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Australian TOPICS

world beater

Newest steam control technology breaks oldest land speed record

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Boiler Water Treatment for the Food and Beverage Industry

So what is different about chemical treatment of boilers at food plants?

The chemical boiler treatment of boilers used in the food and beverage industry is for the most part similar to the treatment demands of any industrial boiler. The chemical treatment program should address the basic needs of corrosion and scale control in the boiler, along with minimising carryover of boiler water into the steam.

Where food plants require special water treatment attention is where live steam is used in the food manufacturing process. "Culinary" steam is used for direct injection into the product or to clean or sterilize product contact surfaces.

In non-food boiler systems, it is a common practice to add volatile corrosion inhibitors to the boiler which will produce a gas or vapour that carries over with the generated steam to provide corrosion protection after boiler pipework. Unfortunately, many of the volatile compounds used in these inhibitors have been implicated as potential carcinogens which render them unacceptable for use in food plants with culinary steam, while a handful of volatile components have received approval for restricted use based on steam and condensate monitoring to very low tolerance levels.

Any chemical additives in culinary steam must meet all applicable food regulatory requirements for human consumption. Many food plants in the dairy industry, for example, take a conservative approach and specify no volatile chemical additives, and will allow only non-volatile chemical boiler treatments. A number of organisations such as AQIS in Australia, AsureQuality or NZFSA in New Zealand along with international organisations such as FDA will certify product approvals or chemical constituents to minimise the pitfalls of using / selecting an inappropriate boiler chemical for food plants. Despite having general product approvals for the food industry, it important the chemical treatment provider has adequate knowledge of the toxicity and application of their product to provide informed advice on the correct application of the chemical treatment product for each process in the food plant.

Howard Davis, Aus / NZ Water Treatment Manager

At Spirax Sarco our water treatment chemical programs are selected and offered with food and product safety as our primary priority. If you have boiler chemical contamination concerns with your current chemical program, please do not hesitate to contact your Spirax Sarco representative.

Instant Knowledge

An Introduction to Controls

This issue's pull-out-and-keep
TECHNICAL INSERT

CONTROLS is a big subject – it's why four sections and about 1/5 of the STEAM AND CONDENSATE LOOP BOOK are devoted to it…and it's also why we could hardly include it all as the pull-out technical insert for this issue. But…the introductory section 'An Introduction to Controls' alone isn't too big, so we've included it – to whet your appetite for the whole lot! And if your appetite really is whetted, you can buy a copy of the hardcover book (and it is a very big book!) by ringing 1300 SPIRAX (774 729)!

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2 Day Seminar:
19 & 20 July 2012 – Brisbane
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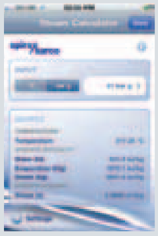

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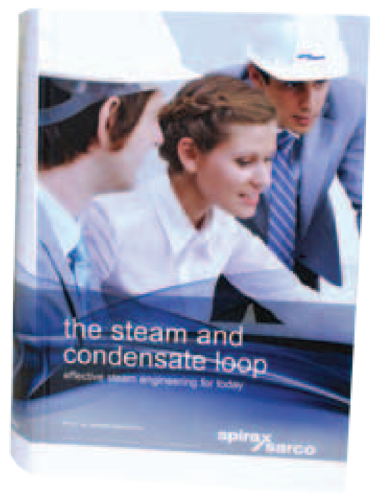

Ring 1300 SPIRAX (774 729) to find out how!!!

- This great book is prepared by experts from Spirax Sarco, a world leader in steam engineering.
- The 'Steam and Condensate Loop' book explains the principles of steam engineering and heat transfer.

Spirax Sarco provides specialist support!

British Team Beats Land Speed Record

Spirax Sarco has provided specialist support and equipment to a team of British engineers which successfully broke five land speed records for a steam powered car.

The following article originally appeared in our sister magazine CONNEXIONS, published by Spirax Sarco in the UK. We're reprinting it because of the Australian connection, loose though it is.

In 1964, the British entrepreneur Donald Campbell set a (wheel-driven) world land speed record of 403 miles per hour (645km/h) at Lake Eyre in South Australia in his turbine driven Bluebird CN7 (not a steam turbine unfortunately!)…which happened to look remarkably similar to the steam powered record breaker described below.

As well as sponsoring the record attempt, Spirax Sarco offered expert guidance to the project engineers on the specification of the car's steam system to ensure it could meet its performance objectives.

Spirax Sarco also supplied control valves and positioners for test rigs and to control steam flow in the car.

"Spirax Sarco expertise was crucial in the technical design and testing of the car. Their input ensured the car had the power and performance capabilities we needed, while the components they provided worked impressively well," says the team's Manager, Matt Candy.

The British team set a new record of 148.308 mph for a measured kilometre at the Edward's Air Force Base in California.

Marc Eggermont, Director UK & ROI Spirax Sarco, said "Congratulations to the team for their hard work; it's a great achievement for British engineering and shows just how versatile steam is in effectively meeting the needs of many different applications."

