DR45AR Truline® Circular Chart Relay Expansion Recorder

Specification

Function

The DR45AR Food/Pharmaceutical and Relay Expansion Recorder combines the broad capabilities of Honeywell's Truline recorders with the special features needed to serve the food and pharmaceutical industries.

These features include:

- FO Calculation; or up to two totalizers
- 2, 4, or 6 alarm relays
- up to 6 customer-configured messages activated by internal alarms or digital inputs
- 200-ohm Burns bulb actuation
- Optional UL and FM approved NEMA4X door available.
- setpoint security with a four-digit alphanumeric code configured by the customer

Honeywell's Model DR45AR Truline recorder is a one to four-channel,

microprocessor-based, circular chart recorder. Its "one-pen" stylus printhead produces up to four analog traces and prints alphanumeric chart data on a blank heat-sensitive chart.

All four traces share the *same time line* reference, which the Truline prints. This eliminates the error caused by pen alignment offsets in conventional pen designs.

Since the Truline prints the chart and generates the analog traces at the same time, there is no error due to variations in chart size caused by changes in temperature and humidity.

In addition to printing informative, accurate chart records, the Truline recorder alternately displays process variable values for all channels in the selected engineering units.

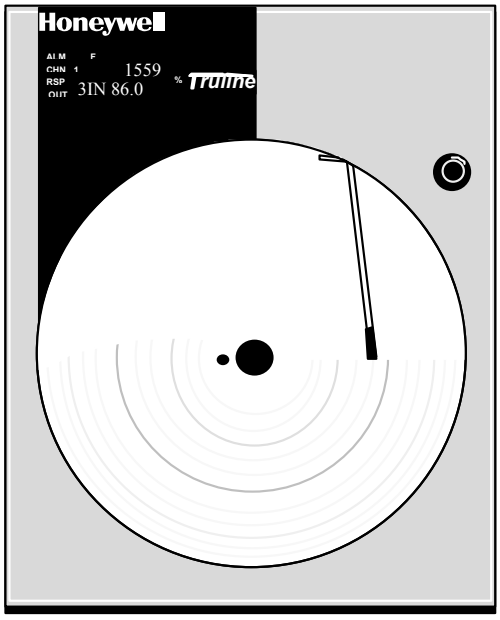

Figure 1—Truline recorder provides printed chart data and continuous digital indication of process variable value.

Features

User Configurable — English language prompts, coupled with simple keystroke sequences, make configuring the recorder easy and straightforward. You can set and/or alter operating parameters to fit your requirements without re-calibration.

Operator Interface — bright, vacuum fluorescent, alphanumeric digital displays make pasteurization process data instantly available to your operation.

Bargraph Display — indicates deviation of ± 10% of input span with center bar, On-control with center bar, On-control indication.

All-Purpose Chart —One all purpose, blank chart eliminates the need for ordering and stocking several types of charts. Users can design the chart to match their specific application.

Four Channels — monitor process variables from a variety of sensor types help reduce panel space requirements

Features, continued

Control Output — up to two versatile PID controllers lets you configure the exact control action needed for your process.

"One-pen" Printer — prints configurable alphanumeric chart data including time and trend lines. This automatically compensates for chart width variations caused by changes in the ambient relative humidity.

Time/Date — To guard against unauthorized chart advancement, an integral real-time clock provides accurate timing for the recorder's time and date printing, and also any operator changes. A 10-year life battery backup assures correct timing even when power fails.

Features, continued

Accutune II™ — This standard feature provides a new, truly plug and play tuning algorithm, which will, at the touch of a button or through a digital input, accurately identify and tune any process including those with deadtime and integrating processes. This speeds up and simplifies start-up plus allows re-tuning at any setpoint.

Fuzzy Logic — This standard feature uses fuzzy logic to suppress process variable overshoot due to SP changes or externally induced process disturbances. It operates independently from AccutuneII™ tuning. It does not change the PID constants, but temporarily modifies the internal controller response to suppress overshoot. This allows more aggressive tuning to co-exist with smooth PV response. It can be enabled or disabled depending on the application or the control criteria.

Event Messages — up to six event messages can each be printed on designated areas of the chart and can be triggered by a specific selectable event.

Setpoint Ramp — a single set point ramp is user programmable and is easily repeated and activated through the Run/Hold key.

Setpoint Rate — Lets you define a ramp rate applied to any local setpoint change. A separate upscale or downscale rate is configurable.

Set Point Ramp/Soak Programming — Lets users program and store 18 ramp and 18 soak segments. Run or Hold of program is keyboard or remote switch selectable. Each control loop can run one of the 6 profiles using any number of consecutive segments of the program.
You can select a recovery mode for power-up.

External Interface Selections

- ***Alarm Output*** — Ties “soft” alarms to up to six integral SPST relays to activate users external equipment.
- ***Auxiliary Output*** — there is also a 4 to 20 mA current output available. It can be used to retransmit a process variable.

External Interface, continued

- ***Modbus™ Communications*** — option allows you to network your recorders to take advantage of overall monitoring of the system using an RS485 network.
- ***Six Alarms*** — Up to six integral “soft” alarms are easily set by users to announce selected, out-of-limit conditions.
- ***Timer*** — This optional feature provides a configurable time period of 0 to 99 hours, 59 minutes or units of minutes and seconds. It can be started via the keyboard, alarm 2, or by a digital input. The timer output is Alarm 1, which energizes at the end of the Timer Period. Alarm 1 can be automatically reset. The Timer Period can be changed between each batch. Status is shown on the lower display.
- ***Digital Input*** — Allows users to initiate from a remote location through two dry contact closures, selected recorder functions, such as switching from automatic to manual control mode, from direct to reverse controller action, or reset totalizers.

