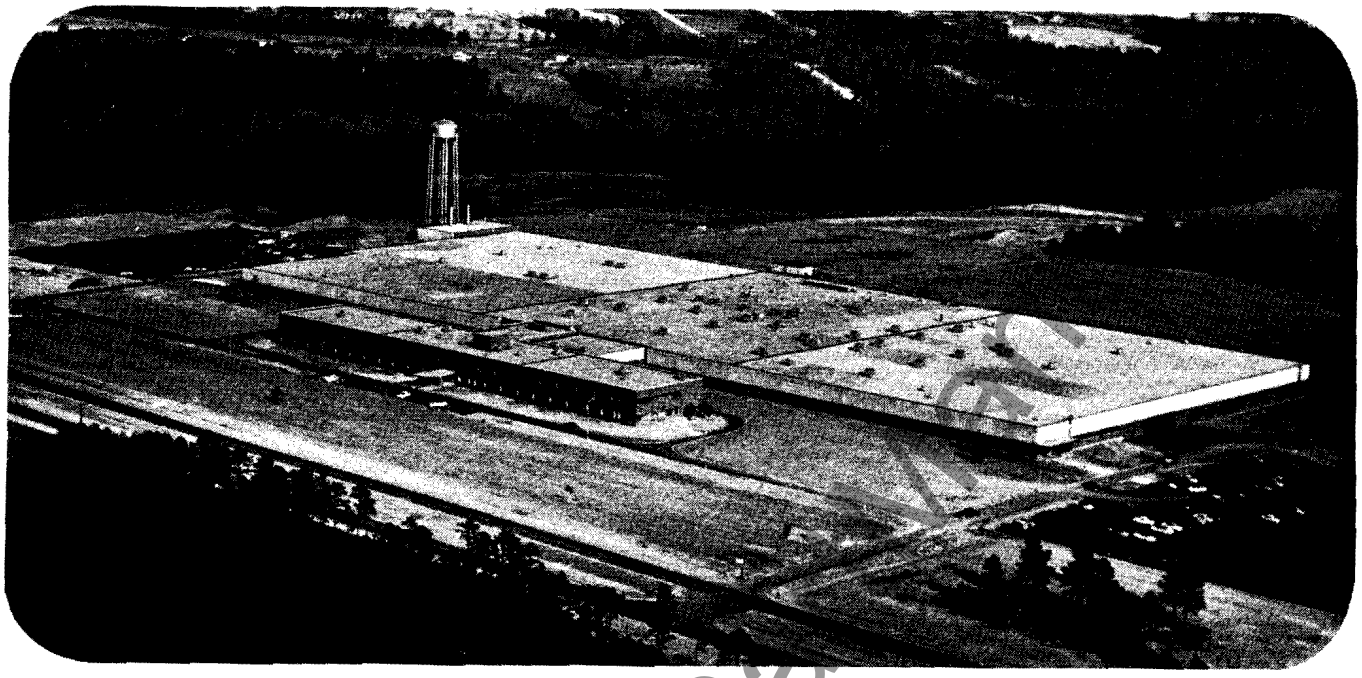
manufacturing



All *Lifetime* meters are manufactured in the new Westinghouse meter plant at Raleigh, North Carolina. The entire plant facilities, 500,000 square feet of manufacturing space, are devoted to the production of meters and sockets by newly developed manufacturing techniques with all new production equipment under the strictest possible quality control supervision.

further information:

prices, style numbers	price list 42-020
sockets and mountings	descriptive bulletin 42-800
replacement parts: single-phase	renewal parts data 42-101

guaranty

from selling policy 42-000

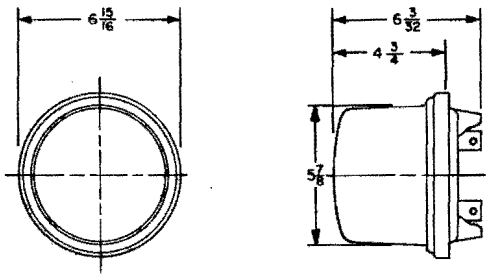
Westinghouse, in connection with types DS and DA meters, will replace any defective part which fails under proper and normal use during the life of the meter which, for the purpose of this guaranty, is 30 years from date of shipment. The replacement part will be shipped prepaid, and such shipment shall fulfill all Westinghouse obligations in respect to said meters. Westinghouse shall not be liable for consequential damages.

Westinghouse Electric Corporation
***meter division:* Raleigh plant • Raleigh, N. C.**
printed in U.S.A.

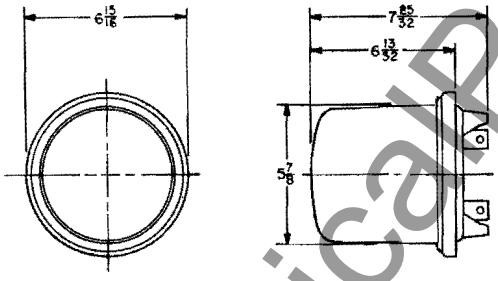
case dimensions for reference only

socket-type

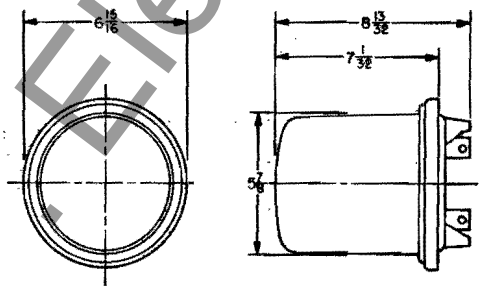
type DS



type DS-5

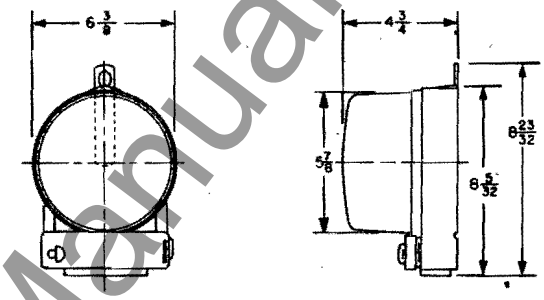


types DSP-2, 7, 8

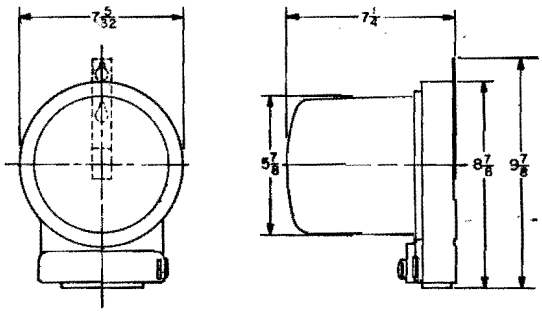


bottom-connected

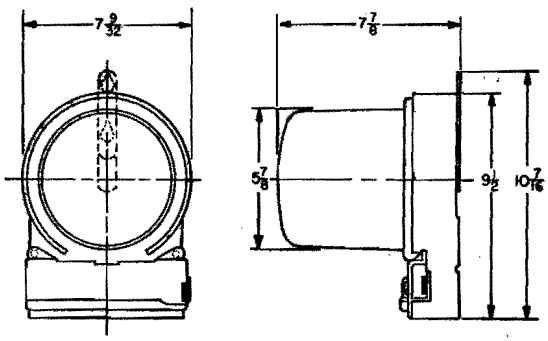
type DA



type DA-5



types DAP-2, 7, 8



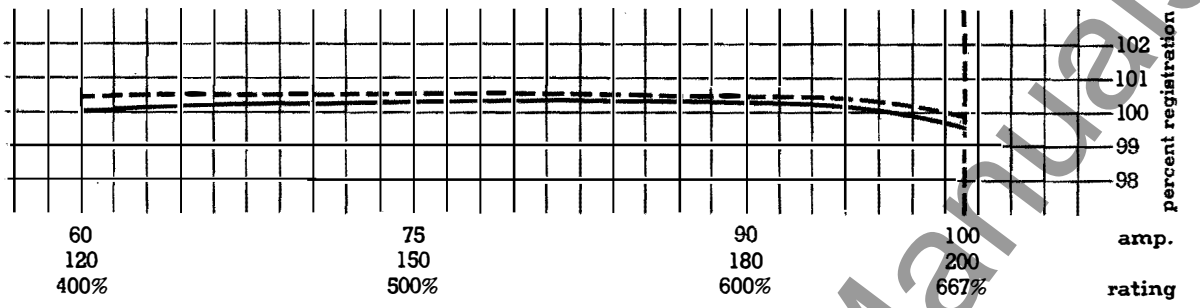
general data

		single phase meters	polyphase meters	
			2 element	2½ element
full load disc speed, rpm		16-⅔	16-⅔	16-⅔
teeth in worm wheel		100	100	100
starting watts at 240 volts 15 amperes		10	20	27
torque, mmg		40	56	42
weight of moving element, grams		16	16	16
torque-weight ratio		2.5/1	3.75/1	2.8/1
potential coil (120 volts)				
without PI lamps	watts loss	1.1	1.05	1.05
	volt-amperes	8.0	6.0	6.0
	power factor, lag	.14	.17	.17
with PI lamps	watts loss	. . .	1.4	1.4
	volt-amperes	. . .	6.1	6.1
	power factor, lag	. . .	.23	.23
current coil (2½ amp coil @ 5 amp)				
2-wire coil	watts loss	.20	.20	.20
	volt-ampere	.36	.36	.36
3-wire coil	watts loss	.11	.11	.11
	volt-ampere	.19	.19	.19
adjustment range	full load	20%	20%	20%
	light load	20%	17%	22%
	balance	. . . .	14%	14%
	power factor	preset	preset	preset