"With modern controls and other technologies, steam is meeting the most stringent environmental and energy saving requirements, cementing its position as the most sustainable industrial heating medium for the foreseeable future."

Bluebird CN7, Source: http://www.wikipedia.org/

Don Wales,
Steam car team driver

An Introduction to Controls

The subject of automatic controls is enormous, covering the control of variables such as temperature, pressure, flow, level, and speed.

The objective of this paper is to provide an introduction to automatic controls. This too can be divided into two parts:

- The control of Heating, Ventilating and Air Conditioning systems (commonly known as HVAC); and
- Process control.

Both are immense subjects, the latter ranging from the control of a simple domestic cooker to a complete production system or process, as may be found in a large petrochemical complex.

The Controls Engineer needs to have various skills at their command – knowledge of mechanical engineering, electrical engineering, electronics and pneumatic systems, a working understanding of HVAC design and process applications and, increasingly today, an understanding of computers and digital communications.

The intention of this Block is to provide a basic insight into the practical and theoretical facets of automatic control, to which other skills can be added in the future, not to transform an individual into a Controls Engineer.

This Block is confined to the control of processes that utilise the following fluids: steam, water, compressed air and hot oils.

Control is generally achieved by varying fluid flow using actuated valves. For the fluids mentioned above, the usual requirement is to measure and respond to changes in temperature, pressure, level, humidity and flowrate. Almost always, the response to changes in these physical properties must be within a given time. The combined manipulation of the valve and its actuator with time, and the close control of the measured variable, will be explained later in this Block.

The control of fluids is not confined to valves. Some process streams are manipulated by the action of variable speed pumps or fans.

The need for automatic controls

There are three major reasons why process plant or buildings require automatic controls:

- **Safety** – The plant or process must be safe to operate.
  The more complex or dangerous the plant or process, the greater is the need for automatic controls and safeguard protocol.
- **Stability** – The plant or processes should work steadily, predictably and repeatably, without fluctuations or unplanned shutdowns.
- **Accuracy** – This is a primary requirement in factories and buildings to prevent spoilage, increase quality and production rates, and maintain comfort. These are the fundamentals of economic efficiency.

Other desirable benefits such as economy, speed, and reliability are also important, but it is against the three major parameters of safety, stability and accuracy that each control application will be measured.

Automatic control terminology

Specific terms are used within the controls industry, primarily to avoid confusion. The same words and phrases come together in all aspects of controls, and when used correctly, their meaning is universal.

The simple manual system described in Example 5.1.1 and illustrated in Figure 5.1.1 is used to introduce some standard terms used in control engineering.

An Introduction to Controls

Example 5.1.1 A simple analogy of a control system

In the process example shown (Figure 5.1.1), the operator manually varies the flow of water by opening or closing an inlet valve to ensure that:

- The water level is not too high; or it will run to waste via the overflow.
- The water level is not too low; or it will not cover the bottom of the tank.

The outcome of this is that the water runs out of the tank at a rate within a required range. If the water runs out at too high or too low a rate, the process it is feeding cannot operate properly.

At an initial stage, the outlet valve in the discharge pipe is fixed at a certain position.

The operator has marked three lines on the side of the tank to enable him to manipulate the water supply via the inlet valve. The 3 levels represent:

1. The lowest allowable water level to ensure the bottom of the tank is covered.
2. The highest allowable water level to ensure there is no discharge through the overflow.
3. The ideal level between 1 and 2.

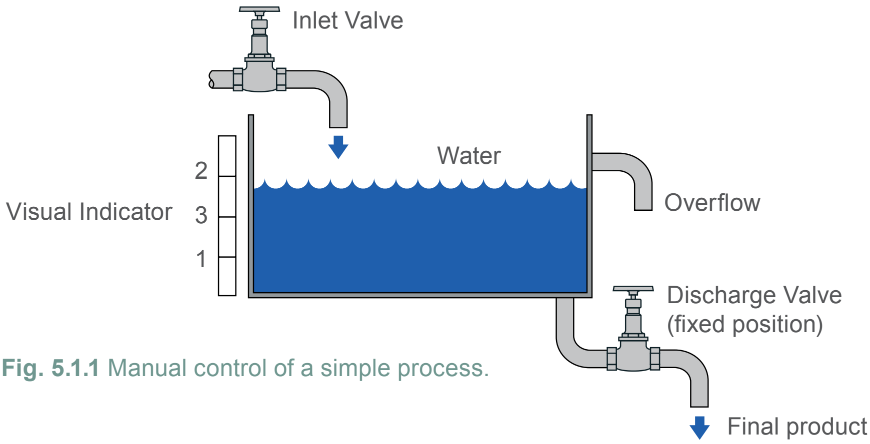

Fig. 5.1.1 Manual control of a simple process.