Options

- ***Math Functions***

  Algorithms — pre-configured algorithms for easy implementation into other control loop with Ratio and Bias.

  Summer - **will** add three inputs with the result as the derived PV.

  Multiplier/Divider - **uses** three analog inputs to calculate a derived PV with or without square root.

  Multiplier- will multiply three inputs with the result as the derived PV with or without square root.

  Subtractor/Multipler - **the** difference between input 1 and input 2 is multiplied by input 3.

  Input High/Low Select - **specifies** the PV as the higher or lower of two inputs.

  Polynomial Curve Characteristics — A fifth order polynomial equation can be used on any one of the analog inputs.

- ***Chart Illumination*** — Lights the chart area to improve readability in lower light areas.

Options, continued

- ***Two Totalizers*** — one or two totalizers are available. Eight digit totals with multiplier on digital display. Fourteen digits totalization print out on chart. A grand total can be printed.
- ***Door Options*** — Choice of gray, black or blue doors with standard latch or optional lock.
  Optional UL and FM approved NEMA4X door available.
- ***Approval Body Options*** — FM approval, CSA certification and UL Listing or a combination is available.
- ***Customer ID Tag*** — (30 characters max.)
- ***CE Mark*** — Conformity with 73/23/EEC, Low Voltage Directive and 89/336/EEC EMC Directive
- ***FO Calculation*** — this function computes equivalent sterilization time by accumulating lethality rates for a product over each scan interval of the recorder.

User Configurable

In the DR4500A Series recorder, microprocessor control replaces conventional electromechanical recording techniques. This means that its software now primarily determines the recorder's capabilities.

Since Honeywell has preprogrammed a variety of functional capabilities into the recorder, a user only has to configure those functions that are specific for the given application. The user configures the recorder by following English language prompts that appear in the digital displays.

The configuration data (type of input, chart speed, chart range, alarm settings, tuning constants, etc.) are stored in nonvolatile memory for safe keeping in the event of a power failure.

Operator Interface

Two digital displays (Figure 2) present the process variable (PV) value and by key selection, the controller set point; controller output; deviation from reference input; dry bulb temperature; totalization value; or engineering units as desired. The lower display can also be set to hold or scroll.

In configuration mode, digital displays are pre-empted by English language prompts and values that you use to enter configuration data. Indicators light to show alarm condition, which channel PV is on display, use of remote set point, the output relay is on, selected temperature unit, and controller's mode of operation.

A deviation bargraph lets operators tell at a glance if the process variable is at, above, or below the controller's set point. The keypad through which configuration data is entered also serves as an integral automatic/ manual station that provides bumpless transfer for controllers.

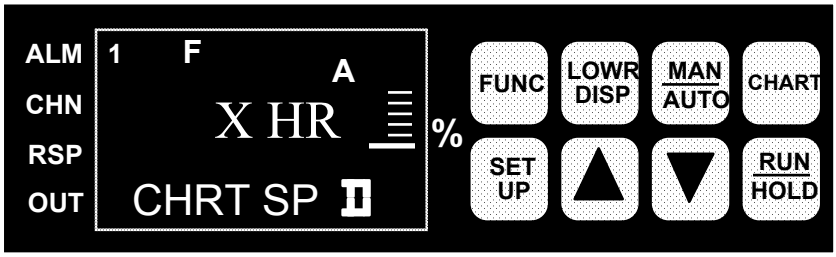

Figure 2—Operator interface includes displays and keypad for comprehensive interaction with the recorder and the process.

Recording and Printing

Both the chart and the printhead are driven by the stepper motors, which are controlled by the microprocessor allowing precise maintenance free operation.

Since chart speed is configurable, users can easily alter the chart speed through the keypad. Gear changing or additional motors are no longer required.

The microprocessor uses the configured chart range data as well as the input data to determine the proper printhead position. The stepper motor accurately positions the printhead drive.

By using a "one-pen" printhead that is capable of printing alphanumeric characters, users can now set various "printed" chart data through configuration. This means that such chart data as range marking in engineering units; digital values for process variables, and trace identification are easily personalized for the application.

Figure 3 is a reproduction of a 12-inch circular chart and illustrates some of these recording features.

This data, plus printed time lines and engineering units of scale, eliminate the need to maintain an inventory of a variety of preprinted charts.

The Truline recorder uses a dot fill technique from a microprocessor algorithm to produce a continuous analog trace of a process variable.

Digital Controller

The DR4500A Series recorder controller (1 or 2 loops) includes an integral microprocessor-based, PID controller.

Depending on the output type, users can configure the control action as On-Off, PID-A, PID-B, or PD with Manual.
As with the record functions, English language prompts quickly guide users through the entry of all the controller's configurable parameters.

Input Processing

The input can be one of many standard low-level electrical signals. Since inputs are isolated, users can connect different types of input signals to multi-channel models in any combination. And, for models with 2 or more channels, a relative humidity (wet/dry bulb) actuation is available using 100 ohm platinum bulbs (α = 0.00385).

The input type and range are user configurable for hassle-free actuation changes in the field. Ranges are easily expanded and compressed within their span limitations to meet specific measurement needs.

Users can select upscale or downscale sensor break protection for many of the actuations.

