	Maximum pre fill
		v		v		v		Filling instruction
		v		v		v		Pre fill
		v		v		v		Pre dump
		v		v		v		
		v		v		Instruction	>	Filling instruction
		v		v		v		Pre fill
		v		v		v		Pre dump
		v		v		v		
		v		v		Ballistic	>	Filling instruction
		v		v				Pre fill
		v		v				Pre dump
		v		Pre fill regulator	>	1		
		v				2		
		v						
		Fill mode	>	Fill mode	>	Standard	>	Maximum pre fill
		v		v		v		Filling instruction
		v		v		v		Pre fill
		v		v		v		Pre dump
		v		v		v		
		v		v		Instruction	>	Filling instruction
		v		v		v		Pre fill
		v		v		v		Pre dump

v	v	v			
v	v	Ballistic	>	Filling instruction	
v	v			Pre fill	
v	v			Pre dump	
v	Filling regulator	>	1		
v			2		
v					
End of cycle	>	Automatic reset			
v	Reset + dump				
v	Filling				
	Double reset				
v					
Blockage	>	Regulator	>	Regulator 1	
v				Regulator 2	
Mini valve	>	Differential auto zero			
v					
Recoverable levels	>	Test recoverable			
v	Reference recoverable				
v					
Stamping	>	Maintien			
v	All				
v	Pass				
v	Test fail				
v	Reference fail				
v	Alarm				
v	Pressure out				
Peak hold	>	Yes / No			
v					

2. CONFIGURATION MENU

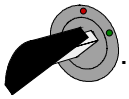
2.1. EXTENDED MENUS

The extended menus offer access to additional functions If these functions are activated, they can be found in the **FUNCTION** menu when a program is created (refer to 3 paragraph 2.3.13). If no additional functions are activated, the **FUNCTION** menu will be empty when a program is created. .

2.1.1. Activation of the additional functions

In the main menu, place the cursor in front of the **CONFIGURATION** label	↵	MAIN MENU SPE CYCLE : Disabled ▶CONFIGURATION RESULTS
Confirm using the **ENTER** key.	↵	CONFIGURATION ▶EXTENDED MENUS PRINTER : YES HOUR
Next, confirm the **EXPANDED MENUS** function with the **ENTER** key. The list of additional functions is then displayed.	↵	CONFI/EXTEND MENUS ▶NAME : No CYCLING : No AUTO CONNECT : No
To activate a function (e.g. the **NAME** function), confirm it with the **ENTER** key. Next, choose **YES** with the navigation keys and confirm again with the **ENTER** key. Start the operation again if you need to activate other functions.	↵ △ ▽ ↵	CONFI/EXTEND MENUS ▶NAME : Yes CYCLING : No AUTO CONNECT : No
Once all the chosen functions are activated, press the **CANCEL** key twice to return to the main menu.	C C	MAIN MENU SPE CYCLE : Disabled ▶CONFIGURATION RESULTS

2.1.2. Setting the additional functions

✓ Place the key in the **ACCESS** position  .

✓ Create a new program (refer to chapter 3 paragraph 2 "Creation of a test program").

✓ In the parameters list for this new program, confirm the **FUNCTIONS** parameter (refer to chapter 3 paragraph 2.3 "Parameter settings").

⚠ **Only the functions which have been activated using the above method will appear in the FUNCTIONS parameter.**

2.1.3. List of additional functions

2.1.3. 1) Name

This function is used to customise a program, for example to name a program after the part to be tested.

☞Select the option and enter settings if necessary.

2.1.3. 2) Program sequencing

This function enables several tests to be carried out by the instrument one after the other. The instrument offers 8 program sequencing criteria.

The sequencing order can be edited; the choice of the following program is defined in the parameters. By default the programs are sequenced according to their original number P+1.

When an active program is sequenced with another program, a "+" is displayed behind the program number.

```
      MAIN MENU
▶RUN PROG.     : 01+
 PARAMETERS
 SPE CYCLE : none
```

Associated parameters to be set: NEXT PROGRAM, INTER-CYCLE (wait or coupling time between two cycles). Chaining conditions: ALL RESULTS (under all result conditions), PASS (part good), TEST FAIL (test part bad), REFERENCE FAIL (reference part bad), ALARM, PRESSURE OUT (pressure error), REWORKABLE (parts which can be repaired), CALIBRATION (calibration error).

☞Select the option and enter settings if necessary.

2.1.3. 3) Automatic connector

The automatic connector is a pneumatic control enabling the driving of an external logic (pneumatic sealing connector). This control is activated at the start of the cycle and is released at the end of the cycle (refer to “cycle end” diagram paragraph 2.1.3.10)

If several programs are chained, the automatic connectors are activated according to the times set as parameters in the first program and are deactivated according to the times set as parameters in the last program in the chain.

They remain active throughout all cycles between the first and last program in the chain.

The various waiting times A are applied in the programs in between.

Associated parameters to be set: WAIT A, WAIT B.

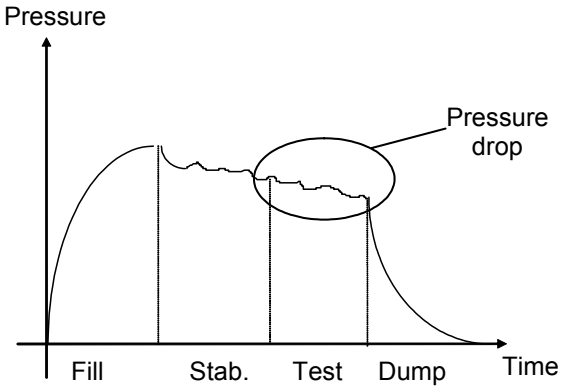
☞Select the option and enter settings if necessary.

2.1.3. 4) Transient attenuation (ATR)

✓ **Problem:**

Is this pressure drop which occurs during the test time due to a leak or a transient effect?

The test environment is not always ideal for the measurement of pressure drops. There are several momentary events (ex: temperature or volume variations...) that can influence the measurement. We call them transient effects.



To avoid any interference, it is possible to increase the stabilisation time to obtain the ideal measurement conditions during the test phase. However, increasing the stabilisation time for each test may not be acceptable at the normal production speed.

✓ **Operational principle:**

The principle consists of measuring the pressure variations caused by transient phenomena through the use of a learning cycle and then removing these variations from the final test result for a part.

Three ATR functions are available: ATR0, ATR1 and ATR2. ATR1 and ATR2 are different because of their learning cycles.

✓ **ATR0:**

The initial value of the transient is known. Parameters must be set manually.

The ATR may only be used on parts which have identical behaviour during the test, in other words, parts which have an identical transient.

Associated parameters to be set are: Start (Initial value of the transient), Transient (actual, non modifiable value of the transient) and Percentage drift (Drift tolerance on acquisition of the transient, as a % of the FAIL level).

☞ Select the option and enter settings if necessary.

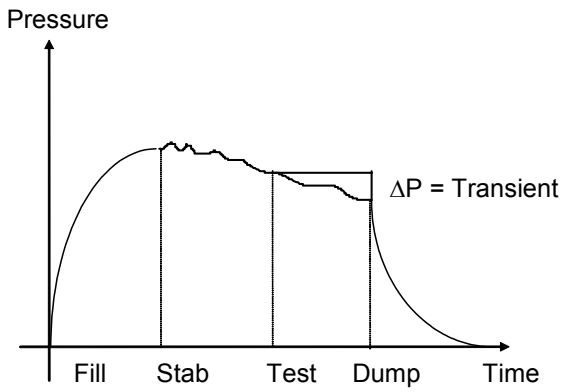
✓ **ATR1:**

The value of the transient is unknown. A special learning cycle must be carried out.

The learning cycle for this function must be carried out on a good leak proof (PASS) part.

The instrument carries out a normal test cycle and considers that the pressure variation measured at the end of the cycle is the transient. This value is saved and taken away from the final result of subsequent tests.

Reasoning: the part is good, therefore the pressure drop measured is the transient.

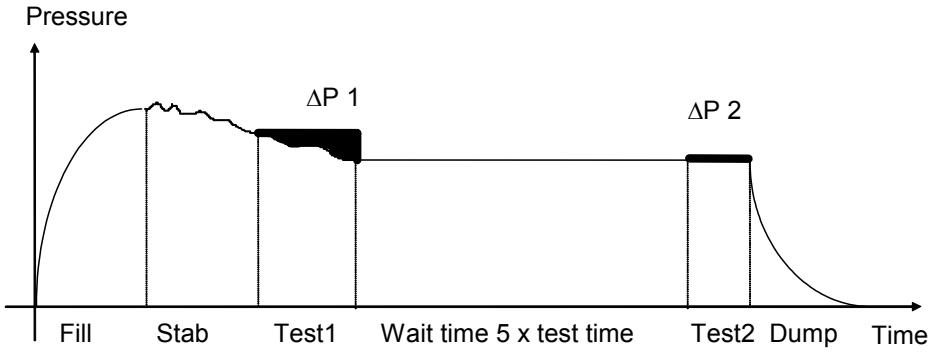


Associated parameters to be set: Start (Initial value of the transient), Transient (actual and non modifiable value of the transient), Percentage drift (Drift tolerance on acquisition of the transient, as a % of the FAIL level).

☞ Select the option and enter settings if necessary.

✓ **ATR 2:**

The value of the transient is not known but the possible leak of the part is taken into account when the transient value is computed during the special cycle.



At the end of test time 1, the ATEQ saves the pressure variation ΔP1, function of the transient and the leak is there is one.

$$\Delta P1 = \text{Leak} + \text{Transient}$$

Following the waiting time (equivalent to 5 times the normal test time), we consider that transient phenomena have disappeared. During the second test time, the ATEQ instrument reads a second pressure drop ΔP2 which corresponds to the leak.

$$\Delta P2 = \text{Leak}$$

By taking these two pressure variations, we can calculate the transient.

$$\Delta P1 - \Delta P2 = (\text{Leak} + \text{Transient}) - \text{Leak} = \text{Transient}$$

It is this transient which will be taken away from the leak measurement of the following cycles.

Through the use of the ATR, the **ATEQ** instrument is able to differentiate a Good (PASS) part from a Bad (FAIL) part without being influenced by the transient effects whilst keeping a short stabilisation time.

Associated parameters to be set: Start (Initial value of the transient), Transient (actual and non modifiable value of the transient), Percentage drift (Drift tolerance on acquisition of the transient, as a % of the reject level).

☞ Select the option and enter settings if necessary.

For ATR learning cycles, refer to paragraph 3.3.10 "ATR learning".

When a parameter is modified but no learning cycle has been carried out, an **ATR** error occurs. The **Alarm** and **End of Cycle** outputs are activated.

Learning may be carried out on a value greater than the reject (FAIL) level and the **Pass** and **End of Cycle** outputs are then activated.

✓ **Transient drift**

Due to the evolution of the test conditions (temperature variations...), the value of the transient can vary through time. It is therefore necessary to track its evolution.

To avoid having to carry out learning cycles too often, the **ATEQ** instrument saves the last ten values of parts considered as very good (result close to 0) and recalculates the transient using the average value.

The parts are considered as very good when their leak rate is lower than the "percentage drift" value of the reject (FAIL) level. This value can be modified between 0 % and 100 %.

$$\text{Transient} = \frac{\sum \text{of the value of the last 10 very good parts}}{10}$$

⚠ **The transient attenuation (ATR) can only be used on parts which behave in very similar ways during the test, in other words, parts which generate similar transients.**

When the batch of parts changes or when the production is stopped for a certain time, it is necessary to carry out a new learning cycle, as the transient will change.

The **ATR** error appears if the difference between the transient and the initial (start) value is greater than the reject (FAIL) level.

