

# Clearscan Mechanical Recorder Flow, Pressure & Temperature

## Model CLEARSCAN

Data sheet : CLEARSCAN/2012

- 1, 2 or 3 pen temperature, pressure & flow recording
- Uses proven and reliable Rotothem temperature, pressure and differential pressure systems
- Simple installation and maintenance requirements
- Wall, panel, portable or pipe mounting available
- Fully mechanical versions available
- Electrical, battery or mechanical chart drive options
- Large 12 inch diameter chart
- Large choice of temperature, pressure and differential pressure ranges

### General Description

#### Case

The Clearscan recorder case is made from high quality zinc coated steel, finished in epoxy powder paint that has a high resistance to weathering, scratches and industrial fumes. The window is high quality acrylic. The case has a lockable front-hinged door, permitting easy access to the chart and pens, and may be either wall, panel or pipe mounted.

#### Pens

The Clearscan recorders utilise sealed ink capsules with built-in fibre tipped pens which are simple to replace and without any mess. Single pen recorders and the first pen of two and three pen recorders trace in red ink; the second pen of two pen and three pen recorders traces in blue and the third pen of three pen recorders in green. Each recorder is supplied with a spare packet of pens.

#### Charts

Clearscan Chart Recorders use a 12 inch circular charts which are interchangeable with Barton, Graphic Controls and Bristol charts. The standard chart durations are one revolution every 24 hours or 7 days - other rotations are available. A pen lift is fitted to ease chart changing. Each recorder is supplied with a packet of 100 charts.

#### Chart Drive Motor

The Clearscan Chart Recorder uses chart drive motors that are available as mains powered, mains powered with battery back-up, mechanical (spring-wound) and battery operated with a wide variety of chart speeds (24 hour and 7 day are standard).

### Clearscan Models

#### Temperature Recorders

CST100	Single Pen Temperature Recorder
CST200	Two Pen Temperature Recorder
CST300	Three Pen Temperature Recorder

#### Pressure Recorders

CSP100	Single Pen Pressure Recorder
CSP200	Two Pen Pressure Recorder
CSP300	Three Pen Pressure Recorder

#### Combined Temperature & Pressure Recorders

CSTP200	Two Pen Temperature & Pressure Recorder
CSTP300	Three Pen Temperature & Pressure Recorder



#### Temperature Systems

The Clearscan chart recorder uses the proven and reliable Rotothem stainless steel thermal system. These consist of a bourdon tube, stainless steel capillary and a stainless steel bulb. All systems are filled with a non toxic filling temperature systems.

#### Pressure Systems

Proven and reliable pressure systems are used to record gauge pressure, vacuum as well as combined pressure and vacuum. The pressure system, unlike other manufacturers models, uses a bourdon tube pressure element - therefore, in the unlikely event of pressure system failure, only the pressure element needs to be replaced - and not the complete recorder.

#### Differential Pressure Systems

Clearscan utilises a high quality differential pressure unit that can record differential pressure and flow. Housed in a high quality Carbon Steel or 316L Stainless Steel enclosure, wetted parts material in Stainless Steel (with an option for certification to NACE) to suit a broad range of process applications.

Minimum differential pressure range is 0 to 100" Wg with a maximum of 800" Wg. The maximum working pressure is 6000 psig (400 bar).

#### Flow (Differential Pressure) Recorders

CSF100	Single Pen Flow Recorder
--------	--------------------------

#### Combined Flow & Temperature Recorders

CSFT200	Two Pen Flow & Temperature Recorder
CSFT300	Three Pen Flow & Temperature Recorder

