INDUMART Canada
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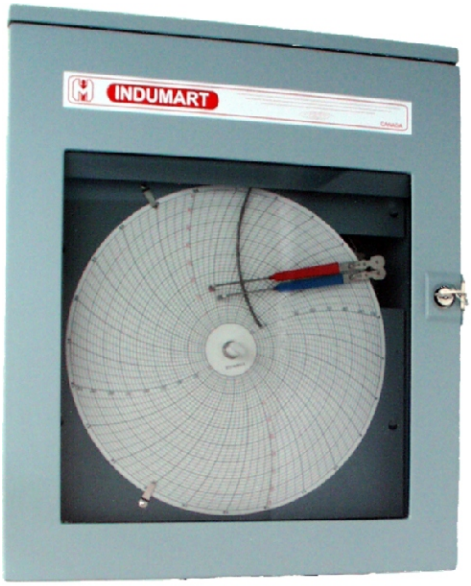
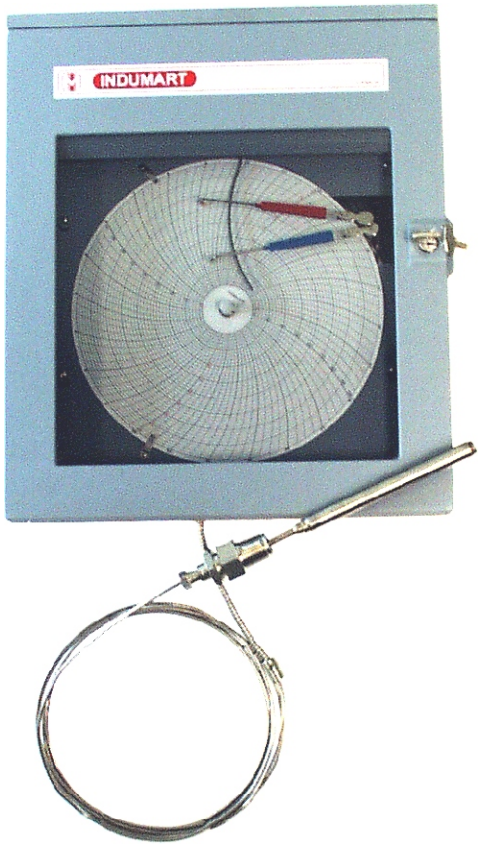
Recorder / Controller - Temperature, Pressure & Flow

SERIES: 80M





- SINGLE, TWO OR THREE PEN RECORDER
- ±1% ACCURACY
- PNEUMATIC CONTROL OUTPUT (3-15 PSI)
- ONE, TWO OR THREE TERM CONTROL (PROPORTIONAL, INTEGRAL, DERIVATIVE)
- ON/OFF OR DIFFERENTIAL GAP CONTROL
- ELECTRICAL ALARMS (RELAYS)
- PANEL OR SURFACE MOUNTING
- PIPE MOUNTING (OPTION)
- AMTS OR AM PANELS (OPTION)
- BATTERY POWERED CHART DRIVE (OPTION)
- FULLY MECHANICAL VERSION AVAILABLE (NO POWER)
- RECEIVES UP TO THREE DIRECT INPUTS: COMBINATIONS OF TEMPERATURE, PRESSURE & FLOW

INTRODUCTION

The *80M Series* Pneumatic Recording Controllers record up to 3 input signals on a 9.5" (240 mm) round chart and provide continuous 3 to 15 psi control output(s). The inputs may be direct pressure, flow and temperature. Up to three filled systems can be fitted to the instrument for temperature measurements, and for flow and pressure measurements, the recorder/controller will be equipped with accurate sensing elements.

The *80M Series* can be supplied as ON/OFF, differential gap, proportional only (P), proportional + integral (P+I), proportional + derivative (P+D) or PID controller.

A fully mechanical version is available for intrinsically safe applications.

RECORDER

The instrument uses a chart drive, a support plate, a 9.5" (240 mm) round chart paper, fiber-tip pen(s), pen arm(s) and a lift-pen arm.

Standard chart drives are operating with 110 or 220 VAC power having one-revolution durations of 12 hours, 24 hours or 7 days. Other power supply or time span options are available.

