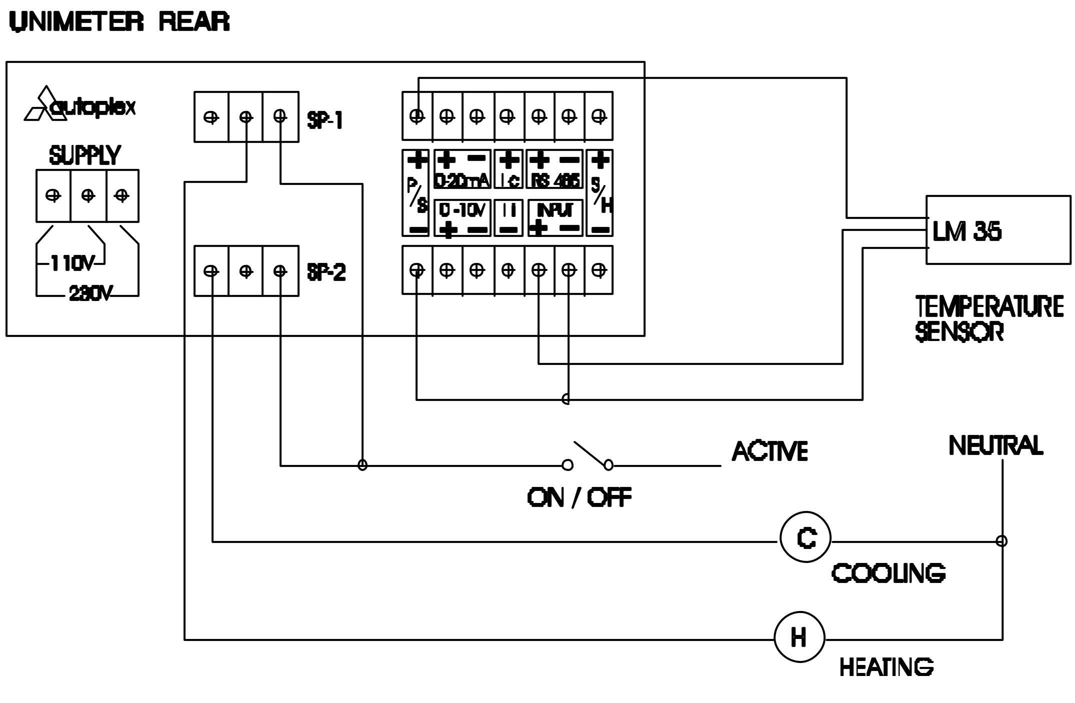
REVERSE CYCLE AIR CONDITIONING CONTROL WITH 1 HEAT AND 1 COOLING CYCLE AND TEMPERATURE INDICATION

General

The UNIMETER is employed to control a reverse cycle air conditioner. Setpoint 1 is used to energise the heating cycle of the system. Setpoint 2 controls the cooling cycle. Any temperature measuring function of the UNIMETER can be used to implement this control. However, for high precision measurement and control at room temperature, a solid state sensor such as the LM 35 or AD 590 should be selected for the application.

Setpoint 1 is set (by special function 6) to the maximum allowable temperature. Setpoint 2 is adjusted (special function 7) to the minimum allowable temperature. Both setpoints can further be controlled by special functions 240 and 241 (setpoint hysteresis) to avoid unnecessary frequent cycling of both the heating and cooling devices.

The diagram below details the electrical wiring and connections for a typical on / off reverse cycle system. The UNIMETER will control the air conditioning system and indicate the temperature. Serial communications and UNISOFT are available for remote indication, data logging and statistical analysis of the system, if required.



Typical Setup:

Function = 54 (LM 35)   Setpoint 1 = 20.00 (SF 6)   Setpoint 2 = 22.50(SF 7)
Setpoint 1 Hysteresis = 2   Setpoint 2 Hysteresis = 2   Ave. Temperature = 21.25

application note 94/52

MATERIAL FLOW INDICATOR / CONTROLLER

General

A rotary valve fitted below a silo supplies material to a high pressure transport system. The quantity of material supplied is proportional to the speed of the rotary valve rotation. A UNIMETER complete with proximity detector are installed to monitor the RPM of the rotary valve (See figure 1 for details below).

UNIMETER function 96 is selected to measure the rate of the rotation. Special functions 2 and 3 are used to convert and scale the rate of rotation to kilograms per minute or hour as required.

Setpoints 1 and 2 can be employed to interlock the system for maximum and minimum flow and supply values to avoid over or under supply to the high pressure transport system.

In case of a non linear relationship between the speed of the rotary valve and the volume of material supplied, the user can select the linearising features of the UNIMETER to indicate and measure real and true volume of material supplied.

A further UNIMETER and proximity detector can be installed in a similar way to measure and indicate accumulated volume. This is done by selecting function 137 of the UNIMETER.

Analog outputs, UNISOFT and serial communications are available for remote indication, data logging and statistical analysis of the system, if required.

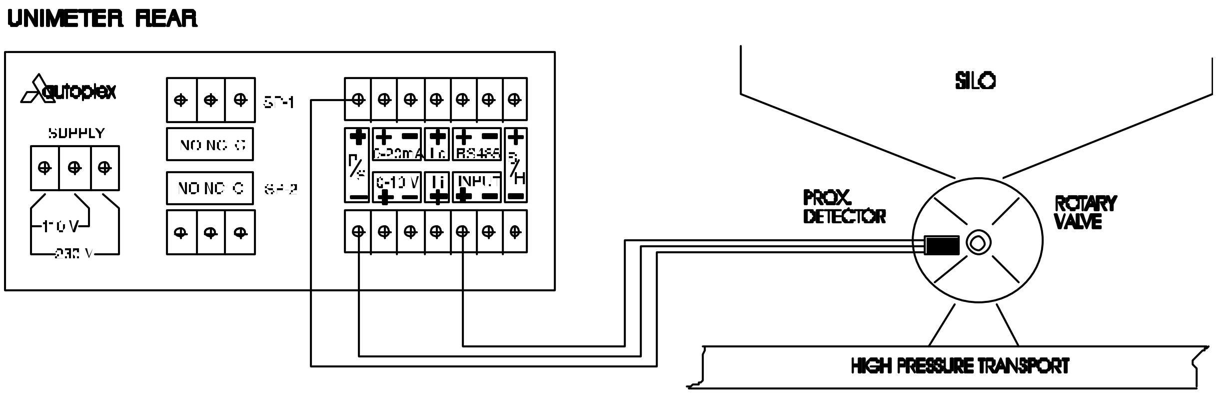


FIGURE 1

Typical Setup:

Function = 95, Special functions 2 and 3 = as required for specific volume to RPM ratio.

OVEN CONTROLLER AND TEMPERATURE INDICATOR

General

The temperature of an oven is controlled and monitored by installing a UNIMETER with a type K thermocouple sensor. Other types of thermocouple, RTD or solid state sensors may be used if required.

UNIMETER function number 48 is selected to measure and indicate temperature in degrees Centigrade. Setpoint 1 is programmed to energise a warning device 10 degrees above controller setpoint.

Special functions 21 and 247 are selected to configure the UNIMETER as a proportional PID controller using setpoint number 2 to energise the heater (see figure 1 below).

The control is based on an ON - OFF ratio over a 20 second period with PID values. The standard PID factory set values will usually suffice for most controllers. However, the user may optimise these and many other available PID features and options, including bumpless transfer from auto to manual to auto if required.

UNISOFT, analog outputs and serial communications are available for remote indication, data logging and statistical analysis of the system, if required.

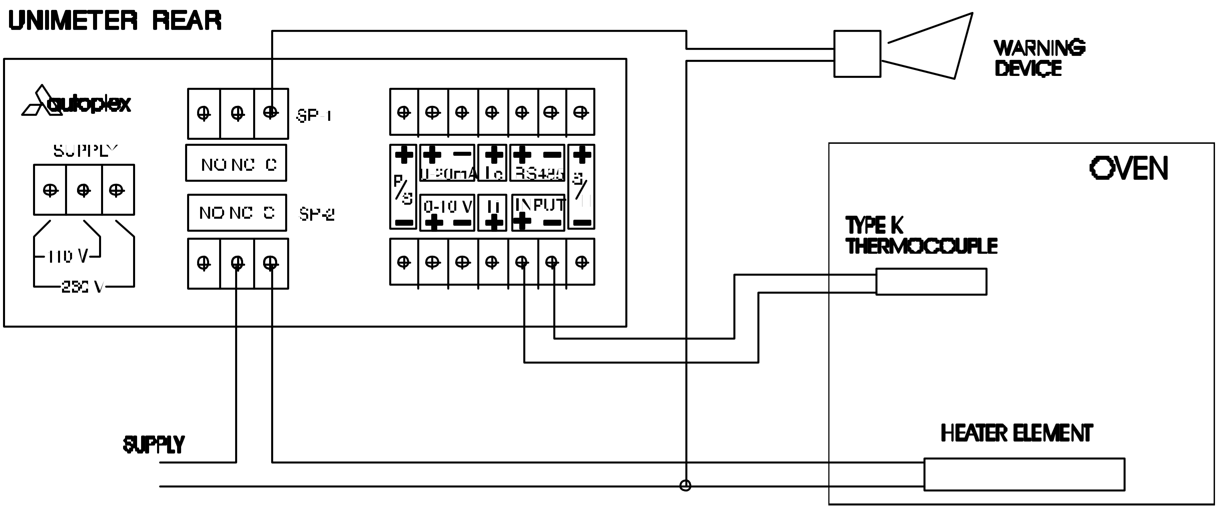


FIGURE 1

Typical Setup for Setpoint = 300 Degrees C:

Function = 48, Special Functions Selected = 21, 247, SF 4 = 290, SF 5 = 310,
SF 254 = 5 (factory set), SF 253 = 120 (factory set), SF 252 = 0 (factory set),
Setpoint 1 (SF 6) = 310,

FOLLOWING CONVEYOR SPEED CONTROL

General

A single UNIMETER is installed to measure and match two conveyor speeds using proximity detectors as sensors. The mis-match of the two mechanical systems can be calibrated and removed by special functions 2 and 3 to synchronise the two conveyor speeds.

A proximity detector (NPN or PNP) is connected to both conveyors to sense the movement of the drive mechanisms. The analog output of the UNIMETER is used to control the speed of conveyor No. 2 .