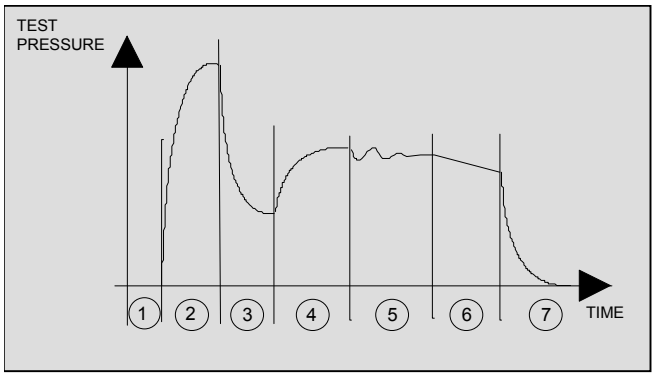
The transient can evolve one way or the other; therefore it is preferable to have identical Test and Reference reject levels.

2.1.3. 5) Pre-fill mode

This pre-fill function is used in three fields of application:

- ✓ large volume part test : to fill the part faster in order to reduce the cycle time (without pre-fill time),
- ✓ test on parts requiring a mechanical constraint so that they remain stable for the duration of the test,
- ✓ part burst tests, where the pre-fill pressure exerts a mechanical constraint similar to that of a mechanical resistance test on the test part.

Insertion of the pre-fill and pre-dump times in the measurement cycle.



1) Wait
2) Pre-fill
3) Pre-dump
4) Fill
5) Stabilisation
6) Test
7) Dump

This function brings up the display of the words "pre reg. adjust" under "Spe. Cycle" so that the new pressure can be set.

There are several types of pre-fill available.

a) Standard

With a mechanical regulator

Set the value of the pre-fill pressure manually adjusting the regulator knob and start a "pre reg. adjust" special cycle then set the associated parameters.

Associated parameters to be set: **Max P-FILL** (maximum pre-fill pressure limit), **Pre-FILL** (pre-fill time), **Pre-DUMP** (pre-dump time).

b) Instruction

With a mechanical regulator

Set a target value for the pre-fill pressure and open the regulator to a pressure at least greater than the target. When the target pressure is reached, filling is stopped.

Associated parameters to set: **I-P-Fill** (target value), **Pre-FILL** (pre-fill time), **Pre-DUMP** (pre-dump time).

***Note**: with an electronic regulator, the pressure and pre-fill time parameters can be set using either the **Standard** or **Instruction** functions.*

c) Ballistic

This fill type enables fluctuation in the air pressure (filling parts with a high level of deformation) and in particular allows the maximum fill limit to be exceeded without the cycle stopping and an error message being displayed. However, in order to move into stabilisation mode, the test pressure must be within the limits at end of fill.

Associated parameters to be set: **Pre-FILL** (pre-fill time), **Pre-DUMP** (pre-dump time).

☞ Select the option and enter settings if necessary.

2.1.3. 6) Pre-fill regulator

This function provides a choice of two regulators to be used for pre-fill (1 or 2).

☞ Select the option and enter settings if necessary.

2.1.3. 7) Fill mode (Kind of fill)

This function provides a choice of three possible types of fill.

a) Standard

With a mechanical regulator

Set the fill pressure value manually using the regulator knob and start a « regulator adjustment » special cycle.

b) Instruction

The user sets a target value for the fill pressure and opens the regulator to full flow. When the target pressure is reached, the air supply cuts off automatically.

Associated parameters to be set: **I. FILL** (fill target).

c) Ballistic

This fill type enables fluctuation in the air pressure (filling parts with a high level of deformation) and in particular allows the maximum fill limit to be exceeded without the cycle stopping and an error message being displayed. However, in order to move to stabilisation mode, the test pressure must be correct.

2.1.3. 8) Blow mode

When this option is activated, the instrument fills the part to low pressure and this is maintained between 2 cycles. This option is used when there is risk of increased damp or dust when testing very dirty parts.

The blow pressure is set using a second regulator.

***Note**: this option is automatic and permanent, and is incompatible with the pre-fill type function.*

2.1.3. 9) Fill regulator

This function provides a choice of which of two regulators to use for the fill (1 or 2).

2.1.3. 10) Cycle end

This function enables different cycle ends to be chosen, depending on the configuration of the instrument (connection to a PLC).

a) Relay sequencing related to different cycle ends

In order to interface the **ATEQ F CLASS** with its environment (PLC, PC …), the following timing charts supply the details of the sequencing of the electrical outputs (relay board on the J3 connector) and pneumatic outputs (automatic connectors), depending on the commands entered on the front panel or through the J3 connector (START, RESET).

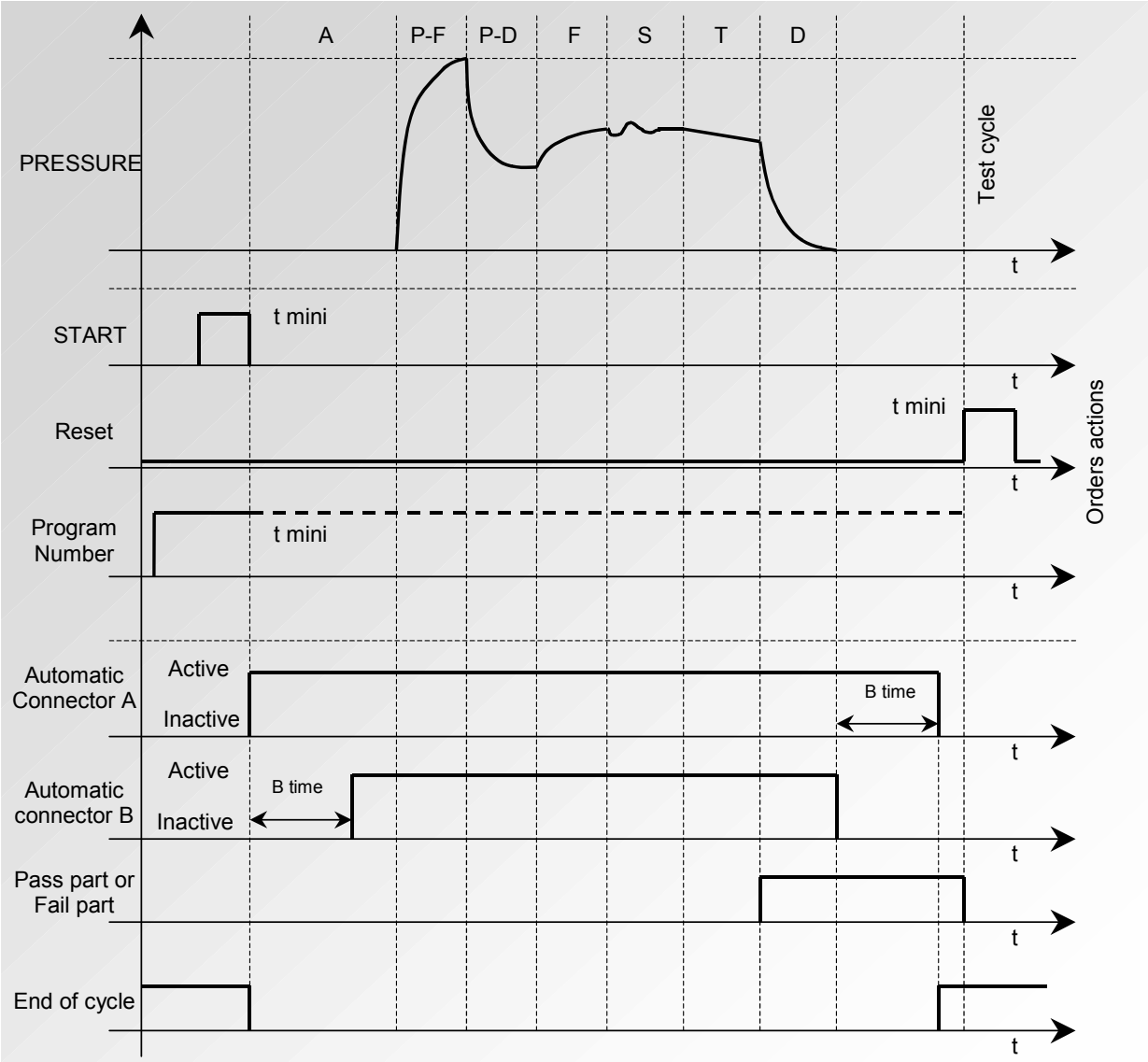
Legend	
A	Wait time for automatic connector A
B	Wait time for automatic connector B
P – F	Pre-Fill time
P – D	Pre-Dump time
F	Fill time
S	Stabilisation time
#	Unspecified time occurring between the programmed test time and the pressing of the reset key.
T	Test time
D	Dump time
START	Press the key on the front panel or make a contact between pins 2-3 on the J3 connector.
RESET	Press the key on the front panel or make a contact between pins 1-2 on the J3 connector.
Automatic Connector	Active (high level) : the pneumatic output is active (air output) Inactive (low level) : the pneumatic output is inactive (no air output)
BP or GP	Bad part or Good part relay on the J3 connector
EoC	End of cycle relay on J3 connector
t mini	Minimum time to accept an entry, 500 ms on connector J8 in the central module and 50 ms on connector J3 on a head.

⚠ ***Actual times are not those displayed but those on the print-out.***

b) "Automatic RESET" cycle end

If the part is OK, the Part OK relay will be activated as soon as the test ends and remain so until the start of the following cycle. Following the dump time, the end of cycle relay is activated.

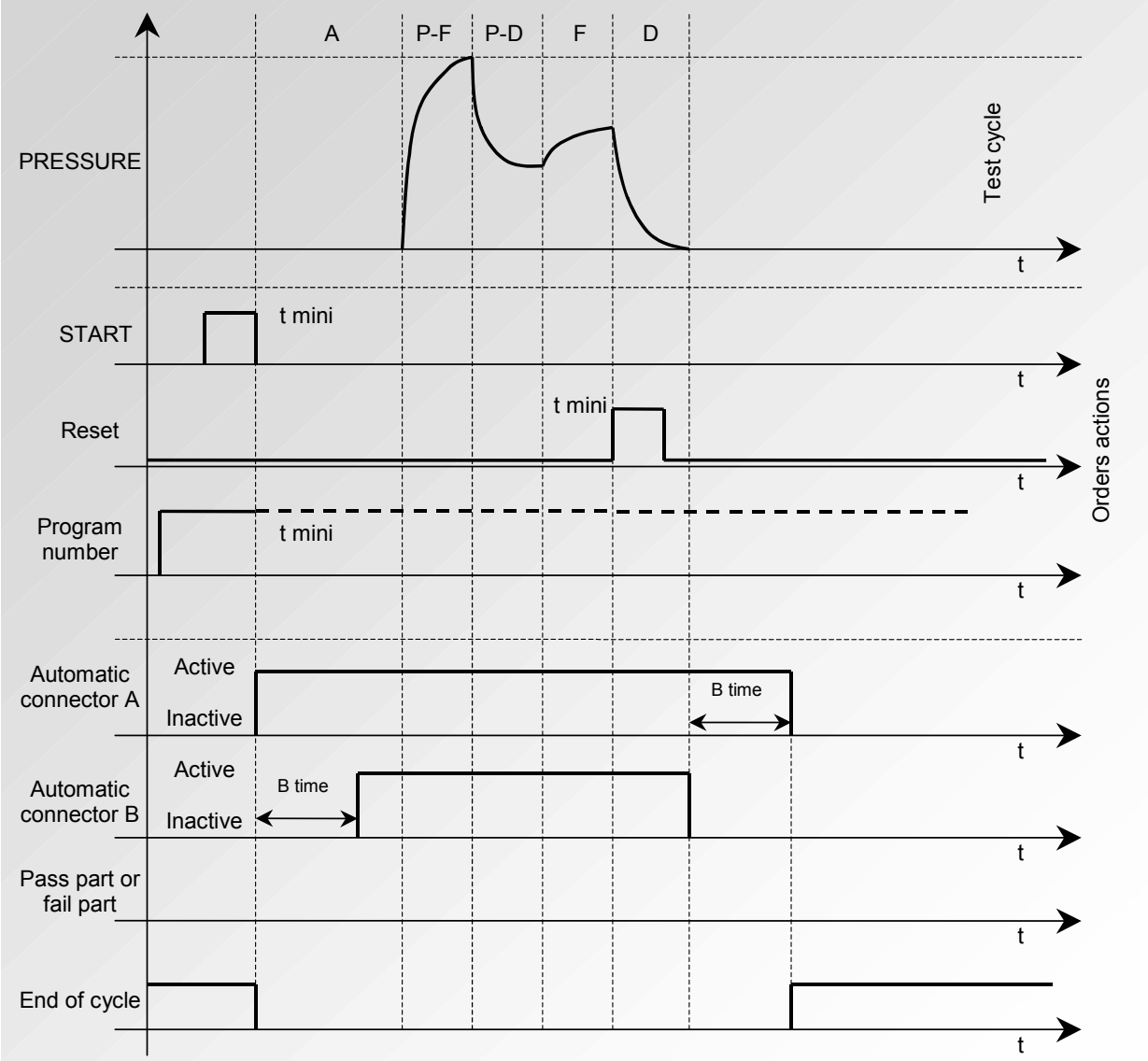
If the part is bad, the bad part relay is activated as soon as the test is completed. The instrument automatically dumps and sends a cycle end signal. A new cycle can then be launched.



