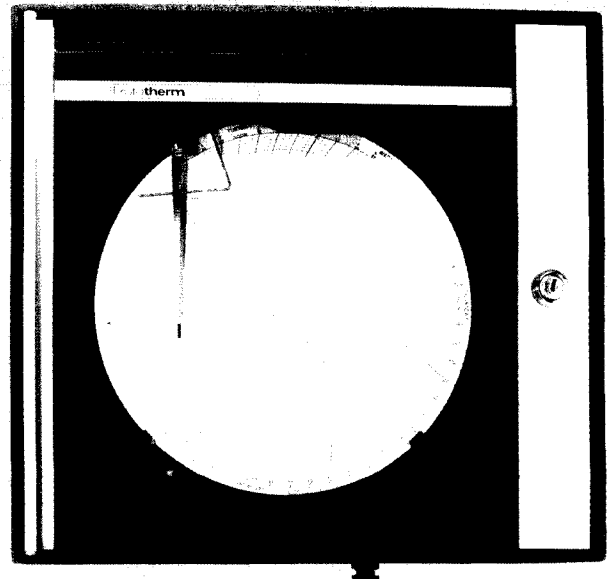
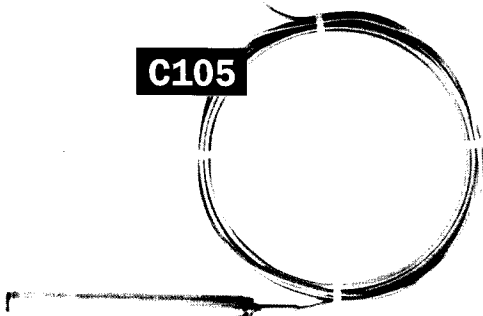
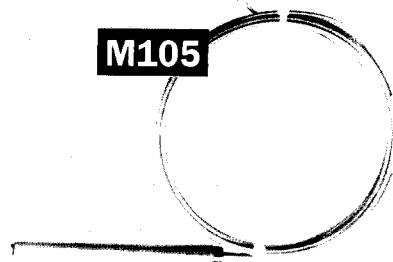


TEMPERATURE RECORDERS & RECORDER/ CONTROLLERS



- Robust and reliable chart recorders
- 255mm diameter chart
- Single or two pen versions
- Large choice of temperature ranges
- Choice of case styles
- Easily installed on wall or flush in panel
- Portable stand option available on C105
- Slim case is ideal for shallow compartments
- Numerous electrical control options
- Pneumatic control for clearscan M105



incorporating



SYDNEY SMITH DENNIS

Rototherm
instrumentation and control

TEMPERATURE RECORDERS & RECORDER CONTROLLERS

Temperature monitoring and control is one of the most important applications found in industry. This comprehensive range of recorders has many versions and alternative specifications to offer. Two pen instruments can be produced with a different temperature recording system on each pen.

Temperature and pressure recording can be specified if required.

CHOICE OF CASES

The Rotothem temperature recorders can be built into either of two types of tough steel case. Both have a lockable front-hinged door, permitting easy access to the chart and pens, and may be either wall or panel mounted. C105's can be supplied complete with a portable stand. The Clearscan M105 has a rectangular steel case, an aluminium door and Triplex glass. Electrical and pneumatic controller versions are available.

The C105 temperature recorder has a tough circular steel case which, as with all other C105 mechanical recorders, is suitable for installing under severe industrial conditions. The door has a strong polycarbonate window. Versions incorporating electronic control are available.

PENS

The recorders utilise sealed ink capsules with built-in fibre-tipped pens which are replaced simply and without mess. Single pen recorders and the first pen of two pen recorders trace in red ink; the second pen of two pen recorders traces in green ink.

CHARTS AND CHART DRIVES

The standard chart durations are one revolution every 12 hours, 24 hours or 7 days, the chart drive being either an electrical or a mechanical (clockwork) motor. Alternatively a 24 hour or 7 day electrical chart drive with its own built-in, recharging reserve power unit, can be selected. This version gives a continuing trace through a mains failure. When running "normally" in the fully charged condition the power unit accumulator holds enough capacity to drive continuously for five days. Alternative chart drive and speeds are also available.

RANGES

The minimum temperature reading is normally located at the centre of the recorder chart. For best recordings select a range in which the normal working temperatures are between 50 and 80 per cent of the instrument span.

