



Wide Chart Recorders

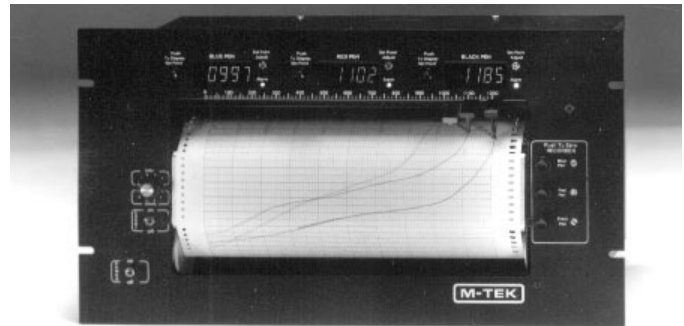
Temperature

Air Quality

Wind Speed

Wind Direction

KVA, MVAR's, Volts, Amps, Frequency



Model 2803 with optional digital display and Type K T/C

Megawatts

Rainfall

NO_x, SO₂ O₃

millivolts, mA



2800 Series Recorder in splashproof enclosure, NEMA-4 Type

10 Inch Wide Chart Recorders; 1, 2 or 3 Pens

Introduction

M-Tek offers two similar series of wide chart recorders: the 2800 and 2900 Series. Both provide 10 inch (250 mm) wide charts; one, two or three pens; and 12 speed chart drives in either English or metric units. The 2900 Series has the most sensitive range of 1 millivolt full scale whereas the 2800's most sensitive range is 10 millivolt full scale. The 2900 Series also provides a 5x attenuator so that any of its 12 amplifier ranges can be adjusted from the front panel to up to 5 times their nominal limit. For example, the 10 volt range can become 50 volts full scale. The 2800 Series recorders can be provided with 7 switch selectable ranges from 10 mV to 10 Volt, but the 2800 is most often built with a single fixed range and dedicated to a single application such as wind speed and direction, or a fixed temperature span.

Both the 2800 and 2900 Series have 1/2% accuracy, better than one Megohm input impedance, and 1/2 second full scale response time. The 2800 Series costs less than the 2900 Series. Most optional features such as splash proof NEMA enclosures, and alarm/control set points are available for either series.

These are high reliability instruments with over 20 years of success in a variety of industries. We're so sure you will be happy with the quality and performance of our recorders that if for any reason you are not completely satisfied you can return the instrument within 30 days of shipment for full credit.

Side By Side Grids

Two and three pen recorders come as standard with full 10 inch travel for all pens. Side by side grids can be specified at no charge by adding an 'SS' suffix to the model number when ordering. Two pen recorders can have 2 grids of 5 inches wide or a full 10 inch wide grid. Three pen recorders may have 3 grids of 3 inches wide, or full 10 inch travel for all pens. Side by side grids are useful in certain applications such as wind speed and direction, or temperature and dew point recording. See the 'Special Scales' section of this brochure for an example of side by side grids.

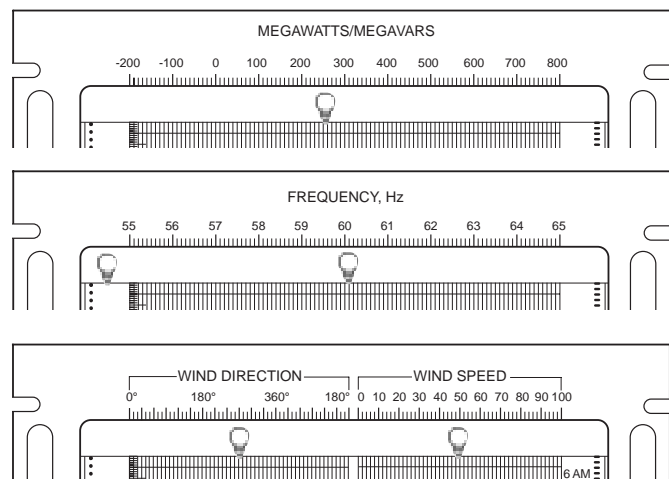
Power and Frequency Recording

M-Tek recorders can accept the outputs of virtually any voltage or current transducers. Our wide chart grid provides the high resolution required and scales and chart grids can be provided to fit your needs.