The Example (Figure 5.1.1) demonstrates that:

1. The operator is aiming to maintain the water in the vessel between levels 1 and 2. The water level is called the **Controlled Condition**.
2. The controlled condition is achieved by controlling the flow of water through the valve in the inlet pipe. The flow is known as the **Manipulated Variable**, and the valve is referred to as the **Controlled Device**.
3. The water itself is known as the **Control Agent.**
4. By controlling the flow of water into the tank, the level of water in the tank is altered. The change in water level is known as the **Controlled Variable**.
5. Once the water is in the tank it is known as the **Controlled Medium**.
6. The level of water trying to be maintained on the visual indicator is known as the **Set Value** (also known as the **Set Point**).
7. The water level can be maintained at any point between 1 and 2 on the visual indicator and still meet the control parameters such that the bottom of the tank is covered and there is no overflow. Any value within this range is known as the **Desired Value**.
8. Assume the level is strictly maintained at any point between 1 and 2. This is the water level at steady state conditions, referred to as the **Control Value** or **Actual Value**.

   Note: With reference to (7) and (8) above, the ideal level of water to be maintained was at point 3. But if the actual level is at any point between 1 and 2, then that is still satisfactory. The difference between the **Set Point** and the **Actual Value** is known as **Deviation**.
9. If the inlet valve is closed to a new position, the water level will drop and the deviation will change. A sustained deviation is known as **Offset**.

An Introduction to Controls

Elements of automatic control

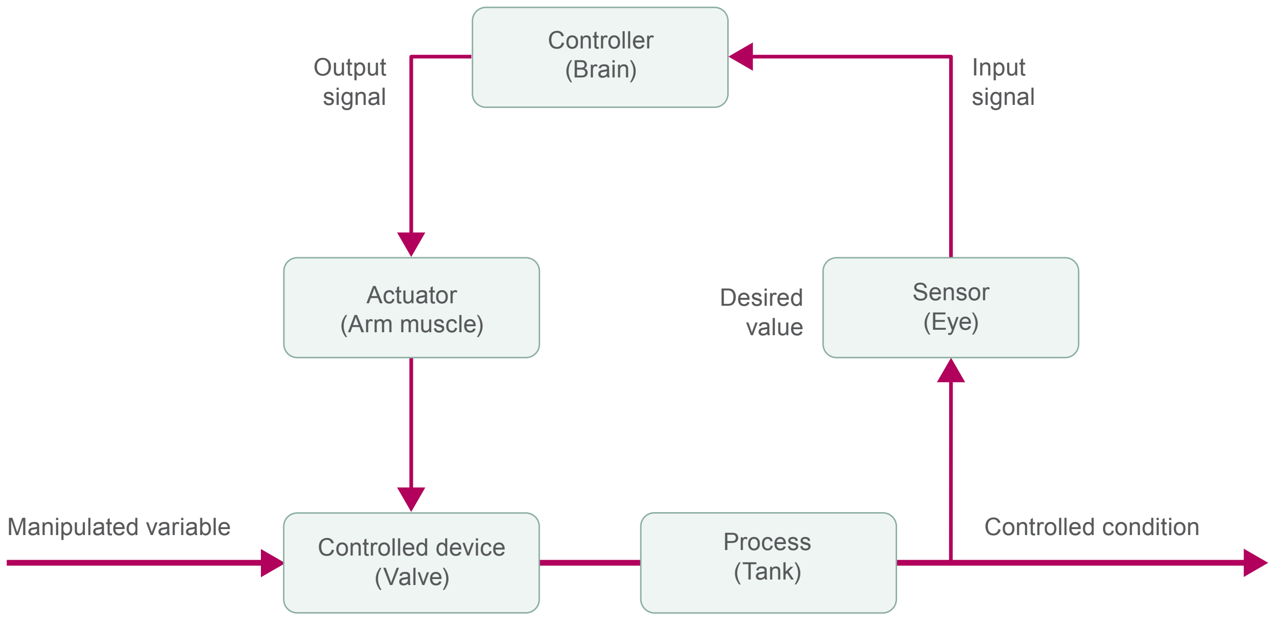

Fig. 5.1.2 Elements of automatic control.

Example 5.1.2 Elements of automatic control

- The operator's eye detects movement of the water level against the marked scale indicator. His eye could be thought of as a **Sensor**.
- The eye (sensor) signals this information back to the brain, which notices a deviation. The brain could be thought of as a **Controller**.
- The brain (controller) acts to send a signal to the arm muscle and hand, which could be thought of as an **Actuator**.
- The arm muscle and hand (actuator) turn the valve, which could be thought of as a **Controlled Device**.

It is worth repeating these points in a slightly different way to reinforce Example 5.1.2:

In simple terms the operator's aim in Example 5.1.1 is to hold the water within the tank at a pre-defined level. Level 3 can be considered to be his target or **Set Point**.

The operator physically manipulates the level by adjusting the inlet valve (the control device). Within this operation it is necessary to take the operator's competence and concentration into account. Because of this, it is unlikely that the water level will be exactly at Level 3 at all times. Generally, it will be at a point above or below Level 3. The position or level at any particular moment is termed the **Control Value** or **Actual Value**.

The amount of error or difference between the **Set Point** and the **Actual Value** is termed deviation. When a deviation is constant, or steady state, it is termed **Sustained Deviation** or Offset.

Although the operator is manipulating the water level, the final aim is to generate a proper outcome, in this case, a required flow of water from the tank.

