



# Application Guide

# Welcome

## to the Status Instruments Application Guide

In this handy notebook-style Application Guide, you'll find essential information about how to use your Status Instruments product for specific applications, so it can retrieve, process and deliver all the data you need, exactly as you need it.

And as always, if you need to know anything that isn't covered in this Guide, please call us on +44 (0)1684 296818.

### Industry sectors.

Status products are deployed in a wide range of industries and disciplines all over the world. Here are the main ones:



**Aerospace**



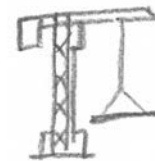
**Automation**



**Automotive**



**Chemical**



**Construction**



**Energy**



**Food and  
Beverage**



**Materials  
Handling**



**Marine**



**Oil, Gas and  
Petrochemical**



**Pharmaceutical**



**Water  
and Waste**

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# 4 Product range overview

This is a summary of the Status Instruments product range.  
For more details, please go to [www.status.co.uk](http://www.status.co.uk), or consult our Product Guide, or call us on +44 (0) 1684 296818.

## Signal conditioning

SEM1600 series	SEM1700 series	SEM1000 series
SEM1600T	SEM1700	SEM1000
SEM1600VI	SEM1720	SEM1010
SEM1600B	SEM1750	SEM1015
SEM1600F		SEM1020
SEM1620		SEM1200
SEM1630		
SEM1633		
SEM1636		

## Rail-mounted transmitters

SEM1605 series	SEM315 series
SEM1605P	SEM315 MKII
SEM1605TC	
SEM1615 series	SEM1800 series
SEM1615	SEM1801
	SEM1802

## Wireless transmitters

WTX series
WTX700
WTR series
WTR900/04
WTR900/22

## In-head transmitters

SEM203 series	SEM206 series	SEM210 series
SEM203P	SEM206P	SEM210 MKII
SEM203TC	SEM206TC	SEM210X MKII
SEM203W	SEM206TH	
TTR series	TTC series	SEM310 series
TTR200	TTC200	SEM310 MKII
TTR200X	TTC200X	SEM310X MKII

## Temperature transmitters

SEM710 series
SEM710
<a href="#">HTR series</a>
HTR200/I
HTR200/IV
<a href="#">STA series</a>
STA206

## Field mounted displays

DM640 series	DM650 series
DM640P	DM650TM
DM640XP	DM650PM
DM640TC	DM650HM
DM640XTC	DM650VI
	DM650LP
DM660 series	
DM660	
DM670 series	DM700 series
DM670TM	DM700
DM670PM	DM700X

## Probe assemblies

Probes/Sensors	Thermowells
STS1 - 12	STW1 - 6
Heads	Accessories
SCH4	Connection blocks
SCH11	Compression glands
SCH15	
SCH50	

## Panel meters

DM720 series	DM3600 series
DM720	DM3600U
	DM3600A
DM3400 series	DM4500 series
DM3410	DM4500U
DM3420	DM4500F
DM3430	

## Humidity and temperature transmitters

SEM160 series	SEM161 series
SEM160ID/H	SEM161W/H
SEM160ID/HP	SEM161D/H
SEM160IW/H	SEM161R/H
SEM160IW/HP	
	SEM162 series
	SEM162W/HP
	SEM162D/HP
	SEM162R/HP

## Pressure transmitters

PTX series
PTX130/1 or 2
PTX130/G3 or G4
PTX19
PTX20
PTX23

## Infra-red sensors

IR series
IR200/2
IR200/15
IR200/30
IR200/CF

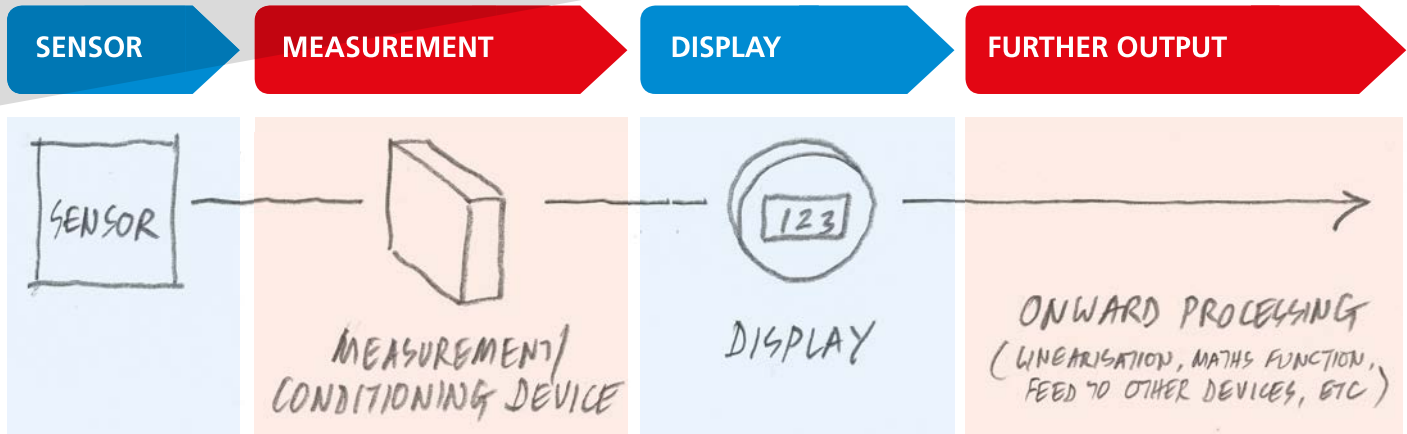
# 5 Solution overview

**For every application, there is a Status product, and a practical solution.**

We pride ourselves on being able to offer the kind of technical support that will help you diagnose opportunities, recognise the optimum solution and specify the appropriate Status products.

Every application contains a series of processes, which we look at as 'journeys', from source to final output. The basic principle is shown below, and over the next two pages, we show how Status can help you 'journey' from sensor output (or from any mA or V process signal) to arrive at the outcome you require.

By asking you a series of consultative questions, your needs can be analysed, mapped and assessed, then accommodated with products from the Status range.



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## Direct sensors from...



Temperature; RTD    Temperature; Thermocouple    Temperature; Thermistor    Temperature; Wireless    Temperature; Contactless    Humidity    Pressure    Flow; Frequency/Pulse    Rotation; Pulse    Movement; Potentiometer    Weight; Loadcell