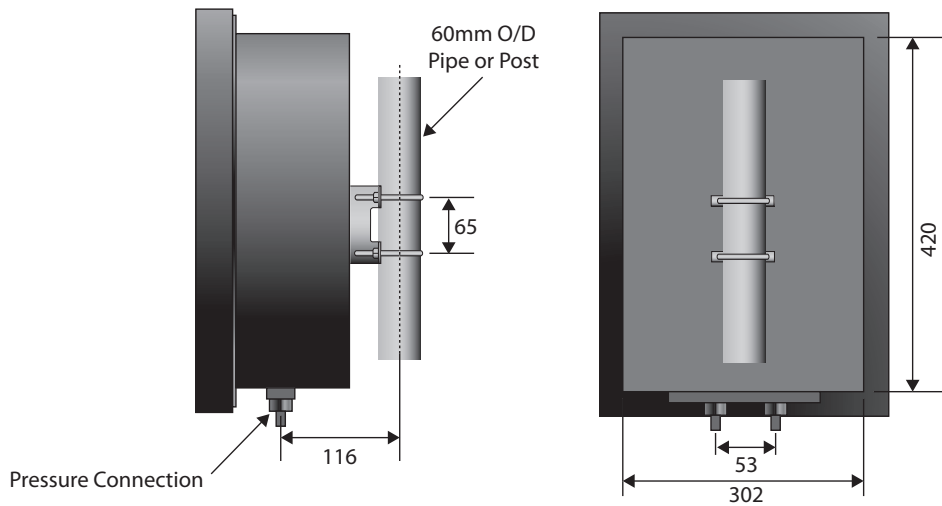
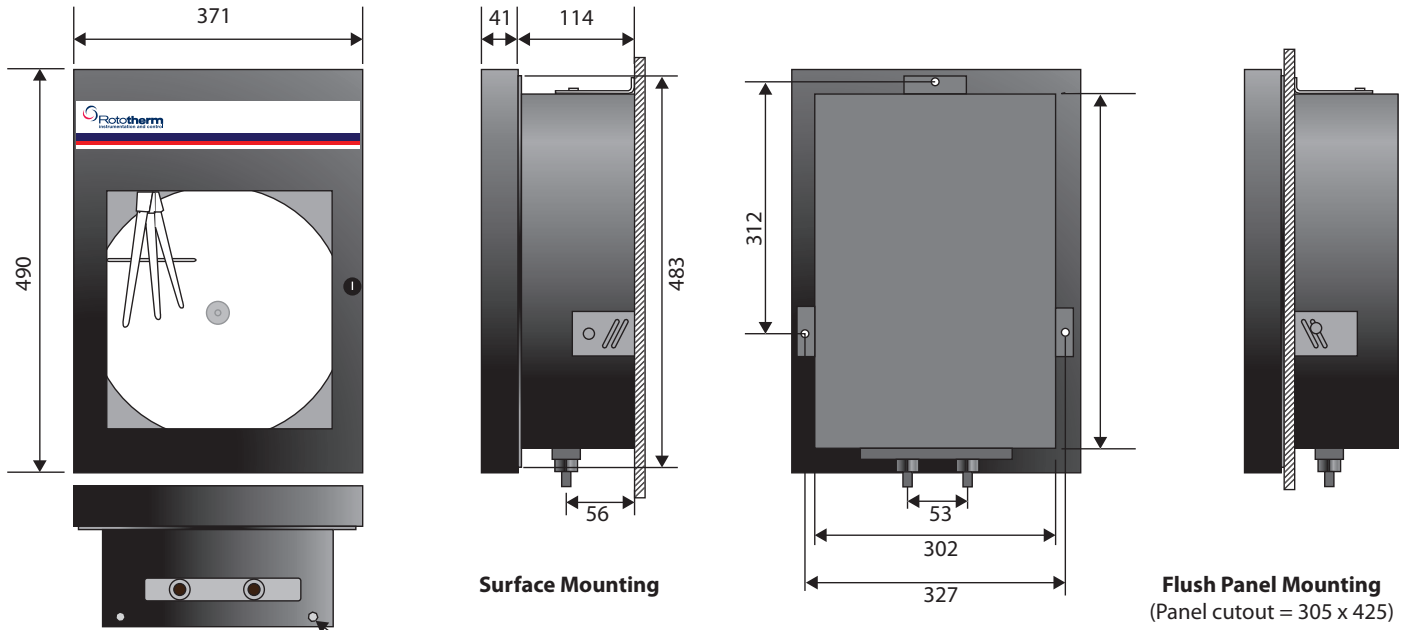
#### Combined Flow & Pressure Recorder

CSFP200	Two Pen Flow & Pressure Recorder
CSFP300	Three Pen Flow & Pressure Recorder