Assessing safety, stability and accuracy

It can be assumed that a process typical of that in Example 5.1.1 contains neither valuable nor harmful ingredients. Therefore, overflow or water starvation will be safe, but not economic or productive.

In terms of stability, the operator would be able to handle this process providing he pays full and constant attention.

Accuracy is not a feature of this process because the operator can only respond to a visible and recognisable error.

An Introduction to Controls

pull-out technical insert

Summary of terminology

Set point	The value set on the scale of the control system in order to obtain the required condition. If the controller was set at 60°C for a particular application: 60°C would be termed as the 'set point'.
Desired value	The required value that should be sustained under ideal conditions.
Control value	The value of the control condition actually maintained under steady state conditions.
Deviation	The difference between the set point and the control value.
Offset	Sustained deviation.
Sensor	The element that responds directly to the magnitude of the controlled condition.
Controlled medium	The medium being controlled by the system. The controlled medium in Figure 5.1.1 is the water in the tank.
Controlled condition	The physical condition of the controlled medium. The controlled condition in Figure 5.1.1 is the water level.
Controller	A device which accepts the signal from the sensor and sends a corrective (or controlling) signal to the actuator.
Actuator	The element that adjusts the controlled device in response to a signal from the controller.
Controlled device	The final controlling element in a control system, such as a control valve or a variable speed pump.

There are many other terms used in Automatic Controls; these will be explained later in this Block.

Elements of a temperature control system

Example 5.1.1 depicted a simple manual level control system. This can be compared with a simple temperature control example as shown in Example 5.1.3 (manually controlled) and Figure 5.1.3. All the previous factors and definitions apply.

Example 5.1.3 Depicting a simple manual temperature control system

The task is to admit sufficient steam (the heating medium) to heat the incoming water from a temperature of T_1; ensuring that hot water leaves the tank at a required temperature of T_2.

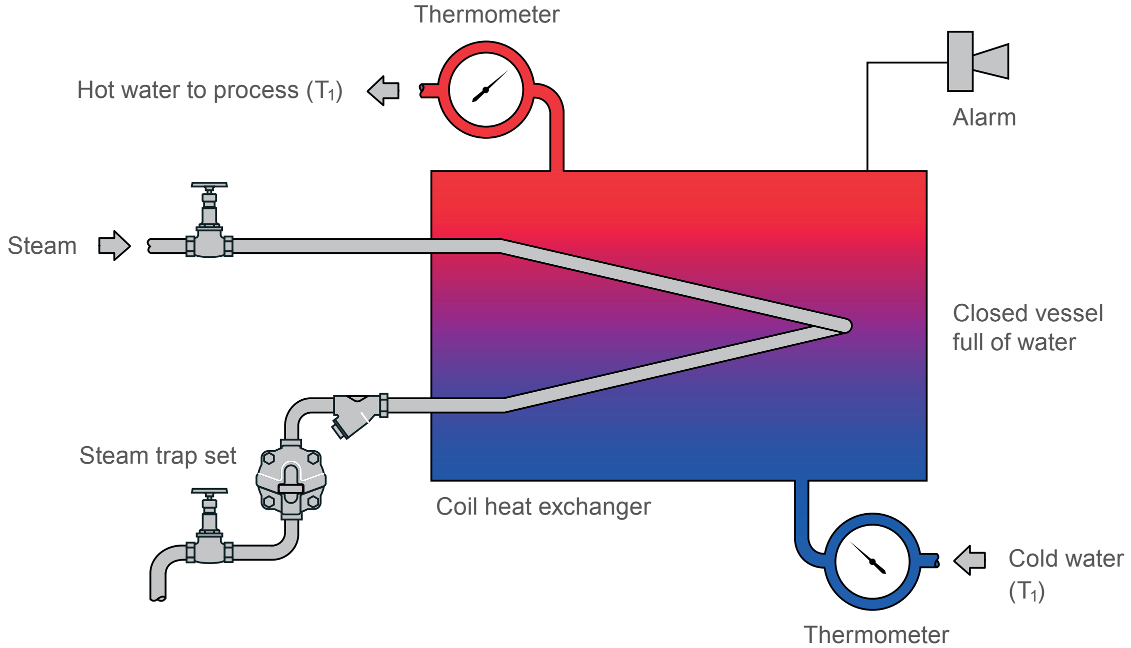

Fig. 5.1.3 Simple manual temperature control.

An Introduction to Controls

Assessing safety, stability and accuracy

Whilst manual operation could probably control the water level in Example 5.1.1, the manual control of temperature is inherently more difficult in Example 5.1.3 for various reasons.

If the flow of water varies, conditions will tend to change rapidly due to the large amount of heat held in the steam. The operator's response in changing the position of the steam valve may simply not be quick enough. Even after the valve is closed, the coil will still contain a quantity of residual steam, which will continue to give up its heat by condensing.

Anticipating change

Experience will help but in general the operator will not be able to anticipate change. The operator must observe change before making a decision and performing an action.

This and other factors, such as the inconvenience and cost of a human operator permanently on duty, potential operator error, variations in process needs, accuracy, rapid changes in conditions and the involvement of several processes, all lead to the need for automatic controls.