The battery-powered version for places with no electrical power, or the all-mechanical model using a spring wound motor for intrinsically safe applications are also available.

Charts are supplied with the minimum value of the measured parameter at the center. Other styles are available as options.

For a neat operation, the *80M Series* of recorders use disposable fiber-tipped pens fitted to the pen arms. Colours of the pens are red, blue and green, respectively. A pen-lift is fitted to ease chart changing.

CONTROLLER

The *80M Series* can be equipped with single term (P), two-term (P+I) or (P+D), three-term (PID), on/off or differential gap control actions to provide pneumatic control output(s). To enable accurate matching to plant conditions, the proportional band, integral time and derivative time are adjustable over a wide range. ON/OFF instruments have a sensitivity adjustment comparable to 0.25% to 1% proportional band.

For applications that the control output must be switched to its maximum at a certain point, and be switched to its minimum at another point, choose the differential gap control action. The switching gaps are equally spaced and adjustable between 5% and 100% of the range.

The *80M Series* of recorder/controllers are very simple in operation. Change of control action does not require repositioning of the flapper/nozzle assembly and will be completed by reversing a lever on the mechanism. A small amplifying relay provides the necessary volume of air required by a control valve.

Single Pen Controller

All control options are available for single pen controllers. A wide proportional band of 3% to 300% can be obtained.

An additional recording only pen, either pressure or temperature can be fitted to this unit.

Two Pen Controller

Proportional only control option with proportional band of 2% to 40% is available for two pen controllers.

AMTS or AM Panels

Optional Automatic/Manual/Test/Service (AMTS) panels are available on two or three term control instruments. This will allow the user to switch from Automatic to Manual control, and to carry out tests and maintenance without disconnecting the pneumatic supply to the control valve.

Automatic/Manual (AM) panels may be ordered, when proportional only control is specified.

ELECTRICAL CONTROL (ALARM)

One and two pen recorders may be specified with electrical alarms. Two contacts (high and low) can be assigned for each pen.

SPECIFICATIONS

General

Accuracy	±1% f.s.
Case	Glass filled polyester resin
Protection Class	IP-55
Window	Acrylic
Chart	Round, 240 mm (9.5") dia.; Synchronous electric, mechanical spring wound or battery operated; 12 hr, 24 hr or 7 day rotation; Other rotations are option
Pen	Disposable fiber-tipped; 1st pen: Red; 2nd pen: Blue 3rd pen: Green
Power Supply	110 or 220 VAC, 50 or 60 Hz (when electric chart drive is fitted)
Pneumatic Conn.	¼" female; Brass standard
Mounting	Surface or flush panel; pipe mounting is an option
Ambient Temp.	-20...+50°C
Weight*	Single pen: 7.5 kg Two pen: 8 kg Three pen: 8.5 kg

*(Approximate for all pressure/temperature recorder/controller)

Temperature System

Measuring Element	Thermal Bourdon tube temperature compensated
Capillary	3 mm diameter stainless steel
Bulb & Stem	Stainless steel, 12.7 mm bulb and ½", ¾" or 1" thread
Fittings	Adjustable compression gland, stainless steel, suitable for pressure up to 50 psi (3.5 bar)

NOTE: For temperature systems add 0.25 kg per 3 meters of capillary to the total weight

Pressure System

Measuring Element	Bourdon tube or pressure capsule as applicable
Connection	⅜" nut and tailpiece suitable for ¼" female receivers

Flow System

Measuring Element	Barton Model 199 differential pressure unit with adjustable internal pulsation damper; self-draining or venting with temperature compensation features; 3¾" diameter bellows for low differential pressure ranges (0...10 to 0...400 inH2O); 2⅛" diameter bellows for differential pressure ranges above 15 and up to 100 psi
Bellows	Stainless steel, Inconel
Body Material	Forged steel, stainless steel, forged Monel
Rating	1000 to 6000 psi (70 to 410 bar)
Connection	½" NPT top ¼" NPT bottom

Pneumatic Specifications

Air Supply	20 psi (1.4 bar)
Output	3...15 psi (0.2...1 bar) direct or reverse acting
Air Consumption	4.5 liters per minute maximum
Proportional Band	3%...300%
Integral Time	0.5...32 minutes
Derivative Time	0.25...12 minutes
Differential Gap	5%...100% f.s.

