



Circular Chart Recorders Series 3000

Circular chart recorders Series 3000 are instruments designed to record one or more variables either directly measured or received in the form of a pneumatic or electric signal.

The maximum number of pens depends on the type and dimensions of measuring elements (see table on page 2).

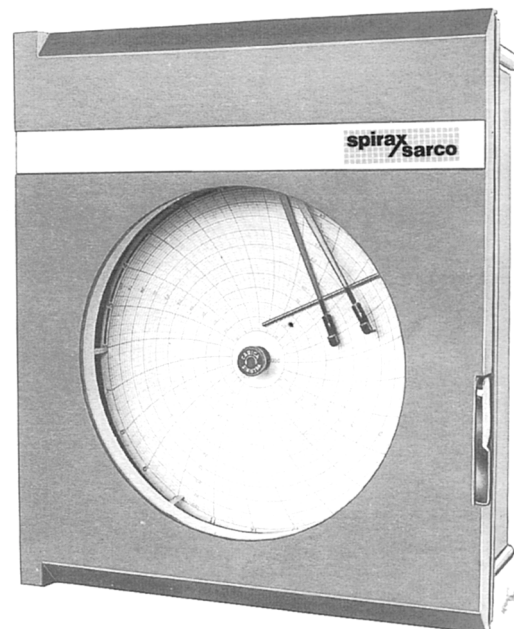
Each pen traces a curve of different coloured ink and has a large inking capacity ensuring long efficiency. Recording is performed on a fully visible 240 mm diameter circular chart, with effective recording width of 100 mm; standard chart speeds are: one day (24 hours) or one week (7 days) revolution; other speeds are available on request.

Chart driving mechanism may be a seven-day spring-wound clock or a standard electric clock for 24V - 50Hz current supply; other voltages are optional.

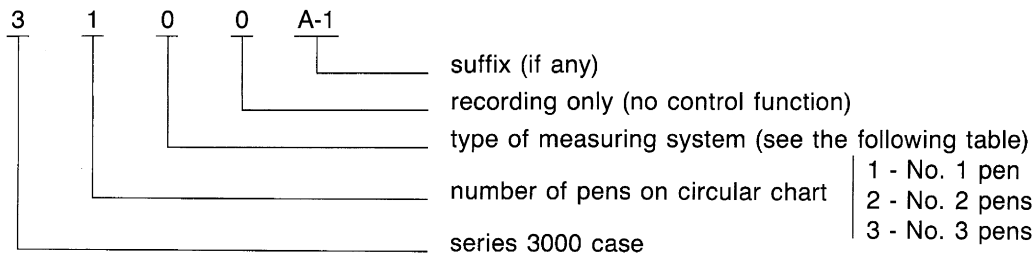
Recording charts are available in a wide choice of scales and the instrument may be provided with a plexi-glass transparent scale, with single or multiple graduation in the actual measuring units, permitting the direct reading of values when the instruments is due to record more than one variable with different ranges or when charts with percentage scale are used.

High and/or low alarm electric contacts are available on request which can be adjusted throughout the entire instrument range for remote or local alarm system.

Instrument case is dust and spray-proof and fitted with accessories for wall or flush panel mounting; optionally instrument can be supplied with accessories for 2" pipe support mounting. Case internal pressurization is possible on request.



The model number, which identifies the general characteristics of the instrument, with particular reference to the number of pens and measured variables, is composed by a number of four digits often followed by an alphanumeric suffix. The meaning of digits and letters is explained with an example:



Ref.	Measuring system	Maximum number of pens
0	Pneumatic receiver for 3 to 15 psi or 0.2 to 1 bar signal	3
1	Bellows for low pressure, vacuum, absolute pressure or level	2
2	Bourdon tube for pressure and level	3
6	Nitrogen filled thermometer system with capillary and bulb	3
8	Two or more different variables (pressure, temperature, any other pneumatically or electrically received) specified by suffix	3
9	Electro-mechanical receiving transducer for electric signal or other measuring system specified by suffix	2

Note: In two or three pens recorder, one or two of them can be replaced with index.

The suffix is used in order to complete or give complementary informations about the characteristics of the instrument: for recorders type 3280 and 3380 with 2 or 3 pens and different measured variables the model number is followed by 2 or 3 suffixes pointing out the measuring element types.

F = flow rate; L = level; P = pressure, vacuum, absolute pressure; S3 = pneumatic receiver; T = temperature; S4 EE = electro-mechanical transducer.

Example: model 3380-FS3-P2-T5 = three pens recorder: for flow rate (measured with pneumatic receiver, suffix S3), pressure (measured with Bourdon tube, suffix P2) and temperature (measured with gas filled thermometer system with cylindrical bulb and capillary, suffix T5). An accessory function as alarm by means of electric contact is specified with suffix A1 when closed for low limit alarm and A2 when closed for high limit alarm, etc.

