



PressureSyn Instruction Manual



Asynt Ltd

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CONTENTS

Introduction	2
Components	3
Technical Specifications	4
Safety Warnings.....	5
General Warnings.....	5
Hot/Cold Surface Warnings.....	5
High Pressure Warnings	5
Key Considerations	7
Cleaning	7
Pre-Assembly Checks	7
Assembly.....	8
Usage Guide.....	9
Maintenance.....	9
Routine Inspection and Safety Check	9
Recommended Operation	Error! Bookmark not defined.

PLEASE READ THESE INSTRUCTIONS PRIOR TO OPERATING YOUR UNIT.

IF THERE IS AN ISSUE WITH YOUR PRODUCT, PLEASE CONTACT YOUR SUPPLIER.

PLEASE DO NOT RETURN ANY GOODS WITHOUT PRIOR AGREEMENT.

INTRODUCTION

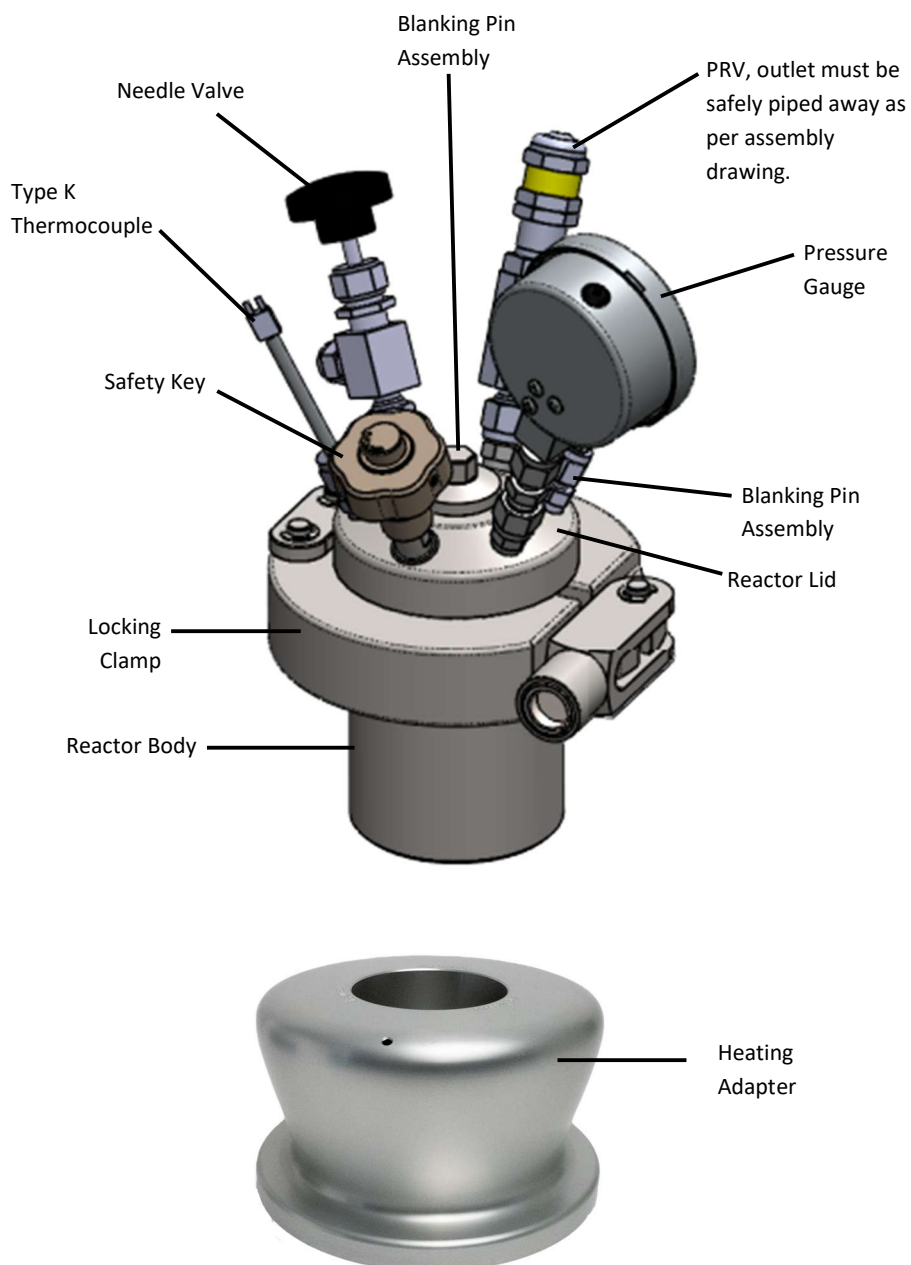
Asynt's PressureSyn high-pressure reactor allows reactions to be carried out safely at high pressures and temperatures. The reactor assembly consists of a reactor body, a main seal, a unique locking clamp, and lid, assembled with a needle valve, a safety key, a pressure gauge, a pressure relief valve (PRV), a burst disk, and a thermowell.