Typical ranges are 55 to 65 Hz, 0 to 150 MW and -80 to 100 MVARs on alternating grids, -200 to 800 MVARs, 0 to 300 KV.

Special Scales And Chart Paper

In many applications the 2800 is permanently dedicated to a specific application and it may help your operators and technicians if the recorder scale and chart paper read directly in the engineering units employed in your process. M-Tek has provided hundreds of such scales and some typical examples are shown here. All that we require from you is a scale drawing of what you want and we will prepare the art work and get your approval of a proof before production or printing. Scales with single or side by side grids can be delivered in about 2 weeks after you approve the art work. The printing of special paper usually takes 15 weeks, but standard 0 - 100 paper can be used until the special paper is delivered.

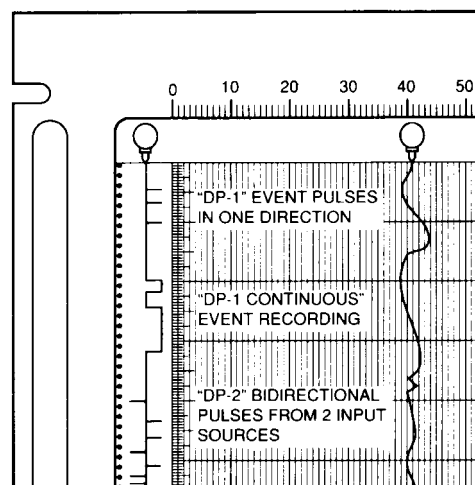


Temperature and Humidity Recorders

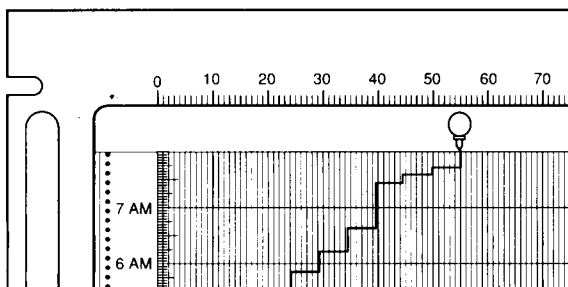
A Model 2802-V two pen recorder can provide a permanent record of humidity and temperature. The standard instrument has sensors mounted on the outside of the recorder rear panel to record ambient temperature from 0° to 100° (specify °C or °F), and 0 to 100% relative humidity. For measurements in HVAC ducts, test chambers or storage vaults remote temperature/humidity sensors are available. A 20 foot cable is standard; up to 300 feet available. Recorders can also be built to accept the output of your existing sensors.

Event Recording

In addition to the standard analog recording pens, any M-Tek recorder can also be provided with several kinds of event pens. These pens provide a continuous trace on the margin of the chart paper with a spike mark produced whenever a pair of rear panel contacts are shorted. Typical applications include sample injection in GC or LC, deionizer bed switching, alarm recording and pipe section addition on oil well mud loggers. The DP-1 event pen produces a single spike each time your equipment shorts the input terminals. The DP-2 event pen has two sets of input terminals and can be pulsed to the right or left to indicate different conditions. Another alternative is to have the DP-1 powered continuously so the duration of events can be recorded on the chart as a square wave. This requires a 12 VDC, 200 mA signal from your equipment and is specified as "DP-1 Continuous."



Rain Gauge Recording



The Rain Gauge Module can be installed on any 2800 Series recorder. Simply connect the unpowered contacts of any tipping bucket rain gauge to the recorder. No external power is required. Each tip of the bucket will produce a 1/4 inch step in the pen; 40 steps across the 10 inch chart. Add 'RG' to the model no. when ordering.

Chart Synchronized to Web Speed

For the measurement of web or coating thickness it is helpful to have the chart paper feed in proportion to the web speed rather than at a fixed rate of inches per minute. When you specify our option "ET" your instrument will be equipped with a rear panel terminal strip to accept 0 to 5 volt positive going pulses at up to 80 pulses/second.

A front panel switch allows selection of:

- 1) our standard chart speeds calibrated in inches/minute, or
- 2) use the external pulses from your tachometer with chart speeds calibrated in inches/100 ft. of web.

Need Something Special? If you have a recording problem that is special or unusual, please give us a call or fax. We will be happy to work with you to find a solution.