With regards to safety, an audible alarm has been introduced in Example 5.1.3 to warn of overtemperature – another reason for automatic controls.

Automatic control

A controlled condition might be temperature, pressure, humidity, level, or flow. This means that the measuring element could be a temperature sensor, a pressure transducer or transmitter, a level detector, a humidity sensor or a flow sensor.

The manipulated variable could be steam, water, air, electricity, oil or gas, whilst the controlled device could be a valve, damper, pump or fan.

For the purposes of demonstrating the basic principles, this Module (which can be found in the Spirax Sarco 'Steam and Condensate Loop book'; see page 3 for more information), will concentrate on valves as the controlled device and temperature as the controlled condition, with temperature sensors as the measuring element.

Components of an automatic control

Figure 5.1.4 illustrates the component parts of a basic control system. The sensor signals to the controller. The controller, which may take signals from more than one sensor, determines whether a change is required in the manipulated variable, based on these signal(s). It then commands the actuator to move the valve to a different position; more open or more closed depending on the requirement.

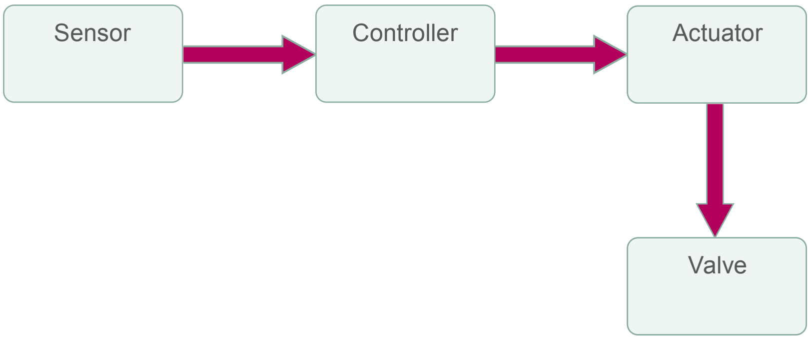

Fig. 5.1.4 Components of an automatic control

STEAM IS CLEAN

An Introduction to Controls

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Controllers are generally classified by the sources of energy that power them, electrical, pneumatic, hydraulic or mechanical.

An actuator can be thought of as a motor. Actuators are also classified by the sources of energy that power them, in the same way as controllers.

Valves are classified by the action they use to effect an opening or closing of the flow orifice, and by their body configurations, for example whether they consist of a sliding spindle or have a rotary movement.

If the system elements are combined with the system parts (or devices) the relationship between 'What needs to be done?' with 'How does it do it?', can be seen.

Some of the terms used may not yet be familiar. However, in the following parts of Block 5 (which can be found in the Spirax Sarco 'Steam and Condensate Loop book'; see page 3 for more information), all the individual components and items shown on the previous drawing will be addressed.

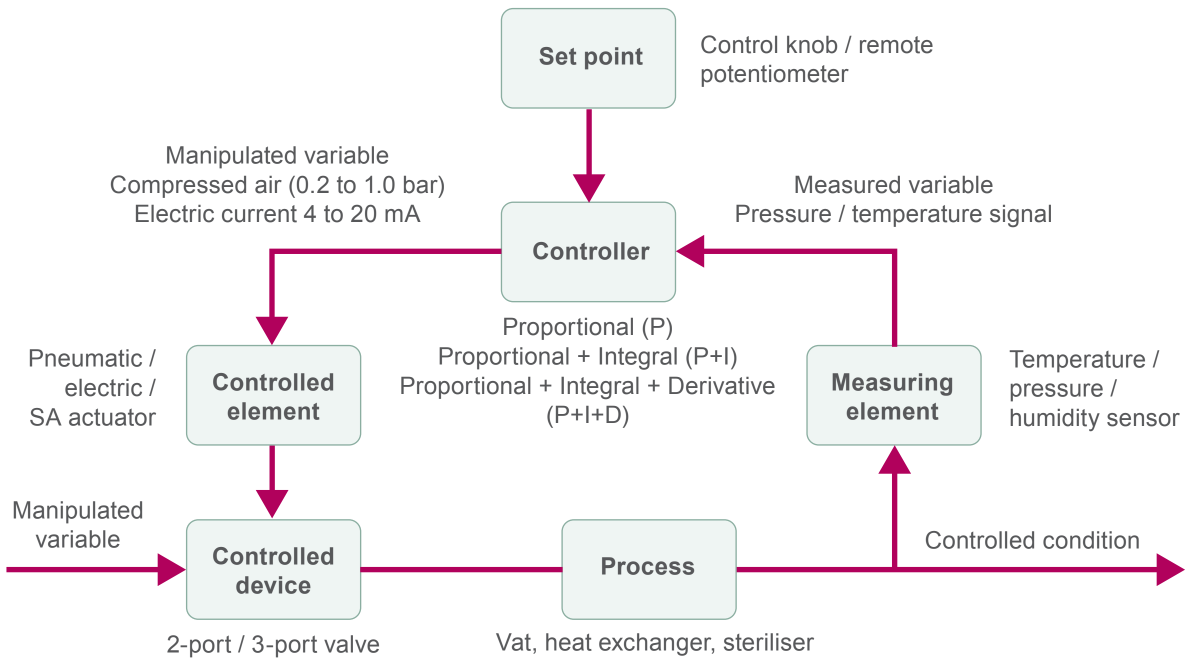


Fig. 5.1.5 Typical mix of process control devices with system elements

STEAM CAN BE EASILY AND EFFECTIVELY DISTRIBUTED

An Introduction to Controls

pull-out technical insert

QUESTIONS

1. **Air temperature in a room is controlled at 25°C. If the actual temperature varies from this, what term is used to define the difference?**