The active program is the one selected before starting up. It remains active even if the program inputs on the connector are no longer activated. This selection can only be modified during the inter cycle period.

To return to program 1, when a cycle is not in progress, press any of the program selection inputs.

c) Ending a cycle with the RESET key ("Automatic RESET" Cycle end)



The active program is the one selected before starting up. It remains active even if the program inputs on the connector are no longer activated. This selection can only be modified during the inter cycle period.

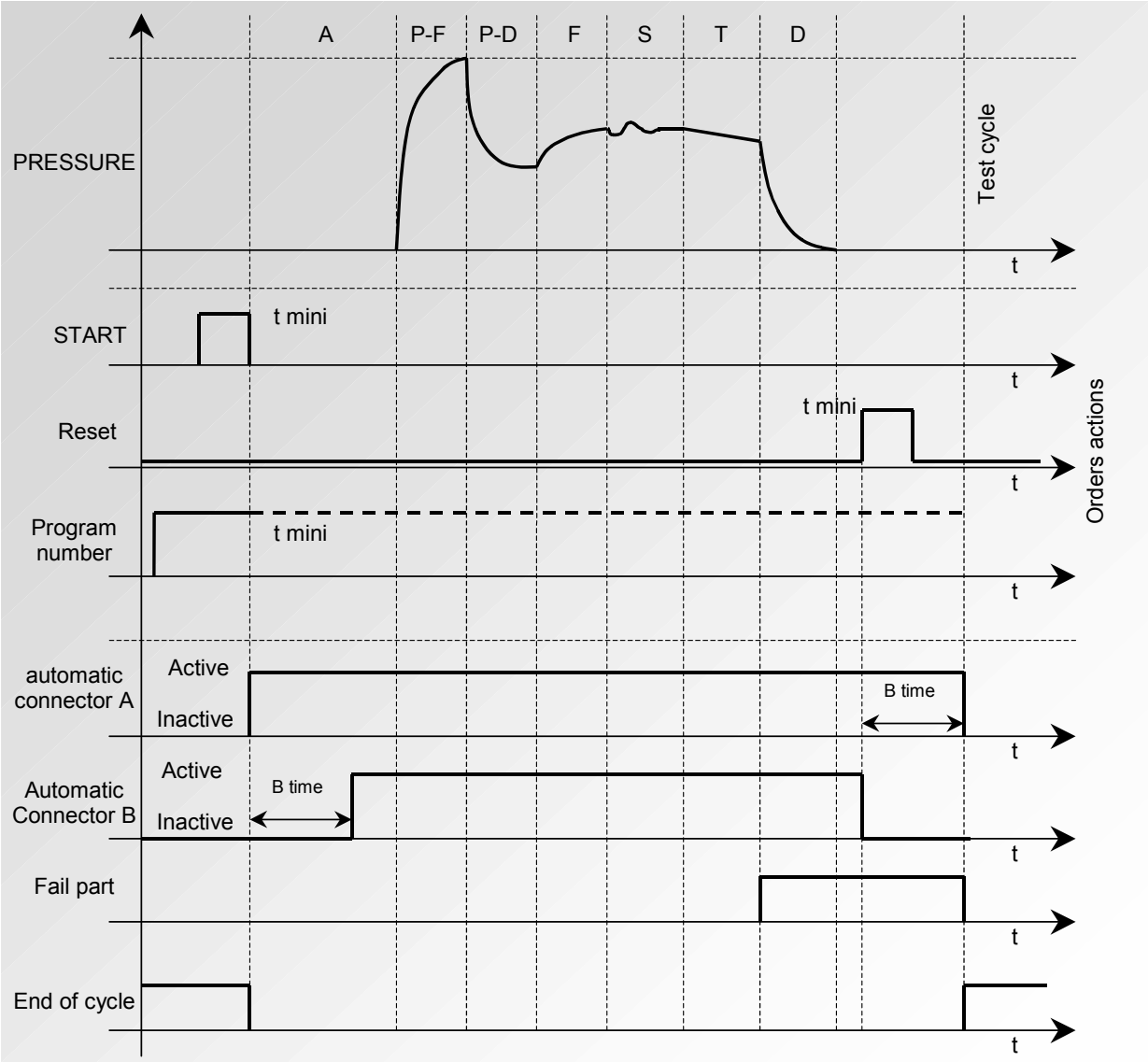
To return to program 1, when a cycle is not in progress, press any of the program selection inputs.

d) "RESET + dump" cycle end (automatic dump)

If the part is OK, the part OK relay is activated as soon as the test time is finished, and remains so (only in position 2) until the next cycle is launched.

At the end of the dump time, the end of cycle relay is activated.

If the part is Bad, as soon as the test time is over, the bad part relay is activated and remains so until the end of the cycle. The dump is then carried out. The cycle can be ended by pressing the **RESET** key.



The active program is the one selected before starting up. It remains active even if the program inputs on the connector are no longer activated. This selection can only be modified during the inter cycle period.

To return to program 1, when a cycle is not in progress, press any of the program selection inputs.

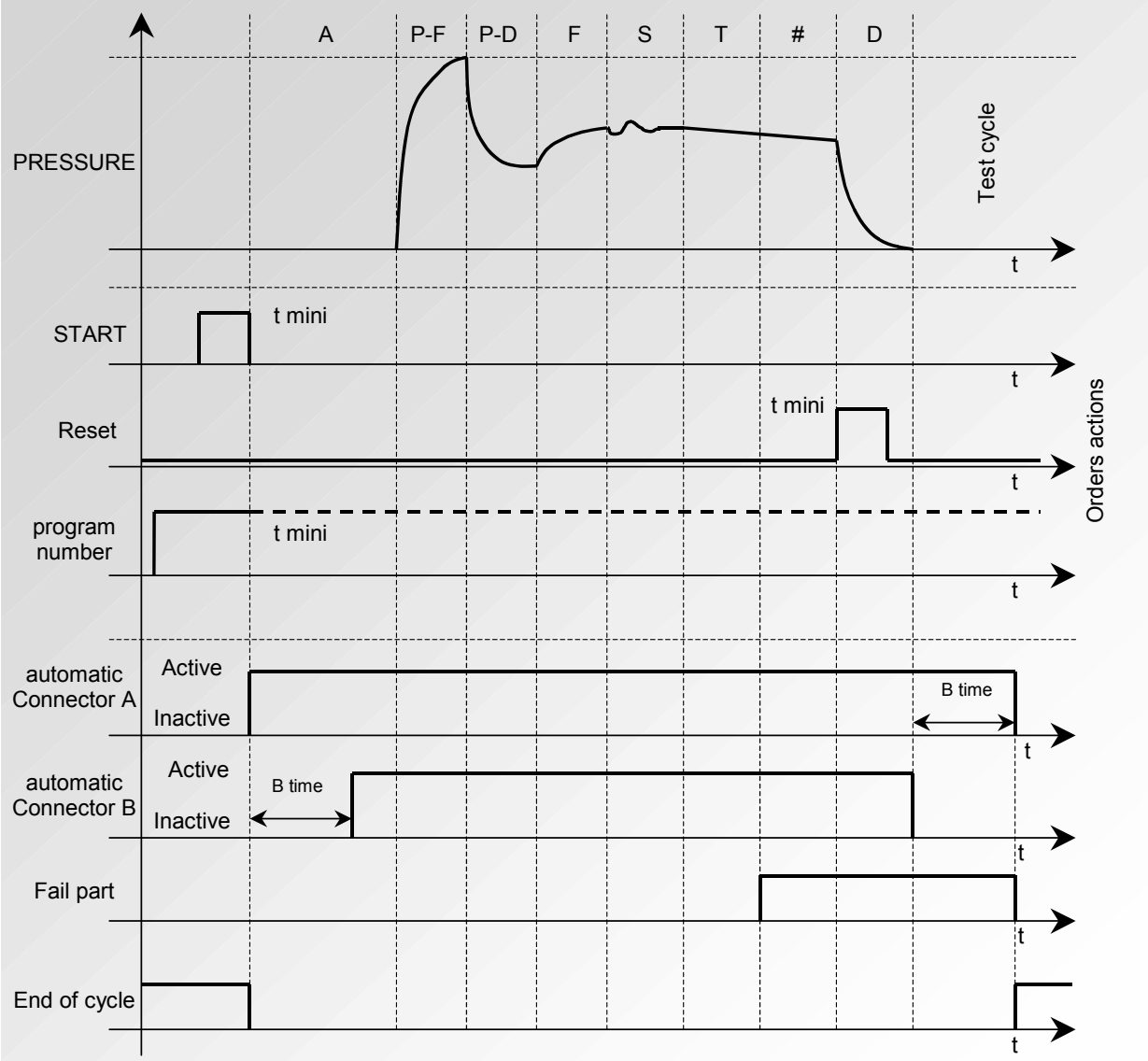
e) "Fill" cycle end

If the part is OK, the good part relay is activated at the end of the test time and remains so till the start of the next cycle.

At the end of the dump time, the end of cycle relay is activated.

If the part is bad, as soon as the test time is finished the relay becomes and remains activated.

The instrument waits for a reset from the operator or the PLC to start the dump time and send the end of cycle signal.



2.1.3. 11) Mini valve

This function is dedicated to applications for small volume parts (below 10 cm^3) and has a base time of 0.01s instead of 0.1 s.

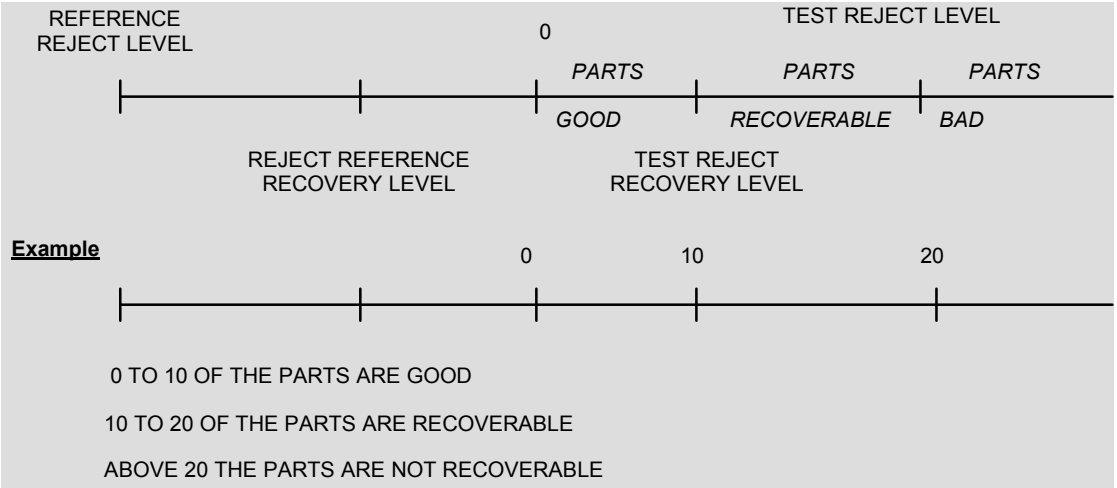
Programming for the **ATEQ F CLASS** with mini valve is identical to that for the standard **ATEQ F CLASS**.