In-head transmitters



Rail-mounted transmitters



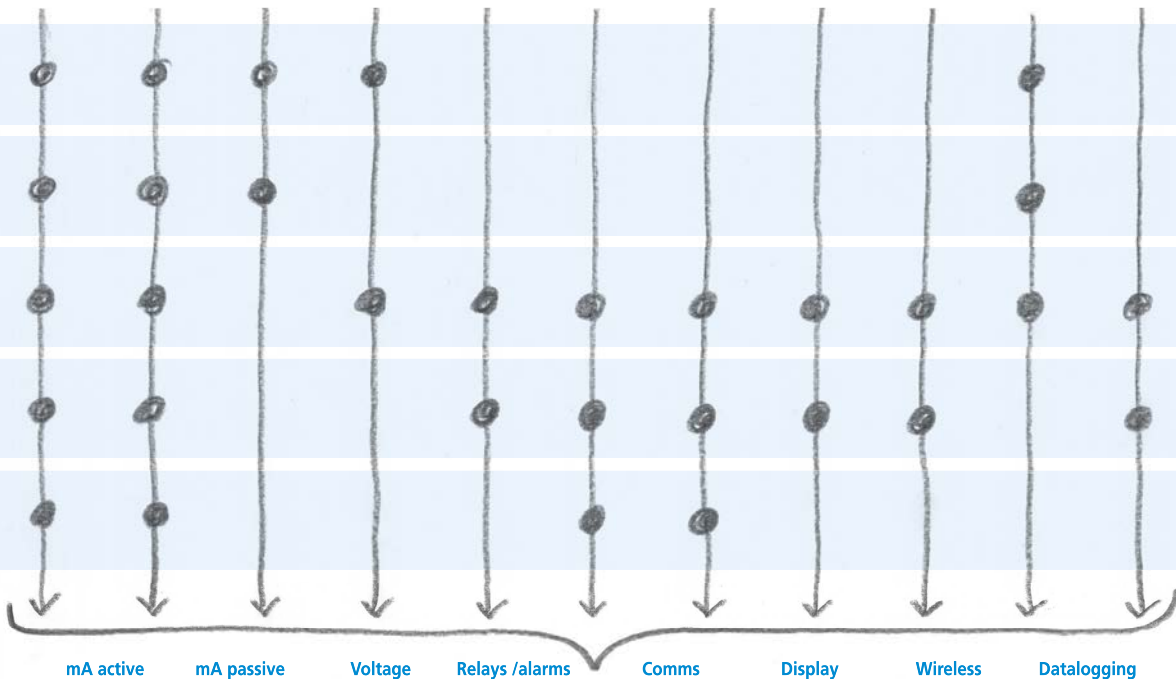
Signal conditioning



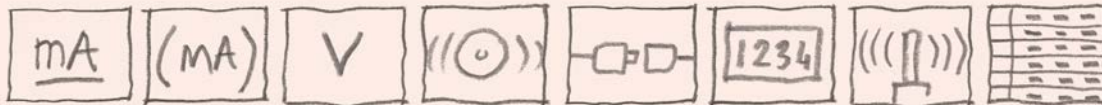
Panel meters



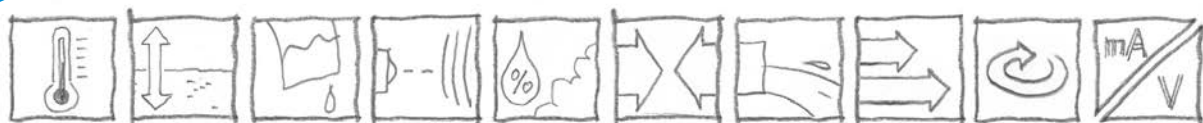
Field-mounted displays



## OUTPUT OPTIONS



# Process signals, in mA or V, from...



Temperature

Level

pH

Infra-red

Humidity

Pressure

Flow

Movement

Rotation

Any other sensor  
providing a  
voltage or mA  
signal

Rail-mounted  
isolator



Signal  
conditioning



Panel  
meters



Loop-powered  
display



mA active

mA passive

Voltage

Relays /alarms

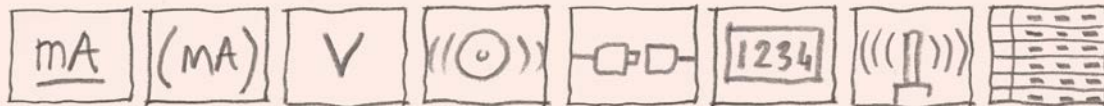
Comms

Display

Wireless

Datalogging

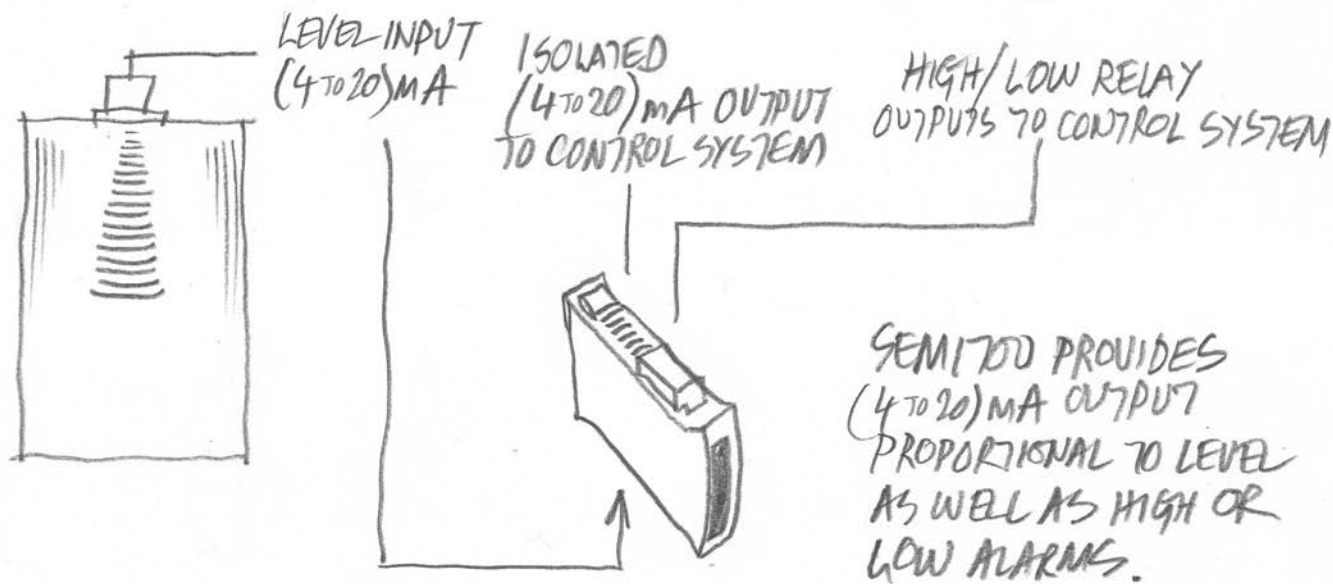
## OUTPUT OPTIONS



## LEVEL

**Application:** Continuous level measurement with an SEM1700.

The SEM1700 can monitor a level sensor input to measure vessel contents, as well as provide a high/low override alarm.

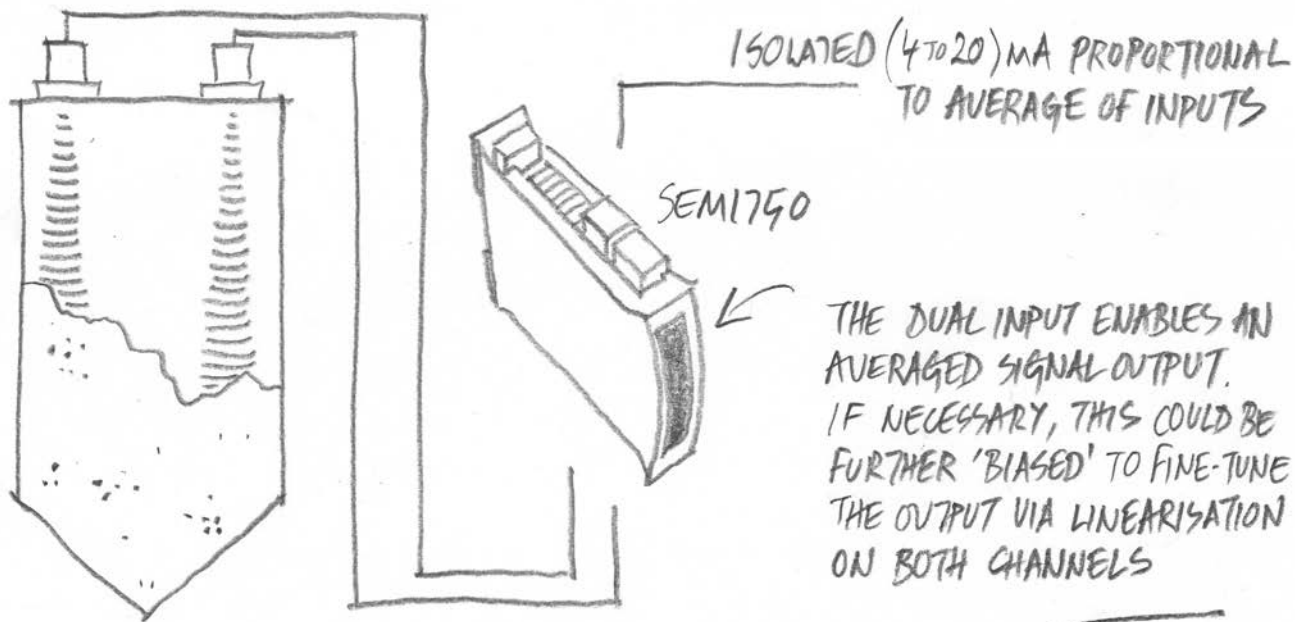




# LEVEL

**Application:** Continuous level measurement in a vessel containing solids can cause problems due to angles of repose from filling cycles.

An SEM1750 combines two separate level sensor inputs to provide an averaged output, as well as vessel contents linearisation for both sensors, as required.

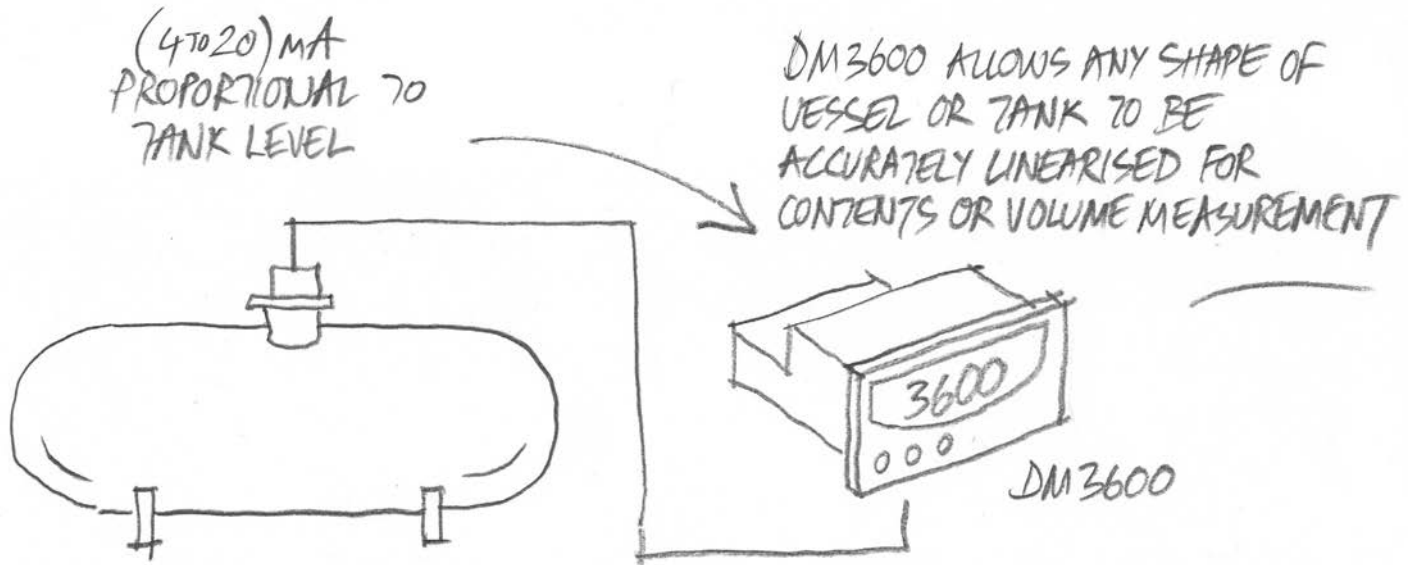


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## LEVEL

**Application:** Continuous level measurement in process vessels can call for high-accuracy linearisation.

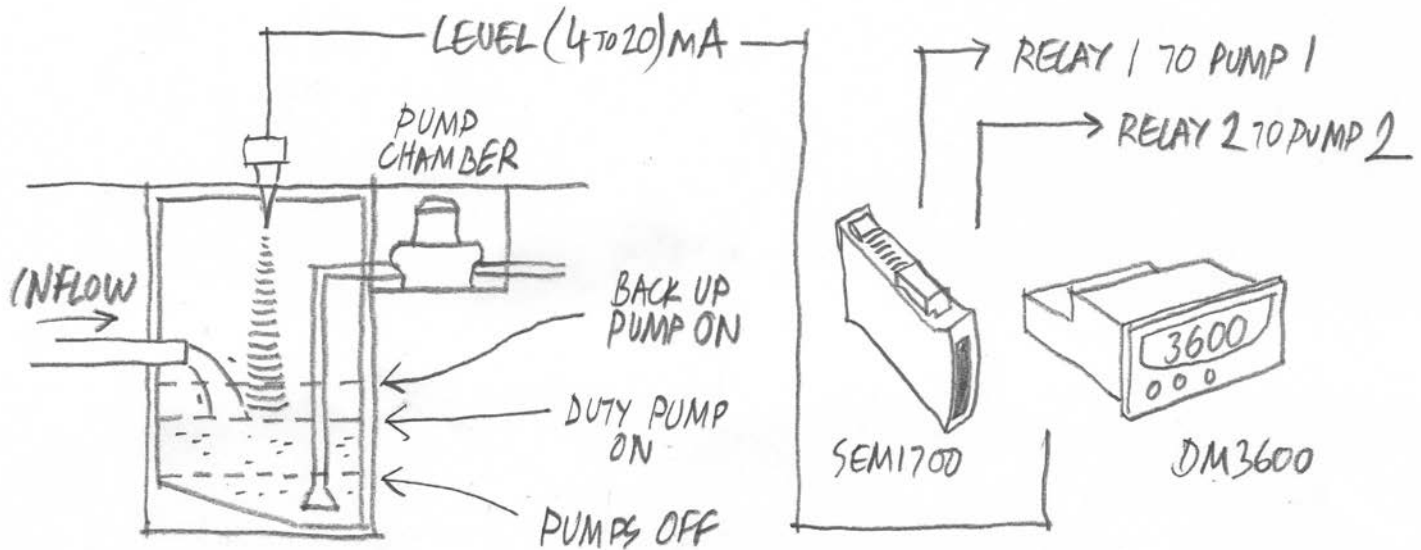
The DM3600 can interface with any level transmitter output and linearise any vessel shape, with up to 60 co-ordinate pairs. Alarms and serial communication are all available.