#### Combined Flow, Temperature & Pressure Recorder

CSFTP300	Three Pen Flow, Temperature & Pressure Recorder
----------	---

Dimensions in mm

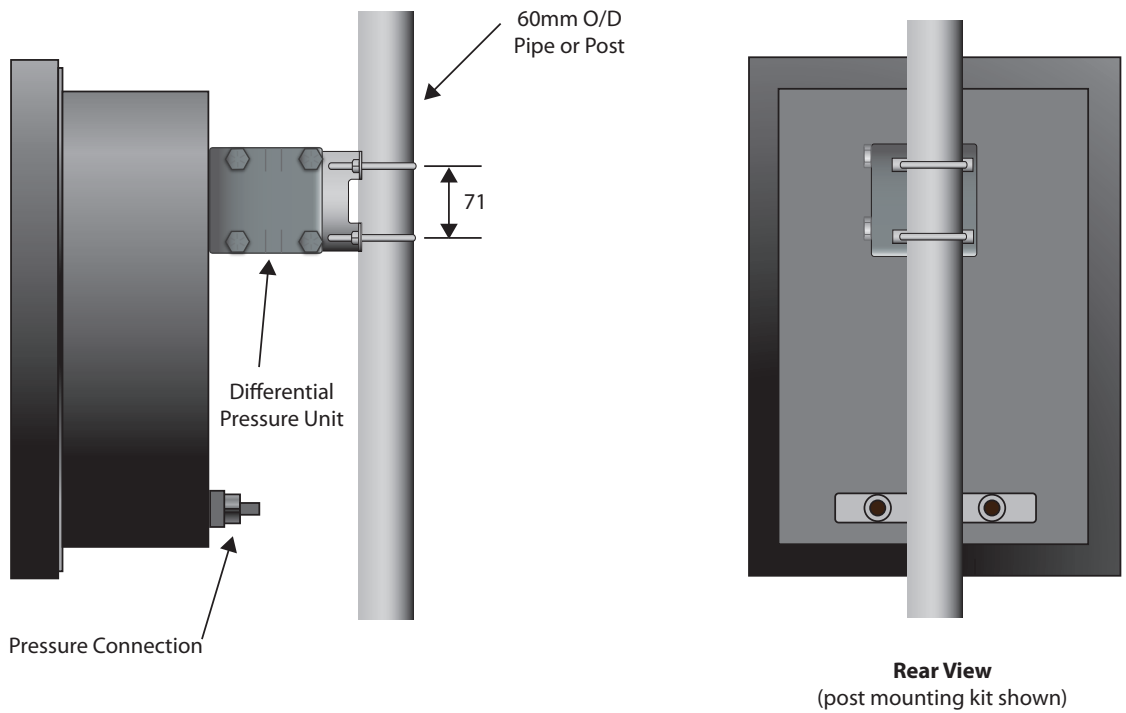
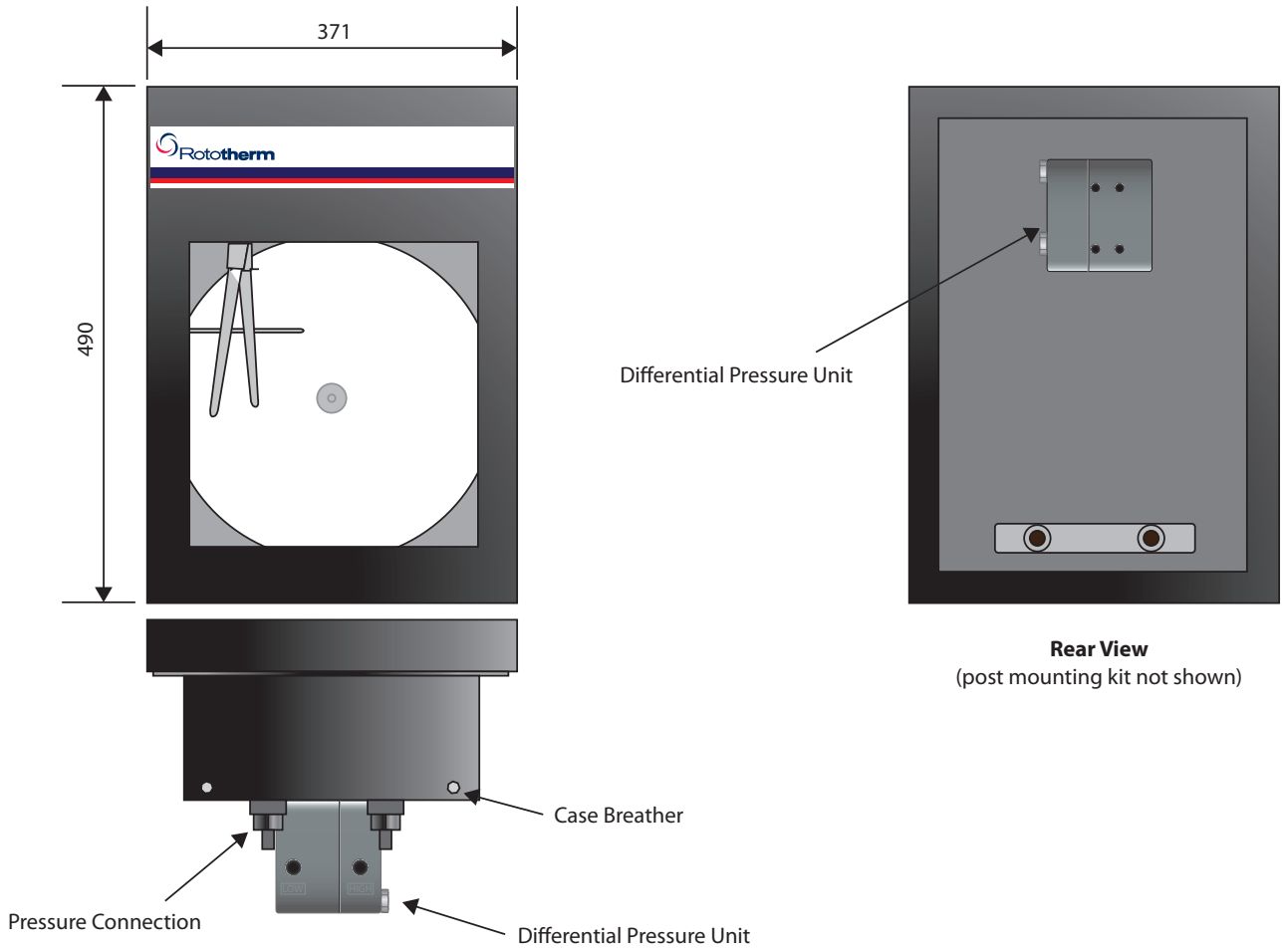


**2" Pipe / Post Mounting**

All dimensions are in mm. Drawings are for illustration purposes only.