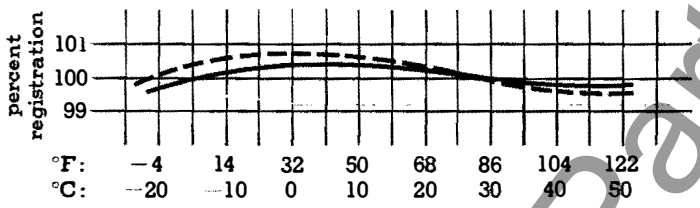
shipping weights, dimensions

for reference only

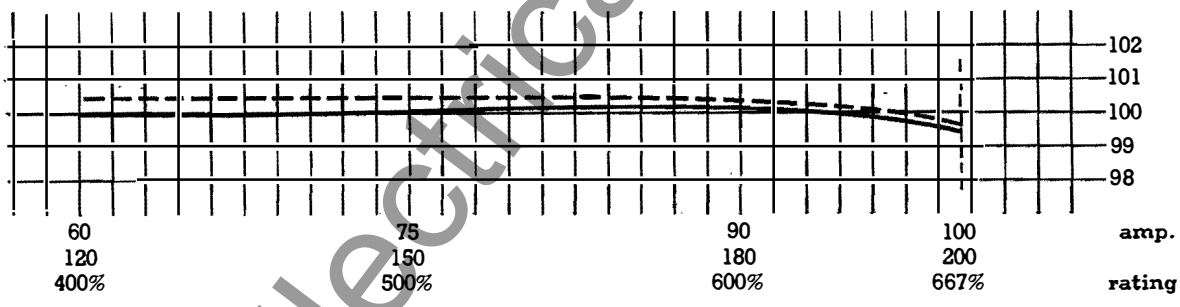
	no. in carton	domestic weight, lb		export (ocean) weight, lb			shipping carton dimensions, in.
		net	shipping	net	legal	gross	
socket type							
type DS	4	22	26	22	26	42	16½ x 16½ x 7¾
type DS-5	4	33	37	33	37	53	16½ x 16½ x 9⅞
types DSP-2, 7, 8	4	35	39	35	39	55	16½ x 16½ x 9⅞
bottom connected							
type DA	4	24	28	29	28	44	17¼ x 13⅝ x 6¼
type DA-5	4	36	44	36	44	76	8¼ x 15⁹⁄₁₆ x 18⅞
types DAP-2, 7, 8	4	38	46	38	46	80	8⅞ x 15⁹⁄₁₆ x 19¹⁵⁄₁₆