Parameters to be set are: A-Z Diff (differential Auto Zero).

☞Select the option and enter settings if necessary.

2.1.3. 12) Recovery limits

This option offers the option of two reject levels: non-tolerance level (the bad part is not recoverable) and recoverable reject level (the part is bad but may be reworked to become acceptable. This option is particularly used in casting, when parts are intended for treatment via impregnation.)



The associated parameters to be set are: RECUP Test, RECUP Ref.

For recoverable parts, with multi-head configuration on the central unit or on the heads themselves, the Pass (PB) and Fail (PM) outputs are both activated simultaneously. .

***Note**: when the recoverable reference reject value is zero, the program uses the symmetrical absolute value of the recoverable test reject (e.g.: if the recoverable test reject is 10 Pa, then with the recoverable reference reject value equal to zero, the program takes the recoverable reference reject to be – 10 Pa).*

☞ Select the option and enter settings if necessary.

The instrument allows for variations in input pressure. This is why the maximum and minimum parameters vary for each cycle.

Learning cycles for good parts and parts with a large leak are accessed through the main menu, special cycles.

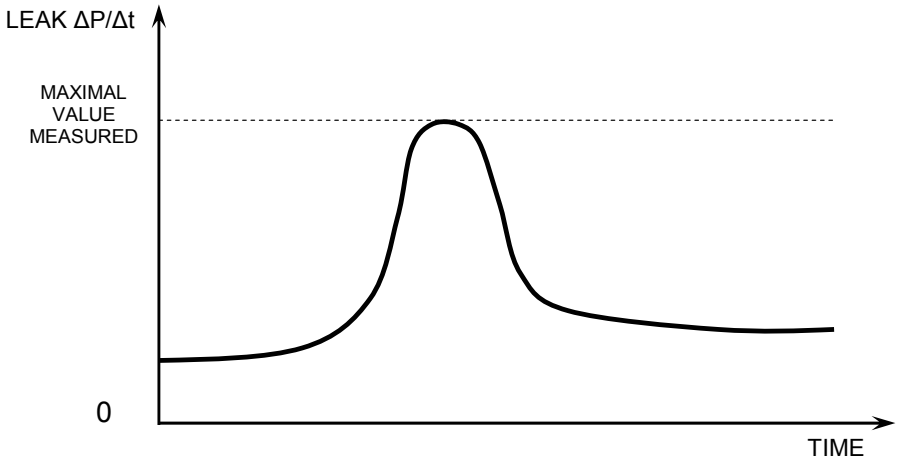
☞Select the option and enter settings if necessary.

⚠ Test cycles can not be carried out unless learning cycles have previously been carried out.

2.1.3. 13) Peak measurement

The peak measurement mode is used to measure a part dynamically. The instrument measures the leak, which can change at a given moment during the test. The instrument stores the greatest pressure drop (ΔP/Δt) and then displays it at the end of the test.

This function is important in circumstances where the test part changes during the test cycle. The system checks the part for leaks in ΔP/Δt throughout the change and the leak is measured continuously. At the end of the test cycle, the instrument has stored the maximum instantaneous leak (the greatest leak) recorded during the test and displays the result.



***Note:** Peak measurement mode only works in ΔP/Δt and excludes the use of ATR mode.*

2.1.3. 14) Reference volume

The program uses the programmed test volume to measure the normal flow at the test output.

When the reference output volume is different from the test output volume, it is possible to set parameters for the exact value of the reference volume to obtain correct measurements in the event of results in negative figures.

This function may only be used on a unit of measurement of flow.

Confirm the function in the **CONFIGURATION/EXTENDED MENUS** menu	▽ ↵	CONFI/ ETENDED MENUS RECUP THRESH: No SEALED CPT : No ▶REF. VOLUME : Yes
Confirm the function in the **PARAMETERS /PROGRAM/FUNCTION** menu**.**	▽ ↵	ARAM/Pr001/FUNCTION ▶ REF. VOLUME : Yes
Enter the value of the reference volume in the **PARAMETERS /PROGRAM** menu.	▽ ↵	01/FUNCT/REF. VOLUME ▶Ref. VOL.: 0.000 L

2.1.3. 15) Volume calculation

If a flow type unit is used, the parameter must be set for the total test volume. This function can be used to calculate it.

Preparation of the instrument

- ✓ Connect to the instrument a part with no leak.
- ✓ Connect a known standard leak to the rapid connector on the instrument's measurement circuit.
- ✓ Run a special "Regulator" cycle to set the test pressure for the known standard leak (see paragraph 3.2. "Regulator").
- ✓ Carry out the special "Volume calculation" cycle by giving the leak value.
- ✓ The value of the volume is updated within the program.

2.2. TIME

This function includes a clock (hours, minutes) and an internal calendar (day, month, year).

☞ Select the option and enter settings if necessary.

2.3. PRINTER

This function is used to configure the instrument so that the data relating to the programs (parameters) and the test results can be printed. When the option is activated (YES), the test results are automatically printed each time a cycle is started.

☞ Select the option and enter settings if necessary.

2.3.1. RS parameters

These parameters are used to configure the instrument for dialogue with the printer.

Associated parameters to be set: **Speed**: 9600 Bds, **stop bit**: 1, **data bit number**: 7, **parity**: even.

☞ Select the option and enter settings if necessary.

2.3.2. Frame

This function is used to configure the page layout when printing results.

Associated parameters to be set: **PRESSURE** (displays/does not display test pressure), **Customisat.** (displays program name if there is one), **Time keeper** (prints date and time), **Bef. result** (number of lines before the result), **After result** (number of lines after the result), Inter Line (spacing between lines).

2.3.2. 1) Frame format

The results frame is based on 40 columns.

a) Example for test OK result

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:	(	O	K	)	:			0	2	7		P	a																						

Frame detail:

Columns	Characters
1	<
2-3	Figure indicating program number
4	>
5	:
6	(
7-8	2 letters indicating OK for good part TD bad test part RD bad reference part AL for Alarm
9	)
10	:
11	SPACE
12	+, - or nothing
13 - 14 -15	3 figures indicating the leak value
16	SPACE
17 > XX	2 to 6 letters indicating the unit of measurement

b) Example for a test result with pressure

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:		0	.	9	4	3		b	a	r	:	(	O	K	)	:			0	2	7		P	a											

c) Example for a test result with time and date

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:	3	0	/	0	5	/	2	0	0	1		1	5	:	4	2	:	1	8																
<	0	1	>			1	.	0	4	:	b	a	r	:	(	O	K	)	:			0	0	6		P	a												

d) Example for a result with fault

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:	(	A	L	)	:	P	i	e	z	z	o		F	.	S	c	.																		

AL : ALARM F.S. = FULL SCALE PIEZO ★ Full scale has been exceeded on the piézo sensor.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:	(	A	L	)	:	L	O	W		P	R	E	S	S	U	R	E																		

AL : ALARM ★ The air supply pressure is lower than the minimum limit set by the user.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<	0	1	>	:	(	A	L	)	:	P	R	E	S	S	.		E	X	C	E	E	D																	

AL : ALARME ★ The air supply pressure is greater than the maximum limit set by the user.

Frame detail:

Columns	Characters
1	<
2-3	Figure indicating program number
4	>
5	:
6	(
7 - 8	2 letters AL for ALARM
9	)
10	:
11 > XX	Error message relating to the fault

2.3.3. Sending conditions

With this function you can choose which data is to be printed on the results sheet.

Associated parameters to be set: **ALL** (all test results), **OK** (number of good parts), **T. BAD** (number of bad test parts), **R. BAD** (number of bad reference parts), **WARN.** (number of times the alarm has been triggered), **PRESS DEF.** (number of times pressure was incorrect), **RECUPERABLE** (number of recoverable parts), **CALIBRATION**.

☞ Select the option and enter settings if necessary.

2.3.4. Exporting

This function can be used to create and send a special results frame which can be processed by a PC using Microsoft Excel.

This frame is of the same type as the print parameters frame except that the different character strings follow each other and are separated by a punctuation mark which enables the various boxes to be entered automatically in Microsoft Excel.

This frame is operated by connecting a computer to the instrument's RS 232 link.

☞ Select the option and enter settings if necessary.

2.3.5. Print parameters

When this option is confirmed the test parameters are printed immediately.

2.3.5. 1) Example of parameter print frame

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
V e r s i o n   0 1 . 1 1 h
0 2 / 1 0 / 2 0 0 1   1 1 : 1 6 : 3 2