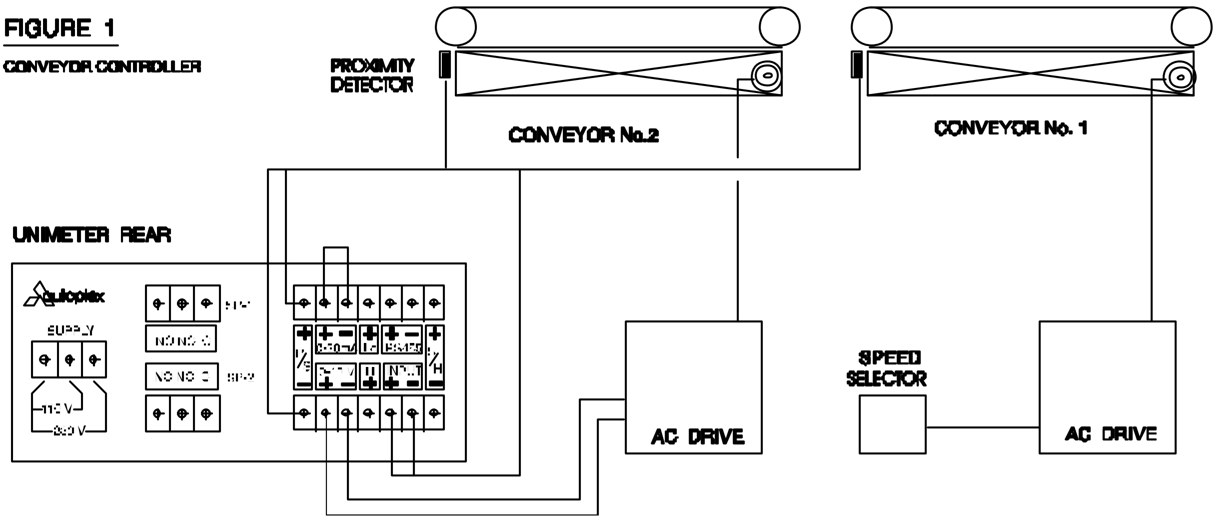
UNIMETER gives the user the choice of several types of control methods from simple proportional control, with selectable gain, to full PID options, features and variations.

Figure 1 shows a typical installation with suitable setup for PID control. To optimise the response of a system we recommend that the user read the PID section of the UNIMETER manual on page 350.

Setpoints 1 and 2 may be employed for control purposes or high / low warning indication. UNISOFT and serial communication are available for remote display, data logging and statistical analysis of the system, if required.

FIGURE 1

CONVEYOR CONTROLLER



Typical Setup:

Function = 98, SF 4 = -10.00, SF 5 = +10 (SF4 and SF 5 = prop. band),
SF 252 = 0 (factory set), SF 253 = 120 (factory set), SF 254 = 5 (factory set)

FLAP POSITION CONTROL FOR AIR CONDITIONING FLOW REGULATOR

General

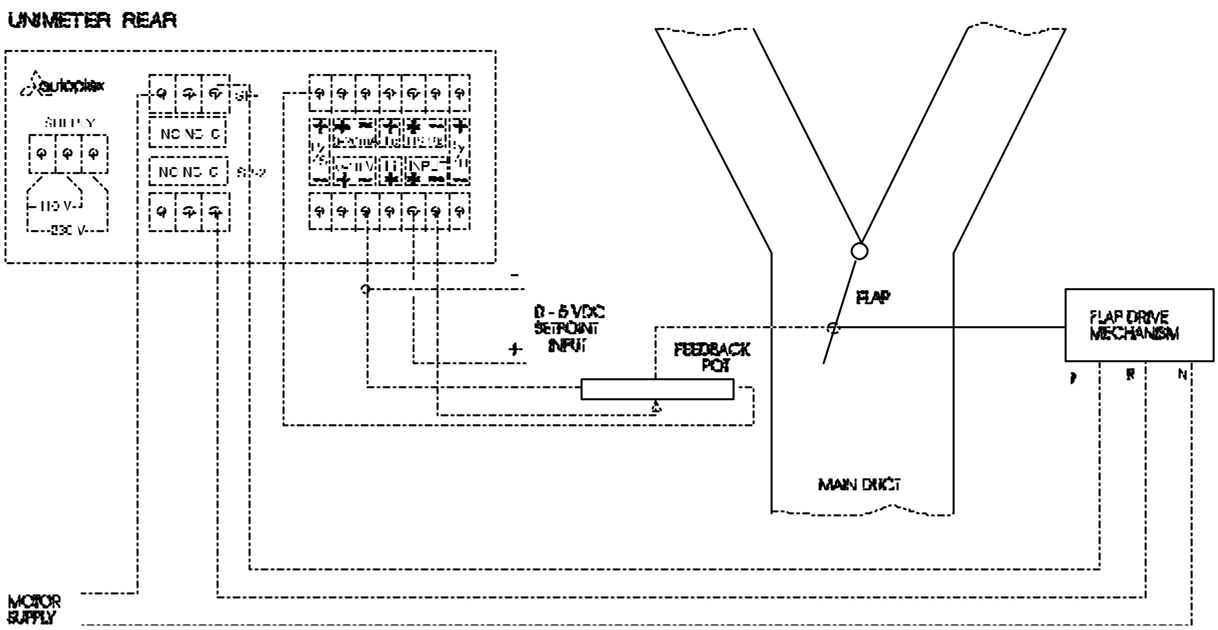
Function 202 of the UNIMETER configures the instrument as a servo controller with feed-back position control. The flow control flap of the supply duct of an air conditioning system is manually or automatically positioned by the system's setpoint selection.

Figure 1 shows the installation and connections of the forward / reverse drive system on the flap mechanism. A feed-back pot is connected to the mechanics to move with the flap.

The user, or the automatic system, can vary the flap remotely and thus optimise the air flow to various areas of the building. The UNIMETER will indicate the present setpoint and flap position.

UNISOFT and serial communications are available for remote indication, data logging and statistical analysis of the system.

FIGURE 1



Typical Setup:

Function = 202 **Special Function 235 = 5** **Special Function 240 = 5**

VOLTAGE TO CURRENT CONVERSION
(0 -10 V INPUT, 4 - 20 mA OUTPUT)

General

Some applications require the conversion of sensors or systems output signals to be converted to a suitable format such as current, frequency or voltage. The UNIMETER can be employed for this purpose. This application note details the conversion from voltage to current.

Figure 1 below shows the connections and programming details for the conversion of a 0 - 10 vdc input voltage to a 4 - 20 madc output current. Naturally, any other input range of voltage or output range of current can be accomodated by using special functions 1, 2, 3, 4, and 5 to offset and span the input and output. Also, special functions 10 and 11 can be selected to further modify the output current range for output offset and output span.

Two setpoints and the input value display are available for control and indication purposes, if required.

UNISOFT and serial communications are also available for remote indication, data logging and statistical analysis of the system.

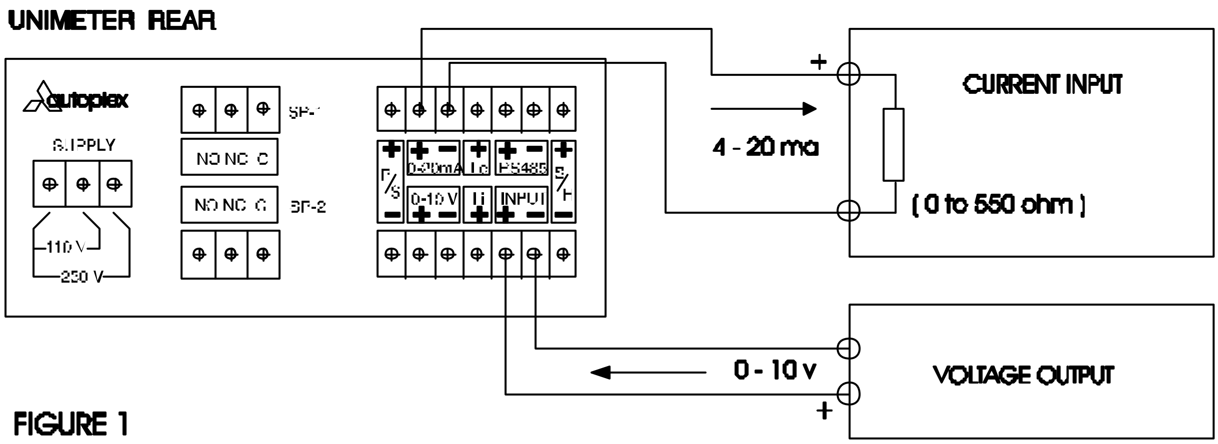


FIGURE 1

Typical Setup:

Function = 64, Special Function 4= 0, Special Function 5 = 100,
Special Function 243 = selected,

CURRENT TO VOLTAGE CONVERSION
(4 - 20 mA INPUT, 0 -10 V OUTPUT)

General

Some applications require the conversion of sensors or systems output signals to be converted to a suitable format such as current, frequency or voltage. The UNIMETER can be employed for this purpose. This application note details the conversion from voltage to current.

Figure 1 below shows the connections and programming details for the conversion of a 4 - 20 madc input current to a 0 - 10 vdc output voltage. Naturally, any other input range of current or output range of voltage can be accommodated by using special functions 1, 2, 3, 4, and 5 to offset and span the input and output. Also, special functions 10 and 11 can be selected to further modify the output voltage range for output offset and output span.

Two setpoints and the input value display are available for control and indication purposes, if required.

UNISOFT and serial communications are also available for remote indication, data logging and statistical analysis of the system.

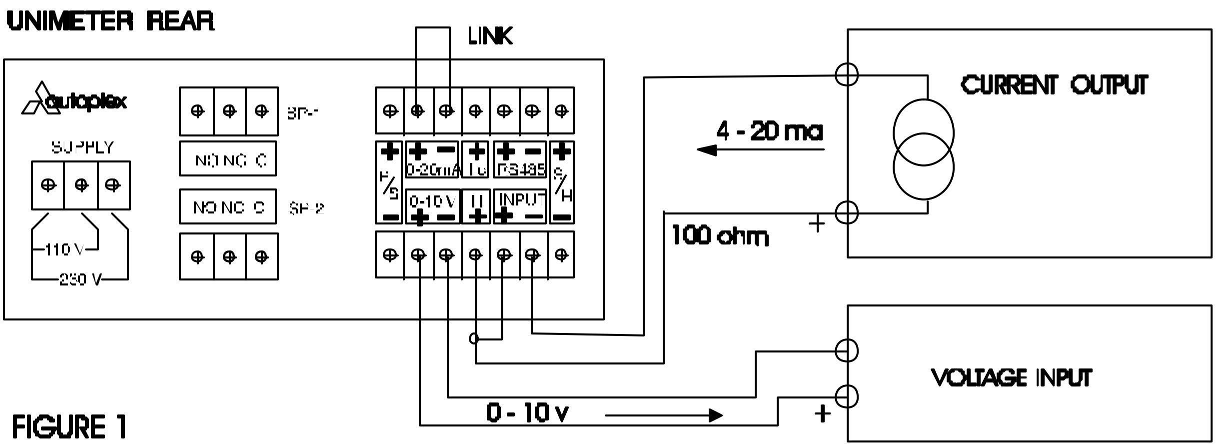


FIGURE 1

Typical Setup:

Function = 81, Special Function 4= 0, Special Function 5 = 100,

application note 94/58

FREQUENCY TO VOLTAGE CONVERSION
(0 - 20 000 Hz INPUT, 0 - 10 v OUTPUT)

General

Some applications require the conversion of sensors or systems output signals to be converted to a suitable format such as current, frequency or voltage. The UNIMETER can be employed for this purpose. This application note details the conversion from voltage to current.