## Dimensions

For instrument fitted with Differential Pressure Units



### 2" Pipe / Post Mounting

All dimensions are in mm. Drawings are for illustration purposes only.

## Specifications

### Accuracy

+/-1% FSD

### Ambient Temperature

-20°C to +50°C

## TEMPERATURE SYSTEM

### Measuring Element

Rototherm thermal bourdon tube temperature compensated.

### Capillary

Microbore stainless steel tube with 3mm diameter stainless steel cover (type C1) as standard.

Other capillary types are available.

### Bulb and Stem

Stainless steel BS970 316. Standard diameter is 12.7mm.

### Fittings

Compression gland (adjustable). Stainless steel (1/2" BSP is standard).

Other BSP, NPT and API are available on request. (suitable for pressures up to 3.5 bar)

## PRESSURE SYSTEM

### Measuring Element

Bourdon Tube, Helical Coil or pressure capsule, in non ferrous or stainless steel material as applicable. Monel to NACE standards is offered as an option.

### Pressure Ranges

Standard pressure ranges available up to 30,000 psig. Other non-standard ranges may be available upon request.

### Process Connections

1/4" NPT female top and bottom. 1/2" NPT available via suitable adaptors.

## DIFFERENTIAL PRESSURE SYSTEM

### Body Material

Carbon Steel, 316L Stainless Steel and 316L Stainless Steel to NACE.

### Wetted Parts

316L Stainless Steel and 316L Stainless Steel to NACE.

## Bulb Types

### Type 301

This bulb type is used when no compression fitting is required. This bulb may be held in place by a bracket or clip (not supplied by Rototherm) or may be inserted directly into the process.

### Type 302

This bulb has a compression gland fitting that slides along the capillary and is tightened into the required position. This bulb type is only available with plain stainless steel capillary (type C1) - armoured capillaries are not available as it is not possible to move the fitting along the armoured capillary. Bulb length cannot be specified.

### Type 303

Compression gland fittings tighten on the bulb to provide liquid and gas tight seal. Once fitted the position of the gland fitting can only be altered by cutting off the olive and replacing it with a new one.

If required this bulb type may be specified with a compression gland fitting - in this instance please confirm the required overall length of the bulb.

### ANSI 11/16" Diameter

This type of bulb is a replacement for the bulb found on Barton recorders.

### Seals

Buna-N is standard. Viton® option (a registered trademark of Dupont).

### Pressure Ranges

Standard pressure ranges = 0 to 100, 200, 300, 400 and 800" H2O. Other non-standard ranges may be available upon request.

### Maximum Working Pressure

6000 psig (400 bar)

### Process Connections

1/4" NPT female top and bottom. Other threads are available.

### Chart Drive Motor

Single & dual speed mechanical

Multi speed battery\*

Mains powered option available

\*Battery operated chart drive versions utilise the popular Sonceboz 820R001 model. Battery operated chart drives require 1.5 volt Alkaline "C" size cell.

See page for 7 for full chart drive motor options

### Charts

Disc 300mm (12 inches) diameter.

Standard dividing 40, 50, 60, 70 or 80 linear divisions. Interchangeable with Barton, Graphic Controls and Bristol charts.

### Inking System

Disposable fibre tipped pens.

2 pen : red & blue.

### Case

High quality steel finished in 2 pack epoxy powder paint that has a high resistance to weathering, scratches and industrial fumes. The case has a lockable front-hinged door.

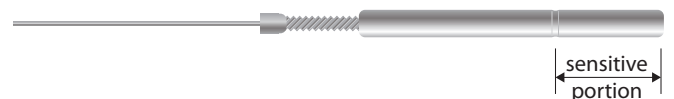
### Window

Acrylic

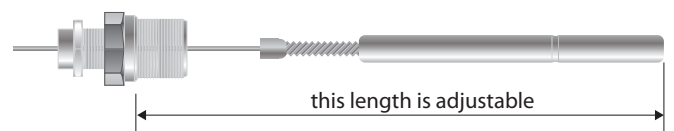
### Mounting

Wall / Panel, Portable or suitable for 2" pipe mounting.