Wind Speed and Direction Air and Water Quality

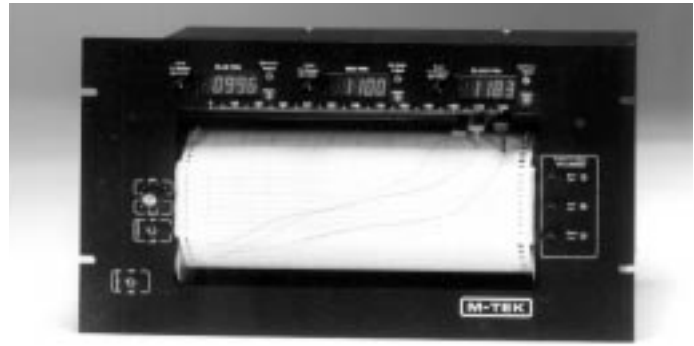
The simple, straightforward design of our 2800 Series makes these instruments ideal for the long term continuous monitoring and computer backup required by government agencies around the world. Wind shifts are easy to see with side by side grids that provide velocity and direction data on the same time line without any offset in the traces. Temperature, humidity, dewpoint and solar radiation can be recorded in addition to wind speed and direction. Compatible with virtually all meteorological gear, the 2800 can also record the outputs of NO_x, SO₂ and opacity instruments as well as flowmeters and GCs with T/C, F.I.D., EC, or any other detectors. Water quality parameters such as conductivity, pH, ORP, DO specific ion, and turbidity can all be recorded by the 2800 Series recorders.



Model 2802, 2 pen wind speed - wind direction recorder

Temperature Recording With the 2800 Series

The 2800 wide chart recorders provide high resolution with easy to read trend recording of J or K Thermocouple signals. Linearization, cold junction compensation and upscale T/C break protection are standard. Miniature flat blade T/C connectors are located on the rear panel. Accuracy is better than $\pm 1^\circ\text{C}$, or 1% of full scale and full scale response time is less than 1/2 second. Alarm/control set points are optional. Add 'AC-1' suffix to model number for each set point required.



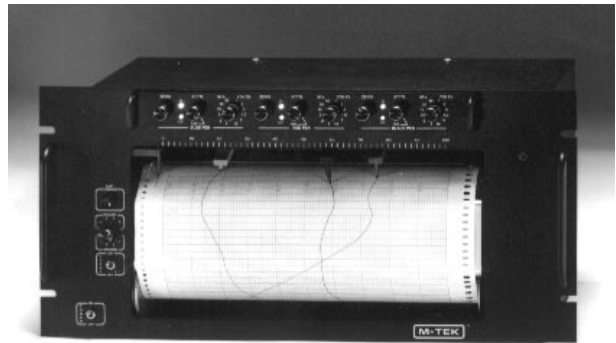
Model 2803, 3 pen temperature recorder with optional digital displays and alarm/control set points. The 3 1/2 digit LED meter can display temperature or other parameters such as %RH, KVA, etc.

One, two or three pen models are available, and any mix of J or K T/C and millivolt or 4 – 20 mA signals can be accommodated. Twelve speed chart drive in inches or metric units is standard. Single and dual speed chart drives are available for no extra charge. Pens are easy to replace cartridge type.

TYPE J THERMOCOUPLES		TYPE K THERMOCOUPLES		
STANDARD RANGES	SPECIAL RANGES	STANDARD RANGES	SPECIAL RANGES	
0° to 100° C 0° to 250° C 0° to 500° C	0° to 250° F 0° to 500° F 0° to 800° F 0° to 1000° F 0° to 1200° F	Almost any range between 0° to 1200° F or 0° to 700° C with minimum span of 200° F or 100° C can be provided.	-200° to 0°C -100° to +100°C -50° to +50°C 0° to 100°C 0° to 250°C 0° to 500°C 0° to 800°C 0° to 1000°C 0° to 1200°C	-200° to 100°F -50° to +150°F 0° to 250°F 0° to 500°F 0° to 600°F 0° to 800°F 0° to 1000°F 0° to 1200°F 0° to 2000°F
			Almost any range between -200° to 1200°C or -300°F to 2000°F with a minimum span of 100°C or 200°F can be provided.	