a|	Offset	☐
b|	Deviation	☐
c|	Sustained deviation	☐
d|	Desired value	☐

2. **A pneumatic temperature control is used on the steam supply to a non-storage heat exchanger that heats water serving an office heating system. What is referred to as the 'manipulated variable'?**

a|	The water being heated	☐
b|	The steam supply	☐
c|	The air signal from the controller to the valve actuator	☐
d|	The temperature of the air being heated	☐

3. **If an automatic control is to be selected and sized, what is the most important aspect to consider?**

a|	Safety in the event of a power failure	☐
b|	Accuracy of control	☐
c|	Stability of control	☐
d|	All of them	☐

4. **Define 'control value'?**

a|	The value set on the scale of the control system in order to obtain the required condition	☐
b|	The quantity or condition of the controlled medium	☐
c|	The flow or pressure of the steam (or fluid) being manipulated	☐
d|	The value of the controlled condition actually maintained under steady state conditions	☐

STEAM IS COMPETITIVE
STEAM IS NON-VOLATILE

An Introduction to Controls

QUESTIONS – CONTNUED

5. **An electronic controller sends a signal to an electric actuator fitted to a valve on the steam supply to a coil in a tank of water. In control terms, how is the water described?**

   a| Control agent ☐

   b| Manipulated variable ☐

   c| Controlled medium ☐

   d| Controlled variable ☐

6. **With reference to Question 5, the controller is set to maintain the water temperature at 80°C, but at a particular time it is 70°C. In control terms how is the temperature of 80°C described?**

   a| Controlled condition ☐

   b| Control value ☐

   c| Set value ☐

   d| Control point ☐

Answers

1: b 2: b, 3: d, 4: d, 5: a, 6: c

Water + Energy	=	Steam
Steam + Work Done	=	Condensate (Water)
Condensate Returned	=	Reduced Water Consumption, Reduced Emissions and Dollars Saved

Audit helps a famous dairy achieve 18% energy target.

A renowned dairy reduced gas consumption by 18%, thanks to a combination of energy saving measures, including a range of steam system improvements recommended by Spirax Sarco. Steam system optimisation played a major role in achieving the overall savings, leading to an extremely rapid payback for Spirax Sarco's audit. "In terms of payback we're talking months not years," was the evaluation of plant manager Gordon Davies.

By Craig McKnight, State Manager - NSW

"It was also useful to bring in Spirax Sarco to release our engineers who are mainly tasked with core activities like keeping the production lines running," he explains. "In our busy manufacturing environment, some of the steam system jobs are pretty low on our day-to-day priority list so we decided to ask Spirax Sarco to do a full audit. We worked in partnership with them on the recommendations and together we met our stretched energy targets for the past two years."

One of the big improvements was raising the temperature in the boiler feedtank, from between 79 and 82°C, to 96°C. As a rule of thumb, increasing the temperature of the feed to a boiler by 6°C reduces the boiler's energy consumption by 1%, so this alone will have yielded savings of at least 2%.

Condensate recovery was another area that produced big results, raising the proportion of hot, treated water recycled back to the boiler from 76% to between 94 and 95%.

In addition, the steam system audit highlighted a variety of other energy saving measures, such as repairing and installing insulation, improving the blowdown control on the boiler and repairing or replacing any malfunctioning steam traps. The Spirax Sarco engineers compiled an asset list of all steam traps around the site and the customer has now engaged Spirax Sarco to carry out an annual inspection and service across the entire population.

'Since the initial savings we have seen another 8% energy savings for 2009' commonly referred to as HACCP, (Hazard Analysis & Critical Control Point within the food and beverage industry).

"It's been a very good relationship and long may it continue," says Mr Davies. "Since the initial savings we have seen another 8% energy savings for 2009. This was helped by the annual Spirax Sarco steam survey, which identifies potential problems and reduces slippage with regards to energy savings.

Safety First

Payback three times over within six months

Spirax SafeBloc™ Double Block and Bleed valves have helped SCA Hygiene in the United Kingdom to eliminate unscheduled boiler shutdowns costing up to $30,000 each in lost production.

The company frequently suffered minor problems with blocked level gauge glasses on its boilers. However, because only single isolation valves were fitted to the gauge glasses, the boiler had to be shut down and depressurised to enable maintenance engineers to fix the problem safely, halving production output for up to 10 hours.