SENSING BULBS AND FITTINGS

Rotothem standard systems can be used with thermowells and sheaths. Standard thread sizes for screwed fittings are 1/2, 3/4 and 1 inch BSP, dependant upon bulb and stem size. Other thread types are available (including API and NPT).

Type 302 should not be used when fittings may be subject to temperatures in excess of 50°C and pressures in excess of 3.5 Bar. Standard bulb diameter is 12.7 mm.

CONTROL OPTIONS

Single and two pen recorders can be supplied with a variety of alarm/control options.

ELECTRICAL CONTROL/ALARM

Rotothem Clearscan M105 and C105 recorders can be supplied with up to four independently adjustable single on/off alarm/control channels, each provided with a setting pointer adjustable over the full chart range to indicate the set value against the chart. The pointers are fitted with a locking device to prevent accidental disturbance.

SWITCHING CAPACITIES AND RELAYS

The control contacts themselves have a switching capacity of 20mA inductive or 30mA non-inductive load, and can be used to switch directly low loads such as alarm lamps. For longer contact life, and where higher loads are to be switched, relays with spark suppression and delayed action circuits are fitted, thereby avoiding arcing and switch point oscillation whilst up-rating the switching capacity to 5A, 240V a.c. non-inductive. Higher rated relays are available on request.

OPTIONAL FEATURES

Clearscan M105 recorder/controllers with contacts and relays can have indicator lights visible through the door. There is a version offering both visual and audible alarms including a muting switch for more critical operations.

PNEUMATIC CONTROL

Pneumatic control can be fitted to most recorders in the Clearscan M105 case. Providing a 0.2 to 1 bar (3 to 15 Psi) output signal for direct connection to control valves or other pneumatically driven regulators.

The pneumatic system operates on the motion balance principle, i.e. motion from the pneumatic feedback unit balances the motion from the temperature system. Control action occurs at or about the value set by the setting pointer. The pointer is adjustable over the full chart range and is fitted with a locking device to prevent accidental disturbance.

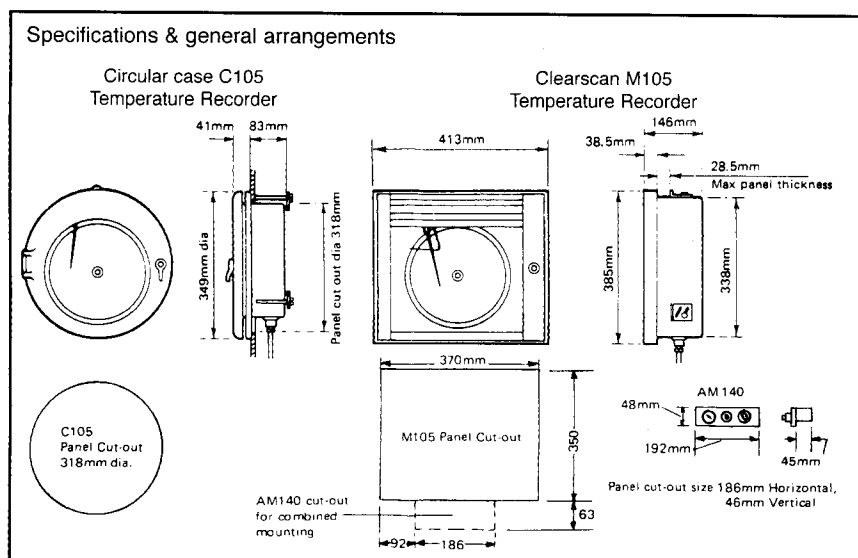
Gauges displaying the supply and output pressures, and the control setting pointers, are clearly visible through the door of the recorder.

PNEUMATIC CONTROL OPTIONS

The following options are available - Proportional only (P), Proportional + Integral (P + I), Proportional + Derivative (P + D) and Proportional + Integral + Derivative (P + I + D). Advice on the best control option for a particular application will be given by our application engineering staff.

The instrument can be set to give either a reverse or direct acting output, reverse and direct action versions respectively provide a decreasing or increasing controller output pressure with a process temperature rise.

Only one channel of pneumatic control would normally be fitted to single pen recorders and to the first pen of two pen recorders. Instruments with two channels of pneumatic control, and combinations of pneumatic and electrical control, may be available to special order.