P r   0 1

T Y P E   :   L E A K   T E S T
C O U P L .   A   :   0 0 . 0   s
F I L L   :   0 1 . 6   s
S T A B .   :   0 2 . 2   s
T E S T   :   0 1 . 5   s
D U M P   :   0 1 . 2   s
M a x .   F I L L   :     2 . 4 0
M i n .   F I L L   :     1 . 6 0
T e s t   F A I L   :     0 2 5
R e f .   F A I L   :     0 1 5
```

***Note**: The "PROGRAM NAME" characters are printed when a program name has been set in the parameters.*

2.4. SECURITY

This function deactivates the **START** and **RESET** keys on the instrument front panel. Programs can only be started from the instrument inputs (J3 connector).

☞ Select the option and enter settings if necessary.

2.5. I/O CONFIGURATION

This menu is used to configure programmable input 7 on connector J3 on the 16-program input/output board.

See Chapter 1, paragraph 2.2.1.1) "Connector J3 (Inputs/Outputs) programmable input".

2.6. LIGHTING THE SCREEN

Screen illumination can be programmed and modified. The lighting can be adjusted according to the ambient conditions or the user's choice.

There are three lighting modes:

- ✓ **continous** mode, display screen permanently lit whatever the conditions
- ✓ **manual** mode, the screen remains lit for 20 minutes and if the keyboard has not been used by the end of this period the screen shuts down and only relights when the keyboard is touched again.
- ✓ **automatic** mode, which is identical to manual mode, with illumination of the screen also if an action is carried out from the external inputs (rear connectors)

Using these three modes, the lighting intensity of the screen can be programmed from 00 (screen off) to 07 (maximum lighting intensity).

In the main menu, position the cursor by the **CONFIGURATION** menu then confirm by pressing **ENTER**.	▽ ↵	MAIN MENU PARAMETERS SPE CYCLE: Disabled ▶CONFIGURATION
Move the cursor down until it is in front of the **ECLAIRAGE** menu then confirm by pressing **ENTER.**	▽ ↵	CONFIGURATION PRINTER : No SECURITY : No ▶LIGHT
Place the cursor in front of **MODE** to choose the required lighting mode and confirm using **ENTER.**	▽ ↵	CONFI/LIGHT ▶MODE :CONTINOU INTENSITY : 04
Select the lighting mode and confirm using **ENTER.**	▽ ↵	CONFI/LIGHT/MODE ▶CONTINOUS MANUAL AUTO
To return to the previous menu, press the **C** button once	C	CONFI/ECLAIRAGE ▶MODE :PERMANEN INTENSITE: 07
To select the lighting intensity for the display, place the cursor in front of the **INTENSITE** menu and confirm using **ENTER.**	▽ ↵	CONFI/LIGHT ▶MODE :CONTINOU INTENSITY : 04
Then select the lighting intensity from 00 (off) to 07 (maximum luminosity) and the new lighting intensity will be applied as soon as **ENTER** is pressed.	▽ △ ↵	CONFI/LIGHT MODE :CONTINOU ▶INTENSITY : 06

3. SPECIAL CYCLES MENU

3.1. SPECIAL CYCLES AVAILABLE

The following list shows all the special cycles which are possible: those available will vary depending on what is checked in the expanded menus or according to the optional extras requested at the time of manufacture of the instrument.

Special cycle	Function
✓ Inactive:	No special cycle selected.
✓ Regulator adjust:	Cycles used to set regulator.
✓ Infinite fill:	Cycle used to put test part under pressure for infinite time.
✓ Piezo auto reset:	Cycle used to carry out forced reset of the piezo transducer and the electronic regulator.
✓ Sealed component learning, good part:	This cycle is used to learn the pressure parameters for a good part if the measurement is of sealed component type. This learning cycle is compulsory.
✓ Sealed component learning, bad part:	This cycle is used to learn the pressure parameters for a bad part if the measurement is of sealed component type.
✓ Calibration check by volume:	Cycle started manually by the operator to carry out calibration check by volume with a good part.
✓ CAL learning:	This cycle is used to carry out learning in calibrated Pascal or Pascal/sec mode on a known standard leak.
✓ CAL check:	This cycle is used for auto-diagnostics in calibrated Pascal mode (see previous function) within a tolerance determined by percentage limits.
✓ CAL check + learn:	This special cycle enables the checking of learning, the checking cycle measures the drift in relation to the imposed percentage limits. If the limits are not exceeded, a learn cycle will be carried out to refresh the value learnt.
✓ ATR learning cycle:	This cycle is used to enter the ATR parameters if they are not known. This should be done after each start-up of the instrument, or after a long period with no test cycles.
✓ Volume compute:	Cycle used to calculate the volume of the test circuit.

To run a special cycle, select it in the "special cycles" menu, then press the ▷ button. To stop it, press the □ button. In some cycles the stop is automatic.

3.2. REGULATOR

This special cycle enables the main regulator pressure to be set.

Position the cursor in front of **SPE CYCLE** and confirm using the **ENTER** key.	▽ ↵	SPE CYCLE ▶Disabled Regulator adjust Infinite fill
Next , position the cursor in front of Regulator adjust and confirm using the **ENTER** key.	▽ ↵	SPE CYCLE Disabled ▶Regulator adjust Infinite fill
The display confirms that the special cycle has been selected.		MAIN MENU RUN PROG.: 005 PARAMETERS ▶SPE CYCLE: Regul
Press the **START** key to start the special cycle.	▷	RUN/Pr : 001 PRESS = 355.5 mbar REGULATOR 1 ADJUST
Adjust the value of the pressure with the regulator.	− +	RUN/Pr : 001 PRESS = 500.0 mbar REGULATOR 1 ADJUST
Once the pressure is adjusted, press the **RESET** key to stop the special cycle.	□	RUN/Pr : 001 PRESS = 0.000 bar READY

3.3. AUTOMATIC CALCULATION OF LIMITS

This function enables maximum and minimum pressure monitoring limits to be programmed in relation to the settings on the selected regulator.

The limit values calculated automatically are plus or minus 20% of the measured value.

Calculation and automatic input of the limits are done in the active program.

Confirm the special regulator setting cycle.		MAIN MENU RUN PROG. : 001 PARAMETERS ▶SPE CYCLE: Regul.

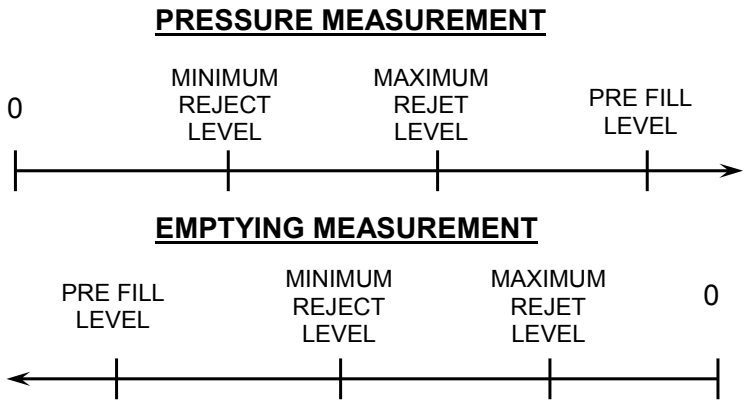
Press the **START** button to run the special cycle.		RUN/Pr: 001 PRESS = 1.00 bar REGULATOR ADJUST
If necessary, adjust the test pressure value using the regulator.		RUN/Pr: 001 PRESS = 1.50 bar REGULATOR ADJUST
Now, when the switch is turned to **ACCESS** position, the question : **CALCULATE LIMITS ?** appears on the screen.		RUN/Pr: 001 PRESS = 1.50 bar COMPUTE LIMITS ? REGULATOR ADJUST
Confirm calculation by pressing **ENTER.** The instrument calculates the limits and enters them in the cycle program parameters.		COMPUTING LIMITS
When the operation is completed, press the **RESET** button to stop the special cycle.		RUN/Pr: 001 PRESS = 1.50 bar READY
When pressing the **ENTER** key, the limits computed are displays.		PRESSURES Press. UNIT. : bar Max. FILL : 1.80 Min. FILL : 1.20

***Notes**:*

***1)** In the case of a test on empty, the negative pressure levels retain their mathematical "order".*

***2)** In the case of installation of an electronic regulator and pre-fill in the test cycle, the automatic calculation of the maximum pre-fill limit is equal to the maximum fill limit.*

It is however possible to adjust this parameter manually to bring it to the most accurate for pressure monitoring.



3.4. INFINITE FILL

It is possible to carry out an infinite fill with the instrument, in other words, a permanent flow of air at the test pressure in order to locate leaks (set-up adjustment...).

If the assembly allows it (risk of sudden disconnection of part under pressure) it is preferable, in the case of infinite fill, to have a dump time of zero so as not to draw in liquid if there is a leak (when looking for leaks using a soapy water based product).

In the main menu, place the cursor in front of the **SPE CYCLE** function and confirm using the **ENTER** key.		MAIN MENU CYCLE PROG.: 001 PARAMETERS ▶SPE CYCLE: Inactive
Next, place the cursor in front of **Infinite fill** and confirm using the **ENTER** key.		SPE CYCLE Regulator adjust Pre-regul. Adjust ▶Infinite fill
The display confirms that the special cycle has been selected.		MAIN MENU CYCLE PROG.: 001 PARAMETERS ▶SPE CYCLE: Inf. fill
Press the **START** key to start a new cycle.		CYCLE/Pr : 001 PRESS = 355.5 mbar FILL
Adjust the test pressure with the regulator.		CYCLE/Pr : 001 PRESS = 1000 mbar FILL
To stop the cycle, press the **RESET** key.		CYCLE/Pr : 001 PRESS = 1.00 bar READY

3.5. PIEZO RESET

Used for compulsory reset to zero of the piezo sensor.

In the main menu, place the cursor in front of **SPE CYCLE** and confirm using **ENTER**.	▽ ↵	MAIN MENU RUN PROG: 001 PARAMETERS ▶SPE CYCLE: Inactive
Next, place the cursor in front of **Piezo Reset** function and confirm using **ENTER**.	▽ ↵	SPE CYCLE Pre-regul. adjust Infinite fill ▶Piezo reset
The display confirms that the special cycle has been selected.		MAIN MENU RUN PROG.: 001 PARAMETERS ▶SPE CYCLE: Piezo R.
Press the **START** key to start the reset.	▷	RUN/Pr : 001 PRESS = 355.5 mbar RESET
Once the reset is carried out, the cycle ends automatically.		RUN/Pr : 001 PRESS = 355.5 mbar READY