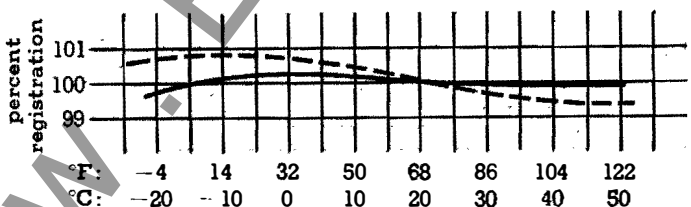
temperature curve



——unity pf - - - - -0.5 pf lag



temperature curve

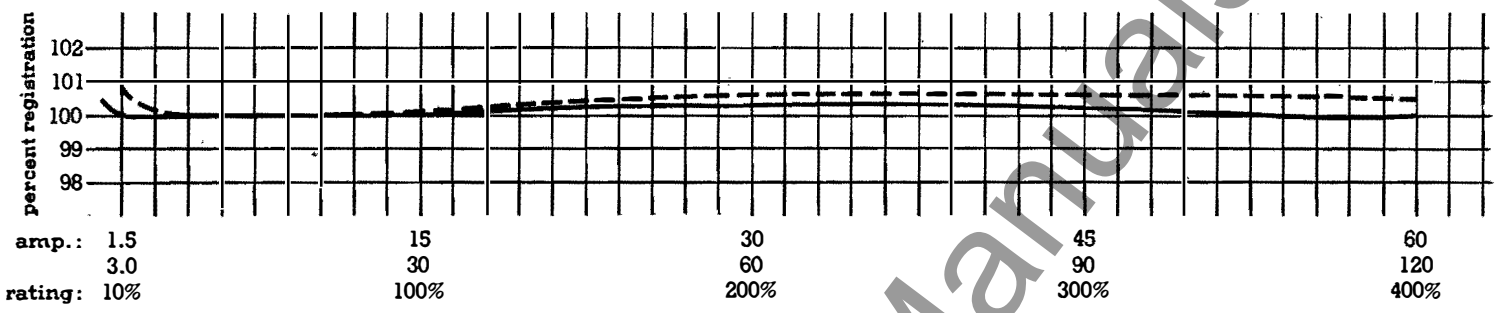


——unity pf - - - - -0.5 pf lag

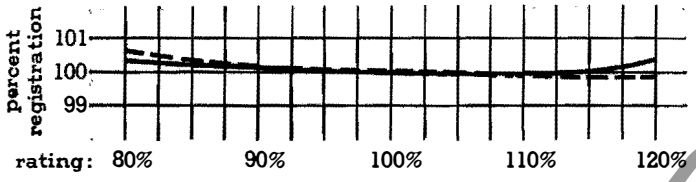
performance data for reference only

single-phase meters 60 cycles

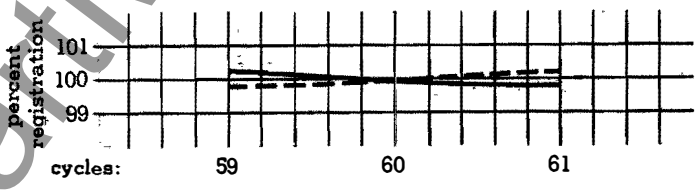
load curve



voltage curve

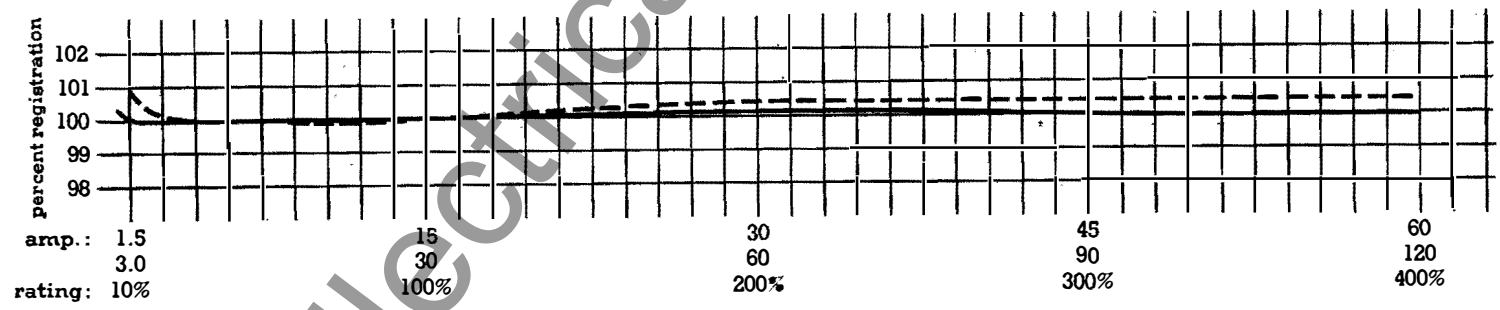


frequency curve

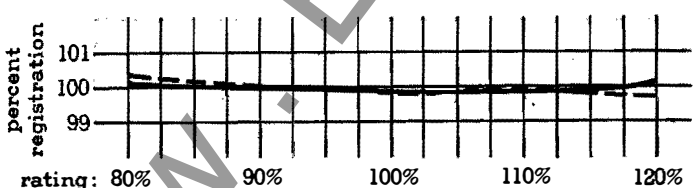


polyphase meters 60 cycles

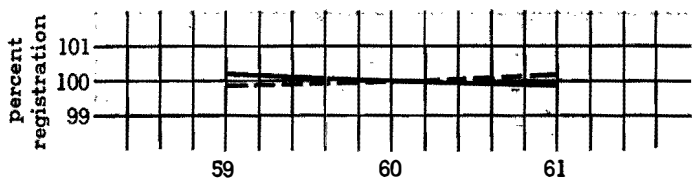
load curve



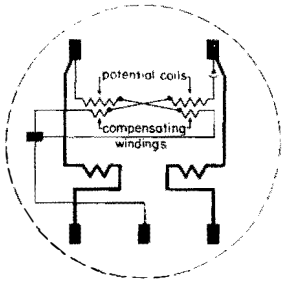
voltage curve



frequency curve

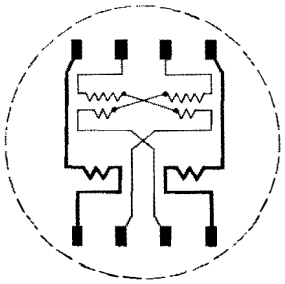


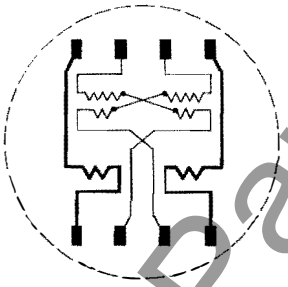
DS-5



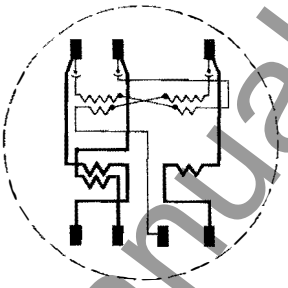
not available

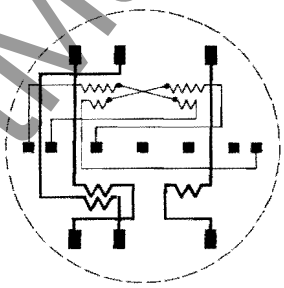
DSP-2



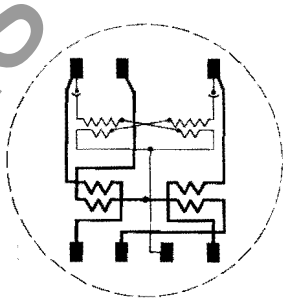


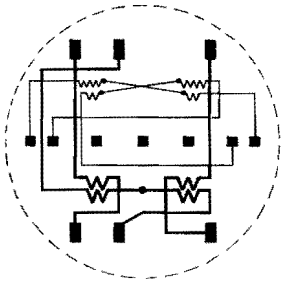
DSP-7



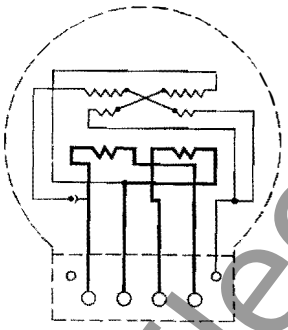


DSP-8



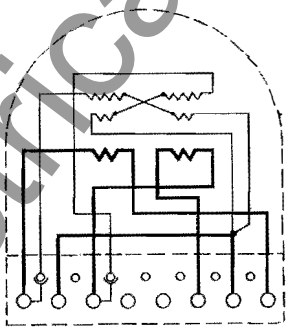


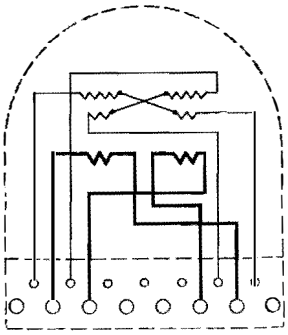
DA-5



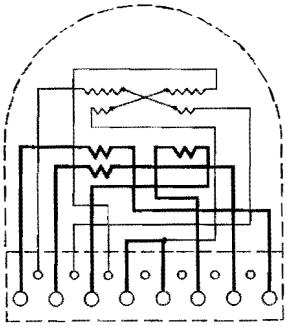
not available

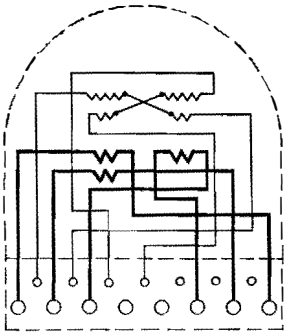
DAP-2



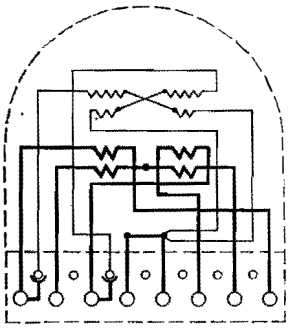


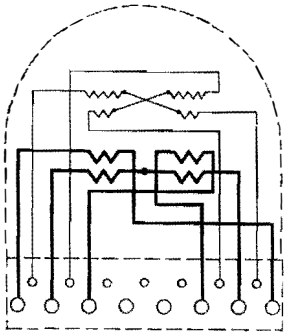
DAP-7





DAP-8





internal wiring diagrams

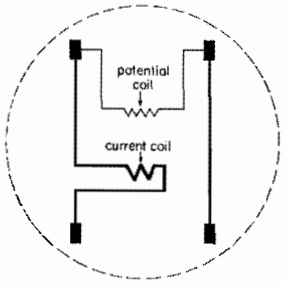
diagrams are front view (for reference only)

socket type

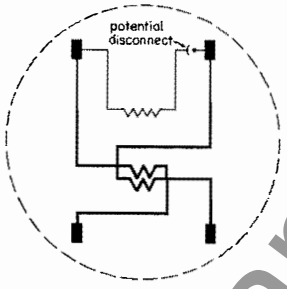
DS

self-contained

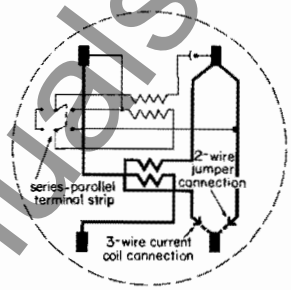
2-wire



3-wire

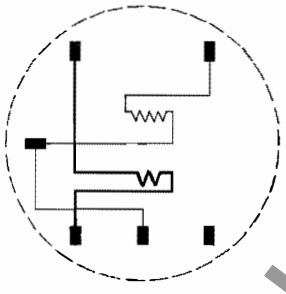


2-3-wire



transformer-type

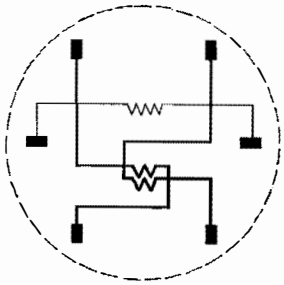
2-wire: for 2-wire current transformer



3-wire: for 3-wire current transformer

(use 2-wire, 5-terminal meter)

3-wire: for two 2-wire current transformers

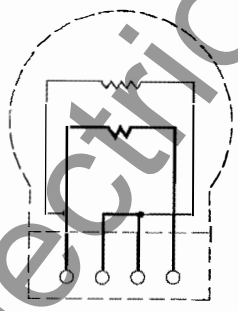


bottom connected

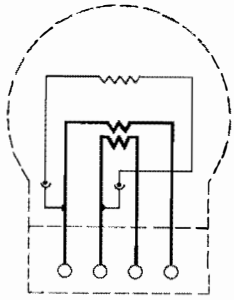
DA

self-contained

2-wire



3-wire

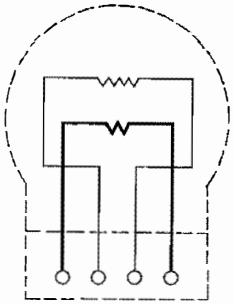


2-3-wire

not available

transformer-type

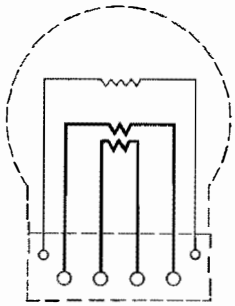
2-wire: for 2-wire current transformer



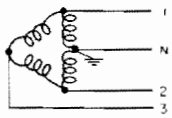
3-wire: for 3-wire current transformer

(use 2-wire, 4-terminal meter)

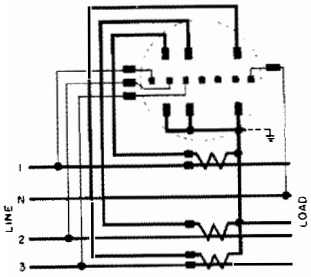
3-wire: for two 2-wire current transformers



3-phase, 4-wire, delta



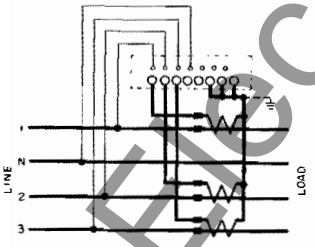
type DSP-7



type ST-3

type STS-3

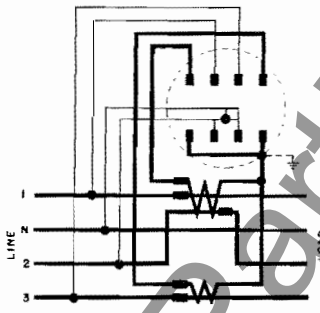
type DAP-7



type STA-9

Use with three 2-wire current transformers.