## LEVEL

**Application:** Level control in sewage lift stations is normally provided by two or more pumps, with a level controller to tell the pumps when to start and stop.

An SEM1700 or DM3600 unit can field-power a radar gauge mounted in the lift station, and provide the switching of the contactors for the pumps. Normally, the duty pump will lower the level, but in storm conditions, the back-up pump may be called to assist.

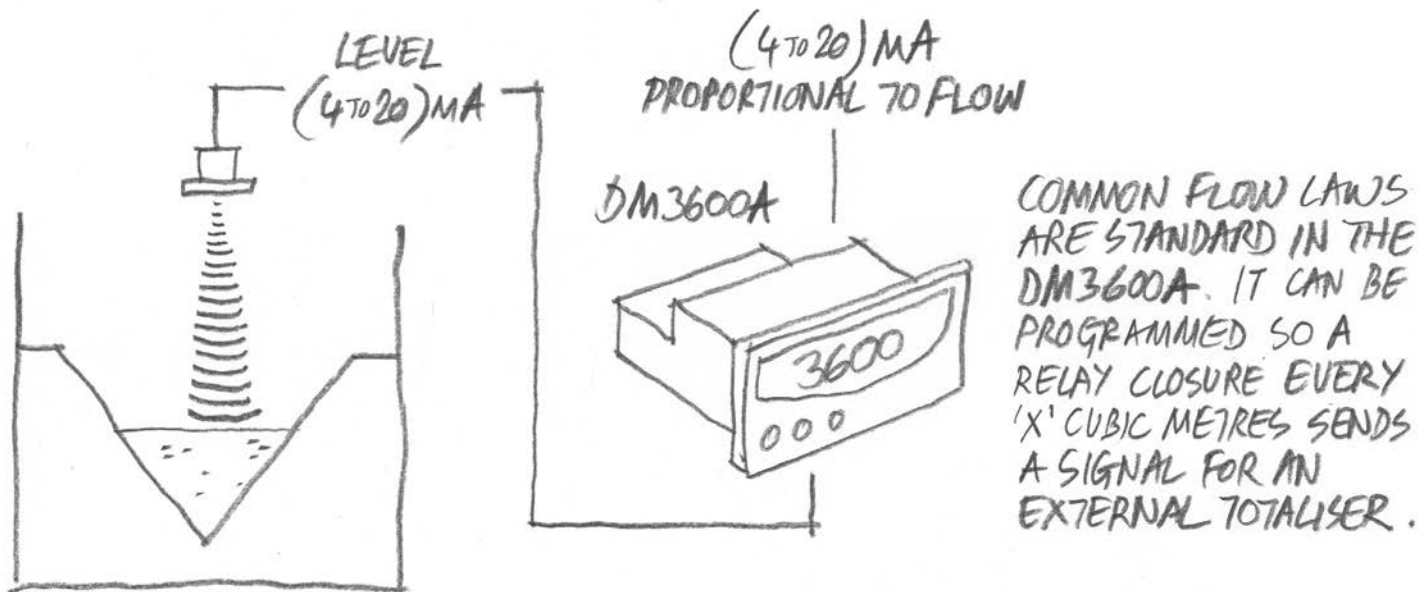


# 12

## LEVEL

**Application:** The DM3600A can be used with almost any level sensor to measure 'head' upstream of a flume or weir.

Standard software allows power  $3/2$  and  $5/2$  flow linearisation, giving a (4 to 20) mA output proportional to flow.



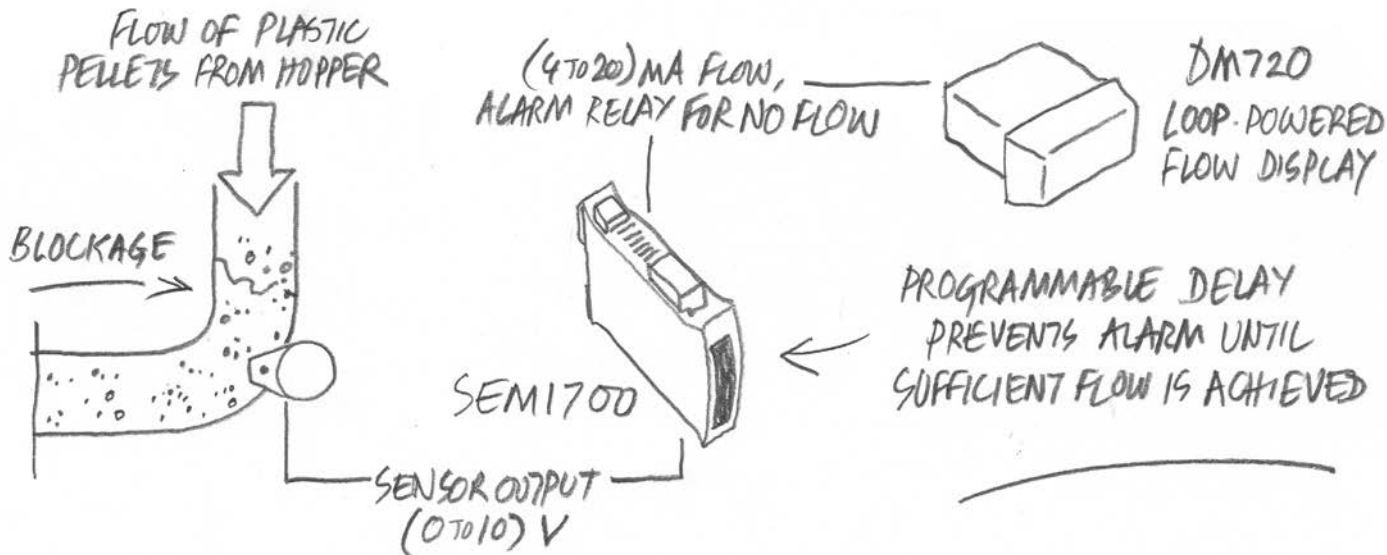
# FLOW

## Application: 'No Flow' alarm.

An SEM1700 with analogue and relay outputs is used with an OEM acoustic solids flow sensor. The 4-wire sensor is powered by 24 VDC supply, and its (0 to 10) V output proportional to acoustic emission (flow-generated) is converted to (4 to 20) mA.

An alarm threshold to signal 'no flow' is set by the relay.

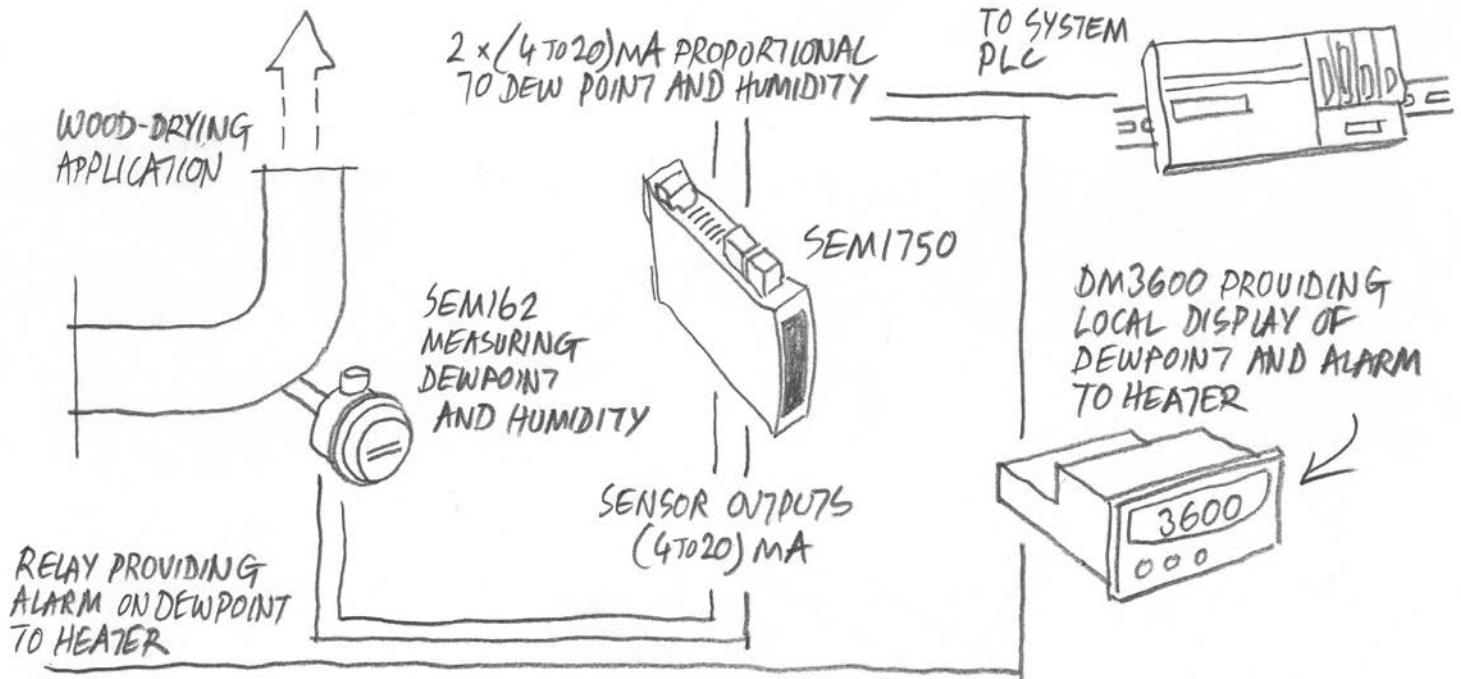
The SEM1700 features a programmable relay on delay to prevent alarm condition, until sufficient flow is reached on start up.