TEMPERATURE RANGES

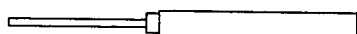
RANGE	SYSTEM FILLING	RANGE	SYSTEM FILLING
-40 to +40°C	f	0 to 160°C	f, m
-30 to +30°C	f, m	0 to 200°C	f, m
-30 to +50°C	f, m	0 to 300°C	f, m
-25 to +25°C	f, m	0 to 400°C	f, m
-25 to +30°C	f, m	20 to 120°C	f, m
0 to 40°C	f, m	50 to 150°C	f, m
0 to 50°C	f, m	50 to 250°C	f, m
0 to 60°C	f, m	100 to 400°C	f, m
0 to 100°C	f, m	100 to 500°C	f, m
0 to 120°C	f, m		

Key: f = filsafe m = mercury
Non-standard ranges are available

BULB TYPES

TYPE 301

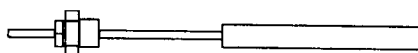
This bulb is used when no fitting is required. The bulb may be held in place by a bracket or clip or may be left free. If a fitting is not requested at the time or ordering this type of bulb will be supplied.



TYPE 301
Plain bulb - no fitting

TYPE 302

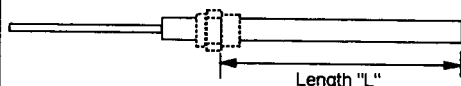
This bulb has a fitting which slides along the capillary and is clamped into the required position. Bulb length cannot be specified.



TYPE 302
Fitting is adjustable on capillary

TYPE 303

The fitting on this bulb is fitted on the actual bulb and not to the capillary. When ordering this type of bulb please specify the insertion length of the bulb - i.e. is the bulb to be fitted into a thermowell? - if yes, what is the insertion length of the thermowell?



TYPE 303
Fitting is adjustable on bulb

Standard bulb diameter = 12.7mm

SPECIFICATIONS

Accuracy	+/-1% FSD
Chart Drive	Synchronous electric or mechanical spring wound. 12 hour, 24 hour or 7 day rotation - other rotations on request.
Charts	Circular 255 mm diameter
Inking System	Disposable fibre tipped pen. Single pen : Red 2 Pen : Red and green
Case	C105 Steel body with moulded door and glass window M105 Steel body with aluminium and Triplex toughened glass door (polycarbonate glazing available as an option)
Power Supply	200 to 250 volts, 50Hz (60Hz available) 100 to 120 volts, 50Hz (60Hz available) Instruments without electrical control require no power supply provided that a mechanical spring wound chart drive is fitted.

ELECTRICAL ALARM & CONTROL

Contacts	20mA at 250V ac 50Hz (inductive load); 30mA at 250V ac 50Hz (non-inductive load)
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PNEUMATIC CONTROL

Air Supply Pressure	1.4 bar (20 Psi)
Air Supply Pressure Effect	No greater than 1% output change at 0.6 bar (9 Psi) per 5% change in supply pressure at 1.4 bar (20 Psi) at 100% proportional band
Output Pressure	0.2 to 1.0 Bar (3 to 15 Psi)
Air Connection Size	For 6.4 mm (1/4") outside diameter tubing
Supply & Output Gauges	0 to 2 bar (0 to 30 Psi)
Air Consumption	Less than 3 litres/min at 0.6 bar output)
Air Output Capacity	60 litres/min
Control Actions	Direct or reverse by simple positioning of nozzle/flapper and feedback bellows
Mounting	Suitable for wall or panel mounting. Portable option available (C105). Instrument must be mounted vertically for accurate results.
Weight (approx.)	C105: 8.5 kg M105: 14.0 kg approximate weight for recorder with 3 metres of capillary.

PNEUMATIC CONTROL OPTIONS

CONTROL OPTION	PROPORTIONAL BAND	INTEGRAL TIMER	DERIVATIVE TIME
On/Off	Approx. 1% fixed	-	-
Proportional	1-50% and 4-200%	-	-
Proportional + Integral	1-50% and 4-200%	0.05 to 5 mins.	-
Proportional + Derivative	1-50% and 4-400%	-	0.05 to 5 mins
Proportional + Integral + Derivative	1-50% and 4-200%	0.05 to 5 mins	0.05 to 5 mins

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