***Note**: the auto zero cycle is an automatic cycle which is carried out approximately every 5 minutes. It is used to initialise the pressure transducers in relation to atmospheric pressure.*

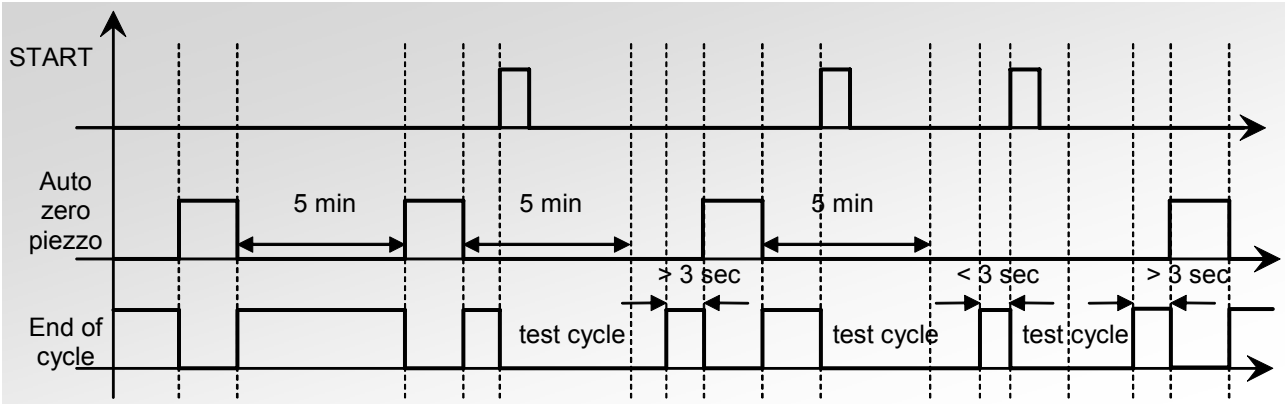
For automatic devices it may be necessary to inhibit the auto zero cycle.

To inhibit the automatic zero cycle, go to the **CONFIGURATION** menu then confirm using **non**.	▽ ↵	CONFIGURATION EXTENDED MENUS ▶AZ PIEZO AUTO: No HOUR

Attention: If an auto zero cycle is not carried out regularly, measurement errors may occur and result in false readings for the air tightness of parts. A request for auto zero may be made automatically or via input 7 on connector J3, programmed for this function, or via a programmed function key on the optional RC5 keypad, if this is installed.

***Note 2**: during the auto zero cycle, only the cycle start is saved.*

3.5.1. 1) Timing chart for auto zero cycle



3.6. VOLUME CALCULATION

This special cycle is used to calculate the volume of the test circuit.

It is only available if the unit chosen is of the flow type (cm^3/min, cm^3/h etc…).

To chose a unit, refer to chapter 3 paragraph 2.3 "Parameter settings".

Preparation of the instrument

- ✓ Connect the instrument to a part with no leak.
- ✓ Connect a known standard leak to the rapid connector on the instrument's measurement circuit.
- ✓ Start a special "Regulator" cycle to set the test pressure for the known standard leak (see paragraph 3.2. "Regulator").
- ✓ The instrument now knows the value of the test pressure and can therefore calculate the volume of the part.

In the main menu, place the cursor in front of the **SPE CYCLE** function and confirm using the **ENTER** key.	▽ ↵	MAIN MENU RUN PROG.: 001 PARAMETERS ▶SPE CYCLE: Disabled
Next, place the cursor in front of the **Volume calculation** function and confirm using the **ENTER** key.	▽ ↵	SPE CYCLE Infinite fill Reset ▶Volume calc.
The display confirms that the special cycle has been selected. Enter the value of the leak under **INSTRUCT** (target calibration) using the navigation keys.	▽ △	SPE C/Volume calc. INSTRUCT : 0.500◀ R. UNIT: cm3/mn
Confirm using the **ENTER** key.	↵	MAIN MENU CYCLE PROG.: 001 PARAMETERS SPE CYCLE: Volume
Press the **START** key to start the cycle. At the end of the cycle the value of the volume of the test part calculated by the instrument is sent directly to the **VOLUME** parameter in the program menu.	▷	RUN/Pr : 001 PRESS = 355.5 mbar LEAK = 0.001 cm3/m TEST

3.7. MANUAL CALIBRATION

3.7.1. CAL Learning (calibration)

If the 4 units of flow are not appropriate for the application, it is possible to go to calibrated mode (manual). To do this, a learning cycle must be carried out so that a calibration value will correspond to a pressure drop.

To access this special cycle, select the unit **Cal-Pa** or **Cal-Pa/s** as a reject unit when creating a program (for selection of units, see chapter 3 paragraph 2.3 "Parameter settings").

Then the special learning cycle must be carried out, either from the special cycles menu or from input 7 on connector J3 programmed for this function, or via a programmed function key on the optional RC5 keypad, if this is installed.

The first CAL learning cycle must be done using the special cycles menu so that a CAL target which is different to zero can be entered.

On these outputs we have:

- "Pass" and "end of cycle" if the target is lower than or equal to the test reject level,
- "Fail" and "end of cycle" if the target is greater than the test reject level.

In the main menu, place the cursor in front of the **SPE CYCLE** function and confirm using the **ENTER** key.	▽ ↵	MAIN MENU RUN PROG.: 001 PARAMETERS ▶SPE CYCLE: Disabled
Next, place the cursor in front of the **CAL. learn** function and confirm using the **ENTER** key.	▽ ↵	SPE CYCLE Infinite fill Piezo reset ▶CAL. Learn.
The display confirms that the special cycle has been selected.		SPE C/CAL. Learn INSTRUCT. : 0.000◀ R. UNIT : Cal-Pa
Set the target calibration **INSTRUCT** which will be used as the base unit using the navigation keys.	▽ △	SPE C/CAL. Learn INSTRUCT. : 0.000◀ R. UNIT : Cal-Pa
Confirm using the **ENTER** key.	↵	MAIN MENU RUN PROG.: 001 PARAMETERS SPE CYCLE: Cal

Press the **START** key to start the learning cycle. At the end of the cycle, the readout displays the test results in the calibration unit.	▷	CYCLE/Pr : 001 PRESS = 0.505 bar LEAK = 1.5 Cal-Pa READY
To stop the cycle, press the **RESET** key.	□	CYCLE/Pr : 001 PRESS = 355.5 mbar READY

***Note**: the CDF (leak flow calibrator) can be used to calibrate the instrument and to send this value via the infra-red link.*

3.7.2. CAL check

This special cycle is used to verify calibration in calibrated mode. See explanation in previous paragraph. The CAL check cycle checks whether the calibration has drifted beyond the limits set as a percentage. If these have been exceeded, an alarm will be triggered and a calibration cycle or an instrument check will be required.

If the opposite is the case the "Pass" and "end of cycle" or "Fail" and "end of cycle" outputs are activated depending on the measurement made in comparison with the reject level.

The CAL check request may be made from input 7 on connector J3 programmed for this function, or from a programmed function key on the optional RC5 keypad, if this is installed.

In the main menu, position the cursor beside **SPE CYCLE** and confirm using **ENTER**.	▽ ↵	MAIN MENU RUN PROG. : 001 PARAMETERS ▶SPE CYCLE: Disabled
Then place the cursor beside **CAL check** and confirm by pressing **ENTER**.	▽ ↵	SPE CYCLE Piezo auto-zero CAL. Learn. ▶CAL. check
Press the **START** button to run the check cycle. The check cycle will stop automatically.	▷	MAIN MENU RUN PROG. : 001 PARAMETERS ▶SPE CYCLE: CAL chck
At the end of the cycle, the display gives the test result in the unit of calibration.		RUN/Pr: 001 PRESS = 2.00 bar LEAK = 2 Cal-Pa READY (OK)

3.8. ATR LEARNING

If the transient values are not known, a transient learning cycle must be carried out so that the instrument can calculate and enter the values. These learning cycles are located as shortcuts in the special cycles menu, on input 7 of connector J3 programmed for this function or on a programmed function key on the optional RC5 keypad, if this is installed.

When transient values are not known, a learning cycle must be carried out for the transient so as to enable the instrument to calculate and enter the values. These learning cycles are found in brief in the special cycles menu.

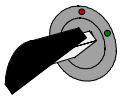
If no transient learning has been carried out, the message **ATR DEFAULT** will appear.		RUN/Pr: 001 PRESS = 1.50 bar LEAK = ATR DEFAULT READY (NO OK)
To carry out the learning, select the **SPE CYCLE** menu.	▽ ↵	MAIN MENU RUN PROG. : 001 PARAMETERS ▶CYCLE SPE : Disabled
Then select the **APPRENT. ATR** menu**.**	▽ ↵	SPE CYCLE Infinite fill Piezo auto zero ▶ATR Learn.
The display confirms that the special cycle has been selected.		MAIN MENU RUN PROG. : 001 PARAMETERS ▶CYCLE SPE : ATR
Press the **START** button to start the learning cycle. At the end of the cycle, the display gives the test result for the good part.	▷	RUN/Pr: 001 PRESS = 1.50 bar LEAK = 002 Pa READY (OK)
The instrument carries out a test cycle, then continues the cycle by carrying out a learning cycle. When the cycle has been completed, the transient values are recorded.		RUN/Pr: 001 PRESS = 1.50 bar LEAK = 002 Pa ATR Learn.
To view the transient values, press **ENTER**. ***Note**: these values can be modified manually.*	↵	ATR2 ▶Begin. : -000 Transient : -003 DRIFT : 020 %

4. MAINTENANCE MENU

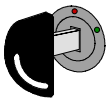
4.1. PARAMETERS SERVICE

This menu is used to manage the memory containing the test cycle parameters.

- ✓ Save maintenance parameters menu: used to save the configuration of the parameters in the current test.
- ✓ Restore maintenance parameters menu: used to restore a previously saved configuration.
- ✓ Erase maintenance parameters menu: used to delete the current configuration.

To access the menu, put the switch to **ACCESS** position. 

In the main menu, place the cursor in front of **SERVICE** and confirm using **ENTER**.	▽ ↵	MAIN MENU CYCLE SPE: Disabled CONFIGURATION ▶MAINTENANCE
Then place the cursor in front of **PARAMETERS** and confirm using **ENTER**.	▽ ↵	MAIN/SERVICE ▶PARAMETERS
Then place the cursor in front of the action required: **SAVE**: save current parameters, **RESTORE**: load from memory to current parameters, **ERASE**: delete current parameters and confirm using **ENTER**.	▽ ↵	IN/SERVI/PARAMETR SAVE : No◀ RESTORE : No RESET : No
To activate an operation, confirm using **ENTER**. Then choose **YES** using the arrows then confirm again using **ENTER**.	↵ ▽ ↵	IN/SERVI/PARAMETERS SAVE : Yes◀ RESTORE : No RESET : No

Turn the switch to **LOCK** position. 

***Note**: if the parameters have been modified, then current and saved parameters are therefore different, when the instrument begins to operate, the following message is displayed on the screen.*

This message is not jamming and disappears after a few seconds. It allows informing that a parameters saving can be necessary. In this case three solutions arises:

```
SAVE PARAMETERS
```

1) **Restore** the saved (current parameters will be lost).
2) **Save** the current parameters in the memory (the parameters already in the memory will be lost).
3) **Nothing to do** and working with the current parameters.

4.2. SENSORS SERVICE

This menu is used to monitor the information communicated by the pressure sensors, "PRESSURE" for the absolute pressure piezo sensor and "LEAK" for the differential leak sensor.

In the main menu, position the cursor beside **MAINTENANCE** and confirm by pressing **ENTER**.	▽ ↵	MAIN MENU SPE CYCLE: Disabled CONFIGURATION ▶SERVICE
Then position the cursor beside **SENSORS** and confirm by pressing **ENTER**.	▽ ↵	MAIN /SERVICE PARAMETERS ▶SENSOR
The values measured by the pressure sensors are then displayed on the screen.		MAIN /SERVI/SENSOR ▶PRESSURE : 0000 LEAK : 0000

5. RESULTS MENU

This function is used for:

- ✓ detailed display of the test results: number of parts tested, number of good parts, number of bad reference parts, number of bad parts, number of recovered parts, number of times the alarm is triggered (each indicator is expressed as a % value),
- ✓ resetting the results memory,
- ✓ printing the results (number of good parts, number of bad parts.)

6. LANGUAGE MENU

This function is used to select the instrument language.

Two languages can be stored in the instrument.

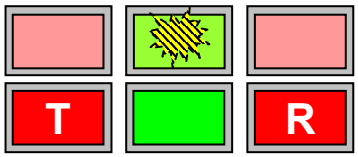
7. STAND BY MENU

This function is used to switch off the instrument without disconnecting it. Standby can be immediate or programmed with start and stop times.

There are two ways to achieve immediate standby:

1) Either through the standby menu,

2) Or by pressing the **RESET** button for more than three seconds.

***Note**: when the instrument is on standby, the display is off and only the yellow indicator light flashes approximately every 3 seconds.*	
To reactivate the instrument, simply press any key on the front panel or activate any input.	ATEQ F5 Version XX.XXi 0-> 4000 mbar Diff.F.Sc. 500 Pa

☞ Select the option and enter settings if necessary.

7.1. STANDBY USING THE MENU

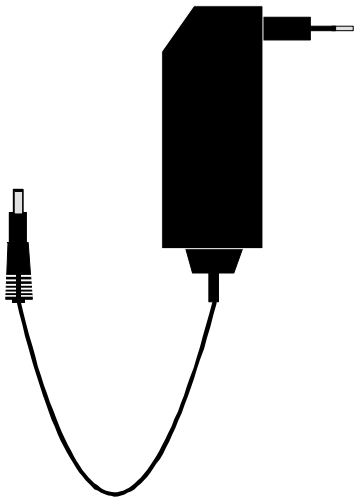
Standby using the menu enables start and stop times for the instrument to be programmed.

In the main menu, position the cursor beside **STANDBY** and confirm by pressing **ENTER**.	▽ ↵	MAIN MENU RESULTS LANGUAGE : English ▶STAND-BY
To program automatic standby at a given time, position the cursor beside **STOP TIME.**	▽ ↵	STAND-BY Now : No Pow-on time : No ▶Pow-off time : No
Confirm the **STOP TIME** parameter using **YES**	▽ ↵	VEILLE Now : No Pow-on time : No Pow-off time : Yes ◀
Then set parameters for the time (hours and minutes) when the standby must take effect. "**TIME DELAY**" is the delay (in minutes) between the programmed time and actual standby	▽ ↵	STAND/Pow-off time HOUR : 00 MINUTE : 00 Delay : 00
To program the start-up time for the instrument, position the cursor beside **START TIME**	▽ ↵	STAND-BY Now : No ▶Pow-on time : Yes Pow-off time : Yes
Confirm the **START TIME** parameter using **YES**	▽ ↵	VEILLE Now : No Pow-on time : Yes ◀ Pow-off time : Yes
Then set parameters for the instrument start time (in hours and minutes).	▽ ↵	STAND/Pow-on time HOUR : 00 ◀ MINUTE : 00

Chapter 5
ACCESSORIES

1. ACCESSORIES SUPPLIED WITH THE INSTRUMENT

1.1. POWER SUPPLY



The power supply of the **F CLASS** converts a network voltage (120 to 240 V AC) into a 24 V DC low voltage supply. It has no power switch and works as soon as it is plugged in. It is protected against surges and short circuits via a thermal fuse (Do not use any other type of fuse).

2. OPTIONAL ACCESSORIES

2.1. CALIBRATED LEAK

Calibrated leaks are used to check the instrument's calibration.

PRESSURE	Master leak type										
	A	**B**	**5**	**C**	**D**	**50**	**E**	**F**	**G**	**1000**	**5000**
2 kPa (20 mbar)			1,5	3,12	6,6	18	31,2	1,24	2,05	4,2	53
5 kPa (50 mbar)		2,3	4	7,4	17,5	42	1,3	2,6	5,25	11,3	132
15 kPa (150 mbar)	2,82	6,7	12	23	55	2,2	4	8,2	17	35,5	338
30 kPa (300 mbar)	4,8	12	24	46,8	2,12	3,6	7,6	22,4	40	74,5	700
50 kPa (500 mbar)	10	25	48	1,4	3,5	8	15,5	31	63	150	1142
100 kPa (1 bar)	23	56	1,8	3,3	8	19	37	74	149	360	2230
200 kPa (2 bar)	55	2,3	4,6	8,5	21	47	89	194	380	830	4343
400 kPa (4 bar)	2,5	6,6	12,1	23,3	56	125	220	540	1030	1500	8750
1 MPa (10 bar)	11,5	29	50	95	198	420	705	2310	3700	4450	

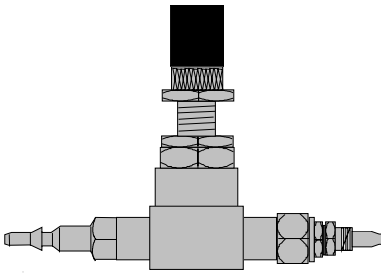
kPa.cm^3/h (bar.cm^3/h) — **kPa.cm^3/min** (bar.cm^3/min)

Note:** the values indicated above are given for information and can vary by +/- 20%. The true rate is precisely measured before delivery with an accuracy of +/- 5% up to 1Mpa.cm^3/min (10 bar.cm^3/min) and +/- 3% from this value. **Special master leaks can be manufactured on request, within 5% of the requested value.

- ✓ The calibrated leaks must be used with clean dry air.
- ✓ These leaks must not be dipped in water. It is essential that they are stored in their case after usage.
- ✓ The leaks must be checked periodically by the company's metrology department or by **ATEQ's** metrology service.
- ✓ Check that there is an O-ring seal and that it is in good condition.
- ✓ The instrument zero check must be done by replacing the leak with a sealing connector and not by sealing off the leak itself.
- ✓ To check that the leak has not been blocked, attach a piece of flexible tubing to the leak and submerge its extremity in water to watch for bubbles. Only with pressure regulation and not vacuum.

2.2. NEEDLE VALVE AND LEAK/FLOW CALIBRATOR (CDF)

2.2.1. Needle valve

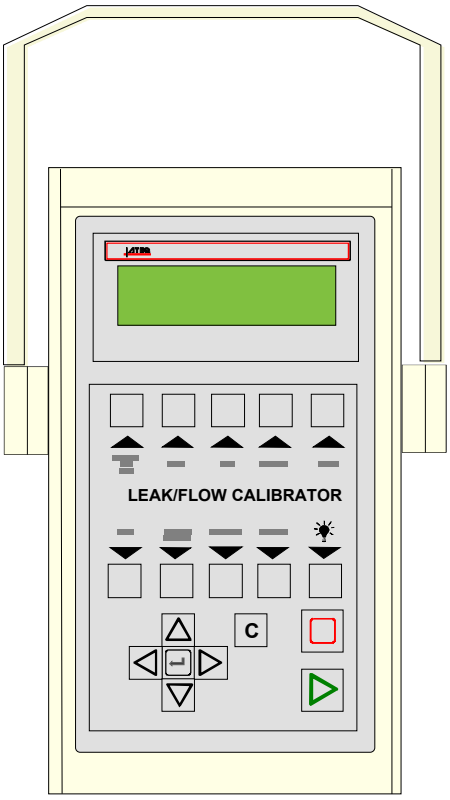


Needle valves are used to calibrate the leakage limits. These valves have an adjustable leak and depending on the model allow adjustments of between a few cm3/h to several l/min.

These valves can be easily disturbed and therefore require the frequent use of some means of checking the setting (eg : SAGA 4000).

***Note:** it is strongly recommended that you do NOT leave a needle valve permanently connected on a leak detection machine with automatic calibration every "n cycles".*

2.2.2. CDF (Leak/Flow Calibrator)



The **Leak/Flow calibrator** is a multiple range **ATEQ** flow meter intended for checking leak testing equipment and particularly **ATEQ** instruments. It measures a loss of charge with a differential sensor, which is connected to a calibrated flow tube.

2.3. AUTOMATIC CONNECTORS WITH EXPANDABLE JOINTS

ATEQ automatic connectors are used so that accurate and reliable assemblies can be built to check air tightness. They simplify the work of the operator as they are self-locking thanks to the use of a pneumatic valve supplied from the mains compressed air supply. Several connectors may be controlled by the same remote, powered by an **ATEQ** or another logic.

They adapt easily to a large number of fittings and apertures of varied dimensions. Their use ensures that non-machined walls can be guaranteed airtight.

There are four basic versions of **ATEQ** automatic connectors :

- ✓ SA for external connections,
- ✓ Si for internal connections,
- ✓ SAG and SIG for threaded and tapped connections.

They are either in anodised aluminium or stainless steel as standard. Different types of joints are available depending on the elasticity required.

2.3.1. Operation

The connector is positioned manually or automatically using a jack or cylinder.

Compressed air is allowed through the control aperture via a three part valve. The pressure pushes the cylinder which squashes the connector. The air tightness is therefore perfect and there will be no leakage in the connector seals.

2.3.2. Standard dimensions

SAG and SIG have been designed for threaded and tapped caps. For the time being, they are available in gas norm. Sizes, which are: 1/2", 3/4", 1", 11/4", 11/2", 2", BSP.

The SA and SI are designed for smooth nozzles, with dimensions from 3 to 80 mm for the external diameters (SA), and from 10 to 75 mm for the internal diameters (SI).

2.4. FILTRATION KIT

Clean, dry air must be used to ensure the reliability of the instruments.

The filtration kit is connected to the air input on the rear panel of the instrument.

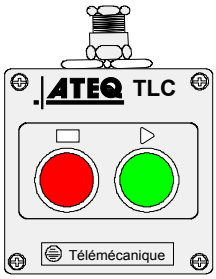
It consists of a dust filtering cartridge (5µm) and another cartridge (0.01 µm) giving residual oil pollution equal to 0.01 ppm.

2.5. SIMPLE REMOTE CONTROL

The remote control allows the remote operation and selection of various settings for instruments in the **ATEQ** range.

2.5.1. Casing reset/start

Example :
START / RESET



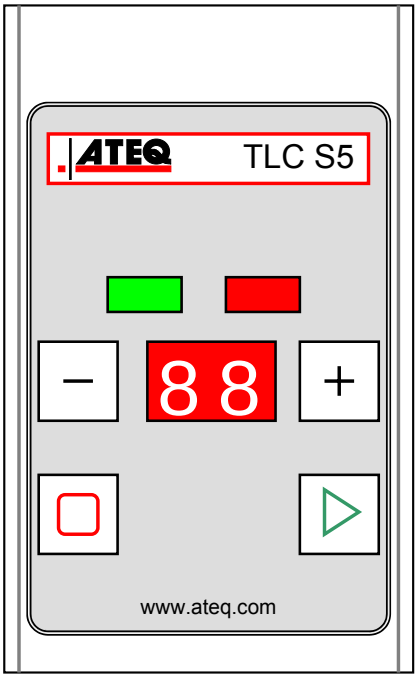
2.5.2. S5 four-function remote control