# HUMIDITY

**Application:** An SEM1750 powers the SEM162, and sends two loops to the panel meter and PLC for further control.

The panel meter has its relay output programmed to alarm if the dewpoint reaches a critical level. The SEM1750 also sends a (4 to 20) mA signal proportional to humidity to a local PLC.

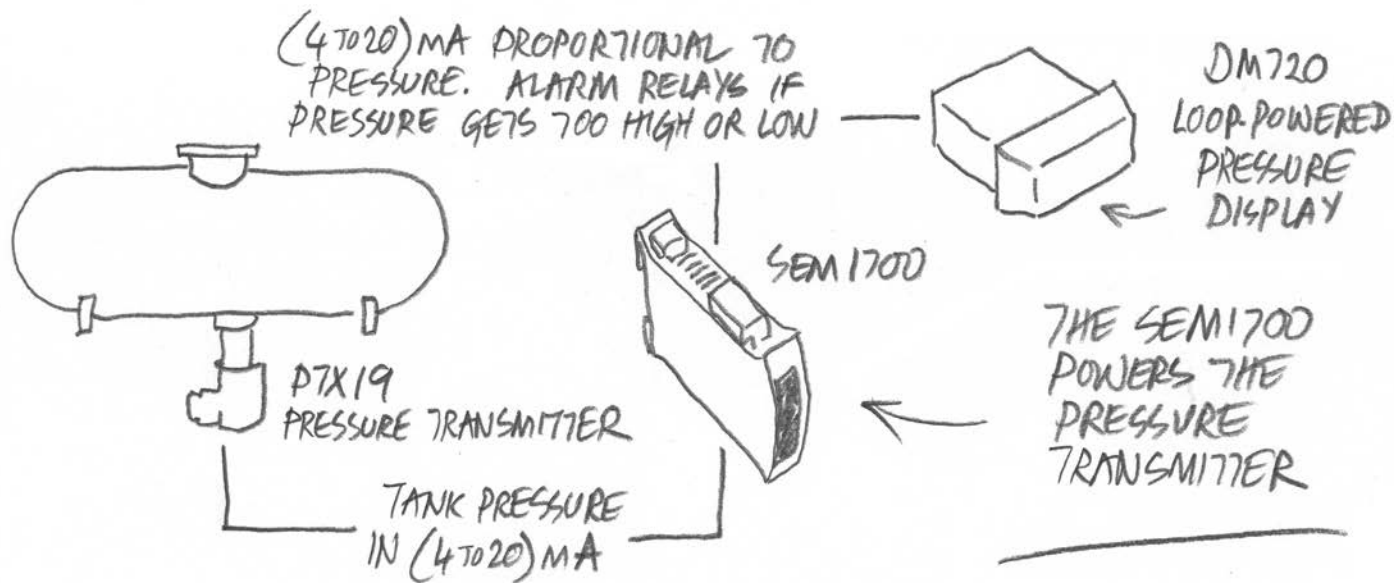


## PRESSURE

**Application:** An SEM1700 with analogue and relay outputs is used with a PTX19 pressure transmitter, which is powered by a 24 VDC supply built into the SEM1700.

In this case the SEM1700 is providing an output proportional to tank pressure, converted to (4 to 20) mA. An alarm threshold to signal 'high or low pressure' can be set by the relays in the SEM1700.

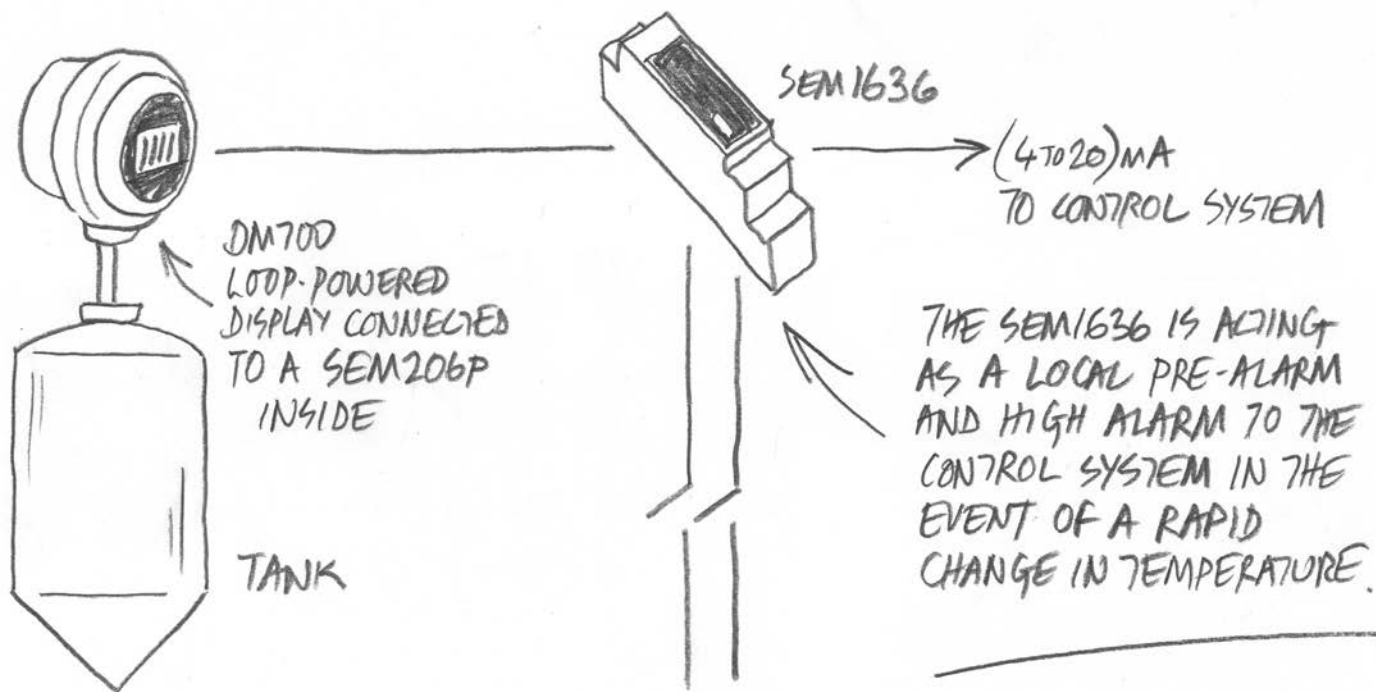
The SEM1700 features a programmable relay on delay to prevent alarm condition, until sufficient pressure is reached on start up.



## TEMPERATURE

**Application:** An SEM206P with a DM700 monitors the tank temperature.

A tank may need local intervention if the control system fails to respond quickly enough to a rapid change in heat of the tank. A local loop-powered alarm and indication is used.





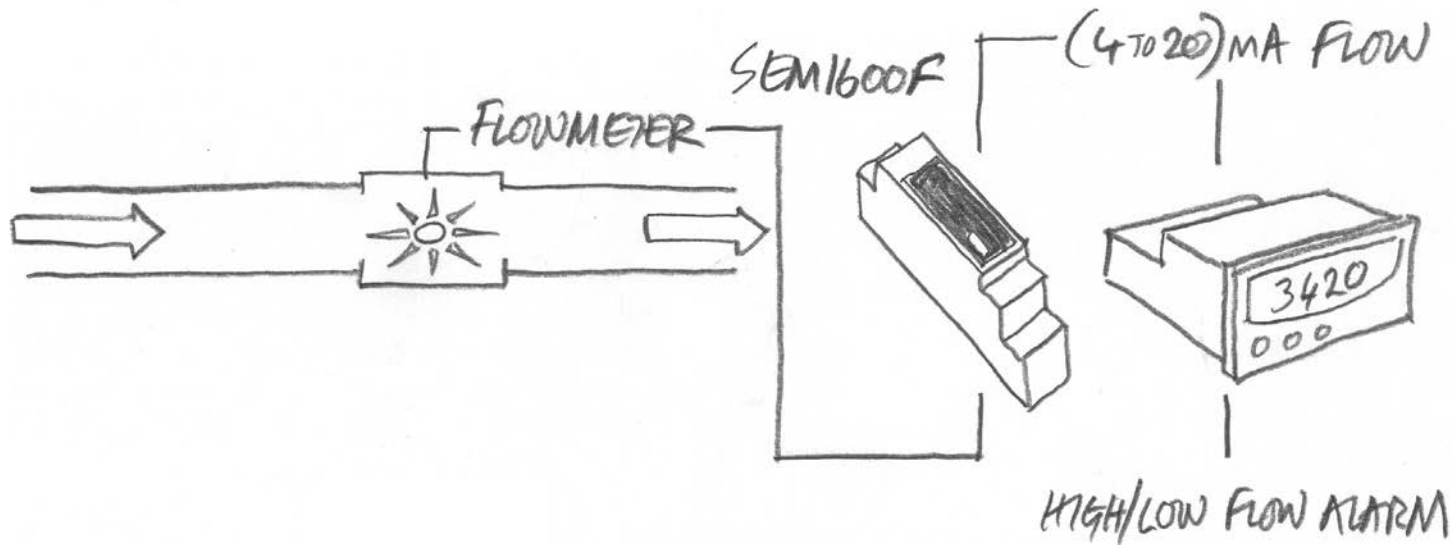
# 17

## FLOW

**Application:** Accurate measurement of flow can be achieved by using the SEM1600F's frequency input, and producing an output proportional to flow.

By using a DM3420, a display of the flow rate can be seen.

Using the relay outputs, these can be set to 'alarm' to reduce or increase flow. A continuous (4 to 20) mA output proportional to flow is maintained by the SEM1600F (for which a totalised flow option is available).