STANDARD TEMPERATURE RANGES (°C)

-40...20	0...40	0...160	20...120
-30...20	0...50	0...200	50...150
-30...30	0...60	0...300	50...250
-25...25	0...100	0...400	100...400
-20...30	0...120		100...500

STANDARD PRESSURE RANGES

Standard Range	Sensing Element	Material
0...25 inH2O	Box Element	Beryllium Copper
-30...30 inH2O -50...50 0...40 0...60 0...100 0...160	Open Stack	Beryllium Copper
0...30 inHg Vac 0...250 inH2O 3...15 psi	Single Capsule	Beryllium Copper or Stainless Steel
-15...15 psi 0...15 0...20 0...25 0...30 0...40 0...60 0...80	Single Capsule	Beryllium Copper or Stainless Steel
0...6 bar 0...10 0...16 0...25 0...40 0...60 0...100	Bourdon Tube	Phosphor Bronze or Stainless Steel
0...160 bar 0...250 0...300 0...400 0...600 0...1000 0...1200 0...1600	Bourdon Tube	Stainless Steel

Calibration in other units of pressure are available.

THERMOWELLS

Thermowells should be used to protect the bulbs from corrosive atmospheres, and to simplify removal and replacement of the sensing elements. A full range of threaded and flanged thermowells are available made of stainless steel, etc. For details, see our temperature catalogue.

ORDER CODES

Model **80M** [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

RECORDER
1 Pen — 1
2 Pen — 2
3 Pen (no control) — 3

PNEUMATIC CONTROL

1st Pen Control
No control — 0
Proportional (P) — 1
Proportional + Integral (P+I) — 2
P+I+D — 3
Proportional + Derivative (P+D) — 4
ON/OFF — 5
Differential Gap — 6

SENSING ELEMENT*

1st Pen
Temperature — T
Pressure — P
Flow — F

2nd Pen
Temperature — T
Pressure — P
None — N

3rd Pen
Temperature — T
Pressure — P
None — N

Second Pen Control
No control — N
Proportional (P) — P

1st Pen Action
No control — N
Direct — D
Reverse — R

2nd Pen Action
No control — N
Direct — D
Reverse — R

ALARMS
None — 1
1st pen — High & Low — 2
2nd pen — High & Low — 3
1st & 2nd Pens — High & Low — 4

CHART DRIVE
Electric 240 V, 50 Hz — A
Electric 110 V, 60 Hz — B
Spring wound — C
Battery — D
Electric other (specify) — E

CHART ROTATION
12 hours — 1
24 hours — 2
7 days — 3
Other (specify) — 9

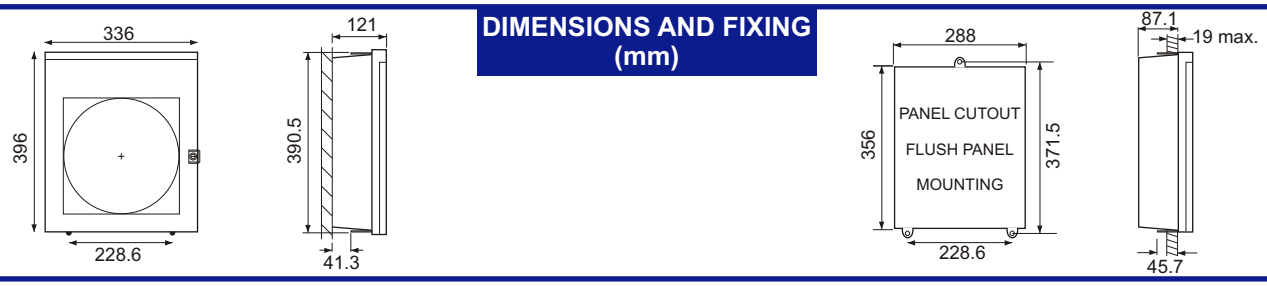
AM / AMTS PANEL
AM — A
AMTS — T
None — N

MOUNTING
Wall / Panel — W
Pipe — P

* For additional specifications about the temperature, pressure and flow elements, please fill out the "Sensor Order Form".

Sample Order:
80M23TPNNDN2B2NW

DIMENSIONS AND FIXING (mm)



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