Each input is sampled at a rate of 3 times per second for 1 or 2 inputs, or 3 times in 2 seconds for 3 or 4 inputs. Each sample is amplified and then converted to a digital signal, which is isolated and passed to the microprocessor.

A digital filter with configurable time constants lets users apply input signal smoothing as desired. All non-linear inputs are linearized by the microprocessor.

An integral 24 Vdc power supply, along with 4-20 mA input configuration, allows direct operation with up to two transmitters without the need for any additional/external transmitter power supply.

To totalize a variable, such as a flow signal, users select the applicable input and set the digital display scaling factor through configuration. This eliminates the need for additional integration hardware including a mechanical counter. The totalizer has an eight digit display and 14 digit printing on the chart.

A grand total can be enabled to print the sum of all the totalizers. Also, there is the capability to reset the totalizer remotely with digital inputs and a low flow cutoff can be set in percent of range below which the applicable totalizer does not increment.

Diagnostics

All DR4500A Series recorders include self-diagnostic systems that check critical operations and provide error messages to alert users about detected faults.

Power-up self-diagnostics is a microprocessor controlled diagnostic program that runs tests on selected circuitry when the recorder is powered up.

A “key” test allows a user to initiate, on demand, a self-diagnostic routine that checks the keypad and front panel displays.

Construction

The DR4500A Series recorder is housed in a molded case, which can be panel or surface, mounted. A glass or optional acrylic window, gasketed door protects internal components from harsh industrial environments while allowing easy access to the chart and operator interface. Circuitry is partitioned on printed circuit boards for ease of service. A UL and FM approved NEMA4X door is also available.

Process Interface

Power, input, and output wiring connect to terminations inside the case. Knockouts in the sides and bottom of the case accept conduit connections for convenient wire entry.

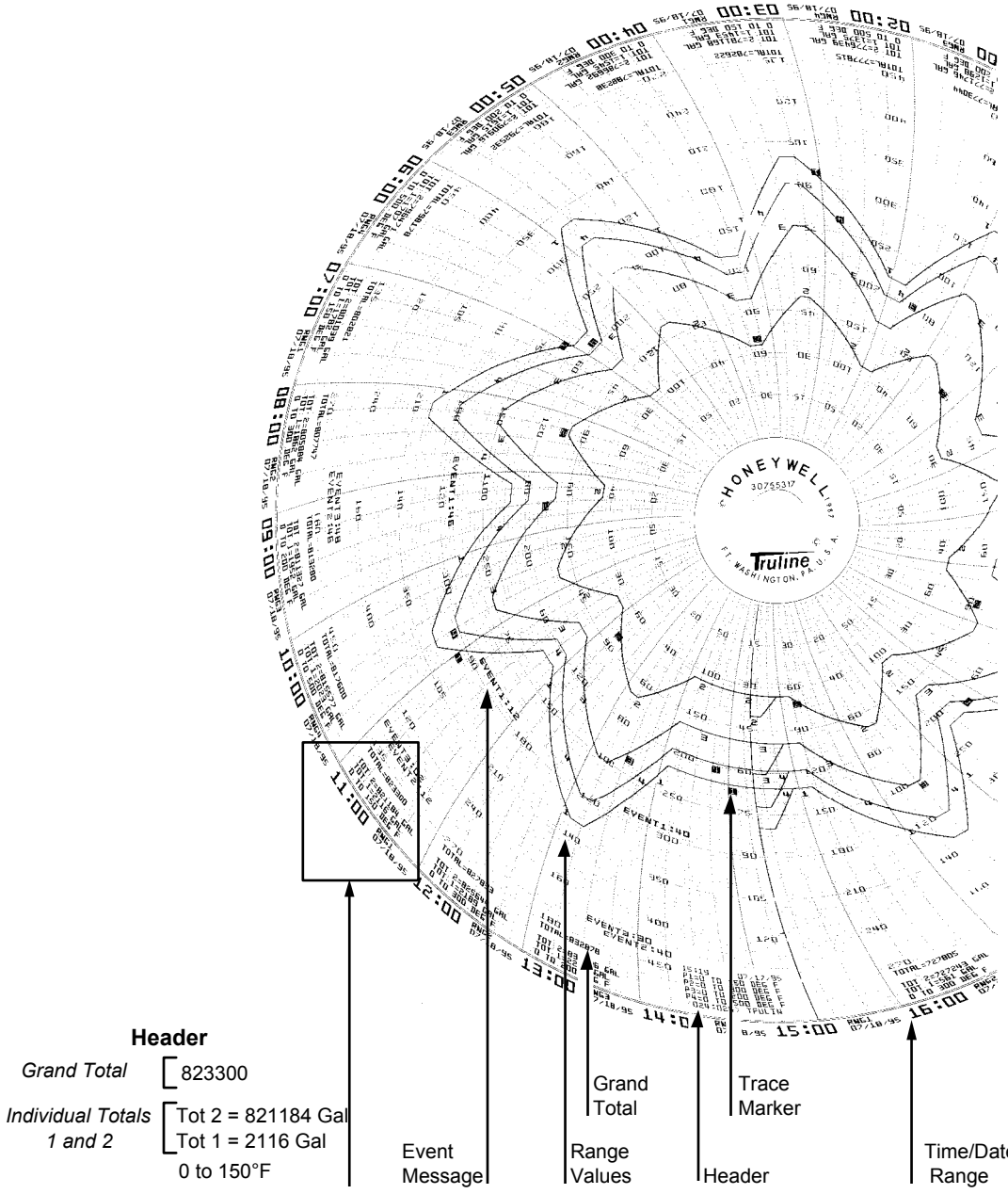

Figure 3—Sample of Printed Chart.