They replaced the existing single isolation valves with four SafeBloc valves on each of their boilers, so that any future maintenance work on the level gauges could be done without having to shut down a boiler, enabling them to maintain production at all times. Previously a boiler shutdown could cost up to $30,000 in production downtime.

Double block and bleed (DBB) is the industry's best practice for double isolation for safe maintenance without having to shut down the entire system. Double isolation is achieved by closing two isolation valves, with the intermediate bleed valve being left open to provide a sealing integrity check to ensure the downstream pipeline remains safely isolated during maintenance work.

The innovative, patented design of Spirax SafeBloc incorporates two isolation valves and a bleed port in a compact assembly, making it easy to install into the space left by an existing single isolation valve. No other commercially available product provides double block and bleed isolation in such an integrated, compact unit.

The last four valves paid for themselves three times over within the first six months.

The Spirax Sarco CSM-C and CSM-CE Clean Steam Generators

The CSM-C and CSM-CE range of 316 stainless steel compact clean steam generators can provide up to 600 kg/h of clean steam at 3 bar g, enabling users to meet the highest steam quality standards in food and beverage manufacture.

The microprocessor-controlled unit uses treated feedwater and either plant steam or electricity as the primary heating source to produce healthcare grade steam, meeting European and international standards. The unit is fitted with a preheating and degassing system to ensure the removal of non-condensable gases prior to entering the boiler.

The generator comes complete with a touchscreen PLC for easy commissioning and operation and arrives at the factory as a pre-assembled, skid-mounted package, ready to be connected to your utilities.

FTGS14 Ball Float Steam Trap

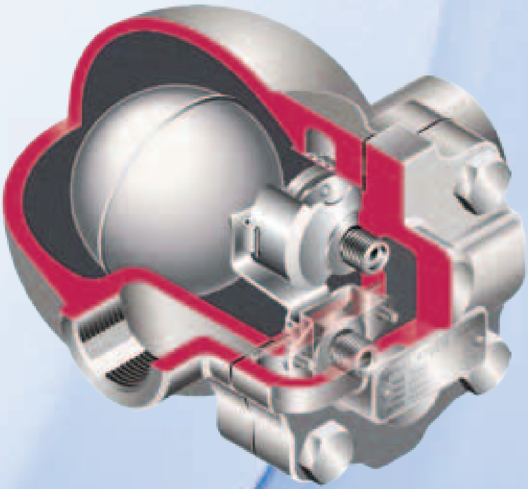
Introducing the FTGS14 ball float steam trap from Spirax Sarco, the world leading steam specialist.

By Trevor Peeling,
Product Manager

The FT range of ball float steam traps from Spirax Sarco are the most popular mechanical steam traps in the world. The FTGS14 with its stainless steel base and electroless nickel plated SG iron cover, has been designed to offer perfect condensate drainage and air venting for process, heating and mains drainage applications.

Key features and benefits:

- **Low cost of ownership**
  Stainless steel base for longer life, low maintenance and minimal system downtime.
- **Easy to replace**
  Dimensionally interchangeable with the FT14.
- **No live steam loss**
  Achieved by self-aligning valve and water seal.
- **Erosion resistant**
  Improved design with simplified flow paths to reduce erosion.
- **Effective condensate drainage**
  Modulating valve orifice mechanism that provides complete and immediate condensate removal under all positive pressure load conditions.
- **Quick start-up**
  Integral air vent for maximum venting of air to improve productivity.
- **High quality product**
  Improved materials and surface finish offer a high quality product.
- **Impact resistant**
  Strong float construction guaranteed against waterhammer.



Product	Size	Connections		SLR option	In-built air vent	Flow direction	Material
		Screwed	Flanged				
FTGS14	½" - DN15	✔	✔	✔	✔	Horizontal left-to-right or right-to-left	Base Stainless steel Cover Electroless nickel plated SG iron
	¾" - DN20	✔	✔	✔	✔		
	1" - DN25	✔	✔	✔	✔		
	1" HC	✔		✔	✔		
IFTGS14	½"	✔			✔	Horizontal right-to-left when looking at the name-plate	
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Marketing Specialist

Congratulation to Issue 16 Competition winners!
MAIN PRIZE WINNER: Brian Whiteroad (LION Dairy & Drinks)
SEMINAR WINNER: David Bower WACHS SW (Health Dept)
STEAM AND CONDENSATE LOOP BOOK WINNERS: Robert Simic (Engineering Commissioning Services), Stuart Gibson (Visy), Shane Ormsby (Bickfords Australia)
Keep entering our competition for your chance to win and remember ALL WHO ENTER WILL RECEIVE A PROMOTIONAL GIFT FROM SPIRAX SARCO!

Topics main prize winner Brian Whiteroad with Andy Williams from Steam Plus (Sole agent for Spirax Sarco Tasmania)

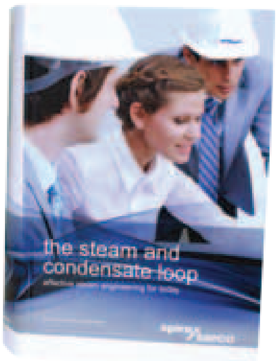
Win a Garmin nuvi 2350 In-Car GPS Navigator and a Sony Playstation Vita Console

Training Courses

We hold seminars and training courses Australia wide.
Call 1300 SPIRAX (774 729) and find out when we are holding one in your state!