This remote control has four functions which can be used to control a series 5 instrument remotely. (F580 or C540 single head only).

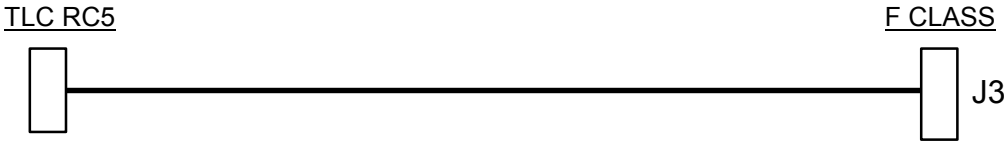
The four functions on this remote control are as follows:

- ✓ RESET and start cycle.
- ✓ Increase or decrease program numbers.
- ✓ Display the number of the program selected.
- ✓ Display the test result, green indicator light for Pass, red indicator light for Fail or alarm.

***Note**: a program number can only be changed (increase or decrease) when no test cycle is running.*



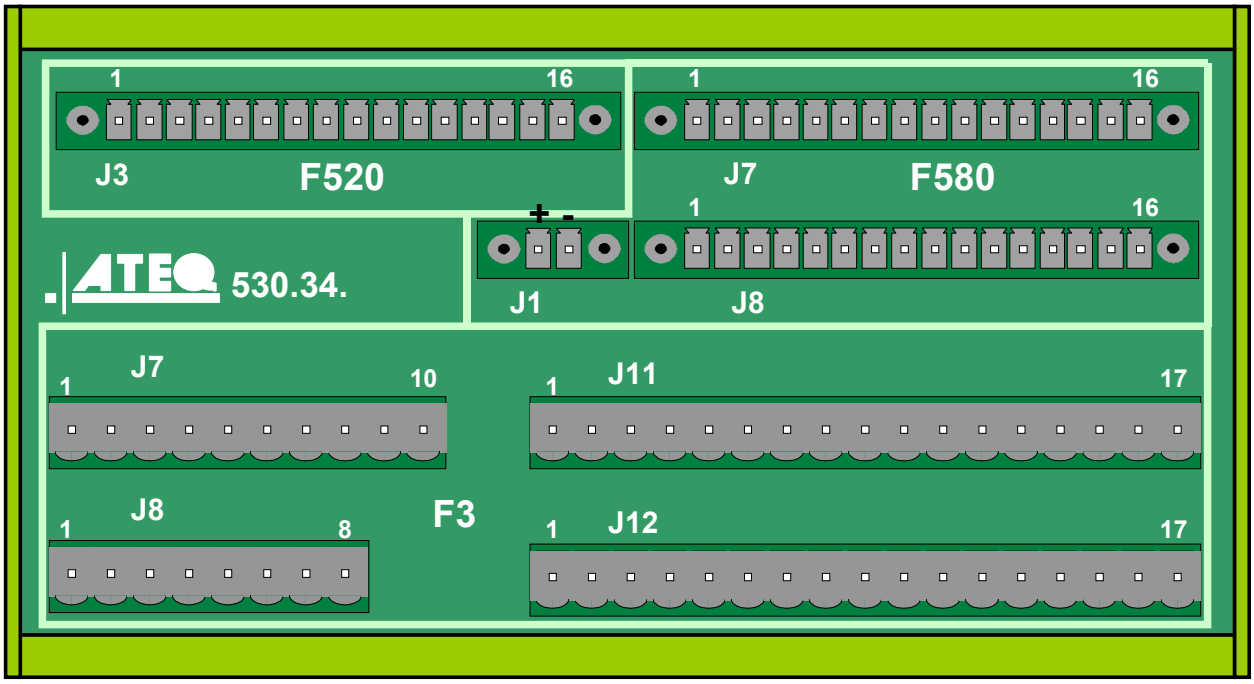
2.5.2. 1) Connection diagram



2.6. INSTALLATION OF THE INTERFACE BOARD F5 TO F3

2.6.1. Presentation

The interface relay board F5 to F3 is presented as follows:



The interface relay board allows the replacement of a 3 series instrument by a 5 series one without modify all the existing wiring. The compatibility only concerns some basic functions, which are described in the following pages.

As the board is an external component, it has to be bought separately from the ATEQ instruments. The board has to be fixed on a DIN support and its measurements are: L = 160 mm x H = 90 mm x D = 50 mm.

2.6.2. Installation of the interface

For information on the installation and compatible functions, please refer the interface's manual or brochure.

Chapter 6

ERROR MESSAGES

The **ATEQ F CLASS** can display error messages if there are operational problems.

PROBLEM	LIT INDICATORS	MESSAGE DISPLAYED
Reference error. Leak in excess of the full scale. **Action**: check the reference circuit.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=>>F.S REF. READY (NO OK)
Test error. Leak in excess of the full scale. **Action**: check the test circuit.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=>>F.S TEST READY (NO OK)
Pressure in excess of the full scale. **Action**: decrease the pressure using the mechanical regulator knob or the target if an electronic regulator is used.	T R	CYCLE/Pr001 PRESS=> FULL SCALE READY (NO OK)
Differential transducer fault. **Action**: contact ATEQ after sales service for repair (probably water or oil in the instrument's test circuit).	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK= SENSOR DEF. READY (NO OK)
Pressure in excess of the max. threshold. **Action**: check regulator settings, pressure limits, check whether the right regulator has been selected if there are two.	T R	CYCLE/Pr001 PRESS=1.02 bar P> READY (NO OK)
Pressure below the min. threshold. **Action**: check the network pressure and regulator settings, the pressure limits, and whether the right regulator has been selected if there are two.	T R	CYCLE/Pr001 PRESS=0.000 bar P< READY (NO OK)
ATR error. **Action**: run another ATR learning cycle or check the ATR parameters. ATR fault.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=ATR DEFAULT READY (NO OK)

PROBLEM	LIT INDICATORS	MESSAGE DISPLAYED
Fault caused by ATR. Not functional.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=ATR DRIFT READY (NO OK)
Fault: no CAL learning or CAL drift found following request for CAL check. **Action**: carry out CAL learning or check the programmed percentage of CAL drift, the known standard leak and the test pressure.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=CAL DEFAULT READY (NO OK)
Commutation fault in the equalising valve. **Action**: check network pressure, contact ATEQ after sales service for repair.	T R	CYCLE/Pr001 PRESS=0.942 bar LEAK=VALVE DEF. READY (NO OK)
The input pressure on the regulator must be at least 10 % of regulator full scale + 100kPa (+ 1 bar). **Action**: check supply network pressure or pressure at the regulator input.	T R T R	The indicator lights come on briefly after the following message is displayed: REGULATOR ERROR
PROG error: the I/O's have selected a program with no parameters. **Action**: enter program parameters.	T R	CYCLE/Pr.:009 ERROR
Inappropriate size for the selected unit of pressure. **Action**: change unit or modify the minimum and maximum pressure limits if these and the test pressure can be used with this unit.	T R	PARAM/Pr001 >Press. Unity: mbar MAX Fill : PPPP MIN Fill : 0.0

Chapter 7
OPERATIONAL PROBLEMS

1. PHENOMENON NOTED

If a test machine begins to detect too many bad parts (statistically, 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.

1.1. CONDITION OF THE MACHINE'S SEALS

This is the no.1 defect as the seals are subject to high levels of dirt contamination (alumina, shavings). Regular cleaning of the seals is an effective remedy.

1.2. DAMAGED INSTRUMENT SEALS

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.

1.3. BUMPER PAD

This is a defect which may occur after a certain amount of time as the bumper pads may be worn, or if the pressure settings in the air cylinder are inadvertently disturbed. Check the stability of the measurement and that the bumper pads are correctly installed.

1.4. PNEUMATIC AIR SUPPLY TOO LOW

This anomaly can cause false measurements (large leaks or erratic measurements). The air supply to the cells must be higher than the minimum of 4 bar and it is essential that it is greater than the minimum test pressure of 1 bar. Also check that sealing connectors are being used correctly.

1.5. PNEUMATIC LINK

The link and reference pipes will age and break with time. The pipes and seals must conform to the required quality. **ATEQ** recommends the use of RILSAN PA11 pipes and AVS type joints.

1.6. ENVIRONMENT

A measurement may be affected by a variation in background temperature (sun, draughts, storage of parts outdoors, handling of the test part by the operator, ...).

The dampness of parts may cause errors in the readings (insufficient drying after washing, outdoor storage, condensation, presence of water in the fixture, ...).

1.7. CALIBRATION

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

1.8. CONCERNS ABOUT RELIABILITY OF THE INSTRUMENT'S CIRCUITS

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

Proceed as follows:

- ✓ Segregate the instrument from its environment (pneumatic assembly),
- ✓ Connect up the instrument (test output),
- ✓ Choose an unused program,
- ✓ Set the parameters as follows:

⇒ the regulator	to the test pressure,
⇒ the pressure monitoring thresholds	to +/- 20 % of the test pressure,
⇒ wait times A and B	0 seconds,
⇒ fill time	4 seconds,
⇒ stabilisation time	10 seconds,
⇒ test time	10 seconds,
⇒ dump time	1 second,
⇒ reject level	maximum,
⇒ unit	Pa/sec,
⇒ function	all functions cancelled.

Run two consecutive cycles.

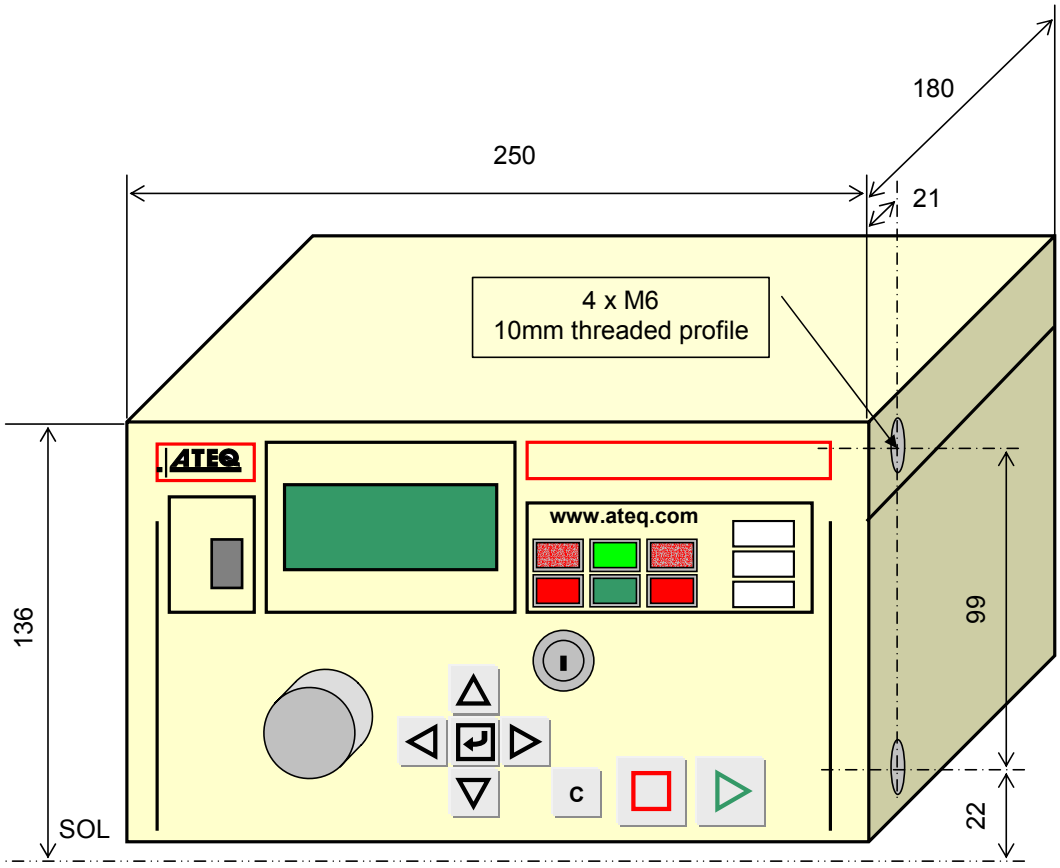
The post test time result should not exceed 2 Pa/sec.

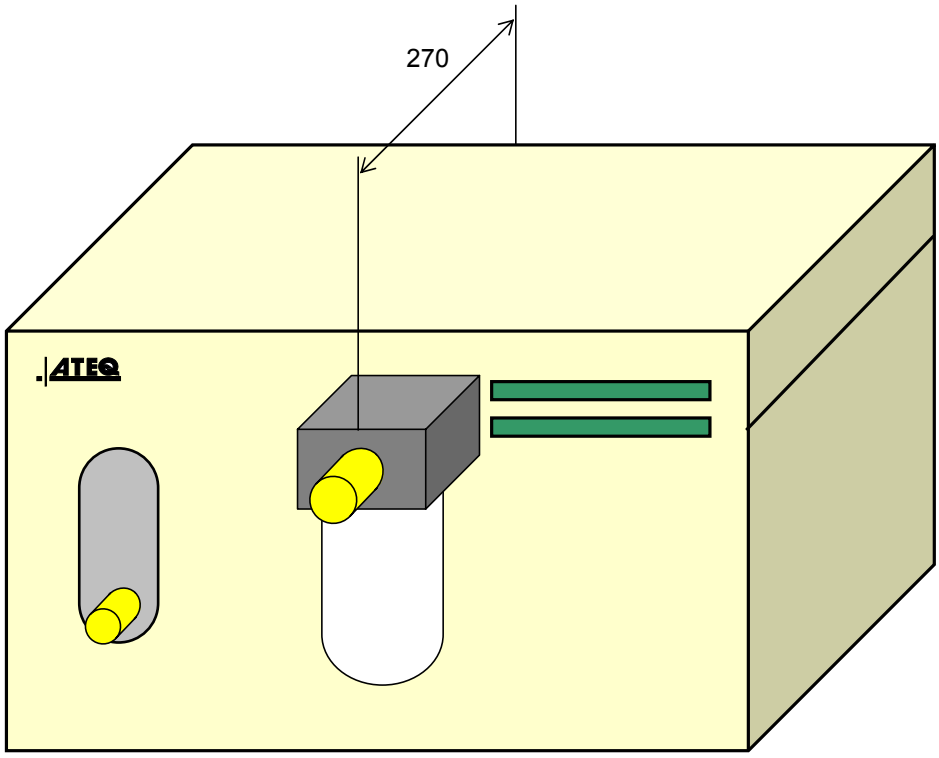
Appendices
ATEQ F CLASS

1. TECHNICAL CHARACTERISTICS F CLASS

	F520
Dimensions H x L x D (mm):	136 x 250 x 180
Dimensions with air filter and regulator (mm)**:**	136 x 250 x 270
Power supply:	24 VDC / 1,6 A Min 23,5 V ; Max 28 V
Pneumatic connections:	3/5, 4/6 or 6/8
Weight (kg)**:**	about 4
Format:	½ 19 inches
Temperatures:	
Operational:	+10°C to +45°C
Storage:	0°C to +60 °C

2. MECHANICAL DEFINITION DRAWINGS OF F CLASS





3. CONVERSION TABLE

TO

FROM	Pa	kPa	bar	mbar	mmH2O	atm	Torr	psi	inH2O	inHg
Pa	1	10^{-3}	10^{-5}	10^{-2}	0.10197	$9.8692 \ 10^{-6}$	$7.5 \ 10^{-3}$	$1.45 \ 10^{-4}$	$4.01 \ 10^{-3}$	$2.95 \ 10^{-4}$
kPa	10^{3}	1	10^{-2}	10	101.97	$9.8692 \ 10^{-3}$	7.5	0.145	4.01	0.295
bar	10^{5}	10^{2}	1	10^{3}	10197	0.98692	750	14.5	401.46	29.53
mbar	10^{2}	10^{-1}	10^{-3}	1	10.197	$9.8692 \ 10^{-4}$	0.75	$1.45 \ 10^{-2}$	0.401	$2.95 \ 10^{-2}$
mmH2O	9.806	$9.8067 \ 10^{-3}$	$9.8067 \ 10^{-5}$	$9.8067 \ 10^{-2}$	1	$9.6784 \ 10^{-5}$	$7.3556 \ 10^{-2}$	$1.4223 \ 10^{3}$	$3..937 \ 10^{-2}$	$2.895 \ 10^{-3}$
atm	$1.013 \ 10^{5}$	101.33	1.0133	1013.3	10332	1	760	14.695	406.78	29.921
Torr	133.32	0.13332	$1.3332 \ 10^{-3}$	1.3332	13.595	$1.3158 \ 10^{-3}$	1	$1.9337 \ 10^{-2}$	0.535	$3.937 \ 10^{-2}$
psi	6897.8	6.8948	$6.8948 \ 10^{-2}$	68.948	703.07	$6.8045 \ 10^{-2}$	51.71	1	27.68	2.036
inH2O	249,09	0.2491	$2.4909 \ 10^{-3}$	2.4909	25.400	$2.4583 \ 10^{-3}$	1.8683	$3.61 \ 10^{-2}$	1	$7.35 \ 10^{-2}$
inHg	3386.4	3.3864	$3.3864 \ 10^{-2}$	33.864	345.32	$3.3421 \ 10^{-2}$	25.4	0.491	13.595	1

4. PARAMETERS STORED

	PARAMETERS	Program n°	Program n°	Program n°	Program n°
TIME	Waiting				
	Fill				
	Stabilisation				
	Test				
	Dump				
	Pre-Fill				
	Pre-Dump				
REJECT	Test reject				
	Reference reject				
	Recov reject test.				
	Recov. refer. reject				
PRESS	Max. Pressure				
	Min. Pressure				
	Pre-Fill				
	Test Pressure				

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