Figure 1 below shows the connections and programming details for the conversion of a 0 - 100 kHz input signal to a 0 - 10 vdc output voltage. Naturally, any other input range of frequency or output range of voltage can be accommodated by using special functions 1, 2, 3, 4, and 5 to offset and span the input and output. Also, special functions 10 and 11 can be selected to further modify the output voltage range for output offset and output span.

The frequency to voltage conversion is also applicable to all the rate monitor functions (functions 95,96 etc.) using rate as input and converting to voltage as output.

Two setpoints and the input value display are available for control and indication purposes, if required.

UNISOFT and serial communications are also available for remote indication, data logging and statistical analysis of the system.

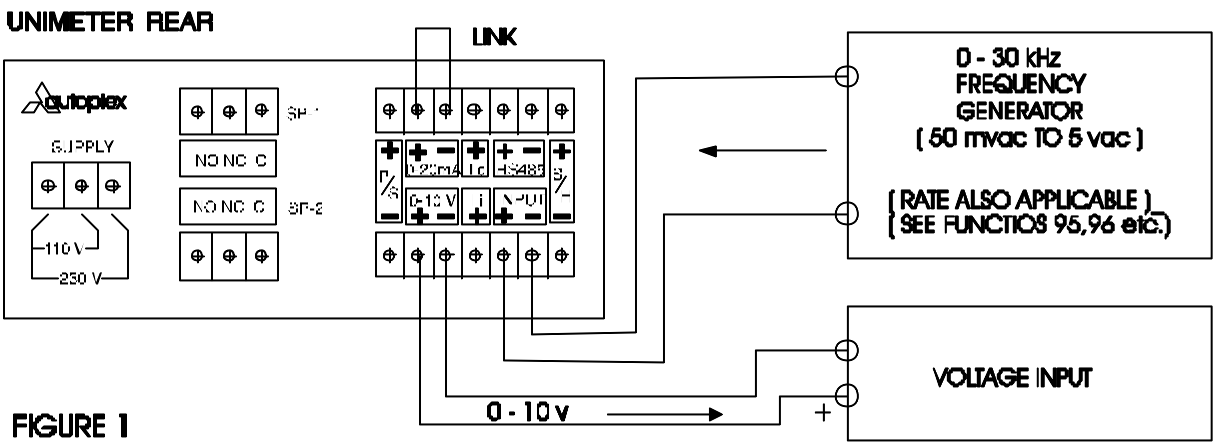


FIGURE 1

Typical Setup:

Function = 105, Special Function 4= 0, Special Function 5 = 100,

application note 94/59

FREQUENCY TO CURRENT CONVERSION
(0 - 20 000 Hz INPUT, 4 - 20 mA OUTPUT)

General

Some applications require the conversion of sensors or systems output signals to be converted to a suitable format such as current, frequency or voltage. The UNIMETER can be employed for this purpose. This application note details the conversion from voltage to current.

Figure 1 below shows the connections and programming details for the conversion of a 0 - 100 kHz input signal to a 4 - 20 ma output current. Naturally, any other input range of frequency or output range of current can be accommodated by using special functions 1, 2, 3, 4, and 5 to offset and span the input and output. Also, special functions 10 and 11 can be selected to further modify the output current range for output offset and output span.

The frequency to voltage conversion is also applicable to all the rate monitor functions (functions 95,96 etc.) using rate as input and converting to voltage as output.

Two setpoints and the input value display are available for control and indication purposes, if required.

UNISOFT and serial communications are also available for remote indication, data logging and statistical analysis of the system.

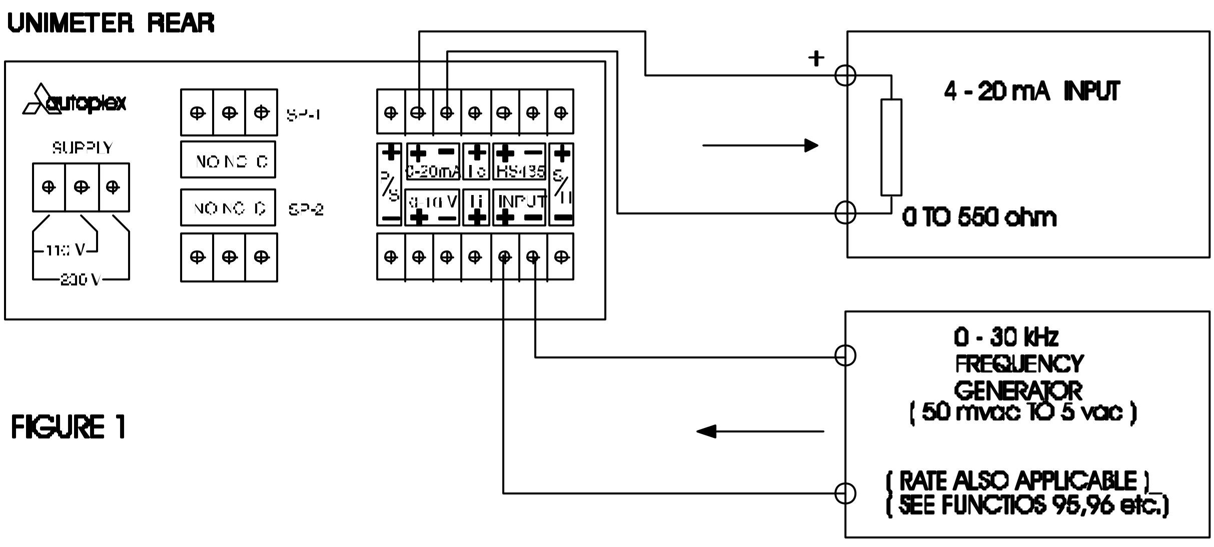


FIGURE 1

Typical Setup:

Function = 105, Special Function 4= 0, Special Function 5 = 100,
Special function 243 = Selected,

VOLTAGE AND CURRENT LEVEL SHIFTING AND CONVERTING

General

UNIMETER can be programmed to shift the level and range of an input voltage or current with a minimum of effort.

The example detailed in figure 1 below shifts an input signal of 0 - 2 volts to an output signal of 0 - 10 volts. Any other range can be programmed by modifying the values in special functions 4 and special functions 5, if required. The user should see application note 94/61 for the mathematical steps to determine these values for any required range.

The programming steps for the example below are simply setting special functions 4 and 5 to the relevant percentage of the input signal display range. For figure 1 this would be: special function 4 = 0.0, special function 5 = 2.00. (The selected function 110 has an equivalent display range of 0 - 10.00 for a 0 - 10 volt input signal).

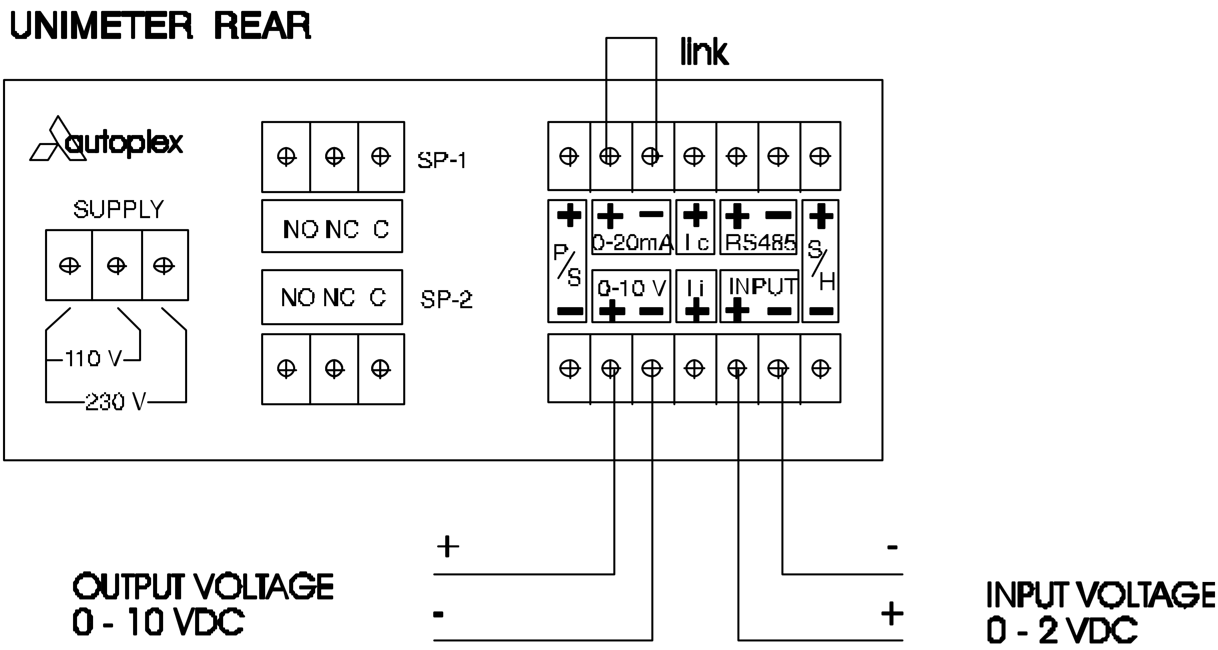


FIGURE 1

Typical Setup:

Function = 110, Special Function 4= 0.00, Special Function 5 = 2.00,

application note 94/61

VOLTAGE AND CURRENT LEVEL SHIFTING AND CONVERTING

General

Mathematical steps to calculate UNIMETER special functions 4 and 5 (output span min and output span max) values for input to output level shifting purposes.

Example: An input range of 4 to 5 volts is required to be converted and shifted to an output current range of 16 to 18 ma.

Display Range = 0 - 100 (function 64)
Wanted Input Range = 4 - 6 volts (40 to 60% of 0 - 10 volts input range)
Wanted Output Range = 16 - 18 ma (80 to 90% of 0 to 20 ma output range)

Procedure:

1. **Calculate display range percentage of wanted input signal range**

   = max input percentage - min input percentage
   = 60% - 40 % = 20% = A

2. **Calculate wanted output range percentage of output range**

   = max output percentage - min output percentage
   = 90% - 80%= 10% = B

3. **Calculate ratio between A and B**

   = 20 / 10 = 2 = C

4. **Calculate special function 4 to special function 5 range**

   = input display range x C
   = 100 x 2 = 200 = D

5. **Calculate special function 4 value**

   = 0 - output span (D) x wanted output span min % + input span min
   = 0 - 200 x 80% + 40 = 0 - 160 + 40 = - 120 =E

   therefore output span min = - 120 (special function 4)

6. **Calculate special function 5:**

   = special function 4 + output range (D)
   = - 120 + 200 = 80 = F
   therefore output span max = 80 (special function 5)

See also TOOLS XQ software for additional solutions !