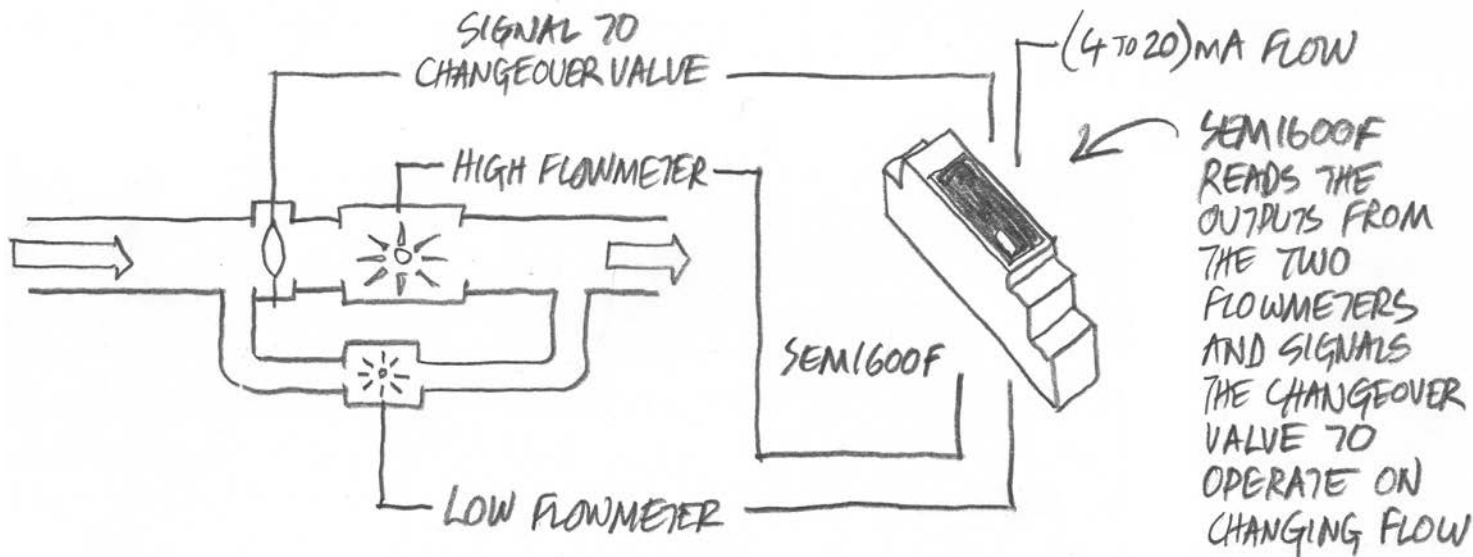


# FLOW

**Application:** Accurate measurement of flow over a wide flow range can be problematic, as the turndown of the flowmeter could provide inaccurate measurement at extremes of span.

The SEM1600F uses two channels to take the inputs from two correctly-sized flowmeters, and by programming it via USB speedlink, can select the most appropriate instrument for the conditions, signalling a changeover valve to divert flow to the selected instrument.

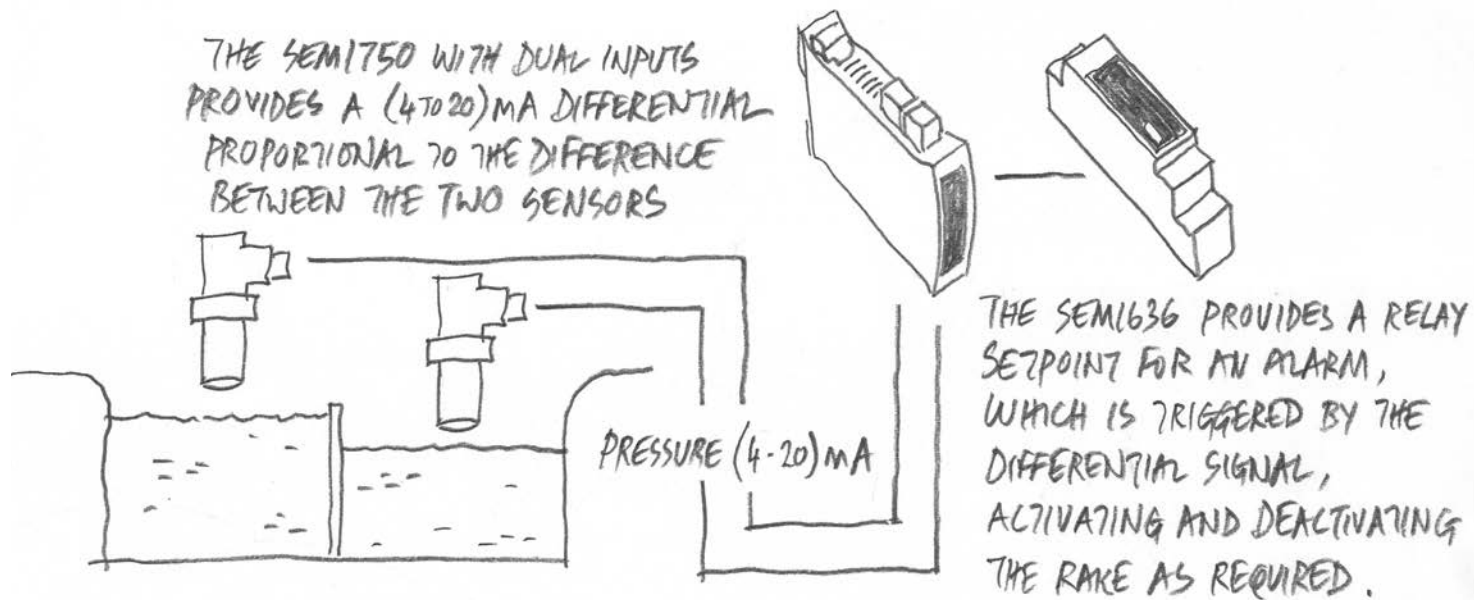
A continuous (4 to 20) mA output proportional to flow is maintained.



## PRESSURE

**Application:** The SEM1750 can be used with almost any sensor to measure differential.

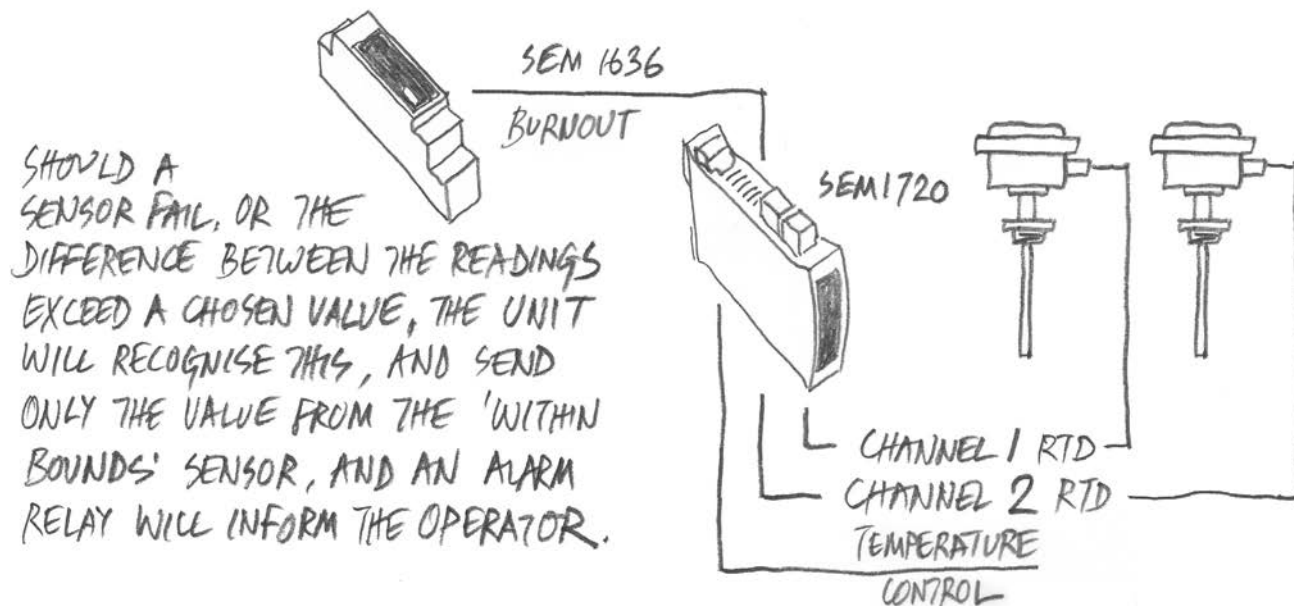
In this common application in rivers and waterways, two level sensors measure level up- and down-stream of a weed screen. Rising upstream differential indicates screen blockage, at which point a relay contact closes, initiating the weed screen rake to activate, which would clear the screen. Rake is deactivated on regaining zero differential.



## TEMPERATURE

**Application:** Critical control or monitoring of a process variable may require 'dual validation', where two sensors are used to ensure contingency in the event of a sensor failure.