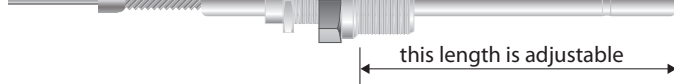
### Type 301



### Type 302



### Type 303



## Standard Temperature Ranges

Degree C Range				Degree F Range	
Code	Range	Code	Range	Code	Range
X01	0 to 40 °C	X31	-30 to +70 °C	X51	0 to 80 °F
X02	0 to 50 °C	X32	-30 to +50 °C	X52	0 to 120 °F
X03	0 to 60 °C	X33	-30 to +30 °C	X53	0 to 160 °F
X04	0 to 70 °C	X34	-25 to +25 °C	X54	0 to 200 °F
X05	0 to 80 °C	X35	-20 to +50 °C	X55	0 to 250 °F
X06	0 to 100 °C	X36	-10 to +50 °C		
X07	0 to 120 °C	X37	-10 to +90 °C		
X21	20 to 70 °C				
X22	20 to 100 °C				
X23	20 to 120 °C				
N08	0 to 150 °C	N14	0 to 400 °C		
N09	0 to 160 °C	N15	0 to 500 °C		
N10	0 to 200 °C	N25	50 to 150 °C		
N11	0 to 250 °C	N26	50 to 250 °C		
N12	0 to 300 °C	N27	100 to 400 °C		
N13	0 to 350 °C	N28	100 to 500 °C		

## Standard Differential Pressure Ranges

Code	Differential Pressure Range
A	0 to 100 "H <sub>2</sub> O
B	0 to 200 "H <sub>2</sub> O
C	0 to 300 "H <sub>2</sub> O
D	0 to 400 "H <sub>2</sub> O
E	0 to 500 "H <sub>2</sub> O
F	0 to 600 "H <sub>2</sub> O
G	0 to 700 "H <sub>2</sub> O
H	0 to 800 "H <sub>2</sub> O

## Maximum Static Pressures & Materials

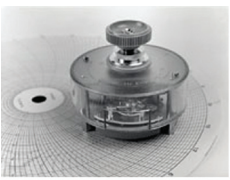

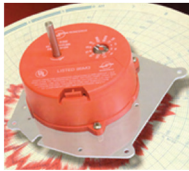

Code	Body Rating	Body Material	Internal Material
1	1500 psi	Carbon Steel	Stainless Steel
2	3000 psi		
3	6000 psi		
4	1500	Stainless Steel	Stainless Steel
5	3000		
6	6000		
7	1500	Stainless Steel (NACE)	Stainless Steel (NACE)
8	3000		
9	6000		

## Standard Pressure Ranges

Standard Ranges		Sensing Element	Material		
mbar / bar	psi				
0 to 100 mbar		Capsule Stack / Open Stack	Non Ferrous or Stainless Steel		
0 to 150 mbar					
0 to 250 mbar					
0 to 400 mbar					
0 to 500 mbar	0 to 7 psi				
0 to 600 mbar					
0 to 800 mbar					
0 to 1 bar	0 to 15 psi				
0 to 1.6 bar					
0 to 2 bar	0 to 30 psi				
0 to 2.5 bar					
0 to 4 bar	0 to 60 psi			Bourdon Tube	316 Stainless Steel or Monel to NACE
0 to 6 bar	0 to 80 psi				
0 to 8 bar	0 to 100 psi				
0 to 10 bar	0 to 120 psi				
0 to 12 bar	0 to 160 psi				
0 to 16 bar	0 to 200 psi				
0 to 20 bar	0 to 250 psi				
0 to 25 bar	0 to 300 psi				
0 to 30 bar	0 to 400 psi				
0 to 40 bar	0 to 600 psi				
0 to 60 bar	0 to 800 psi				
0 to 80 bar	0 to 1000 psi				
0 to 100 bar	0 to 1200 psi				
0 to 120 bar	0 to 1600 psi				
0 to 160 bar	0 to 2000 psi				
0 to 200 bar	0 to 2500 psi				
0 to 250 bar	0 to 3000 psi				
0 to 400 bar	0 to 4000 psi				
0 to 600 bar	0 to 5000 psi				
0 to 1000 bar	0 to 6000 psi				
0 to 1200 bar	0 to 10000 psi				
0 to 1500	0 to 15000 psi				
0 to 1600	0 to 20000 psi				
0 to 2000	0 to 25000 psi				
	0 to 30000 psi				

*Calibration in other units of pressure as well as non-standard ranges are available on request*