WEIGHING AND LEVEL CONTROL

General

Many industrial and commercial applications require weighing, batching, measuring, indicating and level controlling of raw materials. A comprehensive method of doing all of the above if to weigh the raw materials within their storage containers or vessels. The UNIMETER in association with 1 to 3 load cells can measure, indicate and control the volume of a material within a holding tank or storage vessel.

The example below shows three 350 ohm strain gauge type load cells inserted into the support structure of the vessel containing the raw material. All load cells are connected in parallel to the UNIMETER user supply terminals and the input terminals as shown in figure 1.

The empty vessel is then tared out by pressing the UNIMETER's PGM/RUN key while holding down the shift right key. This Hot-Key procedure will cause the instrument to automatically remove the unwanted weight from the measurement. For calibration, a known weight is then added to the vessel and spanned by special functions 2 and 3 to indicate real weight. (The tare of the vessel is automatically spanned to the real scale).

Setpoints 1 and 2 and all other UNIMETER control features such as PID etc. may be employed for control purposes. UNISOFT and serial communication are available for remote display, data logging and statistical analysis of the system, if required.

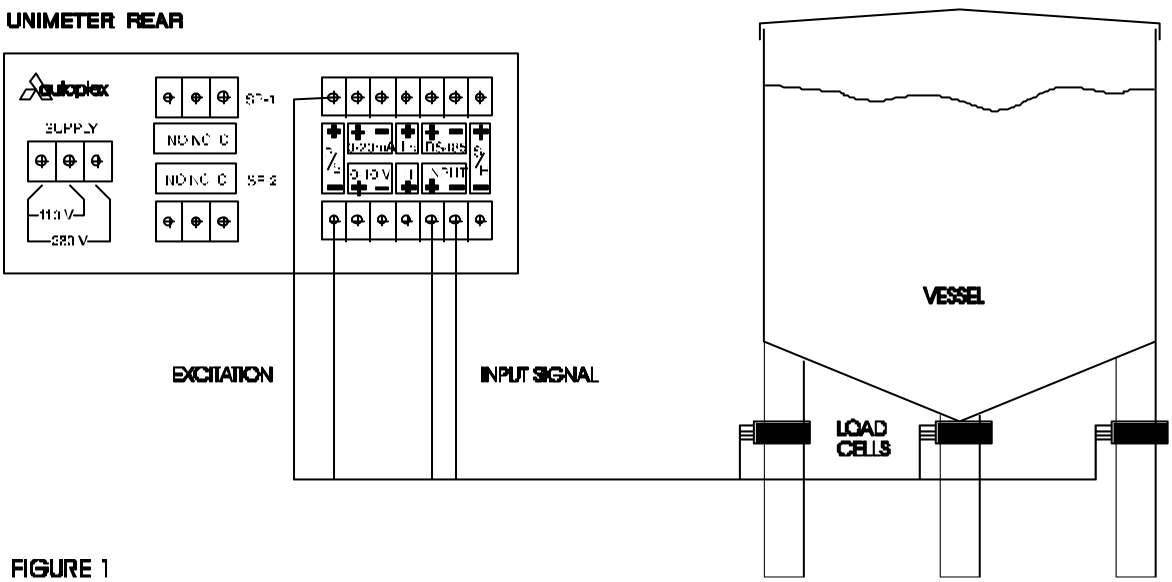


FIGURE 1

Typical Setup:

Function = 159 or 160, SF 2 = as required, SF 3 = as required,
SF 235 = 5, SF 0 = (manual tare if required)

HIGH VOLTAGE INPUT RANGE

General

An input voltage range of 0 - 400 volts is to be measured and displayed by the UNIMETER. Three external resistors are connected to enable this high voltage input.

The resistors are assembled and connected on the AB 200 assembly board generally as per the details in figure 1 shown below. The chosen values will reduce the input voltage to below the maximum input range of the UNIMETER.

The resistance values can be calculated as follows:

UNIMETER input range max = Input voltage max x R (in) / R (total)

or 10 = 400 x R (in) / R (total)

In the example below this would be:

400 x 10 000 / 450 000 = 8.888 (8.88 is maximum input voltage)

Using function 64 as voltmeter this would then be displayed as 88.88 and would need scaling to 400.0. To do this, simply divide the wanted display (400) by the actual display (88.88) and enter the value into the span multiplier with special function 2.

This will be : 400 / 88.88 = 4.50,

4.50 will now be entered into special function 2 and the UNIMETER will now display 0 - 400.0 with an input voltage range of 0 - 400 volts.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

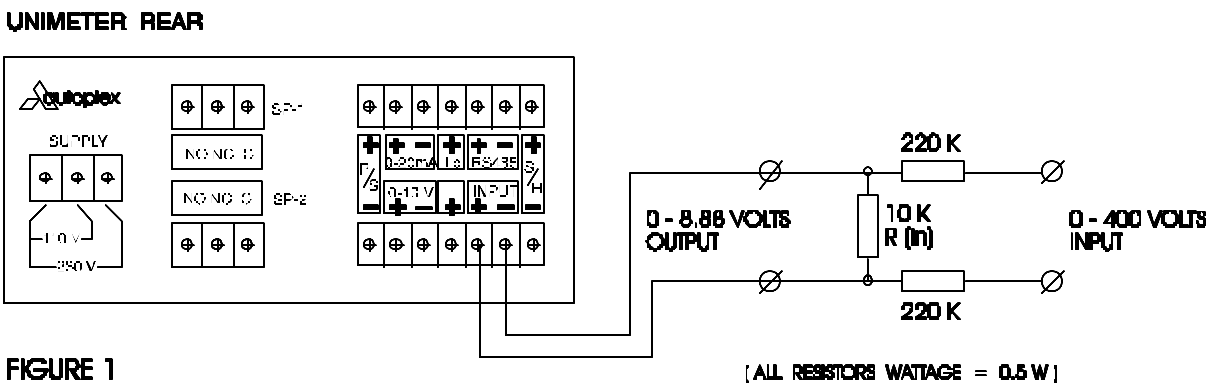


FIGURE 1

Typical Setup:

Function = 64, SF 2 = 4.50,

PRODUCTION RATE MONITOR

General

A bottling plant is monitored to determine the output and filling rate on an on-going basis. A proximity detector is installed to detect the passing of filled bottles on the outfeed of the plant.

The connected UNIMETER receives a pulse every time a bottle passes the proximity detector and evaluates the period between the pulses. The equivalent rate is displayed as the number of bottles per minute. To indicate the rate per hour, the user simply programs the span multiplier (special function 2) with the value 60.0.

Setpoints 1 and 2 can be programmed to interlock the production line or to sound warnings when the rate falls below a pre-determined performance level.

Alternatively, the user can also display the time between bottles in milli seconds or seconds by selecting functions 103 or 104.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

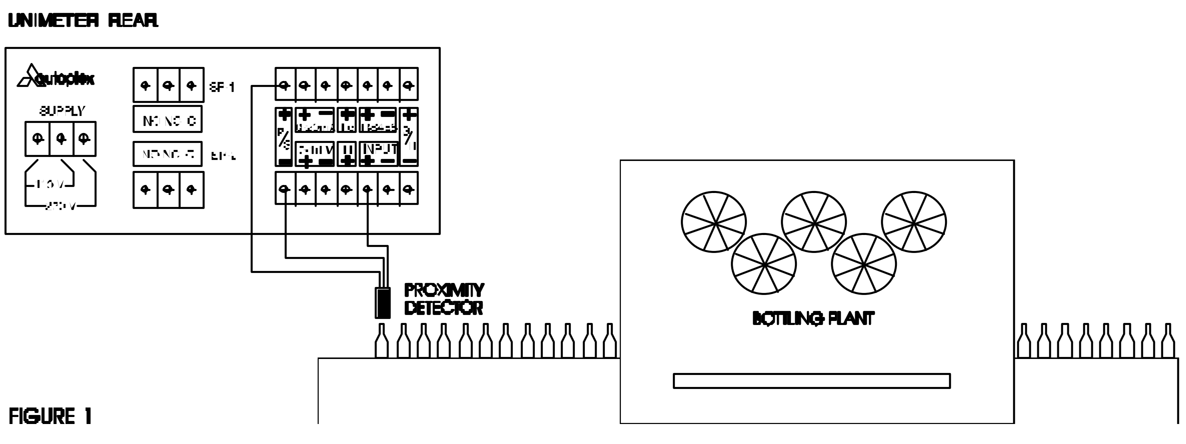


FIGURE 1

Typical Setup:

Function = 95, SF 2 = 60.0,

CONTROLLING LENGTH OF MATERIAL

General

A UNIMETER is installed to control and measure a wire being wound onto a spool. When the desired amount of wire is wound onto the spool, the setpoint 2 of the UNIMETER is programmed and connected to stop the drive mechanism.

Pulses from the pulley running on the wire are fed to the UNIMETER to calculate and display the wire length. In function 137, the UNIMETER indicates 0.01 for every input pulse received.

The proximity detector fitted to the wire pulley generates 1 pulse for every 125 mm of wire being wound onto the spool. To indicate and measure real length in metres, the user must program the ratio of the display to the wanted display. In this case it would be 0.125 to 0.01 or 12.5. (0.125 / 0.01 = 12.5). This value is now programmed into special function 2, the span multiplier.