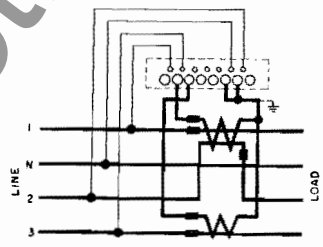
type DSP-2



type ST-2

type STS-7

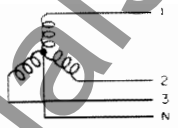
type DAP-2



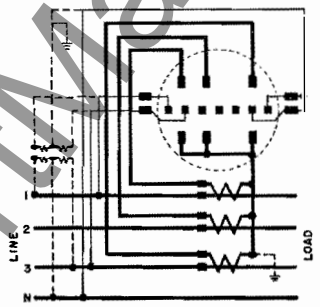
type STA-7

Requires one 2-wire and one 3-wire current transformer.

3-phase, 4-wire, Y



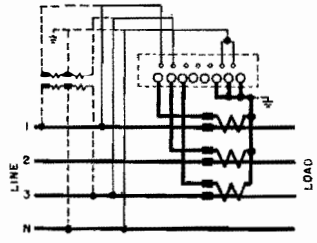
type DSP-8



type ST-3

type STS-8

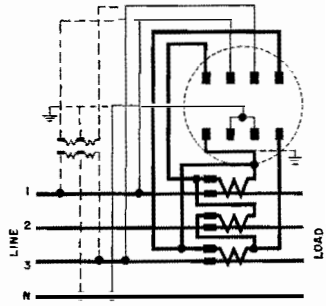
type DAP-8



type STA-8

Use with three 2-wire current transformers.

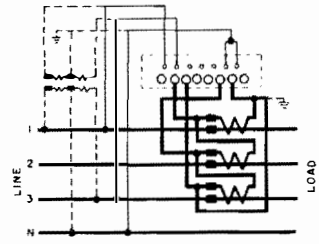
type DSP-2



type ST-2

type STS-8

type DAP-2



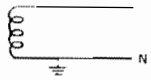
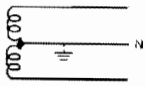
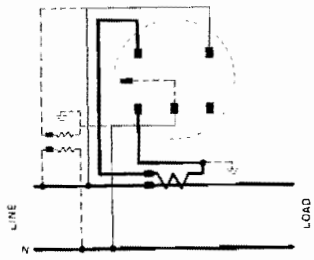
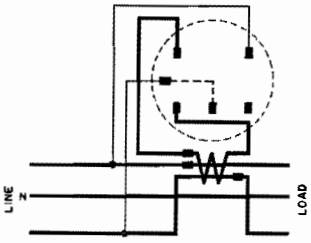
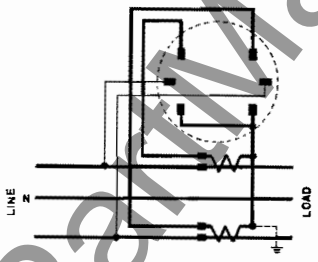
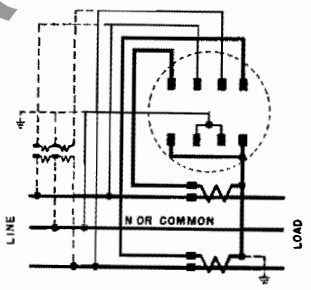
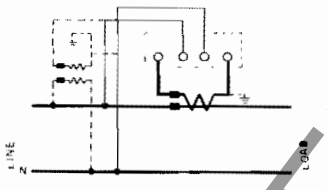
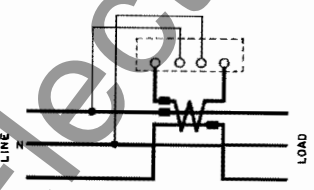
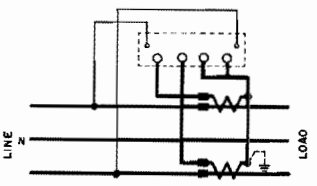
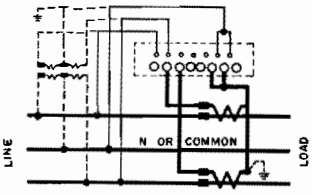
. . . . .

Use with three 2-wire current transformers, secondaries connected in delta.

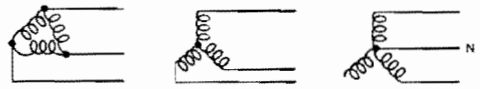
circuit connections

diagrams are front view (for reference only)

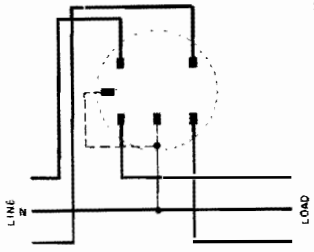
transformer-type meters

1-phase, 2-wire	1-phase, 3-wire		1-2-3-phase, 3-wire or network
			
socket type meter: **type DS** (5-terminal)	**type DS** (5-terminal)	**type DS** (6-terminal)	**type DSP-2**
			
socket: **type S-5**	**type S-5**	**type S-6**	**type ST-2**
TRANSOCKET:	**type STS**	**type STS**	**type STS-2**
bottom-connected meter: **type DA** (4-terminal)	**type DA** (4-terminal)	**type DA** (6-terminal)	**type DAP-2**
			
TRANS-A-MOUNT:	. . . . .	**type STA**	**type STA-2**
Use 2-wire meter with one 2-wire current transformer.	Use 2-wire meter with one 3-wire current transformer.	Use 3-wire meter with two 2-wire current transformers.	Transformer-types DSP-2 and DAP-2 can be used on any application requiring 2-stator meters, including 2-phase, 4- or 5-wire, by proper current transformer connections.

1-2-3-phase, 3-wire or network

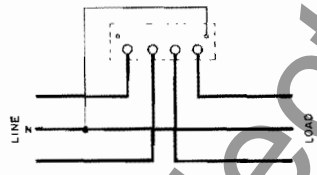


type DS-5



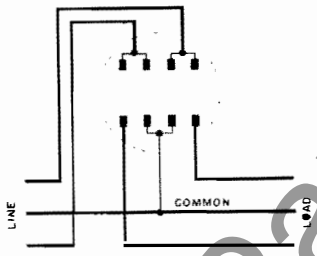
types S-5, ST-5, STU-5

type DA-5



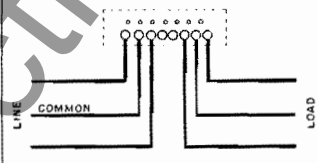
Most commonly used and most economical for this service. Type DS-5 features optional fifth terminal arrangement.

type DSP-2



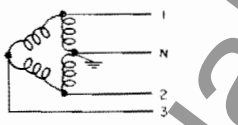
type ST-2

type DAP-2

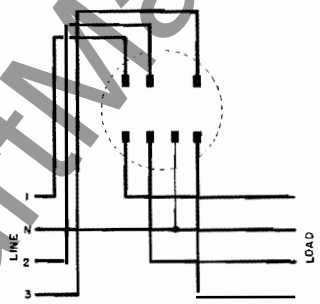


DSP-2 meter can also be used for 2-phase, 4-wire. DAP-2 for 2-phase, 4-wire must be ordered special with 8 terminals instead of 6.

3-phase, 4-wire, delta

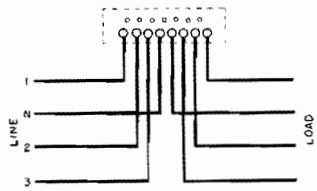


type DSP-7



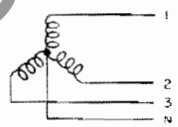
types ST-8, STU-8

type DAP-7



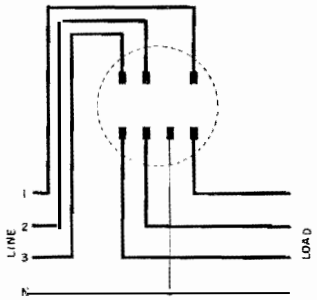
Contains one 2-wire and one 3-wire current coil. Suitable for all 3-phase, 4-wire△ loads except where extreme voltage unbalance may require a 3-stator meter (CS-9, descriptive bulletin 42-100).