GENERAL SPECIFICATIONS

Type of instrument	circular chart recorder with direct measurement or with pneumatic or electric receiving element
Measuring systems	<ul style="list-style-type: none"> • AISI 316L stainless steel Bourdon tube, spiral type for pressure up to 400 bar and helicoidal type over 400 bar • AISI 316L stainless steel or Tombak bellows • Nitrogen filled thermometers system with bulb and capillary tube (for bulb types, dimensions and connections to process see bulletin 7B.390-E) • pneumatic receiver: Tombak bellows for 3 to 15 psi or 0.2 to 1 bar signal • electro-mechanical receiving transducer for 0 to 20, 4 to 20 mA or 0 to 100 Vdc signal, ecc. or for thermoresistance or thermocouple
Accuracy	1% of range span
Sensitivity	0.2% of range span
Repeatability	0.5% of range span
Linearity	0.5% of range span
Recording chart	circular 240 mm diameter and 100 mm actual recording width chart fastening to the clock shaft by means of a special ring nut
Standard recording scales	<ul style="list-style-type: none"> • ranges in actual measuring units as listed in this bulletin • 0 to 100 linear • 0 to 100 square-root
Auxiliary indicating scale	transparent plexiglass with single, double or triple graduations (on request)
Chart movement	standard: daily (24 hours) or weekly (7 days) revolution; other chart speeds available for revolution in 1-3-4-6-8 and 12 hours chart driving mechanism may be 7-day spring-wound clock or standard electric clock for 24V-50Hz supply (110V or 220V on request)
Inking and colours	disposable cartridge pen system with different colours 1 pen: red - 2 pens: red and blue - 3 pens: red, blue and green
Ambient temperature limits	maximum 65°C minimum -15°C
Case	die cast aluminium with blue RAL 5010 enamel finish; spray and dust-proof style with standard protection degree IP 55; connection for internal pressurization (optional)
Mounting	<ul style="list-style-type: none"> • wall or flush panel mounting, by means of standard pillars • on 2" pipe support with clamp (optional)
Weight	8.5 kg approx. for one-pen pressure recorder (minimum weight) anyhow related to the type and number of the measuring elements
Overall dimensions	See drawings on page 4
Standard accessories	100 recording charts and one spare cartridge pen for each colour

STANDARD RANGES OF MEASUREMENT

FOR PRESSURE AND VACUUM

Pressure in bar with stainless steel Bourdon tube	0-1 0-2 0-3	0-4 0-5 0-7	0-10 0-15 0-20	0-25 0-30 0-50	0-75 0-100 0-200	0-300 0-400 0-500	0-1000 50-100 50-150	100-200 100-250 100-300
Vacuum with Tombak bellows	0-500 mm W.G.							
Vacuum with Tombak or stainless steel bellows	0-100 mm Hg 0-250 mm Hg			0-500 mm Hg 0-760 mm Hg				
Pressure with Tombak bellows (1)	0-400 mm W.G.			0-500 mm W.G.			0-750 mm W.G.	
Pressure with Tombak or stainless steel bellows	0-1000 mm W.G. 0-2500 mm W.G.			0-5000 mm W.G. 0-7500 mm W.G.			0-1 bar rel.	
Vacuum-pressure with Tombak bellows (2)	-250 to +250 mm W.G.							
Vacuum-pressure with Tombak or stainless steel bellows (3)	-50 to +50 mm Hg -125 to +125 mm Hg			-250 to +250 mm Hg -380 to +380 mm Hg				
Permissible overpressure	25% of range span for Bourdon tube 2 bar for stainless steel bellows 1.5 bar for Tombak bellows							
Process connection	1/2" Gas male threaded with welding union for 1/4" pipe							

(1) Special ranges on request with span of 250 to 400 mm W.G.

(2) Special ranges on request with span of 500 mm W.G. (ex. -400 to +100 mm W.G., etc).

(3) Special ranges on request with span of 100, 250, 500 and 760 mm Hg.