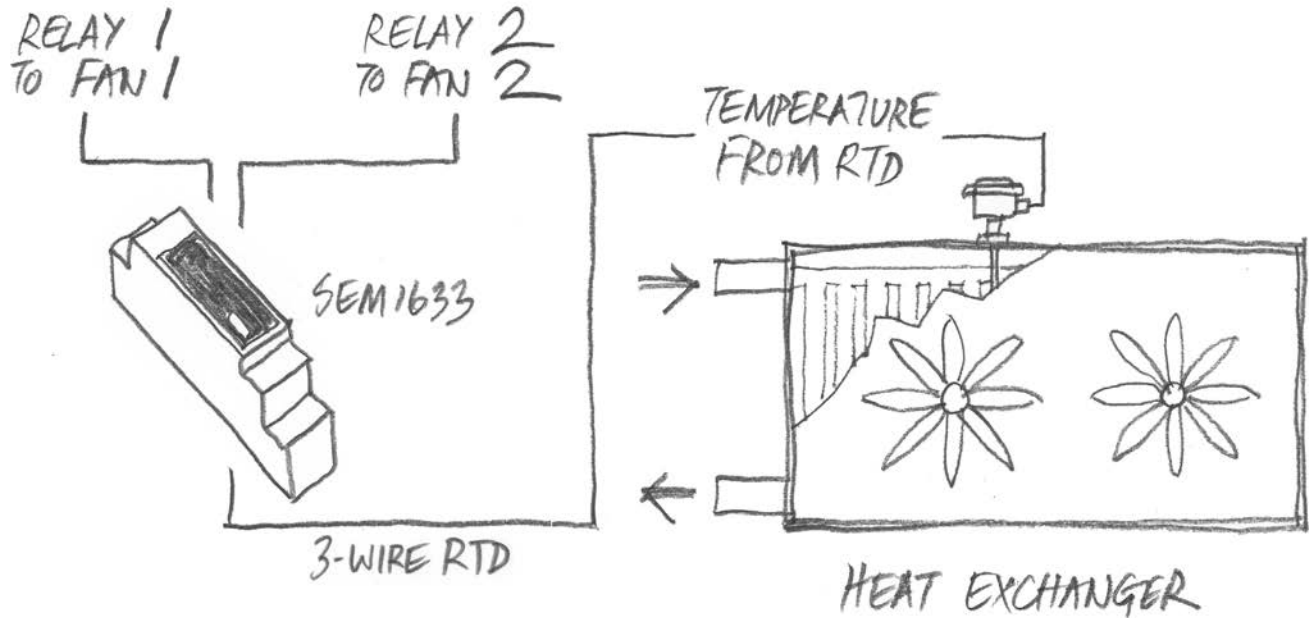
The SEM1720 can read the input from two sensors, with the retransmission output being set to the average of the two sensor inputs (as long as both sensors are in the valid range). If either sensor goes out of bounds, the output is operated from the other input and sends a 'burnout' error signal to the SEM1636 loop-powered alarm.



## TEMPERATURE

**Application:** An SEM1633 is used to switch the cooling fans on and off, based on the temperature measured at the RTD.

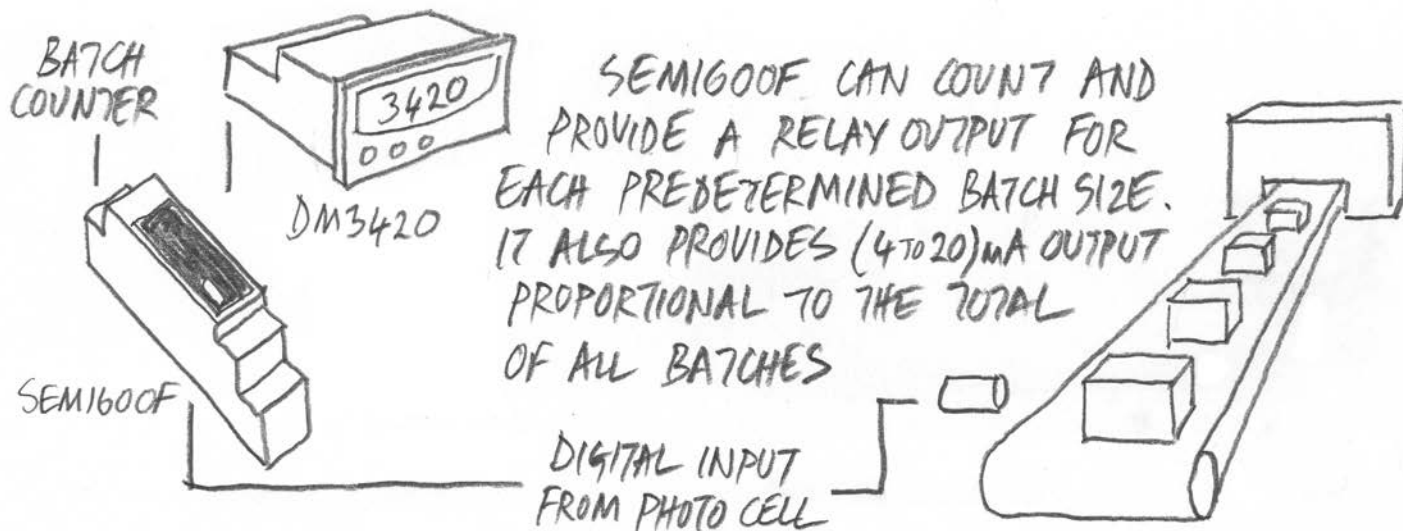
Normally, fan 1 will lower the temperature, but in high load conditions, the back-up fan may be called to assist. With two fans running, the desired temperature is quickly restored.



## QUANTITY

**Application:** An SEM1600F counting items on a belt.

The product can be programmed to count each item that passes the digital sensor. When a number of readings equal to a batch size has gone through, a relay can switch. The device can also provide a (4 to 20) mA output which can be set to be proportional to the total of all batches. This in turn could be displayed on a DM3420, for example.

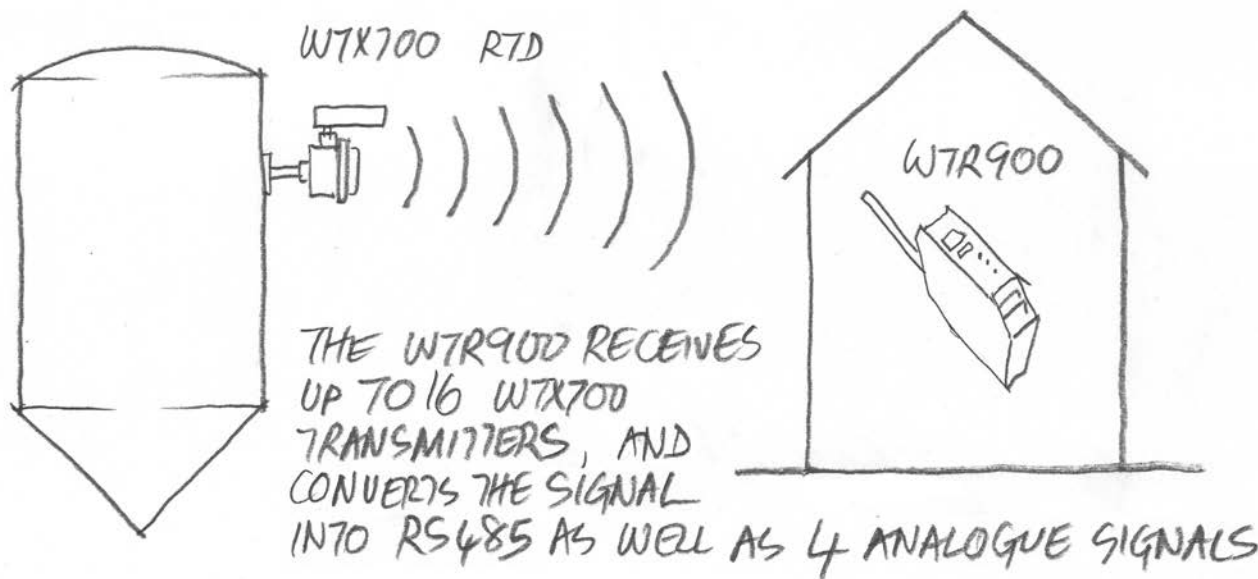


## WIRELESS

**Application:** The WTX700 sends a wireless signal from a remote biomass tank to the control room.

The wireless signal is received by the WTR900, where it can be converted into RS485 as well as (4 to 20) mA.

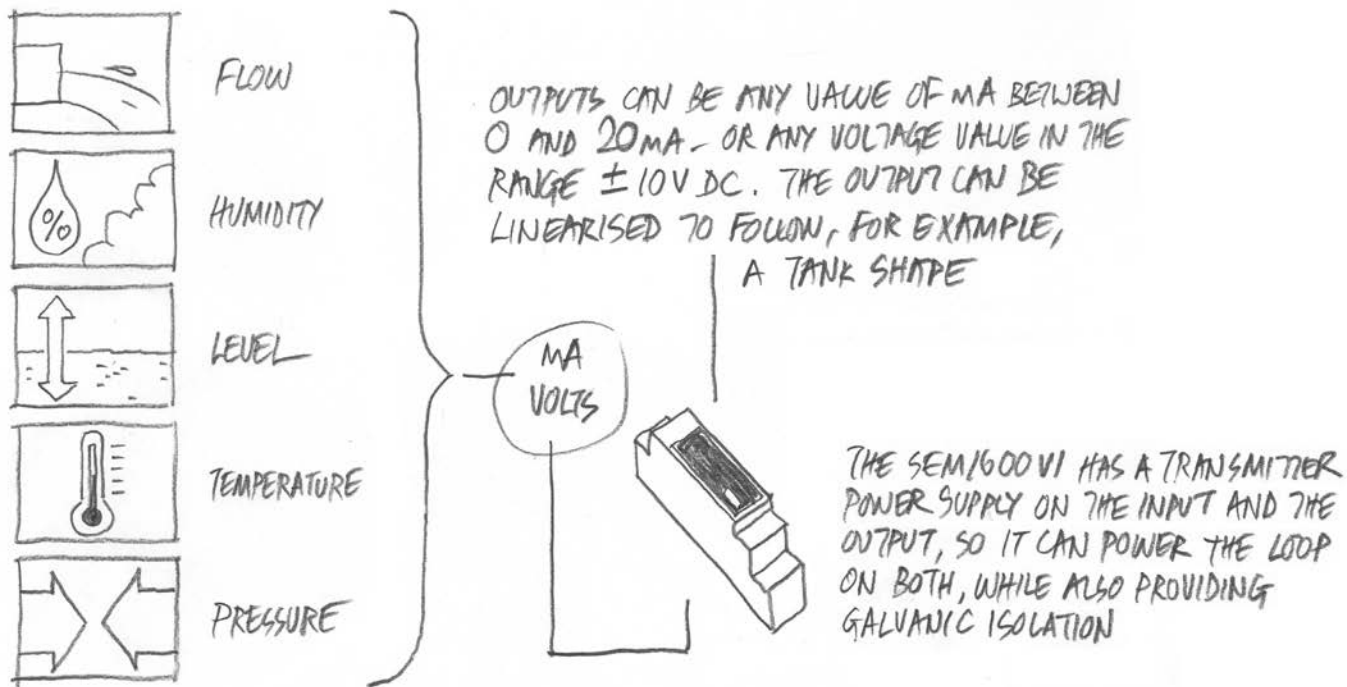
Relay outputs are also available for alarm signals, and can also be linked to battery health in the WTX700.