Specifications

Design	
Digital Indication Accuracy	1 digit
Minimum Input Span	Range is fully configurable with span limitation of the operating range selected
Input Impedance	*4-20 mA dc:* 250 ohms *0-10 Vdc:* 200K ohms *All others:* 10 Megohms
Source Impedance	*RTD:* 100 ohms per lead maximum
Sampling Rate	Each input sampled 3 times a second (1 or 2 inputs); 3 times in 2 seconds (3 or 4 inputs).
Input Filter	*Software*: Single pole low pass section with selectable time constants (off to 120 seconds).
Digital Displays	Vacuum fluorescent, alphanumeric. A six-digit display dedicated to the process variable. Alternate information displayed during configuration mode. An eight-digit display shows key selected operating parameters. Also provides guidance during configuration.
Indicators	Channel PV display (CHN 1, 2, 3, or 4) Alarm status (ALM 1, 2) Controller Output (OUT 1) Remote Set Point (RSP) Temperature unit (F or C) or Engineering units Controller's mode (A or MAN)
Deviation Bargraph	21 segment, color coded deviation bargraph: Green (large) = On Control Green (Small) = Deviation to ± 10% of PV
Controller Modes of Operation	Manual Operation Automatic with local set point Automatic with remote set point
Transmitter Supply Voltage	22 to 26 Vdc at input terminals (50 mA dc at 24 Vdc)
Case/Door	Molded, foamed-Noryl* with gasketed door to meet NEMA 3 enclosure requirements. Panel gasket available separately. An optional UL and FM approved NEMA4X door is also available.
Chart	12-inch (304.8mm) diameter chart. Plain thermal-sensitive paper.
Wiring Connections	Terminals inside the case
Color	*Case:* Black *Door (standard):* Caribbean Blue, Black or Gray
Approval Bodies	U.L. approval depending on model. Consult Model selection Guide for information. FM approved for Class I, Div 2, Groups A, B, C, D areas depending on model.
Dimensions	See Figure 4
Weight	13.2 lb. (6 kg)
Mounting	Panel or surface mounted. Some adapter kits are available for existing panel cutouts.

Specifications, continued

Performance					
Number of Inputs	*One channel model:* One input *Two channel model:* Two inputs *Three channel model:* Three inputs *Four channel model:* Four inputs				
Types of Input Actuation	**Range**		**Reference Accuracy**		**Temp. Stability ±**
Thermocouples[2]	**˚F**	**˚C**	**± ˚F**	**± ˚C**	**Degrees Error Per 1 Degree ΔT**
E	**-454** to **1832**	**-270** to **1000**			
	-454 to -202	-270 to -130	18.00	10.00	0.70
	-202 to 1832	-130 to 1000	1.00	0.55	0.35
E (low)	**-200** to **1100**	**-129** to **593**	0.50	0.30	0.20
J	**0** to **1600**	**-18** to **871**	0.40	0.22	0.06
J (low)	**20** to **770**	**-7** to **410**	0.20	0.11	0.04
K	**-320** to **2500**	**-196** to **1371**			
	-320 to 0	-196 to -18	1.25	0.70	0.18
	0 to 2500	18 to 1371	0.60	0.35	0.09
K (low)	**-20** to **1000**	**-29** to **538**	0.30	0.16	0.05
NIC (Nicrosil Nisil)	**0** to **2372**	**-18** to **1300**	1.0	0.55	0.01
S	**0** to **3100**	**-18** to **1704**			
	0 to 500	-18 to 260	2.00	1.10	0.23
	500 to 3100	260 to 1704	1.00	0.55	0.13
T	**-300** to **700**	**-184** to **371**	0.60	0.35	0.07
T (low)	**-200** to **600**	**-129** to **316**	0.40	0.22	0.07
W5W26	**0** to **4200**	**-18** to **2315**			
	0 to 600	-18 to 316	1.40	0.77	0.17
	600 to 3600	316 to 1982	1.30	0.70	0.17
	3600 to 4200	1982 to 2315	1.60	0.90	0.29
W5W26 (low)	**0** to **2240**	**-18** to **1227**			
	0 to 600	-18 to 316	1.10	0.60	0.14
	600 to 2240	316 to 1227	1.00	0.55	0.10
Radiamatic	**1400** to **3400**	**760** to **1871**	1.00	0.55	0.10
RTDs					
Platinum					
100 ohms	**–300** to **900**	**–184** to **482**	0.40	0.22	0.05
200 ohms (High	**32** to **752**	**0** to **400**	0.30	0.16	0.05
200 ohms (Low)	**32** to **392**	**0** to **200**	0.20	0.12	0.05
500 ohms	**–300** to **900**	**–184** to **482**	0.20	0.11	0.05
Linear					
Milliamperes dc	4 to 20	--	0.10%	--	0.004% /˚F
Millivolts dc	0 to 10	--	0.05%	--	0.004% /˚F
	10 to 50	--	0.05%	--	0.004% /˚F
Volts dc	1 to 5 (can be calibrated 0 to 5)	--	0.05%	--	0.004% /˚F
	0 to 10	--	0.10%	--	0.004% /˚F
Relative Humidity					
Platinum **Wet/Dry**					
100 ohm **Input**	**–130** to **392**	**–90** to **200**	0.30	0.03	0.03
Wet/Dry					
Bulb* %RH[3]		**Dry Bulb Range**		**Reference Accuracy**	**Temp. Stability**
	Measured %RH	**˚F**	**˚C**	**± ˚F ± ˚C**	**53 to 104˚F/ 12 to 40˚C**
	0 to <20	–103 to 212	–75 to 100	2% RH	0.11% RH/**˚F**
	20 to 100	35 to 40	2 to 4	2% RH	0.11% RH/**˚F**
		>40 to 100	>4 to 38	1% RH	0.06% RH/**˚F**
		100 to 212	38 to 100	1% RH	0.03% RH/**˚F**