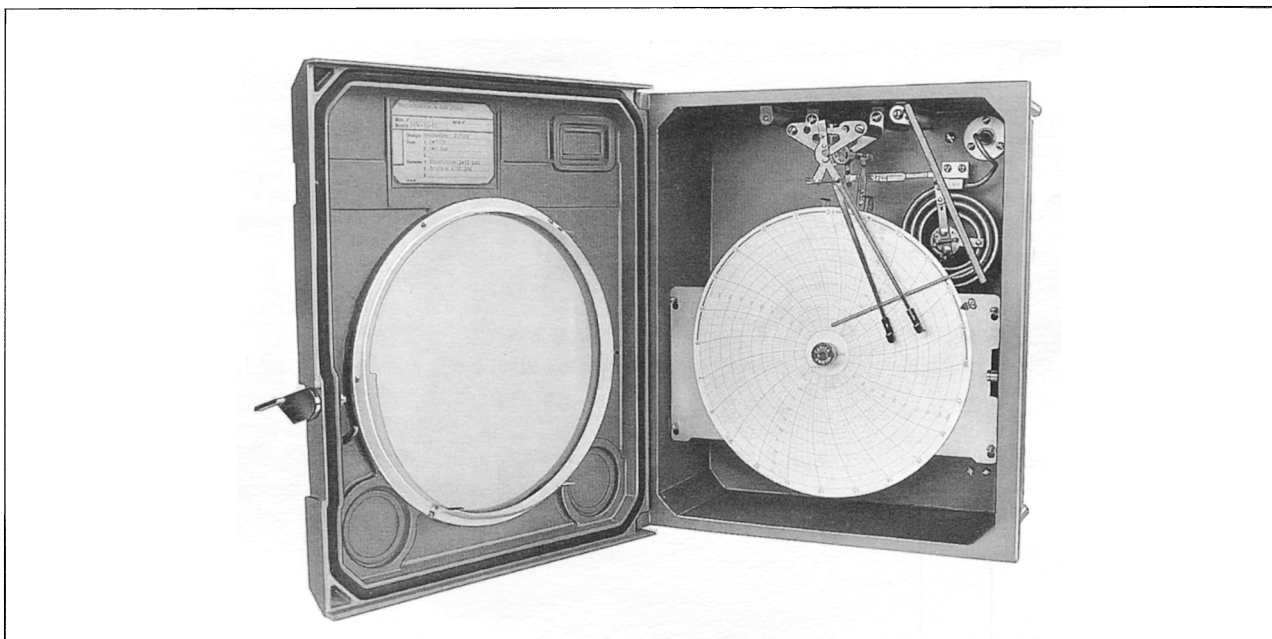
FOR ABSOLUTE PRESSURE

With balanced stainless steel bellows	0-100 mm Hg 0-250 mm Hg	0-500 mm Hg 0-760 mm Hg	0-1 bar abs. 0-2 bar abs.
With balanced stainless steel Bourdon tubes	0-1 bar abs. 0-2 bar abs.	0-3 bar abs. 0-5 bar abs.	
Permissible overpressure	2 bar for stainless steel bellows 25% of range span for Bourdon tube		
Process connection	1/2" Gas male threaded with welding union for 1/4" pipe		

FOR TEMPERATURE

Measuring spans	25°C*	50°C	75°C	100°C	150°C	200°C	300°C	400°C
Ranges in Centigrades	-5-20 0-25 10-35 20-45	-25-25 0-50 25-75 50-100	-25-50 0-75 25-100 50-125	0-100 10-110 25-125 50-150	0-150 25-175 50-200 100-250	0-200 25-225 50-250 100-300	0-300 50-350 100-400	0-400
Permissible overtemperature	25% of range span							
Ambient temperature compensation	Ambient temperature variations and capillary length may require compensation of liquid filled thermometer system obtained providing two capillaries and double opposite thermometric springs							
Process connection	for bulb types, dimensions and connections to process see bulletin 7B.390-E							

* Available with kerosene filled thermometer system only



FOR LEVEL OF LIQUIDS

For open tanks with Tombak bellows	0 - 400 mm W.G.	0 - 500 mm W.G.	0 - 750 mm W.G.	
For open tanks with Tombak or stainless steel bellows	0 - 1000 mm W.G. 0 - 1 m W.G. 0 - 5 m W.G.	0 - 2500 mm W.G. 0 - 2 m W.G. 0 - 7 m W.G.	0 - 5000 mm W.G. 0 - 3 m W.G. 0 - 10 m W.G.	0 - 7500 mm W.G. 0 - 4 m W.G.
For open tanks with stainless steel Bourdon tube	0 - 10 m W.G. 0 - 50 m W.G.	0 - 15 m W.G. 0 - 75 m W.G.	0 - 20 m W.G. 0 - 100 m W.G.	0 - 25 m W.G. 0 - 100%
For closed tanks with differential pressure mercury chambers	0 - 2000 mm W.G. Chart graduated with 0-100 scale Maximum static pressure 100 bar		0-4000 mm W.G.	0-6000 mm W.G.
Process connection	1/2" Gas male threaded with welding union for 1/4" pipe			

FOR PNEUMATIC RECEIVERS

Bellows pneumatic receiver for pneumatic signal 3 to 15 psi or 0.2 to 1 bar	The standard available ranges are the same of instruments fitted with measuring element for pressure, vacuum, absolute pressure, temperature and level. Anyhow the range must be the same of the pneumatic transmitter connected with. In addition 0 to 100 linear or square root scales are available. Special scales for different variables on request. Flow measuring instruments can be equipped with a cam operated device to convert square root signal, received from differential pressure transmitters, into linear one
Receiver connection	1/4 NPT female

FOR ELECTROMECHANICAL TRANSDUCER

Electromechanical receiver transducer for electric signal	Can be connected to a thermoresistance or thermocouple, to other measuring elements with apt signal and to electronic transmitter for 0 to 20, 4 to 20 mA or 0 to 10 Vdc signal. Standard and special scales for different variables on request.
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DIMENSIONS (mm)