3-phase, 4-wire, Y



continued on next page

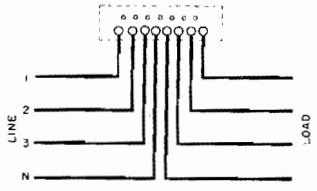
type DSP-8



types ST-8, STU-8

continued on next page

type DAP-8



Contains two split 3-wire current coils wired to produce three current elements. Suitable for all 3-phase, 4-wire Y loads except where extreme voltage unbalance may require a 3-stator meter (CS-3, descriptive bulletin 42-100).

selector guide

general notes

for style numbers, list prices and ordering information, refer to price list 42-020

frequency: All meters are available for 60 cycles; 50 cycle meters should be negotiated. (25 cycle meters are not available.)

kw rating: All transformer-type meters are supplied *secondary-rated* according to meter capacity without instrument transformers (unless specified *primary-rated*).

sockets and mountings: Meters are sold without sockets. For complete description and listing of available sockets, Transockets, and Trans-A-mounts, refer to descriptive bulletin 42-800.

note: Heavy duty STU-5 and STU-8 sockets are rated 200 amperes for 30-amperes type DSP polyphase meters (based on 50 C temperature rise in meter current coils when socket is wired with 4/0 conductors).

accessories

potential indicating lamps: Standard with all polyphase transformer-type meters; can be supplied with self-contained meters.

ratchets: To prevent reverse rotation; can be supplied on new meters or separately for field installation.

contact devices: For transmitting kwh impulses; frame-mounted devices can be furnished for all meters except those with demand registers.

kw demand registers: Indicating (type RWD) or cumulative (type RWD-2) registers can be supplied.

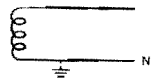
phase-shifitng transformers: For registering kilovar or kva hours; can be supplied for any service.

circuit connections

diagrams are front view (for reference only)

self-contained meters

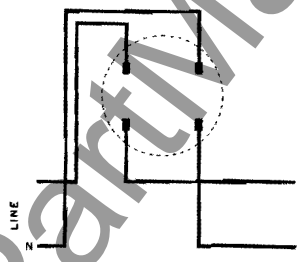
1-phase, 2-wire



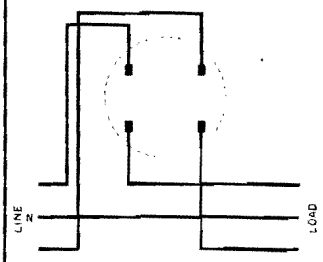
1-phase, 3-wire

socket type

meter: **type DS**



type DS

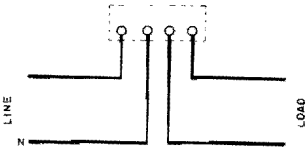


socket: **types S, STU**

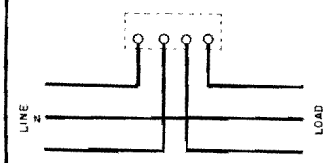
types S, STU

bottom connected

meter: **type DA**



type DA



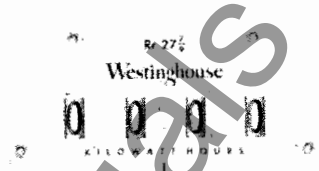
Type DS combination 2-3-wire meter can also be used.

Type DS combination 2-3-wire meter can also be used.

available register ratios (Rr)

clock-dial register

cyclometer register



4-dial			5-dial		4-drum		watthour constant (Kh)
mult x 1	mult x 10	mult x 100	mult x 1	mult x 10	mult x 1	mult x 10	
55⅝	.....	.....	.....	.....	55⅝	.....	1.8
27⅓	.....	.....	.....	.....	27⅓	.....	3.6
333⅓	.....	.....	.....	.....	.....	.....	0.3
166⅔	.....	.....	.....	.....	.....	.....	0.6
27⅓	277⅓	.....	27⅓	.....	27⅓	277⅓	3.6
.....	138⅝	.....	13⅝	.....	.....	138⅝	7.2
166⅔	.....	.....	.....	.....	.....	.....	0.6
166⅔	.....	.....	.....	.....	.....	.....	0.6
27⅓	.....	.....	.....	.....	27⅓	.....	3.6
27⅓	277⅓	.....	27⅓	.....	27⅓	.....	3.6
.....	138⅝	.....	13⅝	.....	.....	138⅝	7.2
.....	138⅝	.....	13⅝	.....	.....	138⅝	7.2
.....	69⅓	.....	6 17/18	.....	.....	.....	14.4
.....	69⅓	.....	6 17/18	.....	.....	.....	14.4
.....	34 13/18	347⅔	.....	34 13/18	.....	.....	28.8
.....	55⅝	.....	5⅝	.....	.....	.....	18.0
.....	.....	277⅓	.....	27⅓	.....	.....	36.0
166⅔	.....	.....	.....	.....	.....	.....	0.6
83⅓	.....	.....	.....	.....	.....	.....	1.2
41⅔	.....	.....	.....	.....	.....	.....	2.4
.....	333⅓	.....	33⅓	.....	.....	.....	3.0
.....	138⅝	.....	13⅝	.....	.....	.....	7.2
83⅓	.....	.....	.....	.....	.....	.....	1.2
18 1/27	185 5/27	.....	18 1/27	.....	.....	.....	5.4
.....	92 16/27	.....	9 7/27	.....	.....	.....	10.8
111⅑	.....	.....	.....	.....	.....	.....	.9
55⅝	.....	.....	.....	.....	.....	.....	1.8

see "general notes" next page

selector guide available ratings

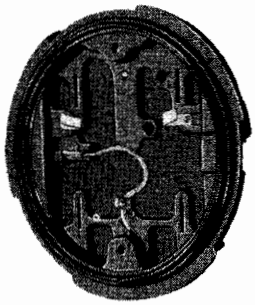
30 ampere ratings: available for socket-types DS meters only (not available for bottom-connected meters)

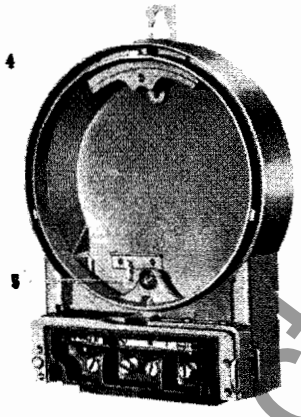
transformer-type meters: ratings listed are secondary ratings without instrument transformers

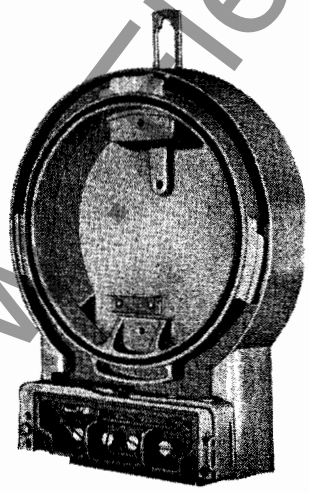
no. of stators■	service (see "circuit connections" pages 10-15)	meter type: socket type	meter type: bottom connected	ratings: self-contained or transformer-type	volts	amp	kw
1	1-phase, 2-wire	DS	DA	self-contained	120	15	1.8
					240	15	3.6
				transformer-type	120	2.5	0.3
					240	2.5	0.6
	1-phase, 3-wire	DS	DA	self-contained	240	15	3.6
						30	7.2
				for one 3w ct‡	240	2.5	0.6
				for two 3w ct's	240	2.5	0.6
2	1-phase, 2-3-wire	DS	. . .	self-contained	120/240	15	3.6
	1-2-3-phase, 3-wire or network	DS-5 DSP-2♦	DA-5 DAP-2	self-contained	120	15	3.6
						30	7.2
					240	15	7.2
						30	14.4
					480	15	14.4
						30	28.8
					600	15	18.0
						30	36.0
	1-2-3-phase, 3-wire 2-phase, 4-5-wire 3-phase, 4-wire Δ 3-phase, 4-wire Y	DSP-2	DAP-2	transformer-type	120	2.5	0.6
					240	2.5	1.2
					480	2.5	2.4
					600	2.5	3.0
	3-phase, 4-wire Δ	DSP-7	DAP-7	self-contained	240	15	7.2
				transformer-type	240	2.5	1.2
	3-phase, 4-wire Y	DSP-8	DAP-8	self-contained	120	15	5.4
					240	15	10.8
				transformer-type	120	2.5	.9
					240	2.5	1.8

♦ DSP-2 self-contained meter is suitable for 2-phase, 4-wire service
‡ For making 1-phase, 3-wire with 3-wire current transformer, use 2-wire meter
■ "Stator" is the new standardized designation for watthour meter elements.