The UNIMETER can be reset by entering zero via special function 1, by pressing the PGM/ RUN button while holding the down arrow key, or by shorting the sample and hold contacts as shown.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

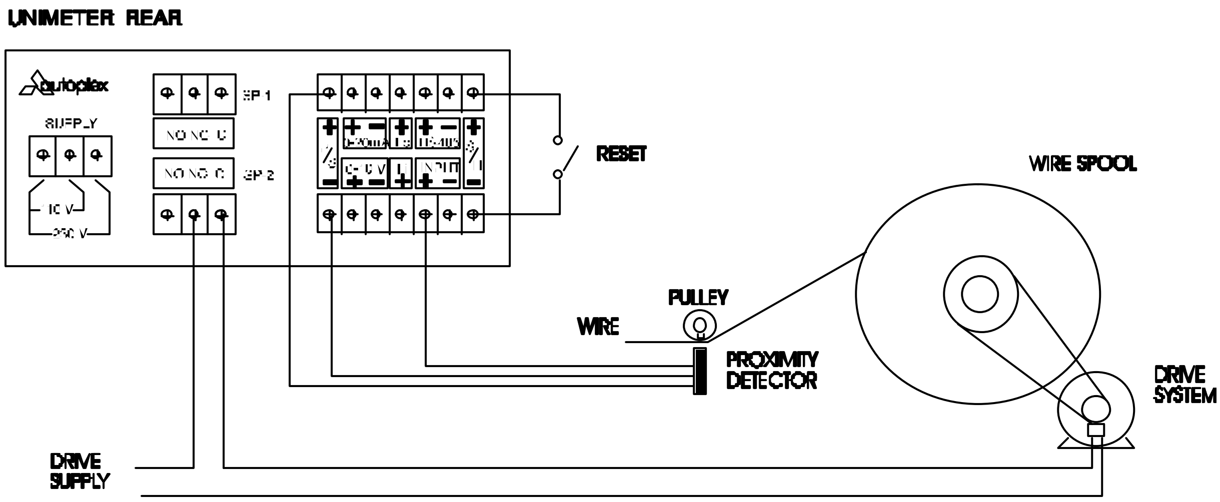


FIGURE 1

Typical Setup:

Function = 137, SF 2 = 12.5,

MASS AIRFLOW MEASUREMENT AND CONTROL

General

The Honeywell series AWM mass airflow transducers can be interfaced to the UNIMETER for airflow measurement and control purposes.

The AWM series transducers are suitable for airflow down to 0 to 0.2 litres per minute and can be employed for air conditioning, medical anaesthesia control, gas analysers, process control, low vacuum control and gas monitoring.

The relative large zero offset of the transducer makes the UNIMETER particularly suitable for this type of device.

Figure 1 below shows a typical sensor connected to the UNIMETER. The zero flow indication is simply tared out by pressing the PGM/RUN button while holding down the shift right key of the UNIMETER's membrane keyboard. (See Hot-Key, section page 270 of the UNITER manual).

Real airflow is indicated by adjusting the span of the UNIMETER (special functions 2 and 3) by entering the ratio of the display to the wanted display.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

UNIMETER REAR

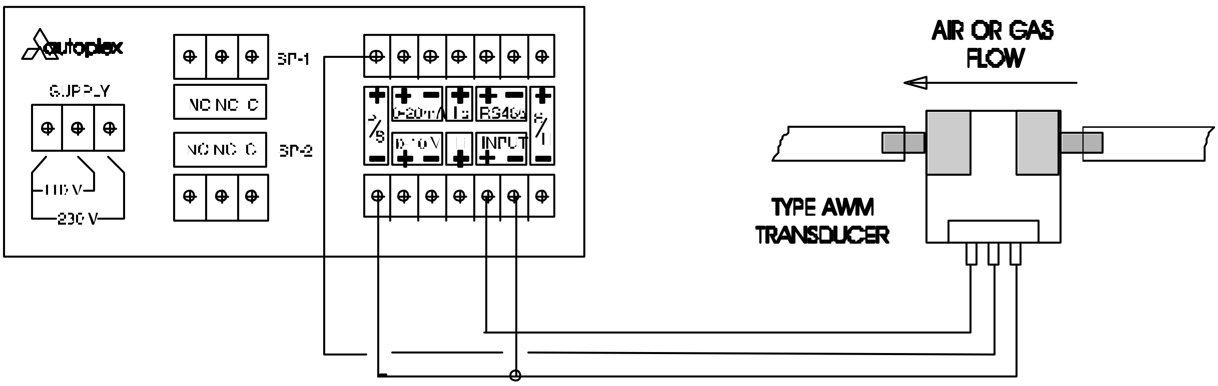


FIGURE 1

Typical Setup:

Function = 64, SF 2 = as required, SF 3 = as required,

application note 94/67

WEB SPEED INDICATION

General

A proximity detector and UNIMETER are installed on a newspaper press to determine the speed of the line.

An existing sprocket on the line is chosen to install the proximity detector to sense the movement of the sprocket teeth proportional to the line speed.

A direct readout of feet per minute is obtained by spanning the UNIMETER via its special functions 2 or 3 to indicate the line speed as required.

The UNIMETER is suitable to also control the line speed via its PID controller to ensure that the correct speed of the line and printing press is maintained at all times. (See page 350 of the UNIMETER manual for PID details).

Functions 95 or 102 are selected to interface with a proximity detector or magnetic pickup as required. (See UNIMETER manual for details on page 95 and 102).

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

UNIMETER REAR

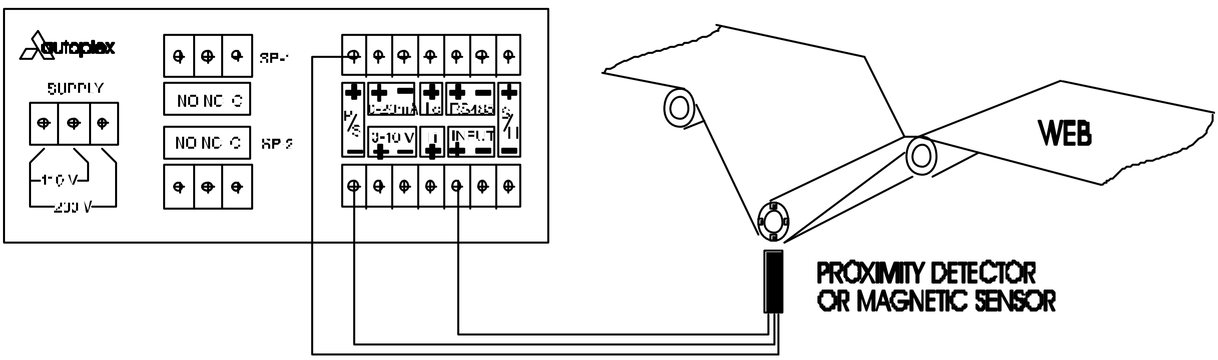


FIGURE 1

Typical Setup:

Function = 95 OR 102, SF 2 = as required, SF 3 = as required,
SF 235 = 15,

application note 94/68

PRODUCT COUNTING AND BATCHING

General

Wine bottles at the end of a filling line are counted and batched into a container in lots of 12 bottles per container.

A photo cell is installed to detect the passing of the bottles before entering the transfer mechanism of the packaging plant. The detection pulse of the photo cell is fed to the UNIMETER to initiate the up-counter.

Setpoint number 2 of the UNIMETER is programmed to 12 and will energise when 12 bottles have been detected by the photo cell. Relay R1 will then energise and latch itself. A contact of R1 is used to reset the UNIMETER count to zero to re-start the batching process. A further contact of R1 is interlocked into the packaging plant control system to initiate the transfer mechanism for the 12 bottles into the container.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

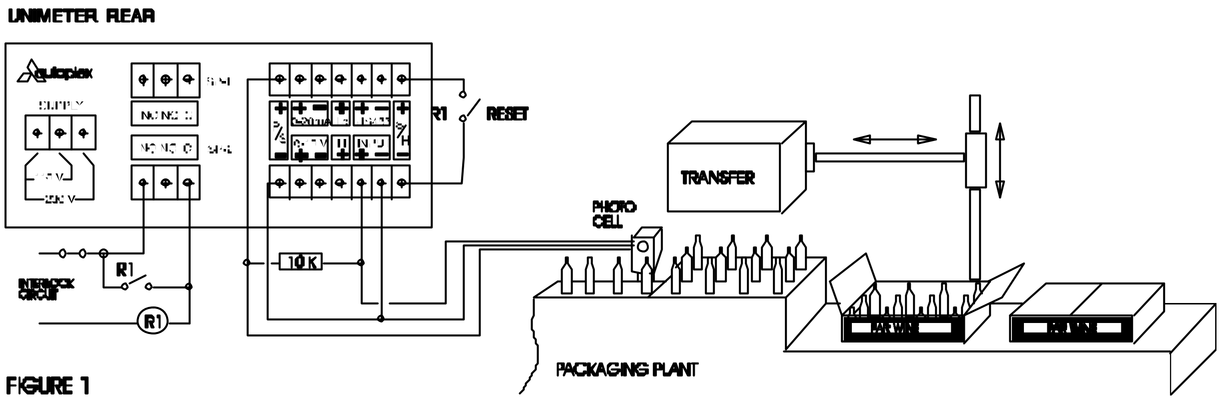


FIGURE 1

Typical Setup:

Function = 126,   SF 7 = 12,

SAW DEFLECTION MONITOR

General

High tension band-saws have been developed and integrated into saw mills for cutting timber logs and re-cutting timber sections. Bluntness, wear and damage of the saw blades will cause out of tolerance cutting and lead to inefficiencies.

The deflection of the saw blades due to bluntness or incorrect feed speed can be detected and measured by installing a UNIMETER and a BS 4000 detector.

The detector is fitted inside of the blade just below the saw guide at a distance of approx. 2 mm. The detector should be mounted just behind the blade teeth to detect the continuous blade section without disturbance from the gullet. The distance to the blade should be adjusted to cause a reading of 4.00 to 6.00 on the UNIMETER.

With the saw running but not cutting timber the UNIMETER is tared, by pressing the PGM/ RUN button while holding the shift right key, to show and display 0.00. The saw deflection can be displayed in real units by causing a known deflection and programming the span by special functions 2 or 3 to modify the display as required.

Any side movement of the saw blades will be measured and indicated by the UNIMETER. Setpoints 1 and 2 can be programmed for out of tolerance warning or interlocking purposes.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

UNIMETER REAR

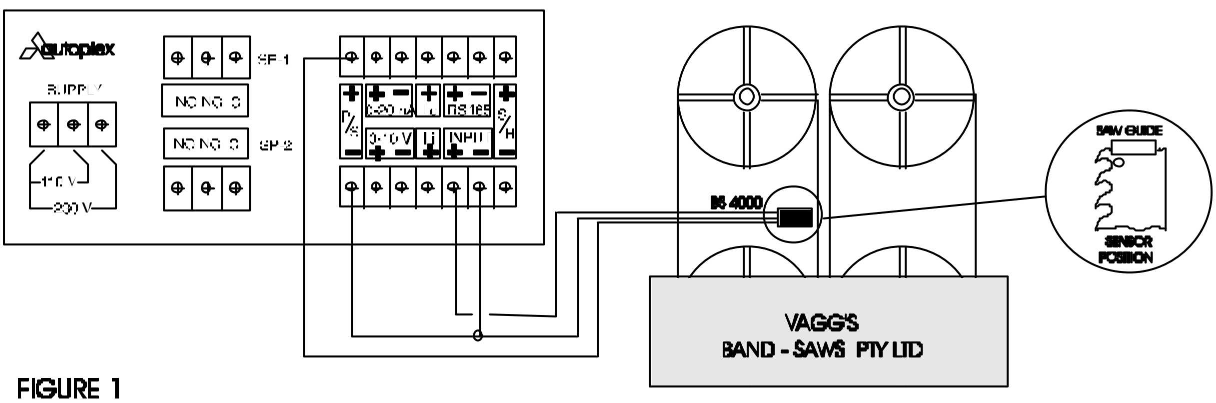


FIGURE 1

Typical Setup:

Function = 163, SF 2 = as required, SF 3 = as required, SF 235 = 15,

application note 94/70

BISCUIT BAKING IN CONTINUOUS FLOW OVEN

General

Biscuits are baked in an oven on a continuous flow through basis. It has been determined that 2 minutes and 6 seconds baking time is required to achieve suitable results as the biscuits are progressed through the oven.