## Chart Drive Motor Options

Mounting Type		Mounting Type	
	<p><b>Mechanical Single Speed</b> wind up</p> <ul style="list-style-type: none"> <li>- Rotation : counter-clockwise</li> <li>- Manufactured according to DIN 58658</li> <li>- Shock-resistant and antimagnetic Swiss anchor escapement</li> <li>- Stainless steel winding spring , pinions and shaft</li> <li>- Accuracy : +/- 5 sec/°C/24 hour , according to DIN 8300</li> <li>- Operating temperature : - 35°C to + 65 °C (- 31 °F ... + 149 °F ) according to DIN 8300-A and DIN 8300-B</li> </ul>		<p><b>Mechanical Dual Speed</b> wind up</p> <ul style="list-style-type: none"> <li>- Rotation : counter-clockwise</li> <li>- Manufactured according to DIN 58658</li> <li>- Shock-resistant and antimagnetic Swiss anchor escapement</li> <li>- Stainless steel winding spring , pinions and shaft</li> <li>- Accuracy : +/- 5 sec/°C/24 hour , according to DIN 8300</li> <li>- Operating temperature : - 35°C ... + 50 °C (- 31 °F ... + 122 °F ) according to DIN 8300-A and DIN 8300-B</li> </ul>
	<p><b>Multi-Speed Battery Operated</b> with UL rating and 11 selectable speeds</p> <ul style="list-style-type: none"> <li>- ON OFF Function indicator</li> <li>- Quartz controlled</li> <li>- On selector Pulsating LED indicates functioning</li> <li>- Rotation : Standard: counter-clockwise</li> <li>- Operating temperature : -40°C ... +70°C (-40 °F to 160 °F)</li> <li>- Regular Temperature 1.5 V Alkaline "C" Size Battery</li> <li>- Low Temperature 3.6 v Lithium "C" Size Battery</li> </ul>		<p><b>31 Day Battery Operated</b> with Battery Holder mounted in Chart Plate</p> <ul style="list-style-type: none"> <li>- Rotation : counter-clockwise</li> <li>- Manufactured according to 89/336/EEC and following 92/31/EEC , 93/68/EEC, EN 55022 class B , EN 50082-1 , IEC 801-2</li> <li>- Supply : DC 1.2 V ... 1.6 V</li> <li>- Operating autonomy : more than 4 years with an alkaline cell AA size , IEC LR6</li> <li>- Accuracy : +/- 1 sec/24 hr</li> <li>- Operating temperature : - 15 °C ... + 60 °C ( 5 °F ... 140 °F )</li> </ul>

Code	Chart Rotation	Type of Chart Drive Motor					AC Electric Motor 220V 50Hz
		Mechanical		Multi-Speed Battery	31 Day Battery		
		Single Speed	Dual Speed				
A	30 minutes	✓	✓	✗	✗	✓	
B	1 hour	✓	✗	✓	✗	✓	
C	2 hour	✓	✗	✗	✗	✓	
D	3 hour	✓	✗	✗	✗	✓	
E	4 hour	✓	✗	✗	✗	✓	
F	6 hour	✓	✗	✗	✗	✓	
G	8 hour	✓	✗	✗	✗	✓	
H	12 hour	✓	✗	✓	✗	✓	
I	24 hour	✓	✗	✓	✗	✓	
J	48 hour	✓	✗	✓	✗	✓	
K	7 day	✓	✗	✓	✗	✓	
L	8 day	✗	✗	✓	✗	✗	
M	14 day	✓	✗	✓	✗	✓	
N	16 day	✗	✗	✓	✗	✗	
O	28 day	✗	✗	✗	✗	✓	
P	31 day	✓	✗	✓	✓	✓	
Q	32 day	✗	✗	✓	✗	✗	
R	Selectable (Set as default to 24 hour)	✗	✗	✓	✗	✗	
S	1 hour & 4 hour	✗	✓	✗	✗	✗	
T	2 hour & 4 hour	✗	✗	✗	✗	✗	
U	2 hour & 8 hour	✗	✓	✗	✗	✗	
V	4 hour & 8 hour	✗	✗	✗	✗	✗	
W	8 hour & 24 hour	✗	✓	✗	✗	✗	
X	24 hour & 7 day	✗	✓	✗	✗	✗	

## Ordering Codes - Basic Recorder - Mounting & Chart Drive

- Single Pen Temperature Recorder
- Two Pen Temperature Recorder
- Three Pen Temperature Recorder
- Single Pen Pressure Recorder
- Two Pen Pressure Recorder
- Three Pen Pressure Recorder
- Two Pen Temperature & Pressure Recorder
- Three Pen Temperature & Pressure Recorder
- Two Pen Flow & Temperature Recorder
- Two Pen Flow & Pressure Recorder
- Three Pen Flow & Temperature Recorder
- Three Pen Flow, Temperature & Pressure Recorder

### Mounting

- Wall / Panel with bottom entry connection
- Portable Stand with rear entry connection
- 2" Pipe / Post with bottom entry connection
- Panel with rear entry connection