[2]Includes reference junction calibration of ± 0.01degrees using standard "ice bath" method of calibration. Factory calibration at reference ± 1.2 ˚F. Note that factory calibration may vary by as much as ± 10 microvolts or ± 0.3 ohms for RTDs which means re-calibration may be required to achieve stated accuracy.

[3]The RH calculation is inoperative when temperature goes below 32 ˚F (0 ˚C) or above 212 ˚F (100 ˚C). However, the dry bulb temperature will be monitored to -103 ˚F (-75 ˚C). Accuracy stated is for Truline Recorder only and does not include remaining system accuracies.

*IEC Alpha (α) = 0.00385 $\Omega/\Omega/$˚C

Specifications, continued

Configurable Parameters: These parameters can be set through the keypad.			
Group	**Parameters**	**Setting Range or Selection**	**Resolution**
Fo RESET	Reset Fo (Note 1)	YES or NO. (To reset "YES" or not to reset "NO" the F_O calculation)	
INPUT 1, 2, 3, 4	Decimal point location	None, 1 (XXX.X) or 2 (XX.XX) -- one decimal place only for non-linear inputs	
	Units	°F, °C or engineering units	
	Engineering Units	A to Z, 0 to 9, +, –, \ .	
	Actuation type	See input types	
	Transmitter characterization	All non-linear input types, linear, square root	
	High range value	–999.0 to 9999	0.1
	Low range value	–999.0 to 9999	0.1
	Low Flow Cutoff	0 to 100% of input range	
	Input compensation	–999.0 to 9999	0.1
	Filter 1	0 to 120	1.0
	Sensor break protection	None, Up or Down(burnout)	
	Emissivity	.01 to 1.00	0.01
PEN 1, 2, 3, 4	Pen x	Disable or Enable	
	Pen x input	Input 1,2,3,or 4, Output 1, SP 1, Dgtl1, Dgtl2, Output 2, SP 2, RH, PV1	
	Chart 1 high range value	–999.0 to 999	0.1
	Chart 1 low range value	–999.0 to 999	0.1
	Major chart division	2 to 10	
	Minor chart division	2 to 10	
	Range 1 Tag	Up to five characters	
	Pen 1 On	0 to 100% of chart	1
	Pen 1 Off	0 to 100% of chart	1
CHART	Chart speed	8 hrs, 12 hrs, 24 hrs, 7 days, or selected hours per revolution	
	Hours per revolution	6 to 744 hrs* (12 hrs. for Abrasion Resistant Pen)	
	Time Div	8 to 24	
	Minor Div	4 or 8	
	Continue	Yes or No (Chart rotation beyond 360 degrees)	
	Chart Name	Up to six characters	
	Header	Yes or No	
	Rem Chart	None, Extsw1, Extsw2, Alarm1,2, 3, 4, 5, or 6, Time	
	Wake Minute	0 to 59	
	Wake Hour	0 to 23	
	Wake Day	0 to 31	
	Wake Month	0 to 12 * Below 8 hrs. chart speed and 24 hrs. chart speed with Abrasion Resistant Pen, printing may be degraded.	
TIME	Minutes	1 to 59	
	Hours	0 to 23	
	Day	1 to 31	
	Month	1 to 12	
	Year	4-digits	
	Day	Monday to Sunday	
TOTAL 1,2	Totalized Value (Read only)	(8 digits displayed, 14 digits printed on chart)	
	Reset total	Yes or No	
	Total 1(2)	Input 1, 2, 3, 4, PV1. ETime	
	Total engineering units	Desired alphanumeric title	
	Rate	Second, Minute, Hour, Day or Million/Day	
	Scaling factor	1, 10, 100, 1000, 10,000, 100,000 or 1E6	
	Resettable	No, Local, EXTSW1, EXTSW2	
Input Algorithm	Input Algorithm	Summer w/ratio-bias, multiplier with or without square root, multiplier/divider with or without square root, subtractor multiplier, or High/Low Select.	
	K Coefficient	00.000 to 1000	
	PV High Limit	-999 to 9999	
	PV Low Limit	-999 to 9999	
	Ratio A	-20 to +20	
	Bias A	-999 to 9999	
	Ratio B	-20 to +20	
	Bias B	-999 to 9999	
	Ratio C	-20 to +20	
	Bias C	-999 to 9999	

* Below 8 hrs. chart speed and 24 hrs. chart speed with abrasion resistant pen, printing may be degraded.

Note 1. The definition of F_O is the time in minutes required to destroy a stated number or organisms with a known z at temperature T. For example, "F 18/250" represents the time in minutes required to destroy a stated number of organisms at a temperature of 250°Fahrenheit with a z = 18°Fahrenheit. F values are used to compare the sterilizing values of different processes, however, F values cannot be compared unless the z values are the same. When temperature is not specified (for example, F = 8.6) it is understood that the temperature is 250°Fahrenheit; the subscript O (as in the term F_O = 7.4) is used to indicate that the z = 18°Fahrenheit, and the temperature is 250°Fahrenheit.