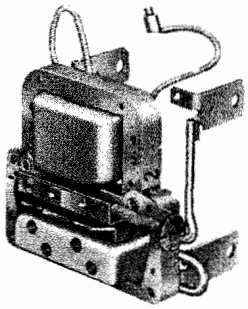
base

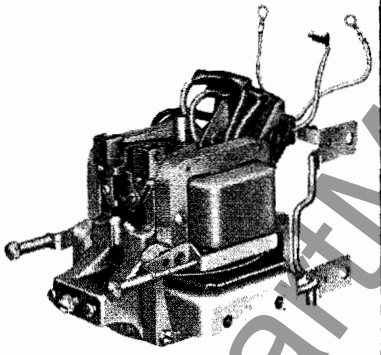


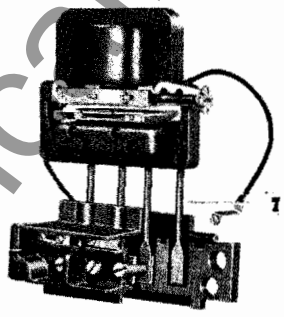


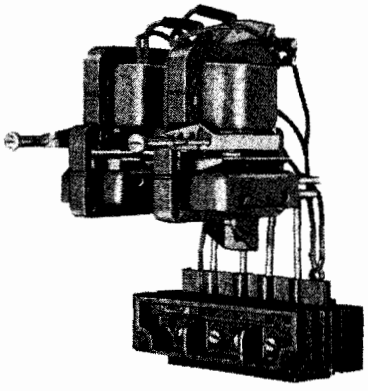


electromagnets









specific details

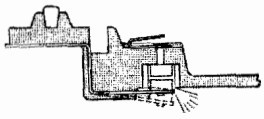
1 glass cover Stree-free design to avoid breakage.

2 aluminum rim Flanged to slide easily over beveled relief cams on meter base for snug fit. Iridited for corrosion protection. Sealing holes provided for sealing cover to base.

3 Moldarta® base Molded in one piece, ribbed front and back for extra strength with well braced insulating angles to protect terminals.

4 foam neoprene gasket Recessed in base without glue, gives weathertight seal that will not shrink.

5 De-ion® arrester gaps Spring contacts on front of base plate carry lightning surges from meter current leads through air gap in base to replaceable outer electrodes for discharge outside the base to ground. Air gap breaks down at 6500 volts impulse. Spring action of outer electrode conductor interrupts power follow and allows easy exit for arc gasses. (Not furnished in 480 and 600 volt meters).



1 glass cover Stress-free design to avoid breakage.

2 aluminum rim Grooved to twist in place on bayocast in meter base. Iridited to prevent corrosion. Gasketed for weathertight seal.

3 terminal cover Aluminum cover for terminals and disconnects. Also locks glass cover securely.

4 die-cast aluminum base Standardized dimensions with two-way hanger and two mounting holes for easy installation.

5 relief gap Projecting angle (on meters rated 120 volts to ground) provides convenient gap for discharging lightning surges from current leads to ground.

6 non-tracking Melamine terminal block With built-in potential disconnects.

7 terminals Electromagnet leads extend down into terminal block and flatten out to form back plate of terminal for low-resistance current path through meter.

for case dimensions, see page 19

design features **mounting details**

socket type

Meters are suitable for indoor or outdoor mounting and are corrosion protected for use in any climate. Meter plugs directly into socket to form a single armor-clad weatherproof installation.

recommended sockets

(from descriptive bulletin 42-800)

meter rating, amperes	service, amperes	socket series
15	100	S round ST trough
30	200	STU heavy duty
2.5	. . .	S round ST trough STS Transocket‡

bottom connected

Meters are suitable for indoor wall mounting or for outdoor mounting in meter boxes. Meter is tamperproof and can be sealed under a single seal. Transformer-type meters can be quickly installed in Trans-A-mount■ mountings (see descriptive bulletin 42-800).

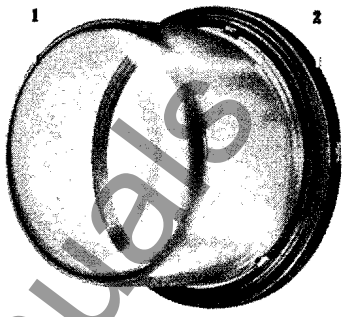
Terminals will accommodate up to no. 1 copper conductors for self-contained loads up to 100 amperes.

‡Transockets include socket current transformers and all secondary wiring.

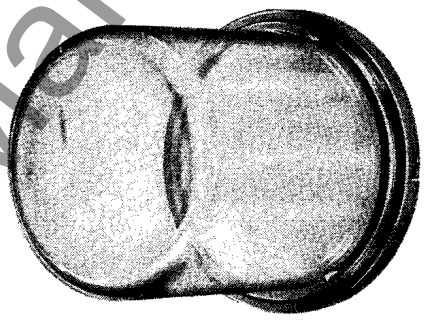
■Trans-A-mount mountings include current transformers, test switch and all secondary wiring up to the switch.

cover

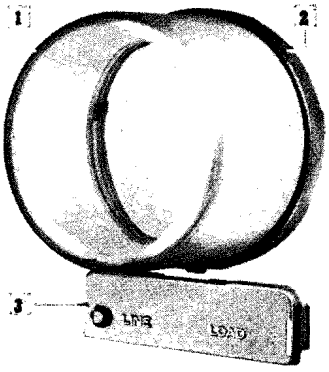
single-phase



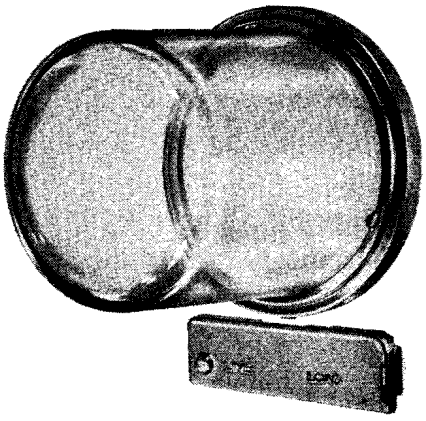
polyphase

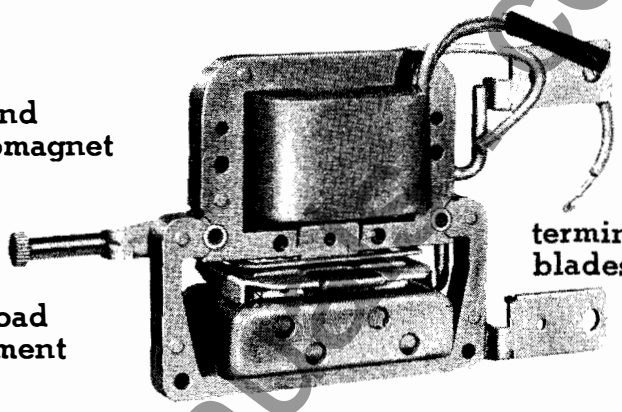


single-phase

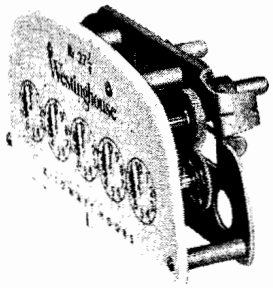


polyphase

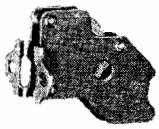




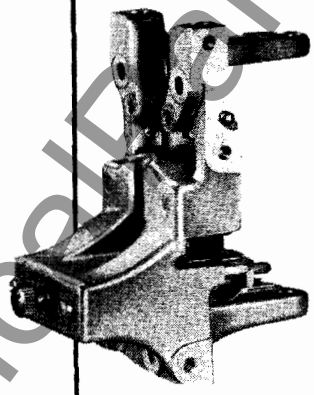
register



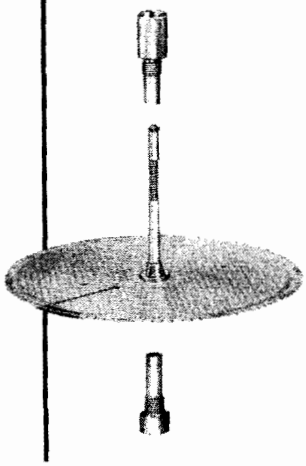
transfer gearing



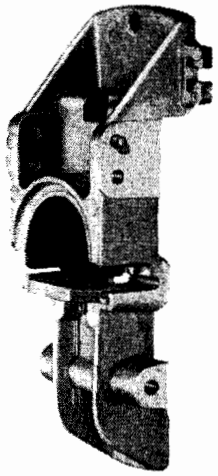
front frame, permanent magnet, full-load adjustment