The transport conveyor main drive shaft rotates at a rate of 32 rpm when the conveyor moves at the required rate of 2 min. 6 sec. for the 5 meter long oven.

A proximity detector is installed to sense the key way of the main drive shaft and connected to the UNIMETER as per figure 1 below. The resulting display will be 32.00 for the above conditions. The required display, however, is 2.1 min. per 5 m or 5 / 2.1 = 2.38 metres per minute. To achieve this display, the 32.00 to 2.38 ratio (32 / 2.38 = 13.49) must be programmed into the span divisor (special function 3) of the UNIMETER.

The UNIMETER will now display the movement of the biscuits through the oven at a rate of metres per minute and will allow simple operator adjustment of the flow rate.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

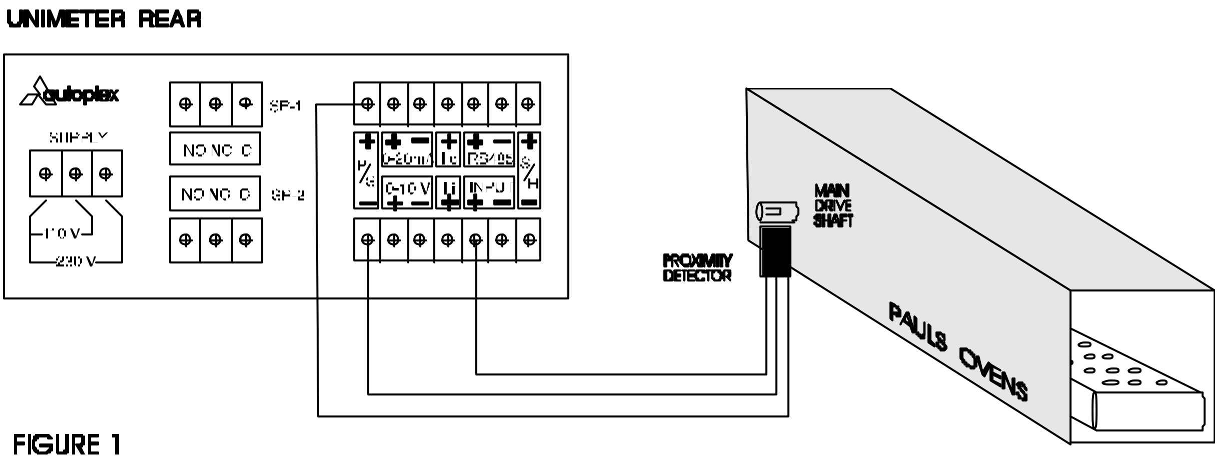


FIGURE 1

Typical Setup:

Function = 163, SF 3 = 13.49, SF 235 = 15,

SAMPLE AND HOLD FOR BATCH WEIGHING PROCESS

General

Wood chip mattresses of particle board are weighed for quality control purposes before further processing. Below specification weight units are rejected to prevent production of reject materials. Units with weights above specification are retained for processing but serve to indicate that excessive raw materials are being used and result in process variable adjustments.

The weighing scale is load cell based and connected to the UNIMETER. Setpoint 1 is programmed to energise at low weight and interlocked for the reject process. Setpoint 2 is programmed above the maximum acceptable weight and will sound an alarm when exceeded.

The weighing of the travelling mattress is carried out by halting the scale conveyor for 2 seconds with the mattress in place. At the end of this settling period, the sample and hold contact is briefly opened and closed for the new measure and display process.

The UNIMETER will display and hold the last weight measured right up to the point where the next weight has been determined and will be available for display.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

UNIMETER REAR

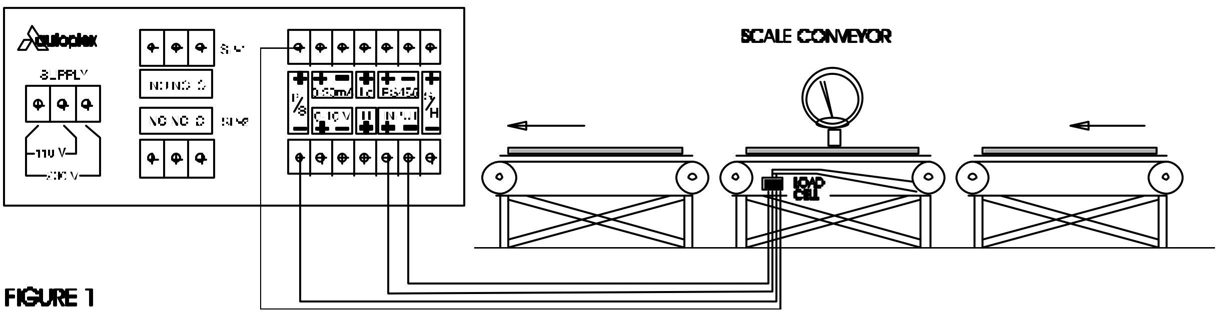


FIGURE 1

Typical Setup:

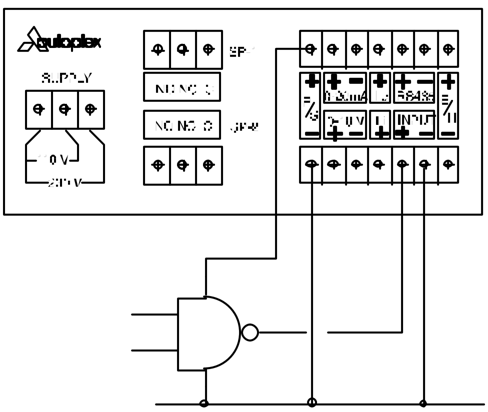
Function = 159 OR 160, SF 1,2,3 = as required, SF 235 = 5,

INTERFACING TTL AND CMOS CIRCUITRY

General

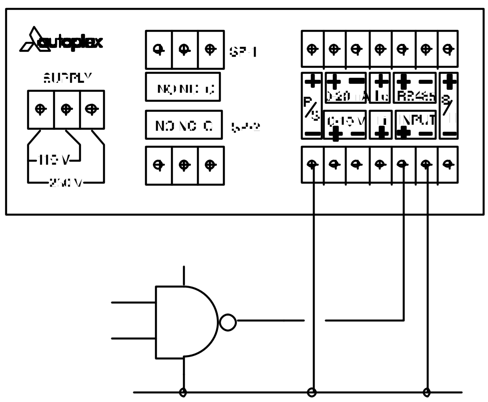
Some applications require the interfacing of sub-systems to instrumentation or display devices. The UNIMETER is suitable to accept a large variety of signals from other systems. Figure 1 shows how TTL and CMOS circuitry should be interfaced for best results. As a general rule, the voltage going into the + and - input terminals should never exceed + or - 5 volt peak with respect to the negative terminal of the sample and hold connection. If these voltages are exceeded, erroneous measurements or damage can result.

UNIMETER REAR



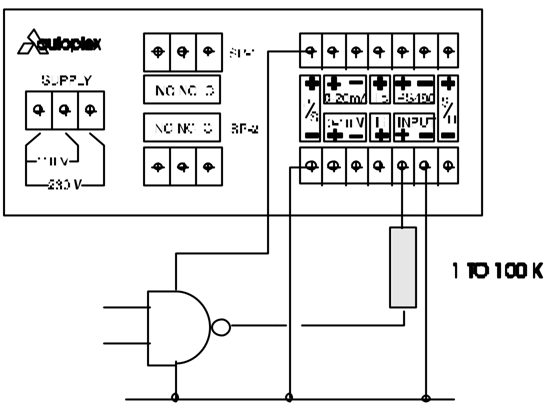
INTERFACING TTL USING UNIMETER SUPPLY SF 235 = 5 V MAX

UNIMETER REAR



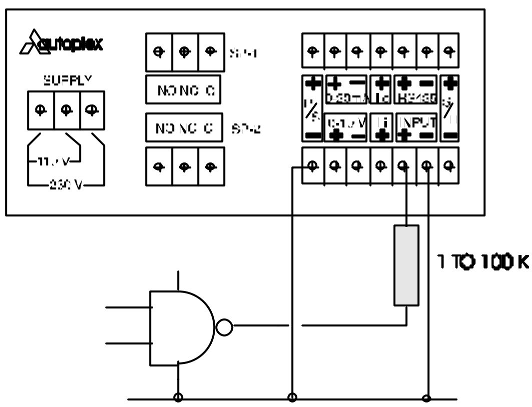
INTERFACING TTL WITH EXTERNAL SUPPLY (VCC = 5 V MAX)

UNIMETER REAR



INTERFACING CMOS USING UNIMETER SUPPLY SF 235 = 5,10, OR 15 V

UNIMETER REAR



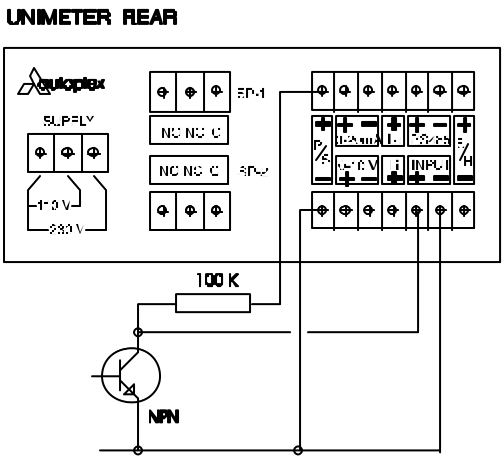
INTERFACING CMOS WITH EXTERNAL SUPPLY

FIGURE 1

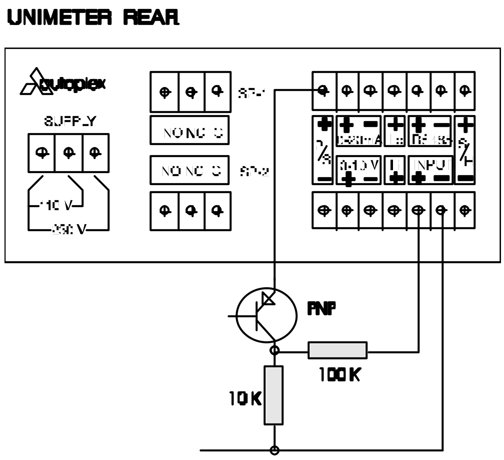
INTERFACING OPEN COLLECTOR NPN AND PNP TRANSISTORS

General

Some applications require the interfacing of sub-systems to instrumentation or display devices. The UNIMETER is suitable to accept a large variety of signals from other systems. Figure 1 shows how open collector NPN and PNP transistors should be interfaced for best results. As a general rule, the voltage going into the + and - input terminals should never exceed + or - 5 volt peak with respect to the negative terminal of the sample and hold connection. If these voltages are exceeded, erroneous measurements or damage can result.