Each PressureSyn features a unique locking clamp and safety key combination, such that no other key can be used to open the vessel. The safety key must be removed from the lid assembly to open the PressureSyn, ensuring that any residual pressure remaining in the reactor after venting through the needle valve, is released.

Designed to be used with standard laboratory equipment, the PressureSyn fits on hotplate stirrers, and can be stirred using a magnetic stirrer bar or overhead motors via optional magnetic coupling. The use of the optional heating adapter centralises the position of the PressureSyn on most standard hotplates and distributes heat evenly to the sides of the reactor body. Users can measure the solution and heating block temperatures by inserting a thermocouple into the PressureSyn thermowell or heating adapter respectively.

COMPONENTS

The PressureSyn features an FKM main seal as standard, between the reactor lid and reactor body. The seal is held by the locking clamp. The reactor lid has seven fittings (see below). Additional fittings can fit supplied replacing blanking pins such as magnetic coupling and burst disks. An optional heating adapter can be used with the PressureSyn.



TECHNICAL SPECIFICATIONS

The PressureSyn has the following operating and technical parameters:

Max Operating Pressure:	200 bar
Max Operating Temperature:	200 °C
Bore Size:	48.0 mm
Volume:	125 mL
Test Media:	Unknown
Fatigue Life:	10,000 cycles
Material of Construction:	Stainless Steel 316
Vessel Style:	Singled ended & blind bored from bar stock.
Closure Type:	Clamp
Seal Type:	FKM
Ports & Penetrations:	4 x 1/8" NPT, 1 x 1/4" NPT, 1x M14x1, 1x 9/16" UNF.
Valves & Fittings:	Fitting plug, type K thermocouple, PRV, needle valve, safety key, two blanking plugs and pressure gauge.

SAFETY WARNINGS

GENERAL WARNINGS

Only trained personnel should be allowed to use the PressureSyn, and they must have full knowledge of the equipment, its capabilities, and of the process likely to be carried out with the equipment.

Any specific warnings and methods of operation are to be drawn up and made available to all users.

The appropriate PPE must always be used when handling the PressureSyn.

It is the user's responsibility to ensure that they follow in house regulations regarding training and PPE.

HOT/COLD SURFACE WARNINGS

Do not touch the PressureSyn or PressureSyn heating adapter whilst hot.

The PressureSyn and PressureSyn heating adapter will retain heat for some time after use. Ensure other personnel are aware of this if the PressureSyn is left unattended during or after use.

HIGH PRESSURE WARNINGS

The following operating instructions should be used as a guide to aid in formulating a detailed in-house procedure document.

Failure to comply with requirements indicated  thus could result in serious injury to personnel.



DO NOT carry out any operation unless you have read and fully understood these operation and maintenance instructions.

Statutory Health and Safety Regulations are applicable to the overall operation and maintenance of the PressureSyn.

The Health and Safety at work act places a duty upon employers to provide such information, instruction, training, and supervision as necessary to ensure, as far as it is reasonably practical, the health and safety at work of their employees. The act also places duty upon every employee to co-operate with their employer on matters affecting health and safety and to take reasonable care for the health and safety of themselves and others who may be affected by their acts or omissions at work.

Always inspect the equipment for any irregularities prior to commencement of operation.



Maintenance should only be performed by suitable qualified and experienced personnel, familiar with equipment of this type. They must be aware of the safety issues relating to carrying out maintenance activities on this type of equipment.



High Pressure



High Temperature

HIGH PRESSURE WARNINGS



Prior to commencing maintenance work, ensure that any power sources are isolated and cannot be switched on by others.

It is recommended to always report and log defects, damage and malfunction or misalignments found, and report them to Asynt Ltd immediately. The log shall identify the cause and effect of any fault.