### Chart Drive

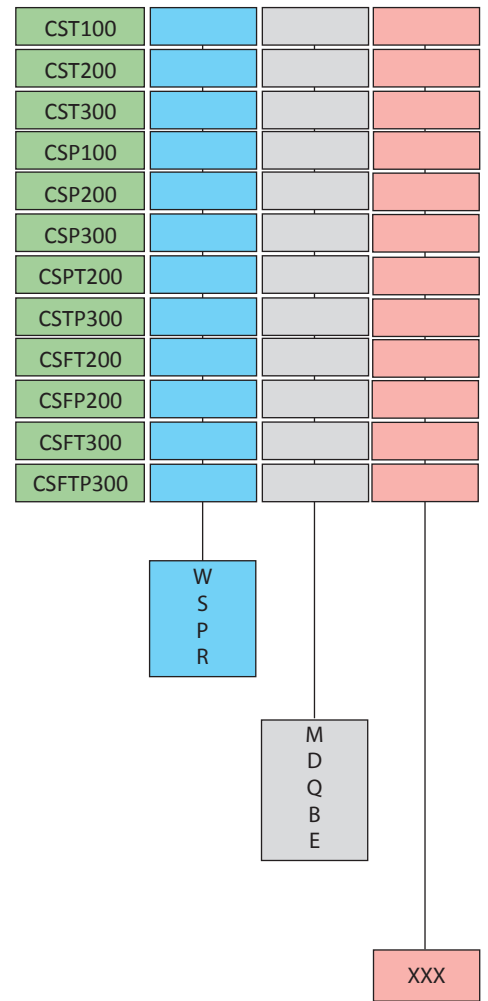
- Mechanical - single speed - wind up
- Mechanical - dual speed - wind up
- Multi-Speed battery operated with 11 selectable speeds
- 31 Day battery operated
- Electrical 220V 50Hz Synchronous Motor

### Chart Rotation

(see page 7 chart rotation speed table for options)

Enter chart speed code

- To configure Differential Pressure Pen** - see page 9
- To configure Temperature Pen** - see page 10
- To configure Pressure Pen** - see page 10





## Ordering Codes - Recorders fitted with Differential Pressure Systems

### Recorder Model

Code for 2nd pen (if required, repeat for 3rd pen)

Add mounting and chart drive codes from page 8

### Differential Pressure Range

- 0 to 100 "H<sub>2</sub>O
- 0 to 200 "H<sub>2</sub>O
- 0 to 300 "H<sub>2</sub>O
- 0 to 400 "H<sub>2</sub>O
- 0 to 500 "H<sub>2</sub>O
- 0 to 600 "H<sub>2</sub>O
- 0 to 700 "H<sub>2</sub>O
- 0 to 800 "H<sub>2</sub>O

### Maximum Static Pressure

Carbon Steel Body / Stainless Steel Internals

- 1500 psi
- 3000 psi
- 6000 psi

Stainless Steel Body / Stainless Steel Internals

- 1500 psi
- 3000 psi
- 6000 psi

Stainless Steel Body / Stainless Steel Internals to NACE

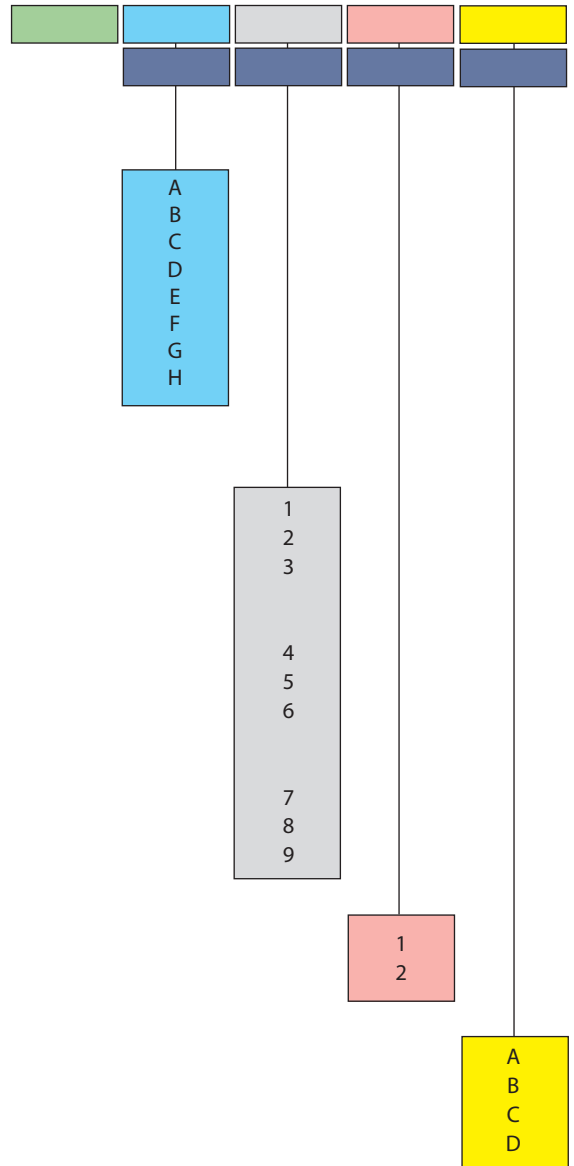
- 1500 psi
- 3000 psi
- 6000 psi

**Seals** (check your process compatibility)

- Buna N (Standard)
- Viton

### Process Connection

- 1/4" NPT female
- 1/2" NPT female
- 1/2" NPT male
- 1/2" API male



## Ordering Codes - Recorders fitted with Temperature Systems

### Recorder Model

Code for 2nd pen (if required, repeat for 3rd pen)