Specifications, continued

Configurable Parameters, continued			
Group	**Parameters**	**Setting Range or Selection**	**Resolution**
Input Algorithm, continued	Polynomial Characterization	None, Input 1, Input 2, Input 3, Input 4	
	Polynomial coefficient C0	–99.99 to 99.99	
	Polynomial coefficient C1, C2, C3, C4, and C5	–9.999 to 9 999	
Control 1 (2)	PID tuning sets	1 or 2 (keyboard or automatic switchover)	
	Set point source	Local, Remote* (Control 1 only), 2 Local, or Control Loop 2 output	
	Ratio (input 2)	–20.00 to 20.00	0.01
	Bias	–999 to 9999	1.0
	SP tracking	None or RSP (Control 1 only)	
	Power-up mode recall	Manual, Auto LSP, Auto RSP, AMSP, or AMLSP	
	Power Out	Last or Failsafe	
	High and low SP limits	0 to 100% of span in engineering units	
	Action	Direct or reverse	
	High and low output limits	–5 to 105% of output	1.0
	Dropoff value	–5 to 105% of output	1.0
	Deadband	–5.0 to 25%	0.1
	Output Hyst	0.0 to 5.0	0.1
	Failsafe output value	Within the output limits	1.0
	Remote Switching	None, ToMan, ToLSP, To2SP, ToDir, RN/HLD, TUNE	
	Man Key	Disable or Enable	
	PB or Gain	Proportional band (%) or gain	1.0
	Reset units	Repeats/minute or minutes/repeat	
	Control 1 Algorithm	PIDA, PIDB, PD + MR, ON-OFF	
	Output 1 Algorithm	Current	
TUNING 1(2)	Gain (or Prop Band)	0.1 to 1000	0.1
	Rate Min (or RPM)	0.00 to 10.00	0.01
	Reset Min (or RPM)	0.02 to 50.00	0.01
	Man Rset	–100 to 100% output	1
	Cyc Sec	1 to 120 sec.	1
SPRAMP 1(2)	SP Ramp (1 or 2)	Disable or Enable	
	Time Min	0 to 255	
	Final SP	0 to 100% of Span	
	SPRate	Enable or Disable	
	EU/HR UP	0 to 9999	
	EU/HR DN	0 to 9999	
	SP Program	Disable or Enable	
	Recycles	0 to 99	
	Soak Deviation	0.0 to 99.0	
	Profile	1 to 6	
	State	Disable or Hold	
	Recovery	Enable or Disable	
	Program End	Last Setpoint or Failsafe	
OPTIONS	Reject Frequency	60 or 50 Hz	
	Auxiliary Output	Disable, In1, In2, PV1, PV2, Dev1, Dev2, Out 1 (2), SP 1 (2)	
	Relative Humidity	Yes or No	
	Atm. Pressure	590 to 800	
	Scroll	None, 1 sec, 2 sec, 3 sec	
	Deviation	None, SetPnt, Chan 1	
	Units	Eng or Percent	
	Sterilization Time	Yes, No	
	Input for Product Temperature	Input 1, Input 2, Input 3, Input 4	
	Standard Reference Temp.	0.1 to 9999	
	Thermal Resistance (Z Value)	0.1 to 9999 (Note 2)	
	Remote Switching	To Man, To LSP, To 2SP, To Dir, To Hold, Fo RST,None,	
	Remote Switching 2	Fo RST	
SPPSEGS	Profile Start Segment	Ramp 1 to Ramp 35	
	Profile End Segment	Soak 2 to Soak 36	
	Ramp Unit	Time or Rate	
	Synchronize Profiles	Enable, Disable	
	Segment X Ramp	0.00 to 99:59	
	Segment X Setpoint	within High/Low Range Limits	
	Segment X Time	0.00 to 99.59	
SPP EVENT	Segment X Event	None, Alarm 1, 2, 3, 4, 5, or 6	
TIMER	Timer	Enable/Disable	
	Period	0.00 to 99:59	
	Start	Run/Hold Key or Alarm 2	

continued

Specifications, continued

Configurable Parameters, continued			
Group	**Parameters**	**Setting Range or Selection**	**Resolution**
TIMER, continued	Ldisplay Reset Increment	Time Remaining or Elapsed Time Run/Hold key or Alarm 1 Minute or Second	
ALARMS (1, 2, 3, 4, 5, 6)	SP Value SP Type Alarm Type Alarm Scaling Multiplier for Totalizer Alarm Alarm Hysteresis	-999 to 9999 None, Input 1 (2, 3, 4), RH/PV, Dev, Output, Dev2, Out2, Event, Total 1, Total 2 High or Low 1, 10, 100, 1000, 10000, 100000, 1E6 0.0 to 100% of span or full output	 0.1
AUXILIARY OUTPUT	Aux Output 4mA Val 20mA Val	Disable, IN1, IN2, PV1, PV2, Dev1, Dev2, Out1(2), SP1(2) Low scaling factor High scaling factor	
MODBUS	Communications State Communications Address Baud Transmit Delay	Enable/Disable 1 to 99 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 None, 10msec, 20msec, 30msec, 40msec, 50msec.	
EVNT MSG	Event 1 (2,3,4,5,6) MESSAGE 1 (2,3,4,5,6) POSITION 1 (2,3,4,5,6)	EXTSW1, EXTSW2, ALARM 1, ALARM 2, ALARM 3, ALARM 4, ALARM 5, ALARM 6 Message for event (up to 6 characters) Chart position for message printing (0 to 100%)	
LOCKOUT	Password Lockout (Software and/or Hardware) Change	Up to four characters None, Calib, +Conf, Max (Hardware Configuration Lockout—Option) Used if changing Password	
STATUS	Version Failsafe RAM Test Configuration Test Calibration Test Fact CRC (Factory Set Input Constants) Battery Test	Latest Software Version Yes or No Pass or Fail Pass or Fail Pass or Fail Pass or Fail Pass or Fail	