The Steam and Condensate Loop Book

- This great book is prepared by experts from Spirax Sarco, a world leader in steam engineering.
- The 'Steam and Condensate Loop' book explains the principles of steam engineering and heat transfer.



Contacting Us

NEW SOUTH WALES
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BLACKTOWN NSW 2148
Ph: 1300 SPIRAX (774 729)
Fax: (02) 9831 8519
E-mail: Info@au.SpiraxSarco.com

QUEENSLAND
57 Distribution Street
LARAPINTA QLD 4110
Ph: 1300 SPIRAX (774 729) or +61 7 3441 1600
Fax: (07) 3800 9900
E-mail: Qld@au.SpiraxSarco.com

WESTERN AUSTRALIA
1/14 Bannick Court
CANNING VALE WA 6155
Ph: 1300 SPIRAX (774 729)
Fax: (08) 9455 4809
E-mail: Wa@au.SpiraxSarco.com

VICTORIA
4A/9 Jersey Road
(PO Box 353)
BAYSWATER VIC 3153
Ph: 1300 SPIRAX (774 729)
Fax: (03) 9720 5224
E-mail: Vic@au.SpiraxSarco.com

SOUTH AUSTRALIA
Unit 5/ 6 Walla St
LONSDALE SA 5160
Ph: 1300 SPIRAX (774 729)
Fax: (08) 8307 2777
E-mail: Sa@au.SpiraxSarco.com

TASMANIA
Steam Plus
13 Ferguson Drive
QUOIBA TAS 7310
Ph: 03 6424 6202
Fax:03 6424 6214
E-mail: admin@steamplus.com.au

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BLACKTOWN NSW 2148

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14 Forge St
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Enter our competition for your chance to WIN

a Garmin nuvi 2350 In-Car GPS Navigator and a Sony Playstation Vita Console

To enter online visit
spiraxsarco.com/au
and follow the instructions

spirax sarco

WIN

a Garmin nuvi 2350 In-Car GPS Navigator and a Sony Playstation Vita Console

About the Prizes

FIRST PRIZE:

The Garmin nuvi 2350 In-Car GPS Navigator features lane assist with junction view, trafficTrends™, myTrends™ predictive routing, and ecoRoute™ to help calculate a more fuel-efficient route. Pedestrian capabilities can be enhanced with optional cityXplorer™ maps for mass transit information.

PLUS

A SONY PLAYSTATION VITA CONSOLE. Join the handheld gaming revolution with PS Vita, the next generation portable entertainment system from PlayStation. With a stunning screen and dual analog sticks, PS Vita is every gamer's dream come true.

PS Vita uses the latest technology to deliver the best performance and graphics and the built-in cameras and GPS help create augmented reality and location-based experiences. PS Vita is fully compatible with PlayStation Network, as well as connecting with PS3. Get ready for a genuinely cutting-edge, next generation ultimate portable entertainment experience.

Q1. Do you have a requirement for a food grade in your plant?

☐ Yes ☐ No

Q2. Do your company's OH&S regulations call for a Double Block and Bleed valve?

☐ Yes ☐ No

Q3. Are you interested in Spirax Sarco's stainless steel product range?

☐ Yes ☐ No

If yes, would you like more information on it?

☐ Yes ☐ No

Q5. Do your WT chemicals have AQIS approval for use in food plants, and are you confident that no cross contamination occurs between your boiler treatment chemical and your food product?

☐ Yes ☐ No

Your Details

Name ....

Company..

Position ....

Phone number ....

Company address ....

....

Email address ....

TERMS AND CONDITIONS: Enter the competition by answering a few simple questions on an insert placed in our quarterly Topics publication. The competition starts 21st March 2012. Closing Date of the Competition is 22nd May 2012. Date of the draw will be 24th May 2012. Time will be 10.00am. Draw will take place at the Spirax Sarco Head Office at 14 Forge Street, BLACKTOWN NSW 2148. The total prize value is: $1,135.00. Main prize is Garmin nuvi 2350 In-Car GPS Navigator valued at $137.00. and a new Sony PS Vita Console valued at: $348.00. Second Prize is a place in the next Spirax Sarco 'Steam Engineering' seminar when held in your state valued at $650.00. Winners' names will be announced on the Spirax Sarco website on 30th May 2012 and published in Issue 18 of Topics. All prize winners will be notified by phone call and e-mail from their local representative who will personally deliver the prize. Website address is: www.spiraxsarco.com/au in the News section. The Promoter is Spirax Sarco with registered office at 14 Forge Street Blacktown, NSW 2148. ABN 52 001 126 601. Redraw will be held on 14th Sep 2012. Redraw will be held at the same address and time as original draw. Prize winners will have their prizes delivered by our Spirax Sarco staff member for that sales territory and all prizes will be delivered before 22nd June 2012. ACT residents excluded. NSW: LTPS/10/10821 and LTPS/11/11485.