## CONDITIONING

**Application:** The SEM1600VI can accept any sensor input from (-50 to 50) mA and (-50 to 50) VDC.

It can linearise, with up to 22 co-ordinate pairs - for example, to allow the output to reflect a non-linear tank volume.

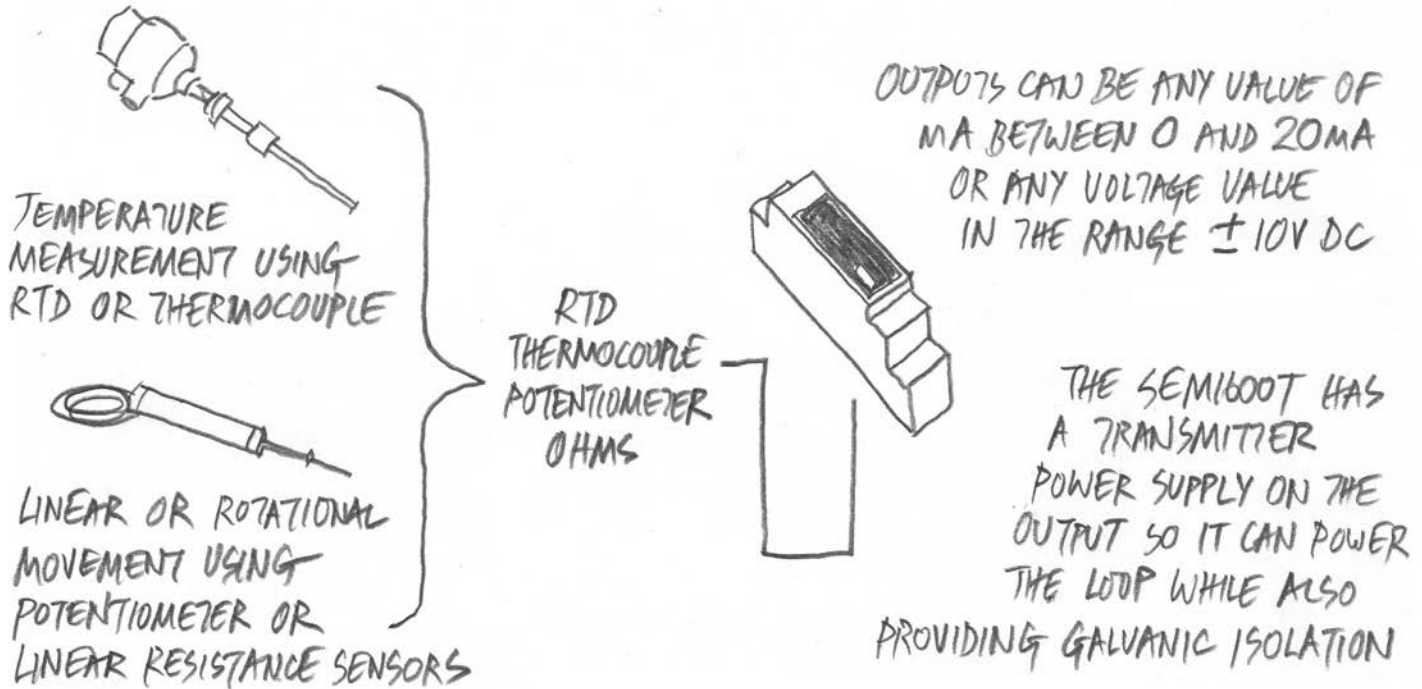




**Application:** The SEM1600T can accept RTD and thermocouple sensors as well as Ohmic, mV and potentiometer sensors.

A sensor calibration function is provided to help minimise sensor error.

## RESISTANCE



**Application:** Our in-head transmitter range can accept RTD and thermocouple sensors as well as Ohmic, mV and potentiometer sensors.

A sensor calibration function is provided to help minimise sensor error.

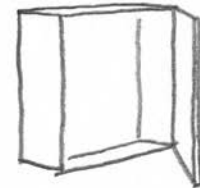
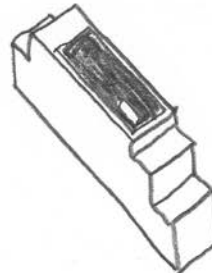
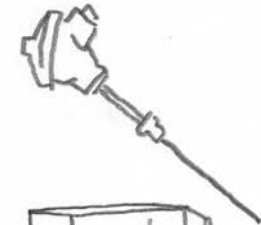
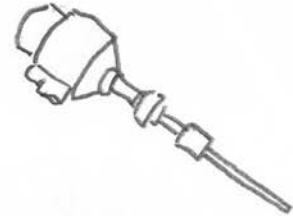
## CONDITIONING

RTD TEMPERATURE  
MEASUREMENT

THERMOCOUPLE  
HIGH TEMPERATURE  
MEASUREMENT

POTENTIOMETER —  
ROTATIONAL MOVEMENT

RESISTANCE —  
LINEAR MOVEMENT



## VOLUME

**Application:** The weight of a tank mounted on 4 loadcells is measured by an SEM1600B, which takes their average output (equivalent to tank weight) and converts this into a voltage or (4 to 20) mA signal – in this example, for the DM3420 to measure as volume.

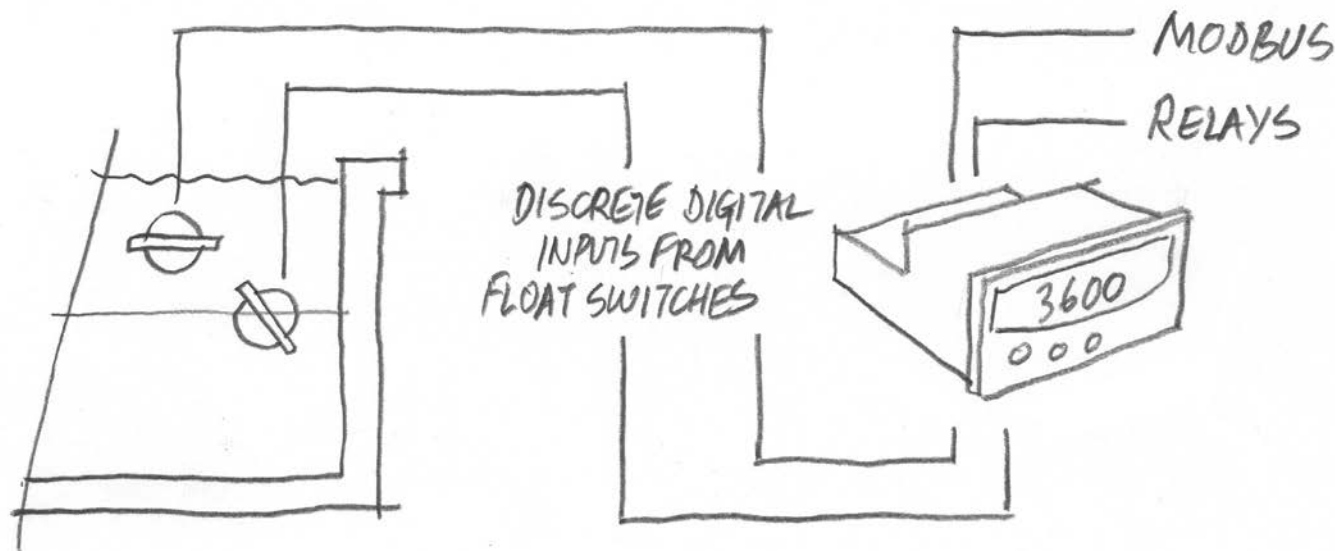
The panel meter will display the volume, level of contents or just the weight of the tank. Using a relay output on the DM3420, the weight of the tank can be monitored, and a valve activated to stop filling the tank at a pre-programmed point.



FOUR LOAD CELL INPUTS  
TO SEM1600B

**Application:** A DM3600 can be used as an intelligent trip amplifier, providing relay set points and MODBUS serial communications for float switches, which in turn provide alarm functions in a reservoir, allowing easy interrogation or re-programming via the serial communications.

The display gives a clear read-out of data and status, and push-buttons allow easy on-site interrogation if required.



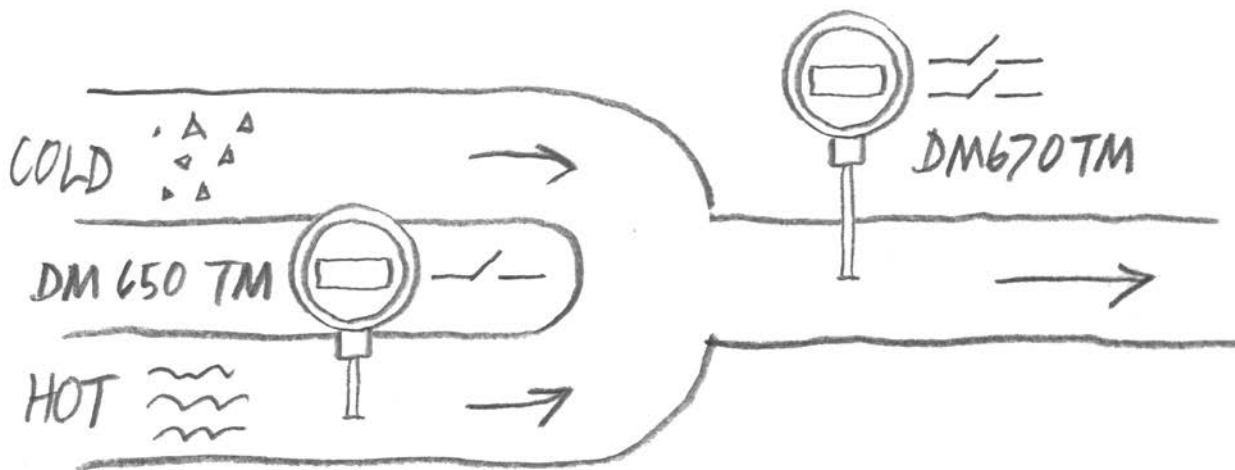
## TEMPERATURE

The DM650 and DM670 series of battery-powered displays, with either one or two relays, can be used for many types of applications, with the added bonus of datalogging direct to PC via USB, or contactless via NFC.

There are even solutions to supply into hazardous environments.