Options	
Controller Output (Optional)	• *Current Proportional* 21 mA dc maximum into a negative or positive grounded or non-grounded load of 0 to 1000 ohms. Output range can be set between 4 and 20 mA, and as direct or reverse action. Resolution: 10 bits Accuracy: 0.5% full scale FM Approved Output (Optional)
CE Conformity (Europe) *Product Classification:* *Enclosure Rating:* *Installation Category (Over-voltage Category)* *Pollution Degree:* *EMC Classification* *Method of EMC Assessment* *Declaration of Conformity*	This product is in conformity with the protection requirements of the following European Council Directives: **73/23/EEC**, the Low Voltage Directive, and **89/336/EEC**, the EMC Directive. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed. Class I: Permanently Connected, Panel Mounted Industrial Control Equipment with protective earthing (grounding). (EN 61010-1) Panel Mounted Equipment, IP 00, this recorder must be panel mounted. Terminals must be enclosed within the panel. Front panel IP 65 (IEC 529) Category II: Energy-consuming equipment supplied from the fixed installation. Local level appliances, and Industrial Control Equipment. (EN 61010-1) Pollution Degree 2: Normally non-conductive pollution with occasional conductivity caused by condensation. (Ref. IEC 664-1) Group 1, Class A, ISM Equipment (EN 55011, emissions), Industrial Equipment (EN 50082-2, immunity) Technical File (TF) 51197639-000
Alarm Output	Two, four or six SPST electromechanical relays *Relay Contact Ratings:* First Relays, Resistive Load: 1A @ 120 Vac, 1/2A @ 240 Vac. Relays 3 through 6, Resistive Load: 5A @ 120 Vac, 2.5A @ 240 Vac.

Note 2. The definition of z is the slope of the thermal resistance curve. The z value is a measure of the effect of a change in temperature on the resistance of an organism and is the number of degrees Fahrenheit required for the thermal resistance curve to traverse one log cycle (that is, the degrees Fahrenheit required for the thermal resistance to change by a factor of 10).

Specifications, continued

Options	
Auxiliary Linear Output (Optional)	21 mA dc maximum into a negative or positive grounded load or non-grounded load of 0 to 1000 ohms. Output range can be set between 0 to 21 mA, and as direct or reverse action. It can be configured to represent any one of 10 parameters, Deviation, or Control output. The range of the auxiliary output, as a function of the selected variable, can be scaled. This output can be used as a second current output for current duplex outputs. *Resolution:* 12 bits over 0 to 21 mA *Accuracy:* 0.2% of full scale *Temperature Stability:* 0.03% F.S./°C
Digital Input	+20 Vdc source for external dry contact or isolated solid state contacts. Selects one configured input.
Totalizers	One or two totalizers available. Eight digit "totals" with multiplier on digital display; 14-digit totalization printout on chart. When enabled, a grand total can be printed with Total 4 is normally printed.
Calculations	F_O calculation available
Math Algorithms	Eight algorithms are available: A + B + C (summer) √ A • B/C (square root multiplier/divider) √ A • B • C (square root multiplier) A • B/C (multiplier/divider) A • B • C (multiplier) (A-B) • C (difference multiplier) High/Low Select between Input 1 and Input 2 Polynomial Equation – Fifth order provides equation where: A = Input 1 • ratio A + bias A B = Input 2 • ratio B + bias B C = Input 3 • ratio C + bias C Limit of Ratio = -20 to +20 Limit of Bias = -999 to +9999

Environmental and Operating Conditions				
Parameter	**Reference**	**Rated**	**Extreme**	**Transport and storage**
Ambient Temperature	67 to 77˚F 19 to 25˚C	58 to 131˚F 15 to 55˚C	32 to 131˚F 0 to 55˚C	–40 to 151˚F –40 to 66˚C
Relative Humidity (%RH)	0 to 55*	10 to 90*	5 to 90*	5 to 95*
Vibration				
Frequency (Hz)	0	0 to 70	0 to 200	0 to 200
Acceleration (g)	0	0.1	0.2	0.5
Mechanical Shock				
Acceleration (g)	0	1	5	20
Duration (ms))	0	30	30	30
Mounting Position from Vertical				
Tilted Forward	5˚	5˚	5˚	Any
Tilted Backward	5˚	30˚	90˚	Any
Tilted to Side (**±**)	5˚	10˚	20˚	Any
Power Requirements				
Voltage (VRMS)	119 to 121 238 to 242	102 to 132 204 to 264	102 to 132 204 to 264	N/A N/A
Frequency (Hz)	49.8 to 50.2 59.8 to 60.2	49 to 51 59 to 61	48 to 52 58 to 62	N/A N/A
Power Consumption	24 watts maximum			

General Reference Data	
Stray Rejection	*Common Mode Rejection Ratio:* 120dB or 1 LSB (whichever is greater) at 60 Hz with maximum source impedance of 100 ohms. *Normal Mode Rejection Ratio:* 60dB with a 100% span peak-to-peak maximum at 60 Hz.
Static Charge Effects	Exposed panel surfaces capable of withstanding a discharge from a 250pf capacitor charged to 10KV through 100 ohms.
Line Noise Effects	Field terminals for connecting power line to recorder can withstand the IEEE Surge Withstanding Capability Test to a level of 2.5KV.
Stylus Life	Typically capable of printing one chart per day for five years under clean room conditions.
Technical Assistance	Toll-free 800 number puts technical assistance only a phone call away.