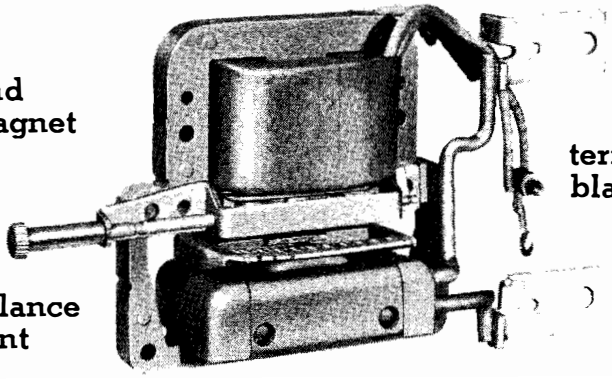


moving element bearings

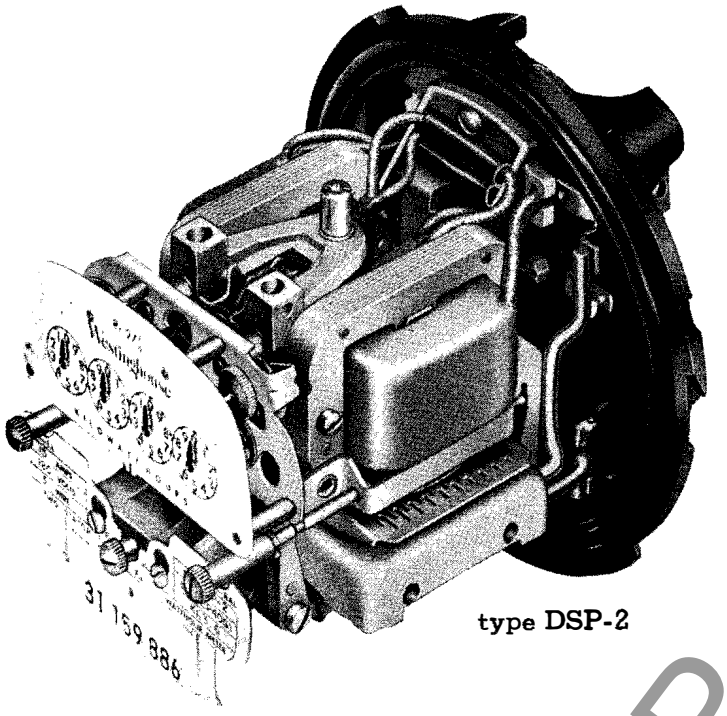


back frame, permanent magnet





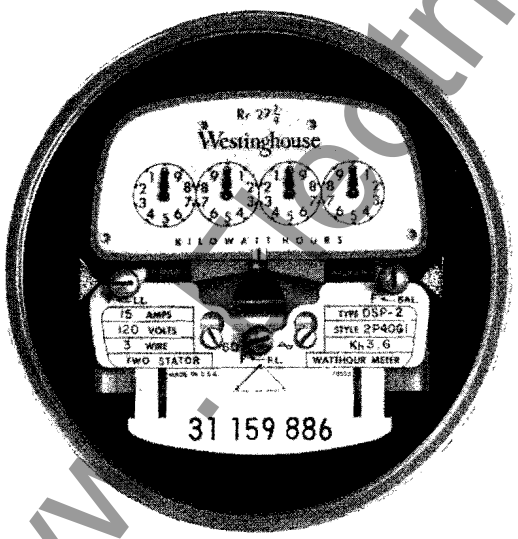
design features polyphase meters



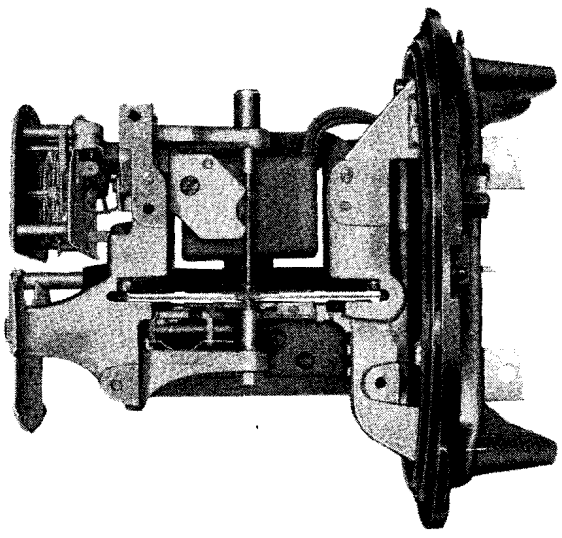
type DSP-2

Series DSP and DAP meters bring to polyphase metering the high accuracy and extended range formerly limited to single-phase metering. All components are essentially the same as used in single-phase meters, only slightly modified to achieve a rigid box-type construction surrounding a single disc. Voltage and current interference between electromagnets is eliminated by mechanical positioning and "crossover wiring": a compensating winding on the opposite electromagnet connected in series with each main potential coil. Calibration is simplified to three adjustments, one each for full load, light load, and phase balance—all accessible from the front. Electromagnets are permanently adjusted for power factor during precise factory calibration.

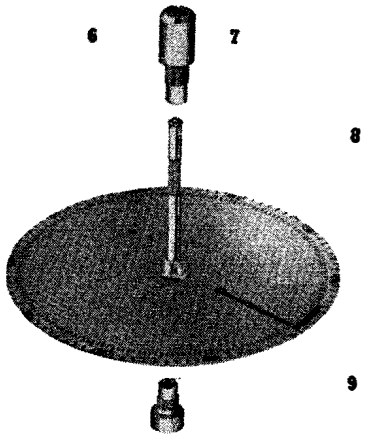
all adjustments accessible from front of meter



right-hand electromagnet removed to show interlocked box-type construction



moving element, bearings



6 top bearing Flexible stainless steel guide pin fits in non-lubricated bronze bearing mounted in top of disc shaft. Provides practically noise-free operation.

7 disc shaft Holds disc in exact position with no bearing adjustment required. Worm milled in shaft drives register directly with negligible friction.

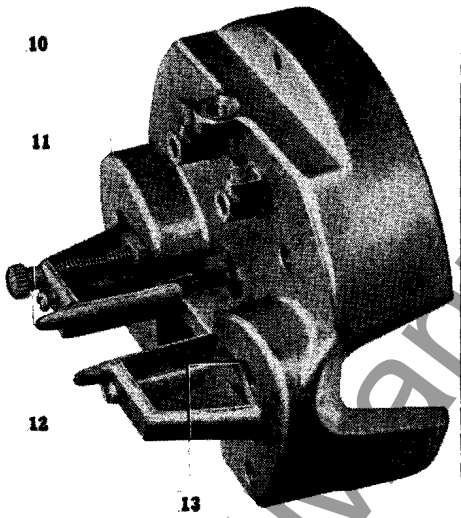
8 disc Aluminum disc permanently fixed to shaft and accurately located. Disc markings standardized: 360 teeth, 100 numbered divisions on outer circle for gang testing; 180 divisions on inner circle for stroboscopic testing.

9 lower bearing Westinghouse lifetime ball-and-jewel bearing: hardened chrome-steel ball between two polished sapphires. Has negligible wear or friction, needs no lubrication.

cut-away view top bearing

enlarged view bottom bearing

frame, permanent magnets

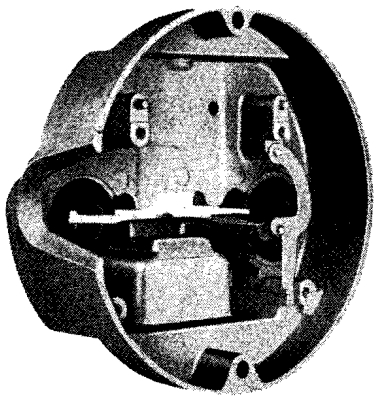


10 aluminum frame Die-cast to hold all components in exact alignment without adjustment or any possibility of shifting. Bearing and register mounts are precision machined. Tapered dowels (see rear view below) align electromagnet with disc. Disc guards project beyond nameplate to protect disc against damage even when meter is laid on its face.

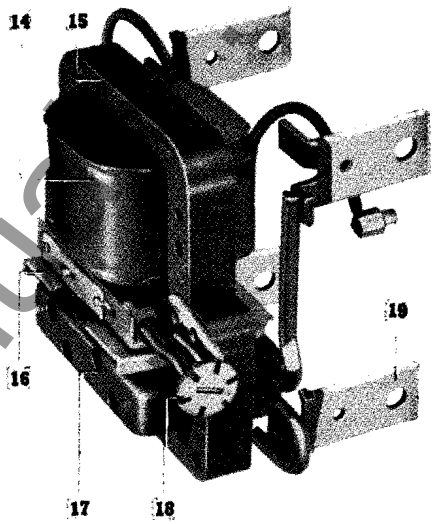
11 alnico magnets Mounted in frame for precise non-shifting positioning on either side of disc. Constant damping strength unaffected by lightning surges up to 40,000 amperes, 20 x 50 microsecond wave.

12 full load adjuster Spring-loaded magnetic shunt adjustable from meter front by hand or screwdriver. Linear adjustment: 1% per turn.

13 temperature compensators C-shaped alloy shunts cast in place with permanent magnets reduce class 1 temperature errors to less than 1% registration from −20 to +140 F.



electromagnet



14 potential coil Vacuum impregnated with Laminac thermosetting polyester resin drawn into every layer of winding. Insulation level: 10,000 volt withstand surge test.