**Application:** A DM670TM with two relays can be used to control heating and cooling through a pipe, whilst a DM650TM can be used to trigger an alarm if the pipe gets too hot.

If no alarms or relays are required, the DM660 could be used, or for hazardous environments, the DM640X series.

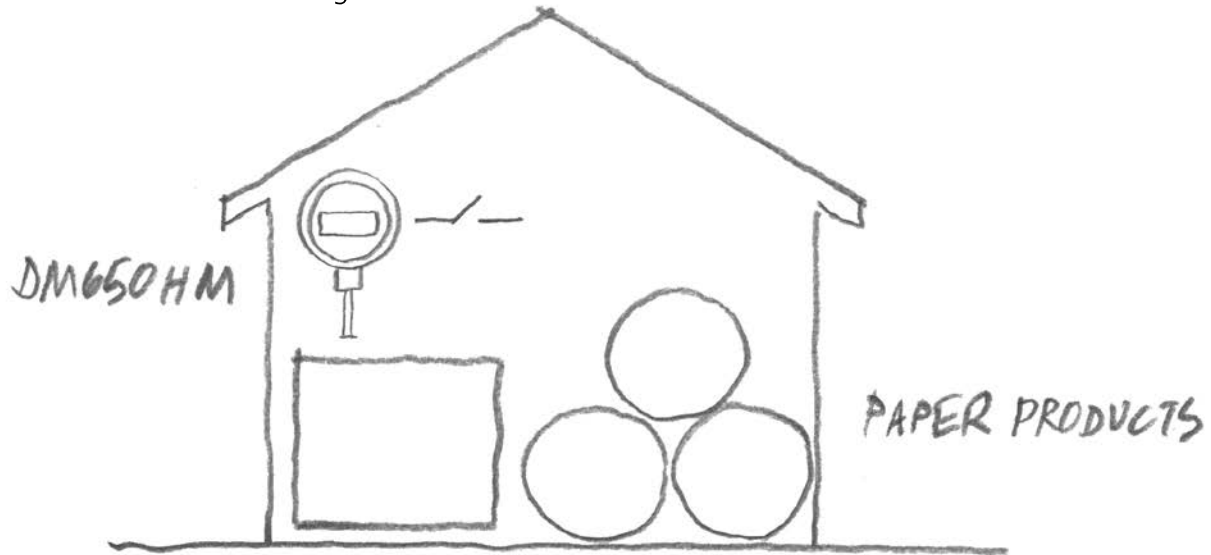


## HUMIDITY

The DM650 and DM670 series of battery-powered displays, with either one or two relays, can be used for many types of applications, with the added bonus of datalogging direct to PC via USB, or contactless via NFC.

There are even solutions to supply into hazardous environments.

**Application:** A DM650HM with one relay can be used as an indicator for processes that require strict control on humidity - for example, in warehouses producing or storing paper. An alarm can be used as a trigger to indicate that the humidity is too high and will cause critical damage to goods.

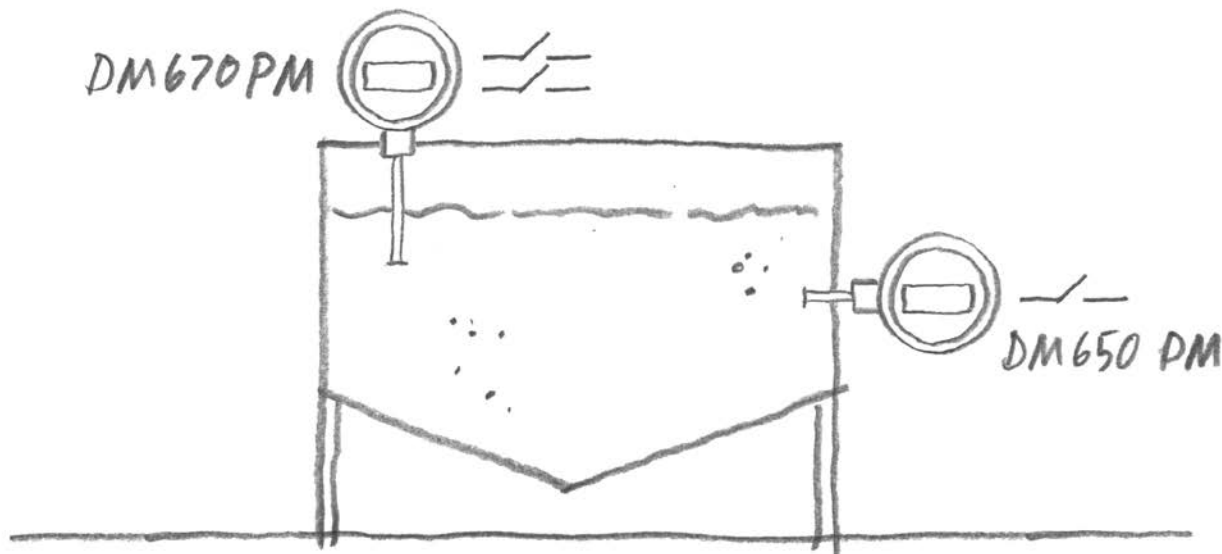


## PRESSURE

The DM650 and DM670 series of battery-powered displays, with either one or two relays, can be used for many types of applications, with the added bonus of datalogging direct to PC via USB, or contactless via NFC.

There are even solutions to supply into hazardous environments.

**Application:** A DM670PM with two relays can be used to control the opening and closing of a valve on a tank in relation to pressure, whilst a DM650PM can be used to trigger an alarm if the pressure exceeds a given level. Both will also monitor the media temperature.

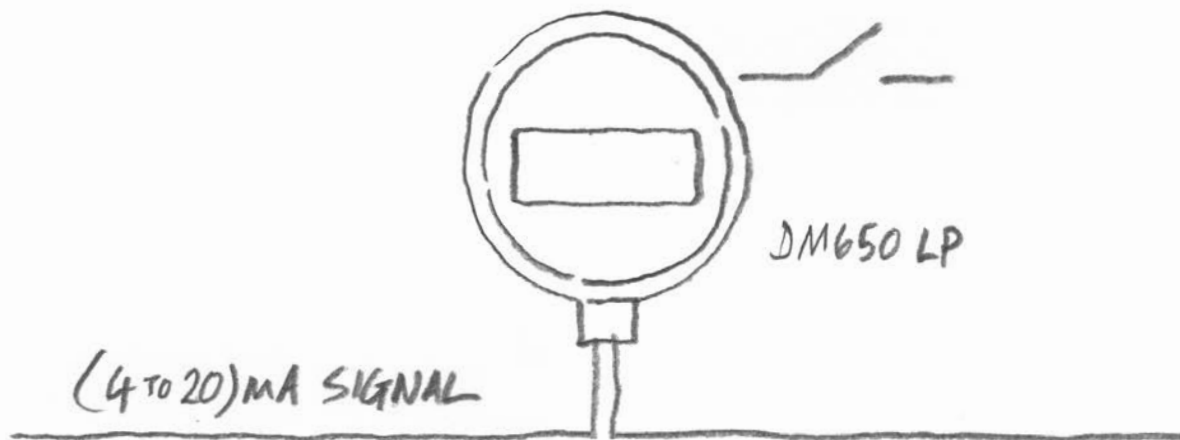


## ANY (4 to 20) mA SIGNAL

The DM650LP loop-powered indicator - with one relay - can be used for many types of applications, and can transfer data direct to a PC via USB, or contactless via NFC. There is an on-board battery that keeps monitoring the loop so that in the event of loop failure, this can be recorded in the datalogging feature.

There are even solutions for hazardous environments.

**Application:** The DM650LP can be used with any (4 to 20) mA circuit to monitor and display the process variable in engineering units. A built-in relay can be set to provide an alarm at a programmable set point. For example, used with a temperature or pressure sensor, it can provide an alarm at a programmed set point. Alternatively you can use the DM700X in hazardous applications, but without the relay.





## ANY (0 to 20) mA SIGNAL

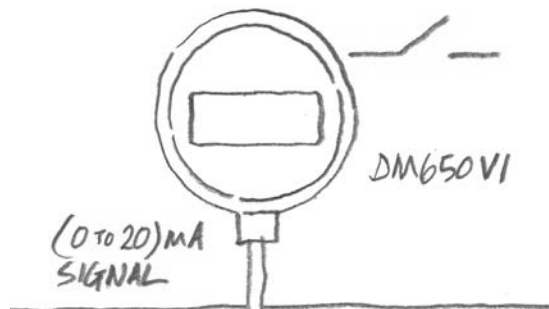
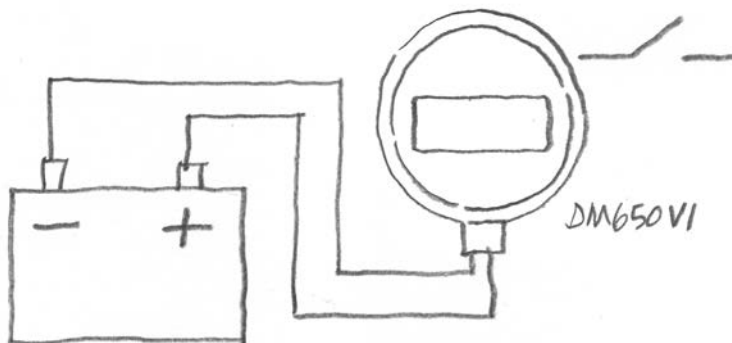
The DM650VI (voltage or current indicator) is designed to monitor voltage or current between -50V and +50V, or -50mA and +50mA. It can be used for many applications, and can transfer data direct to a PC via USB, or contactless via NFC.

There is an on-board battery that monitors the input so that it can record the process value in the datalogging feature.

**Application:** The DM650VI can be used with any mA or voltage circuit within it's specification, to monitor and display the process variable in engineering units. A built-in relay can be set to provide an alarm at a programmable set point.

**For example:** battery condition. The DM650VI can be set to monitor battery voltage, and provide an alarm on low voltage.

The DM650VI can also be used to provide local indication of a (0 to 20) mA current loop and provide an alarm at a programmable set point.





## Notes



## Notes



[www.status.co.uk](http://www.status.co.uk)

+44 (0) 1684 296818

Every effort has been made to ensure the accuracy of the information contained in this Application Guide, but the company accepts no liability for any errors or omissions.

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