* The maximum rating only applies up to 104˚F (40˚C). For higher temperatures, the RH specification is derated to maintain constant moisture content.

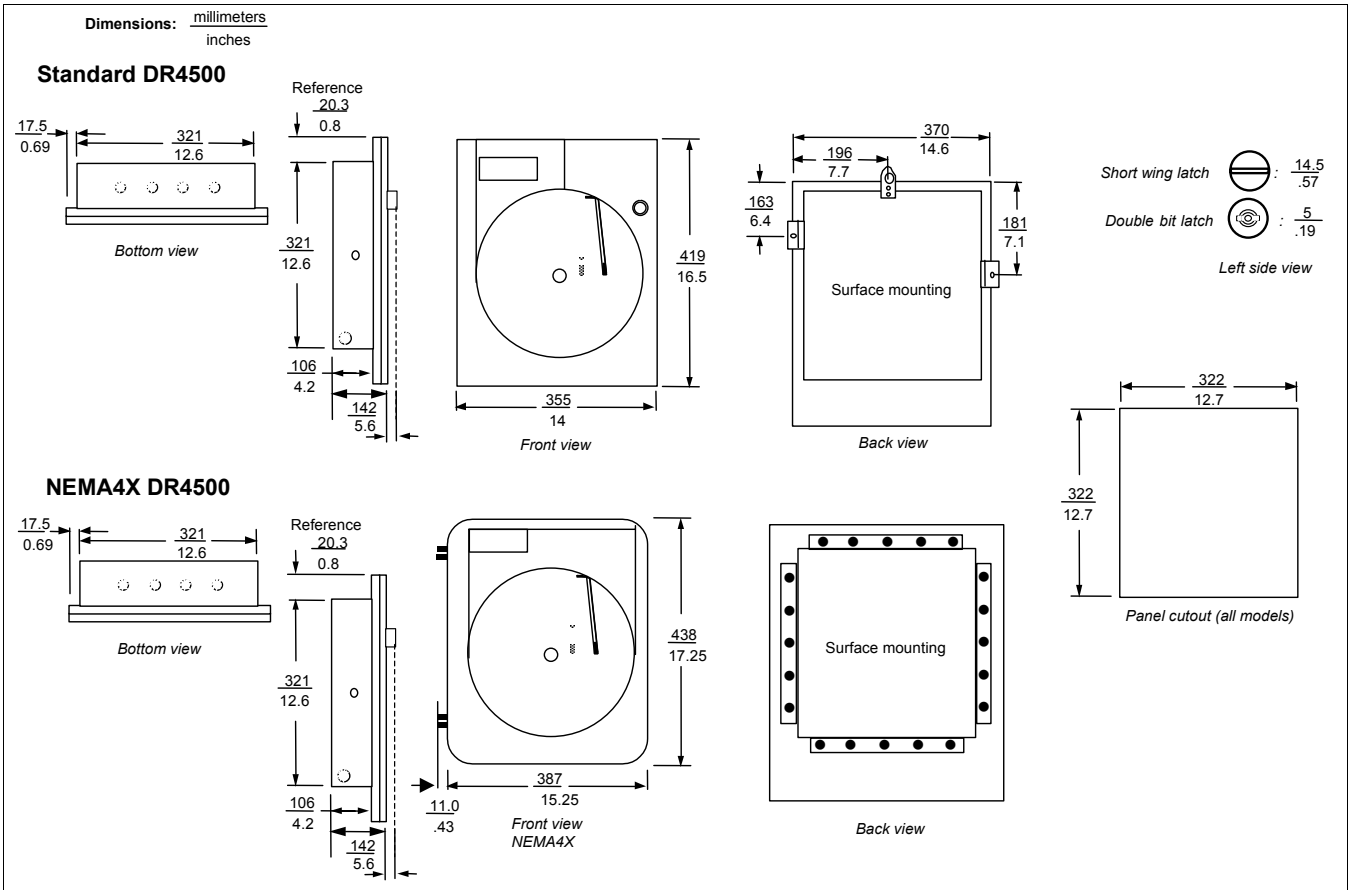

Figure 4—DR4500A series recorder dimensions - for reference only

Ordering Information

For complete ordering information, request Model Selection Guide 44-45-16-07 for DR4500A Series Circular Chart Recorder.
Honeywell offers a full line of sensors and transmitters that produce a compatible range of dc voltage or current signals, which can be used as inputs to the DR4500A Series Recorder.
These devices measure:

- Temperature: (Thermocouple or RTD)
- Pressure
- Flow {4 to 20 mA dc or 1 to 5 Vdc process transmitter}
- Liquid Level
- Relative Humidity

Specifications are subject to change without notice.

Honeywell

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