2900 Series Recorder

The 2900 series offers the ultimate in versatility with 12 switch selectable ranges from 1 mV to 10 Volts full scale and a front panel attenuator that allows any of the 12 ranges to be expanded by up to a factor of 5. For example the 10 volt range can be expanded up to 50 volts or the 500 mV range expanded to as much as 5 volts. This feature is most often used to adjust the recorder full scale to match the output of an analyzer, sensor or other device. The attenuator is frequently used with the zero offset to give recording directly in engineering units.



Specifications for 2800 & 2900 Series Wide Chart Recorders

Accuracy: Better than $\pm 0.5\%$ full scale in ambient temperature of 40°F to 110°F

Zero Adjust: $\pm 100\%$ of all ranges. (Pen may be referenced anywhere on chart.)

2900 Series Full Scale Ranges:

1, 2, 5, 10, 20, 50, 100, 200, 500 millivolts; 1, 5, and 10 volts plus variable attenuator to 5 times any range

2800 Series Full Scale Ranges:

Any single span of 10 mV or more or 4 - 20 mA.
Optional multirange of 10, 20, 50, 100mV, 1, 5, 10 V full scale

Chart Speeds, 12 speed chart drive (English or Metric):

Standard English Unit Speeds:
1/2, 1, 2, 3, 6, 12, 30 in/hr.; 1, 2, 4, 5, 10 in/min.

Optional metric speeds:
1, 2, 3, 6, 12, 30 cm/hr. and 1, 2, 5, 10, 15, 25, cm/min.
Single and dual speed chart drives are also available

Chart Paper: Linear 10 inch scaled width, 100 foot long roll

Recording Pens: Long life disposable fiber tip cartridge type

Pen Lifter: Manual front bar lift, optional electric pen lift

Input Impedance: Greater than 1 megohm at balance, 30 Kohms at minimum

Input Isolation: 250 VAC common mode voltage from input to supply voltage

Common Mode:

(2900 Series) Greater than 140db at 50/60 Hz
(2800 Series) Greater than 80db at 50/60 Hz

Input Type: Floating

Damping: Critically dampened, less than 0.5% overshoot

Deadband: Less than 0.15% full scale

Response Time: Less than 0.3 second for 90% of step change, less than 0.5 second for full scale

Chart Take-up: Constant tension, clutch regulated chart take-up

Power: 110V-60Hz-15 Watts (Optional 230V-50Hz)

Weight: Standard Instrument 20 lbs., 26 lbs. with gasketed door

Dimensions: 19"W x 8-3/4"H x 8-1/4"D (10-3/8" H w/gasketed door)

Operating Temp.: 40-100°F ambient temperature

2800 Series Ordering Information

Select optional features such as temperature modules or special enclosures from the selections below and add the appropriate suffix to the recorder model number.

Model 2801-V Single pen with single range input: select either 1, 5, or 10 V or 4 - 20 mA full scale, or any standard temperature range.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928101

Model 2802-V Two pens with single range input: select 1, 5, or 10 V; or 4 - 20 mA full scale, or any standard temperature range.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928201

Model 2803-V Three pens with single range input: select 1, 5, or 100 V; or 4 - 20 mA full scale, or any standard temperature range.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928301

Model 2831 Single pen with 7 switch selectable ranges: 10, 20, 50, 100 mV & 1, 5, 10 V full scale.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928103

Model 2832 Two pens each with 7 switch selectable ranges: 10, 20, 50, 100 mV & 1, 5, 10 V full scale.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928203

Model 2833 Three pens each with 7 switch selectable ranges: 10, 20, 50, 100 mV & 1, 5, 10 V full scale.

Specify chart drive: 12 speed English units, 12 speed metric units, single, or dual speed; P/N 928303

Side By Side Grids Two and 3 pen recorders can be ordered with full 10 inch travel for all pens or with side by side grids at no extra charge. 2 pen recorders can have 2 grids of 5 inches wide or a full 10 inch wide grid. 3 pen recorders may have 3 grids of 3 inches wide, or full 10 inch travel for all pens. Side by side grids are useful in certain applications such as wind speed and direction and can be specified for no additional charge by adding an "SS" suffix to the model number.

2900 Series Ordering Information

Select optional features such as alarm/control set points or special enclosures from the selections below and add the appropriate suffix to the recorder model number.

Model 2901 Single pen recorder with 12 switch selectable ranges from 1 mV to 10 Volts plus a 5x attenuator. 12 speed chart drive, select English or metric speeds.