Add mounting and chart drive codes from page 8

### Temperature Range

Enter range code (see standard range table)

### Bulb Type

Type 301, 12.7 mm diameter

Type 302, 12.7 mm diameter

Type 303, 12.7 mm diameter without gland

Type 303, 12.7 mm diameter with gland

ANSI 11/16" diameter

### Capillary Type

Stainless steel

Flexible stainless armour

Flexible stainless armour over stainless

### Capillary Length

3 metres

Other\* (enter length in metres)

### Fitting / Gland (type 302 or 303 bulbs only)

No fitting required

1/2" NPT male

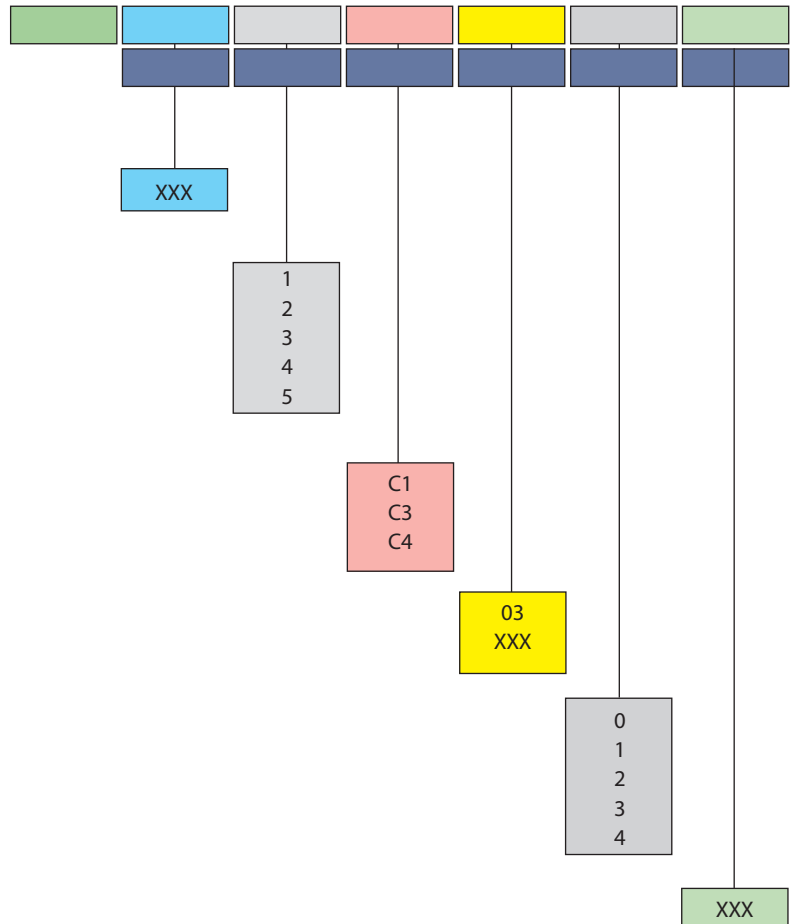
3/4" NPT male

1/2" BSP male

3/4" BSP male

### Bulb Immersion Length (Type 303 bulbs only)

Enter length in mm



## Ordering Codes - Recorders fitted with Pressure Systems

### Recorder Model

Code for 2nd pen (if required, repeat for 3rd pen)

Add mounting and chart drive codes from page 8

### Pressure Range

Enter range & units of measurement

### Element / Connection Material

Non Ferrous

Stainless steel

Monel to NACE

### Process Connection

1/4" NPT male

1/2" NPT male

1/4" NPT female

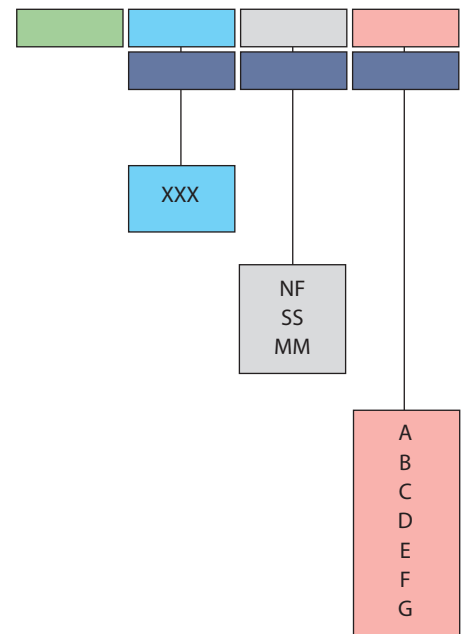
1/4" BSP male

3/8" BSP male

1/2" BSP male

1/4" HP Autoclave 9/16" UNF

Other



Excellence the world can Measure™

### British Rototherm Company Limited

Kenfig Industrial Estate, Margam, Port Talbot SA13 2PW United Kingdom

T: +44 (0) 1656 740 551

E: sales@rototherm.co.uk

F: +44 (0) 1656 745 915

W: www.rotothermgroup.com