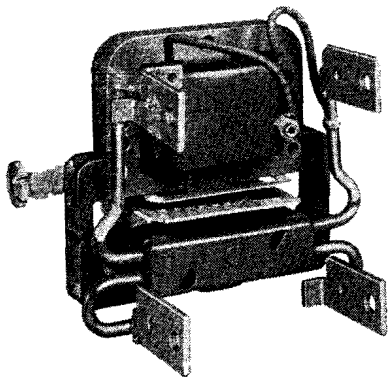
15 laminations Bonderized to minimize current eddies between laminations and to prevent corrosion. Solidly riveted and keyed.

16 lag coil Single-formed loop carries alloy strip shunt for class 2 temperature compensation. Permanently adjusted for power factor at factory.

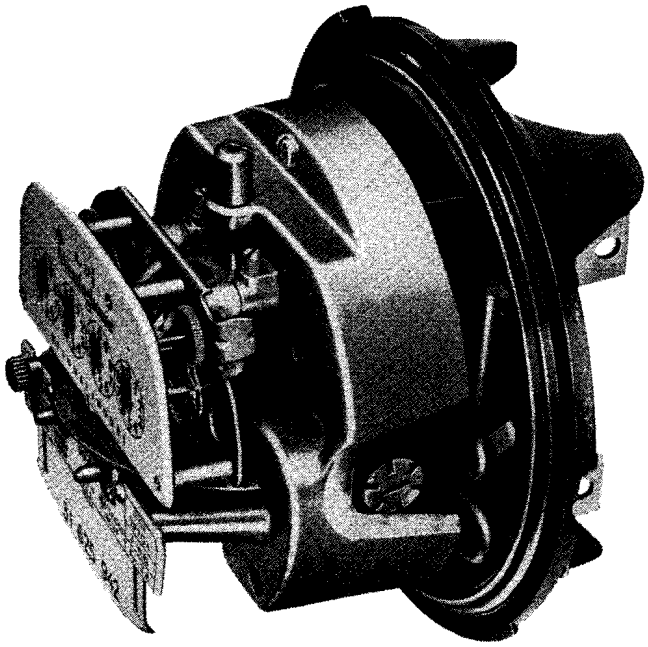
17 current coils Heavy form-wound coils molded in resilient polyester compound. Insulation level: 10,000-volt withstand surge test.

18 light-load adjuster Spring-loaded, accessible from front or side by hand or screwdriver. Linear: 1% per turn.

19 terminals DS current leads are brazed directly to terminal blades. DA current leads are extended to form part of terminal (see page 5).



design features single-phase meters

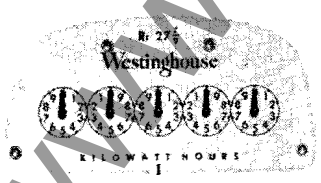


All meter components are manufactured to exact mechanical, electrical and magnetic tolerances. Register, bearings, moving element and frame are interchangeable on all DS and DA meters with no mechanical adjustment required. Electromagnets of DS and DA meters are respectively interchangeable. Light-load and full-load adjustments have calibration range of 20%. Full compensation for class 1 and class 2 temperature errors is provided. Electromagnets are permanently adjusted for power factor during precise factory calibration. All materials and finishes are carefully coordinated for maximum corrosion protection. High insulation level to withstand extreme voltage surges is backed up by built-in lightning protective devices (see page 7) which discharge well below insulation breakdown point.

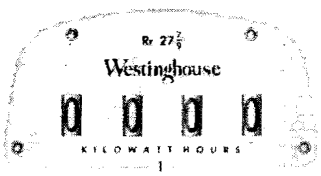
registers

Meters can be supplied with 4-dial or 5-dial clock registers, or 4-drum cyclometer registers. Depending on meter kw rating, registers are supplied direct-reading or for use with a multiplier or 10 or 100.

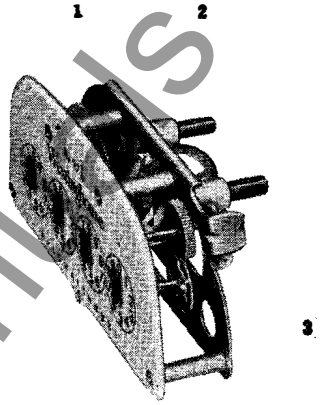
5-dial register



cyclometer register



register nameplate



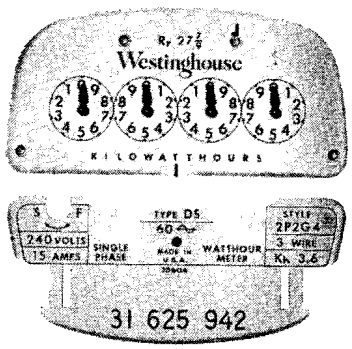
1 precision gears Gold finished for protection against corrosion.

2 bayonet mounting Assures correct register mesh with worm pinion on disc shaft without adjustment.

3 rugged frame Maintains proper gear mesh for accurate registration with negligible friction. Protects all gears from accidental damage in handling. Iridited to prevent corrosion.

4 register dials Large easy-to-read numerals on permanently white dial face. Register ratio printed on each register face for convenient reference.

5 separate nameplate Complete identification with conveniently large serial number. Will mount tag or strip-type power company label without obscuring serial.

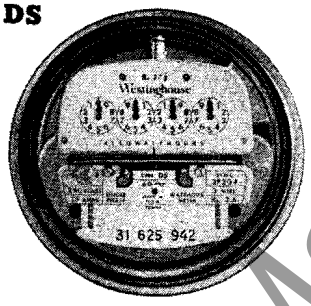
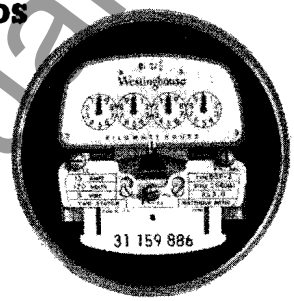
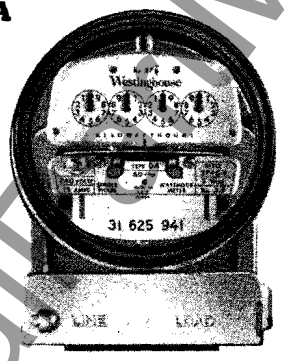
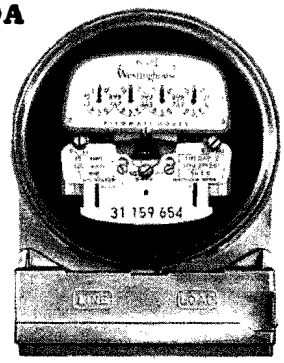


Lifetime watthour meters

self-contained • transformer-type

volts: 120, 240, 480, 600
amperes: 2.5, 15, 30

descriptive bulletin **42-101** page 1

	single-phase	polyphase
socket type	**type DS** 	**series DS** 
bottom connected	**type DA** 	**series DA** 

application

A completely new line of guaranteed watthour meters specifically designed to accommodate higher future loads up to 667% of meter rating with straight-line performance all the way.

Lifetime meters are available for any single-phase or polyphase meter service. They can be supplied with 4 or 5 dial registers or 4 drum cyclometer registers to meet the requirements of any billing procedure.

A complete line of meter accessories can be furnished: demand registers, contact devices, ratchets and phase-shifting transformers.

available current ratings

15 amperes: for self-contained meter loads up to 100 amperes
30 amperes: for self-contained meter loads up to 200 amperes■
2.5 amperes: for loads metered through current transformers

■30 amp range available for socket-type DS, single and polyphase meters only

October, 1956
supersedes descriptive bulletin 42-101 dated July, 1954
mailed to: E/331/DB; 65-5B; C29-5F,G,H,Z,J,K,L,M; WME

Refer to "general data" on page 18 of descriptive bulletin 42-101 dated October, 1956 and make the following revision on current coil information:

		single phase meters	polyphase meters 2 element	polyphase meters $2\frac{1}{2}$ element
current coil ($2\frac{1}{2}$ amp coil @ 5 amp)				
2-wire coil	watts loss	.45	.47	.....
	volt-ampere	1.16	1.25	.....
3-wire coil	watts loss	.22	.24	.24
	volt-ampere	.58	.37 (1)	.37 (1)

2 wire coil data for polyphase meters is given per stator.

3 wire polyphase and single phase data is given per winding per stator.

(1) changed since previous issue.

December, 1957
supersedes supplement to descriptive bulletin 42-101, pg. .01, dated October, 1957
mailed to: E/331/DB; D65-5B; C29-5F, G, H, Z, J, K, L, M; WME

Lifetime watthour meters

Westinghouse Electric Corporation
meter dept: meter division • Raleigh plant • Raleigh, N. C.
printed in U.S.A.