Pen records across full 10 inch chart width; P/N 929101

Model 2902 Two pen recorder with 12 switch selectable ranges from 1 mV to 10 Volts plus a 5x attenuator. 12 speed chart drive, select English or metric speeds.

Specify 2 grids 5 in. wide or full 10 in. travel for all pens; P/N 929102

Model 2903 Three pen recorder with 12 switch selectable ranges from 1 mV to 10 Volts plus a 5x attenuator. 12 speed chart drive, select English or metric speeds.

Specify 2 grids 5 in. wide or 3 grids 3 in. wide or full 10 in. travel for all pens; P/N 929103

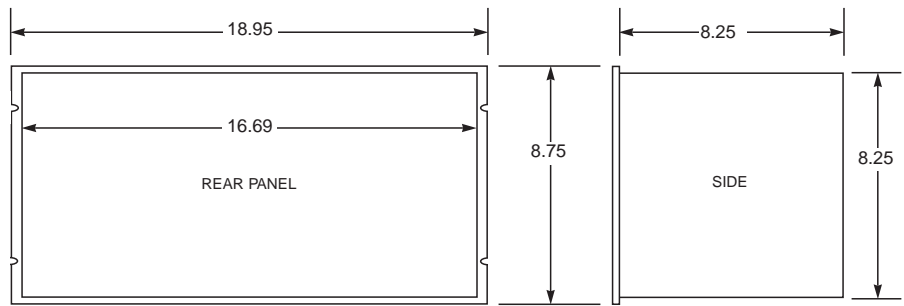
Optional Features for 2800 and 2900 Series Recorders

GD	Gasketed door with window	J T/C	Temperature Modules include linearization, cold junction compensation and T/C break protection. Select any standard
PD	Hinged plastic door with catch	K T/C	range and specify °C or °F.
AC-1	Alarm Contact for 2800 Series. On/off set point adjustable over entire range from front panel	P-1	230V/50Hz power operation
AC-2	Alarm Contact for 2900 Series. High and Low, on/off set points adjustable over entire range from front panel	R	Reverse polarity right hand zero (left hand zero standard)
DP-1	Continuous trace event pen; single direction pulses	RC	Remote ON/OFF control of chart drive
DP-2	Continuous trace event pen; bi-direction pulses to either left or right	RG	Rain gauge module, 2800 only
ES	Analog trace spike event marker. Contact closure produces 1/2" spike on recorder pen trace	RHA	Humidity and temp. sensors on rear of recorder, 2800 only
ET	Externally triggered chart drive advance requires 5 volt pulses from 0-80 pulses per second	RHP	Humidity and temp. sensor on 20 ft. cable, 2800 only
N-4	Dust proof, splash proof NEMA type enclosure	SA	Audible alarm. Requires AC-1 or AC-2 Alarm Contact option
		SC	Special scales, one time charge for art and cost for each scale
		SS	Side by side grids for 2 or 3 pen recorders
		Z	Front panel zero check push button. Shorts input from front panel to facilitate zeroing

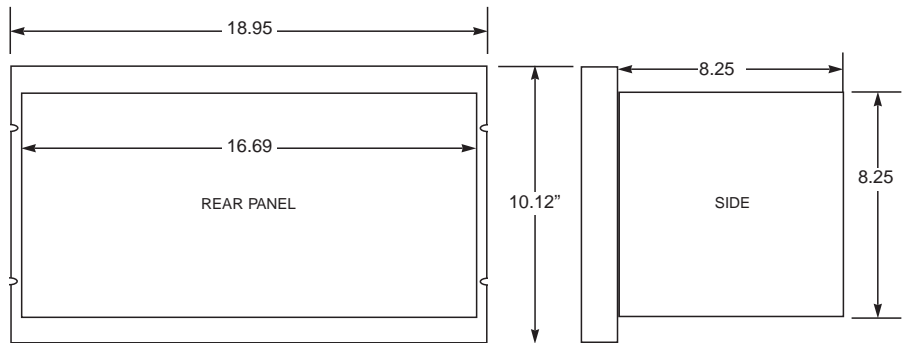
Order by model number followed by option codes. For example, a one pen recorder with a gasketed door, alarm contact and an audible alarm would be ordered as a Model 2831-GD-AC-1-SA.