It is advised that operators unfamiliar with this type of equipment, should be formally trained. Training should be provided by someone with a definite technical knowledge and hence, should be carried out exclusively by skilled persons (i.e. supplier / equipment specialist).

Access to the equipment is NOT restricted and is therefore the responsibility of the end user to control access to the hazardous areas.

KEY CONSIDERATIONS

CLEANING

Before assembling & using the PressureSyn, the following areas should be inspected and cleaned as stated: -

1. REACTOR BODY

The sealing face on the end of the reactor body should be wiped with a soft cloth before assembling with the lid. Ensure the seal face is smooth and free of debris, but do not clean with abrasive materials or tools that may scratch the surface. Do not apply solvents that may damage the seal material.

2. REACTOR LID

The main seal face on the lid should be wiped with a soft cloth. Ensure the face is smooth and free of debris, but do not clean with abrasive materials or tools that may scratch the surface. Do not apply solvents that may damage the seal material.

3. THREADS

Before assembling or replacing any fittings onto the reactor lid, ensure that each internal thread is cleaned thoroughly by blowing out with an airline. Lubricate threads prior to assembly.

PRE-ASSEMBLY CHECKS

Before assembling the PressureSyn, confirm the following has been performed.

- Check cleaning procedures have been followed.
- Check for signs of damage, wear, pitting and/or corrosion on the following parts: -
 - Reactor Body
 - Reactor Lid
 - Pressure Gauge
 - Valves
 - PRV
 - O-Rings
 - Adaptors & Fittings

ASSEMBLY

To load test samples and test media into the reactor body, first unscrew the safety key. Insert the key head into the locking clamp and unscrew to loosen and then remove the locking clamp. Lift the reactor lid off the reactor body.

If the PressureSyn has been supplied with any liners, ensure that these are inserted and pushed down fully before filling the reactor body with any samples or media.

Before running the PressureSyn, ensure that it is fully sealed. To do so, place the main seal within the O-ring groove, and place the reactor lid onto the reactor body. Then place the locking clamp around the reactor lid and reactor body, screwing it hand tight using the safety key.

Reassemble the safety key into the lid hand tight. We recommend the use of PTFE tape on the thread and around the tip of the needle within the safety key assembly.

The safety key is sufficiently tight when the key head starts to spin.

The needle valve is to be used for pressurising and sampling / venting the PressureSyn. Rotate clockwise to close the valve and anti-clockwise to open the valve.



Caution: Never exceed the max allowable working pressure (MAWP) of 200 bar or max allowable working temperature (MAWT) of 200 °C.

Where commercial off-the-shelf components are used (i.e. valves & adaptors), please refer to the manufacturer's usage instructions for safe operation and maintenance.

If using the PressureSyn heating adapter, screw the feet into the appropriate holes on the underside of the adapter for your hotplate.

- For circular hotplates with a diameter of 145 mm, attach 3 feet to the outer most holes.
- For circular hotplates with a diameter of 135 mm, attach 3 feet to the inner most holes.
- For square hotplates, remove all pins and centralise the base on the hotplate stirrer. If using the Stuart branded line of square topped hotplate stirrers, attach 4 feet to the 4 smaller holes (if purchased with the PressureSyn).
- If using an irregularly sized hotplate, do not attach any feet.

USAGE GUIDE

MAINTENANCE

Ensure that the O-ring seals are checked every time before use for signs of wear and tear. If any part of the O-ring seals becomes pitted or abraded, they should be discarded, and a replacement used. If spares are required, please email enquiries@asynt.co.uk or call +44 (0)1638 781 709.

Always ensure that the O-ring grooves and sealing faces are clean and free from debris before use.

ROUTINE INSPECTION AND SAFETY CHECK

It is highly recommended that an annual inspection of the equipment is carried out by a competent pressure trained engineer to ensure safe and continuous operation; this periodic inspection should be included in the client's written scheme of examination.

During the inspection, the following activities are performed: -

1. An overall equipment inspection to identify any defects.
2. Review of system operation and performance against tolerances / specification.
3. Replacement of recommended Seals.
4. Hydrostatic pressure test at MAWP.
5. Identify any further additional corrective or preventative actions required – these are detailed within the service report.

If upon inspection, it is deemed that further non-destructive testing is required, or replacement parts are needed to ensure further safe operation of the equipment, then this will be advised upon completion of the routine inspection.

If you feel that you require further guidance, please contact your supplier.



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