INTERFACING OPEN COLLECTOR
NPN TRANSISTOR (SF 236 = 5, 10, OR 15 V)



INTERFACING OPEN COLLECTOR
PNP TRANSISTOR (SF 236 - 5, 10, OR 15 V)

FIGURE 1

application note 94/74

HUMIDITY CONTROL IN KILNS

General

The timber drying process in modern high temperature kilns requires the control of humidity within the kiln for optimal drying performance.

Humidity is generally controlled by way of a series of flaps at the top of the kiln. The UNIMETER is ideal for measuring and controlling the relative humidity within the kiln by automatically adjusting the position of the flap opening.

Function 164 configures the UNIMETER as a humidity meter / controller using 2 LM 35 sensors as wet and dry bulb detectors. Special function 21 selects the PID features of the UNIMETER and will output a 0 - 10 volt and / or 4 - 20 ma signal for the flap position control. (An additional UNIMETER may be employed to carry out the flap position control by using function 202, see application note 94/55 and UNIMETER manual for details). All additional PID features and functions are available for use if required.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

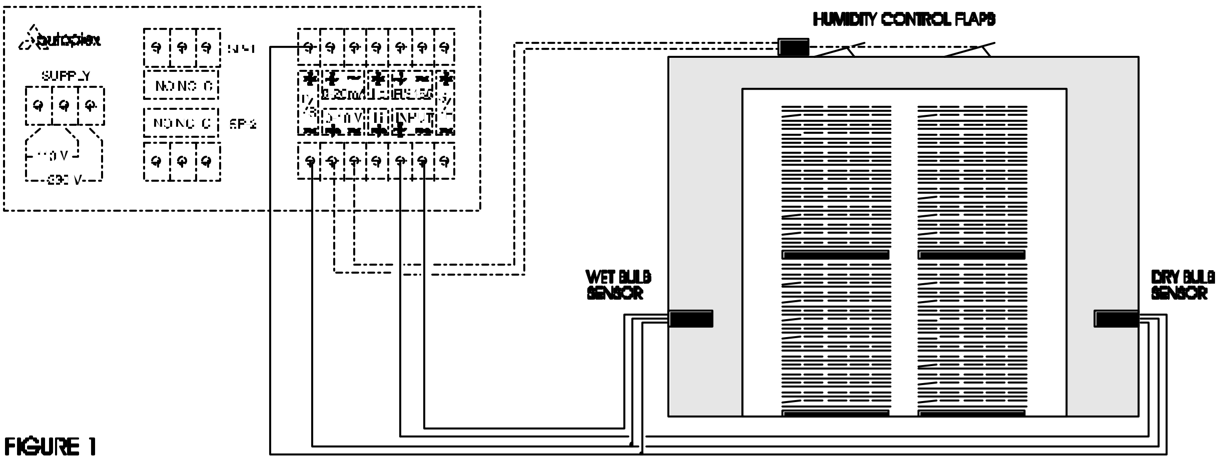


FIGURE 1

Typical Setup:

Function = 164,   SF 21 = selected,

application note 94/75

STEAM PRESSURE MONITORING AND CONTROL

General

Steam is used throughout industry for heating and drying purposes. Close monitoring of the steam pressure is in most cases necessary to obtain optimum results in the steam generation process.

For high precision pressure measurement such as steam pressure, the UNIMETER and a strain gauge type pressure transducer can be utilised to measure, indicate and control the steam generation process.

Figure 1 shows a typical installation and connection of a strain gauge pressure transducer and a UNIMETER.

Setpoints 1 and 2 may be programmed and configured to set warning devices or interlocks when the steam pressure moves out of the required pressure window.

PID type controls are available to influence or control the steam generation process.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

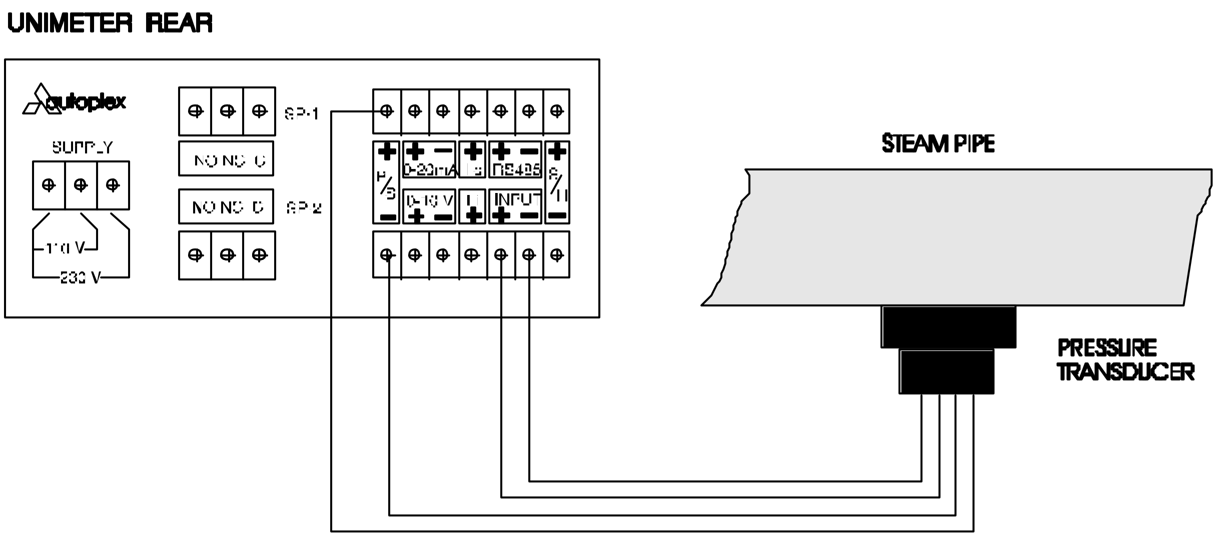


FIGURE 1

Typical Setup:

Function = 162, SF 235 = 5, SF 1, 2, 3, 6, 7, = as required,

application note 94/76

TANK LEVEL CONTROL AND INDICATION

General

A chemical process needs to maintain the level of an acid solution in a tank to ensure constant supply of solution for a process.

An ultra sonic level probe with 0 -10 volt or 4 - 20 ma is connected to a UNIMETER to measure and indicate the level of the acid solution within the tank.

A proportional valve with 0 - 10 volt or 4 - 20 ma input is installed and also connected to the UNIMETER with the proportional term of the PID options selected. This will control the filling process of the tank to ensure that the input flow rate is proportional to the level error in the tank.

Special function 21 is selected for PID control with the integral and derivative terms de-selected. The proportional band (SF 4, SF 5,) is set 10% below and above the required level. Setpoints 1 and 2 are used for high and low level warning alarms.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

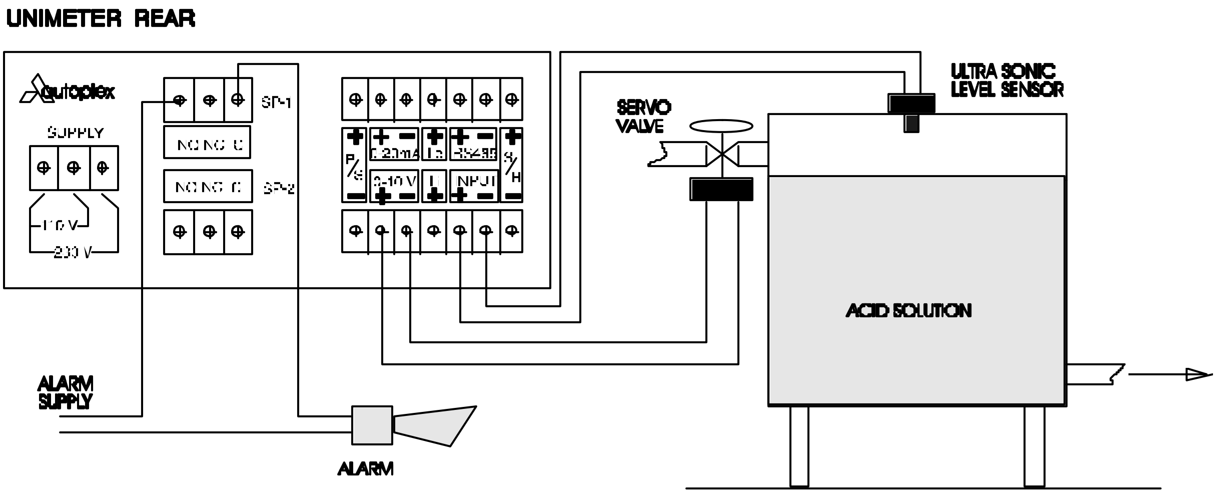


FIGURE 1

Typical Setup:

Function = 64,	**SF 21 = selected,**	**SF 4 = 10% below level,**
SF 5 = 10% above level,	**SF 252 = 0,**	**SF 253 = 0,**
SF 254 = as required,	**SF 6 = as required,**	**SF 7 = as required,**

application note 94/77

COMPONENTS 'IN-PROCESS' MONITORING

General

Some manufacturing processes require monitoring and controlling of components going into and out-of the manufacturing plant. Some applications also need the supply of two components to be monitored to achieve correct ratios of the feeding process.

Function 125 (version 3.03 or higher only !) of the UNIMETER has been developed specifically for this type of application. Here a UNIMETER can be used to determine the difference between in going and out going component quantities on an up-count and down-count basis. Part A increments the counter and part B decrements the counter. The + / - display value is a true indication of the difference between A and B.

The maximum difference between input A and input B can be regulated by the controller features of the UNIMETER.