2800 & 2900 Recorders Outline Dimensions

The 2800 and 2900 Series Recorders are virtually identical in size and weight. The 19 inch rack panel mount is the standard configuration for both series. The gasketed door shown in the lower drawings is available with either 2800 or 2900 as is the splash proof NEMA 4 enclosure pictured on the cover of this brochure. The dimensions of the splash proof enclosure are: 20 in. wide x 12 in. high x 10 in. front to back (50 x 30 x 25 cm).



Standard 2800 & 2900 Rack Panel Mount Enclosure



2800 or 2900 with Optional Gasketed Door

Standard Chart Papers for 2800 & 2900 Recorders, 100 ft. rolls (delivery from stock)

414103	Single grid with alternating scales 0 - 100 & 100 - 0	414053	Same as 414103 except time lines every 1 cm apart	414055	Dual grids, 0-360-180 and 0-100 mph/knots
		414056	Dual grids, both 0-100		

Optional Chart Papers for 2800 & 2900 Recorders, 100 ft. rolls (stock to 6 wks. delivery)

Single Grid 10" Wide (250 mm)

414030	0° to 800° J T/C non linear	414146	0° to 2000° K T/C non linear	414191	2 grids 50° to 250°F for overlapping pens
414031	0° to 1200° J T/C non linear	414147	0 to 15 linear	414192	1500° to 2500°F S T/C linear
414032	0° to 1600° J T/C non linear	414166	0 to 12 linear	414194	1300° to 2500°F linear
414033	0° to 2000° J T/C non linear	414174	50 to 150 linear	414195	-30 to 90 MV and 0 to 120 MW
414040	Blank paper, no grid	414175	55 to 65 Hz perf. every 8 1/2"	414196	0 to 400 amps and 0 to 150 volts
414043	0 to 30% CO and CO ₂ one linear grid; alternating scales	414179	0 to 100% RH & -100° to 200°F alternating scales	414197	55 to 65 Hz
414044	10 to 0 to 100, live zero	414180	1500° to 2200°F K T/C non linear	414198	0° to 2200°F K T/C linear
414107	10 3 to 10 5 Torr, 2 log decades	414181	-150 to +250 linear	414199	2200° to 3200°F S T/C linear
414111	5 decade log paper	414184	0 to 100%, 0 to 10% O ₂	414203	0 to 5000 PSI (Beth Steel) linear
414126	0 to 360 degrees	414185	0 to 200 PSIG, 0 to 30 #/hr. alternating scales	414204	0 to 6000 PSI linear
414136	0° to 1400° K T/C non linear	414187	.005 to 0 to .005 inch	414205	0 to 150 MW & -80 to 100 MVARs alternating grid
414137	-400° to +100° T T/C non linear	414188	-200 to 800 megw/megvars	414209	0° to 500°F J T/C non linear
414139	0° to 3000° S T/C non linear	414189	0 to 300 KV		

Dual Side By Side Grids; Each Grid Approximately 4 3/4" Wide (120 mm)

414021	0° to 360° to 120° and 0 to 120	414055	0° to 360° to 180° and 0 to 100	414134	0° to 360° to 180° and 0 to 50
414045	Both grids -30 to +50	414074	Both grids .004 to 0 to .004 inches	414201	Both grids 50 to 250 linear
414046	Both grids 0 to 100	414124	Both grids -30 to +120 degrees	414178	Both grids -40 to +60 linear
414053	Both grids 50 to 0 to 50				

3 Side By Side Grids; Each Grid Approximately 2 3/4" Wide (76 mm)

414058	All 3 grids 0 to 100 and 100 to 0	414148	All 3 grids 0 to 600
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Custom Chart Papers, 100 ft. rolls (10 to 12 weeks delivery) One time set-up charge & minimum order of 50 rolls

Pens for 2800 Recorders, sold in packs of 5 pens

Round body pens below are used on all 1 & 2 pen recorders and 3 pen side by side recorders. Blue, P/N 412001 Red, P/N 412002 Black, P/N 412003
Three pen recorders with full 10 inch pen travel use same rectangular pens as 2900 series.

Pens for 2900 Recorders, packs of 5

Blue, rectangular body, short nib, P/N 412025
Black, rectangular body, long nib, P/N 412027
Red, rectangular body, medium nib, P/N 412026



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