Setpoint 1 and 2 can be used to interlock the supply mechanism of parts A and B to automatically control the supply process of both parts.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

UNIMETER REAR

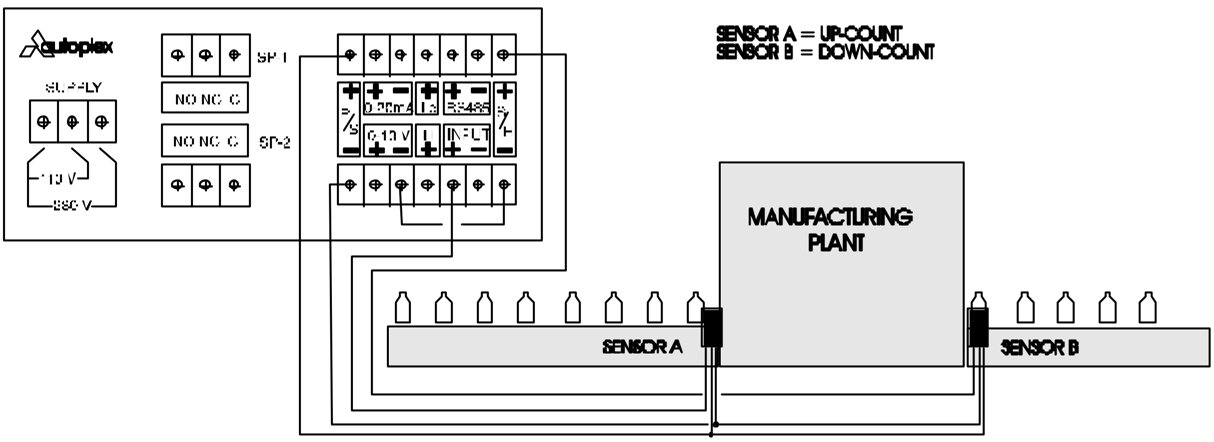


FIGURE 1

Typical Setup:

Function = 125, SF 235 = 15, SF 1, 2, 3, 6, 7, = as required,

PEAK - HOLD PROCESS VARIABLE

General

Some applications require the largest or peak of a measuring process to be recorded or held for evaluation at the end of a period.

The UNIMETER's special function 239 will configure the instrument to hold and display the peak or largest value of a variable measured. In cases of fast moving processes this feature will retain the process high until the down arrow key on the UNIMETER keyboard is pressed. Following this reset, the peak hold process is restarted and repeated.

Figure 1 shows the UNIMETER monitoring the speed of a raw material supply screw used in an automatic mode to control the supply of the material. It is important that the supply does not exceed a given maximum value. The UNIMETER monitoring the process has special function 239 selected and will as a consequence retain the highest reading for evaluation at all times.

All other UNIMETER control features, UNISOFT and serial communication are available for control, remote display, data logging and statistical analysis of the system, if required.

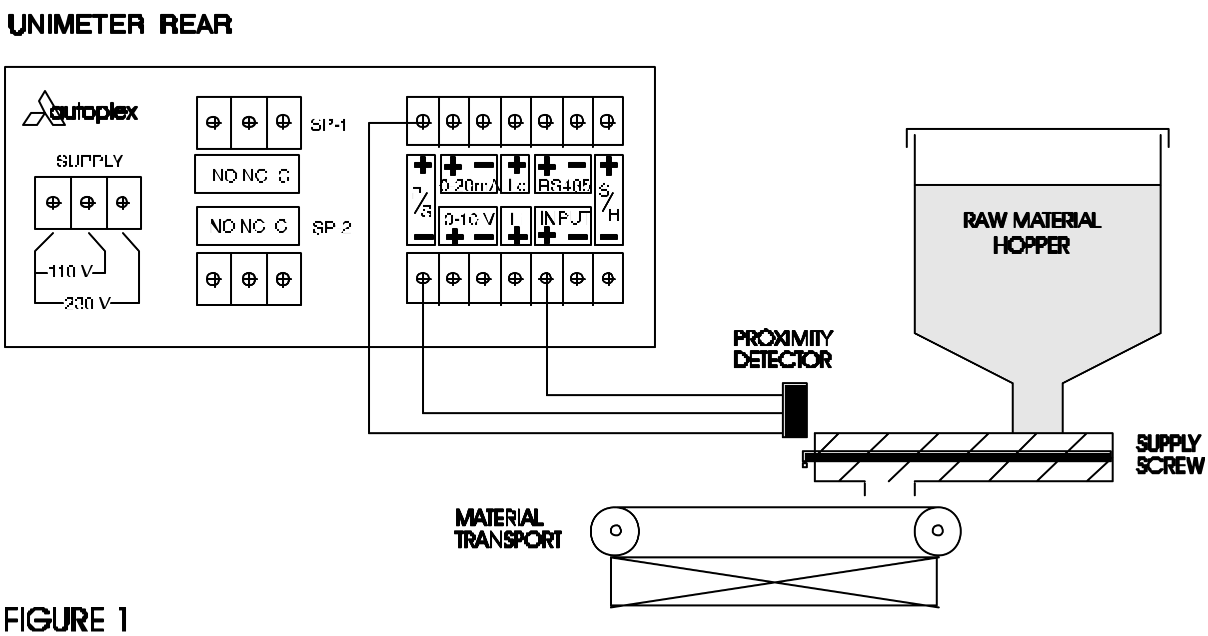


FIGURE 1

Typical Setup:

Function = as required, **SF 239 = selected,**

L.E.D. DISPLAY SIGN INTERFACE

General

The UNIMETER's special function 228 will configure the instrument to communicate with a type FS - M002 L.E.D. display. The large display can be remotely mounted to indicate the Unimeters value and thus be seen from many locations and large distances. The message on the sign is up-dated every 10 seconds.

Unimeter to L.E.D. sign connections are as shown in figure 1 below. The AS 4000 serial adapter should be situated close to the sign and will convert the Unimeter's RS 485 industrial format to the sign's RS 232 format. The L.E.D. display is in the receive mode RS 232 and requires the lines on pins 2 and 3 to be reversed.

The Unimeter display value is transmitted to the remote display and formatted to occupy the last 5 digits of the display (position 11,12,13,14,and 15). Position 10 is always kept blank. The user can chose any message or wording to fill the first 9 display characters of the L.E.D. display. The programming of this can be carried out by connecting the Unimeter to a P.C. and running the program called LED_SIGN.EXE which is part of the TOOLS_XQ software package.

Note: The Unimeter with JIC logger option can be used to display up to 100 automatically selected meassages on the LED sign. Refer page 72 and 365 for additional details.

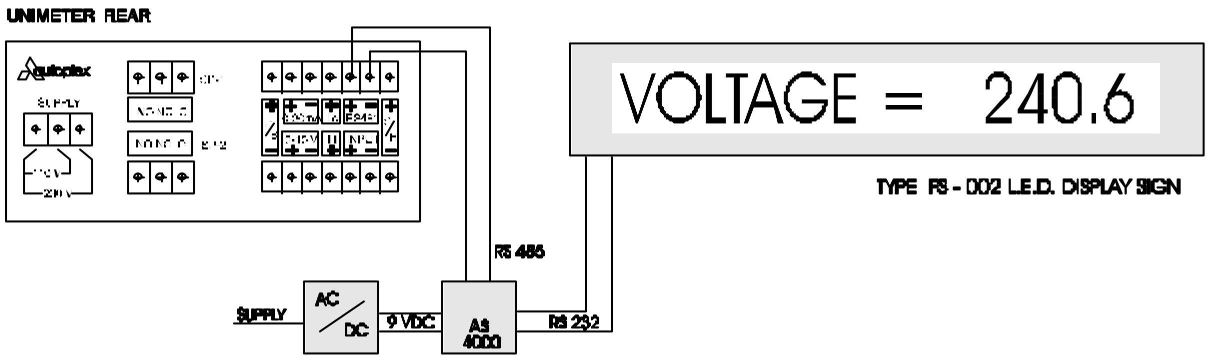


FIGURE 1

Typical Setup:

Function = as required, **SF 228 = selected,**

HIGH PRECISSION OBJECT SIZE MEASUREMENT

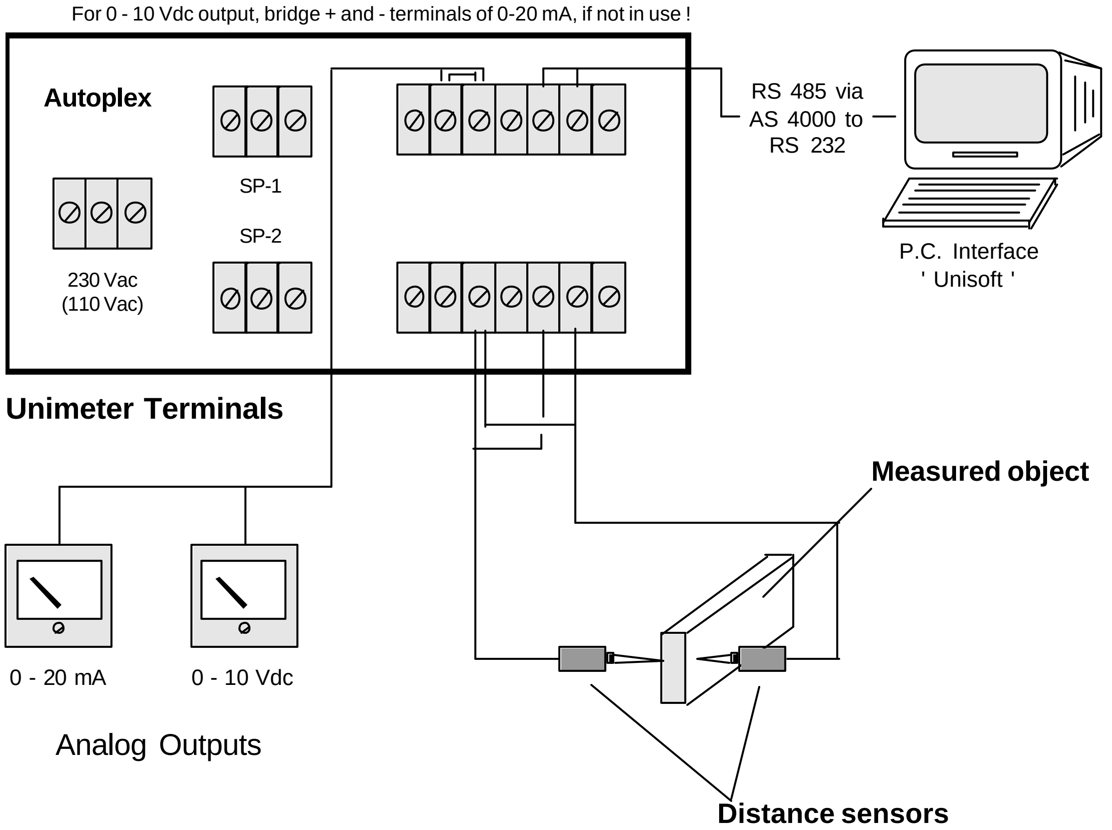
General

The UNIMETER has several dual input analog functions to measure two signals and condition the two signals as required.

The diagram below shows the details of an object size measuring system employing two non-contact, high speed, analog laser distance measuring sensors of the type LAS - 5010 or LAS - 8010 and a single Unimeter.

Special functions 1, 2, 3, and 224 enable the user to display any engineering value of the object being measured.

All other features of the Unimeter can be selected to show, control and record the objects being measured.



Typical Setup:

Function = 203, 204 or 205
Special functions = 1,2,3 and 224, as required