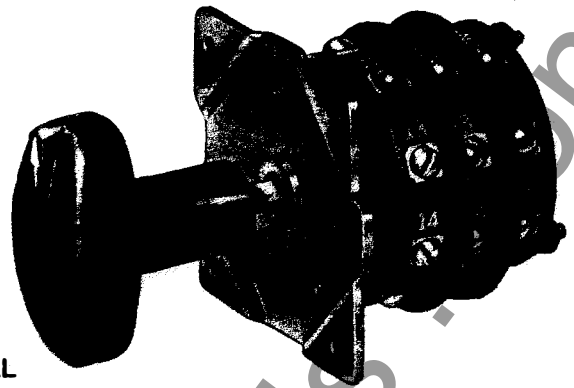


# 4-hole SERIES 31

- 2-8 POSITIONS
- 15A/600VAC CONTINUOUS



## ELECTRICAL

### Interrupting Ratings:

10A/125VAC, 60 to 400 cps, resistive to 0.75 pf  
 5A/240VAC, 60 to 400 cps, resistive to 0.75 pf  
 3A/600VAC, 60 to 400 cps, resistive to 0.75 pf  
 5A/30VDC, resistive  
 1A/125VDC, resistive

**Overload:** 50 operations @ 60A/125VAC, resistive

**Voltage breakdown:** 2000V rms minimum

**Insulation resistance:** 100 megohms minimum

**Contact resistance:** .01 ohms max.

**Electrical life:** See Page 3.

## MECHANICAL

**Sections:** 1 to 10      **Poles:** 1 to 20

**Positions:** 8; adjustable stops for 2-8 position limited rotation

**Contacts:** break-before-make (non-shorting); make-before-break (shorting)

**Action:** 45° positive detent indexing

**Mounting:** panel, 4 tapped mounting holes

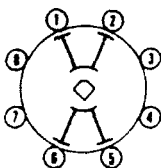
**Panel thickness:** 3/16 standard

**Rotor contacts:** silver plated phosphor-bronze, double-grip

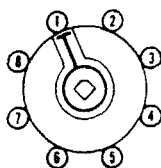
**Stationary contacts:** silver plated copper, integral with screw-type terminals

**Construction:** contacts enclosed in molded-phenolic disks

### Assemblage 2



### Assemblage 3



Nominal torques, weights, and depth behind panel are listed below.

assemblages are shown with handle in 0° position (12 o'clock)

No. Sec.	Catalog Number	No. Sec.	Catalog Number	Weight oz.	Torque lb.-in.	Depth behind Panel-inches
1	31201B	1	31301B	5	6	1.25
2	31202B	2	31302B	6	7	1.63
3	31203B	3	31303B	7	8	2.00
4	31204B	4	31304B	8	9	2.38
5	31205B	5	31305B	9	10	2.75
6	31206B	6	31306B	10	11	3.13
7	31207B	7	31307B	11	14	3.75
8	31208B	8	31308B	13	15	4.13
9	31209B	9	31309B	14	16	4.50
10	31210B	10	31310B	15	17	4.88

## Features...

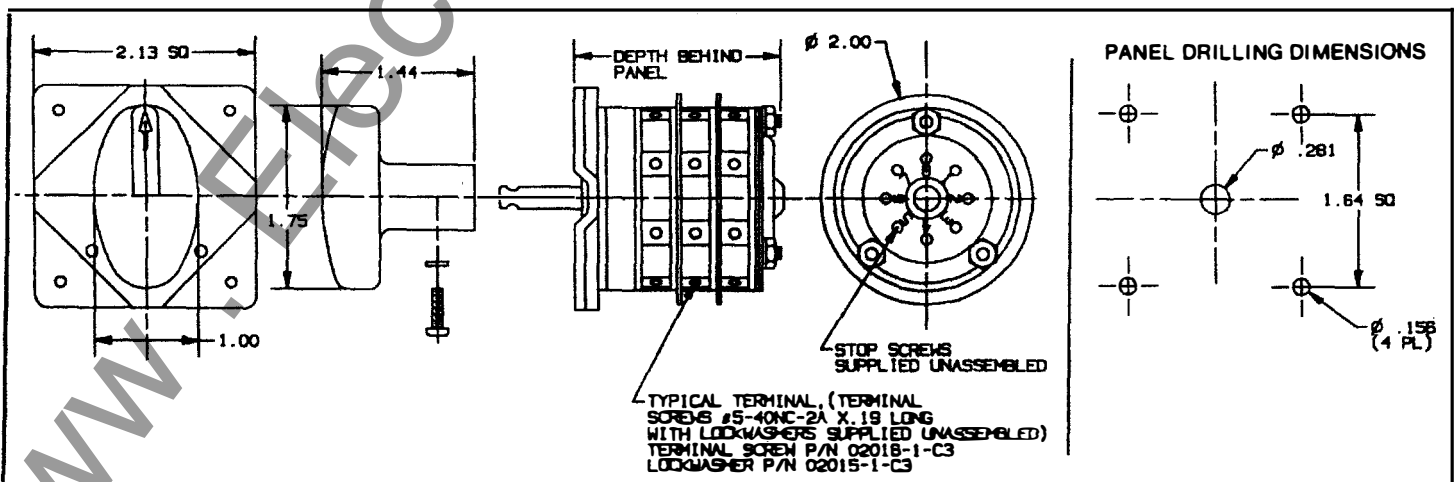


UL File No. E18174

Additional contact assemblages are available on request. See pages 4 & 5.

For make-before-break (shorting) contacts:  
 add "S" (e.g. 31201B-S).

Nameplates are optional and are only supplied if requested at additional cost.



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# SERIES 31

- 2-8 POSITIONS
- 15A/600VAC CONTINUOUS



## ELECTRICAL

### Interrupting Ratings:

10A/125VAC, 60 to 400 cps, resistive to 0.75 pf  
 5A/240VAC, 60 to 400 cps, resistive to 0.75 pf  
 3A/600VAC, 60 to 400 cps, resistive to 0.75 pf  
 5A/30VDC, resistive  
 1A/125VDC, resistive

**Overload:** 50 operations @ 60A/125VAC, resistive

**Voltage breakdown:** 2000V rms minimum

**Insulation resistance:** 100 megohms minimum

**Contact resistance:** .01 ohms max.

**Electrical life:** See Page 3.

## MECHANICAL

**Sections:** 1 to 10    **Poles:** 1 to 20

**Positions:** 8; adjustable stops for 2-8 position limited rotation

**Contacts:** break-before-make (non-shorting); make-before-break (shorting)

**Action:** 45° positive detent indexing

**Mounting:** panel, bushing-mount, single-hole

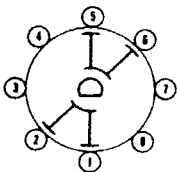
**Panel thickness:** 3/16 standard

**Rotor contacts:** silver plated phosphor-bronze, double-grip

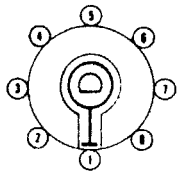
**Stationary contacts:** silver plated copper, integral with screw-type terminals

**Construction:** contacts enclosed in molded-phenolic disks

### Assemblage 2



### Assemblage 3



Nominal torques, weights, and depth behind panel are listed below.

## Features...



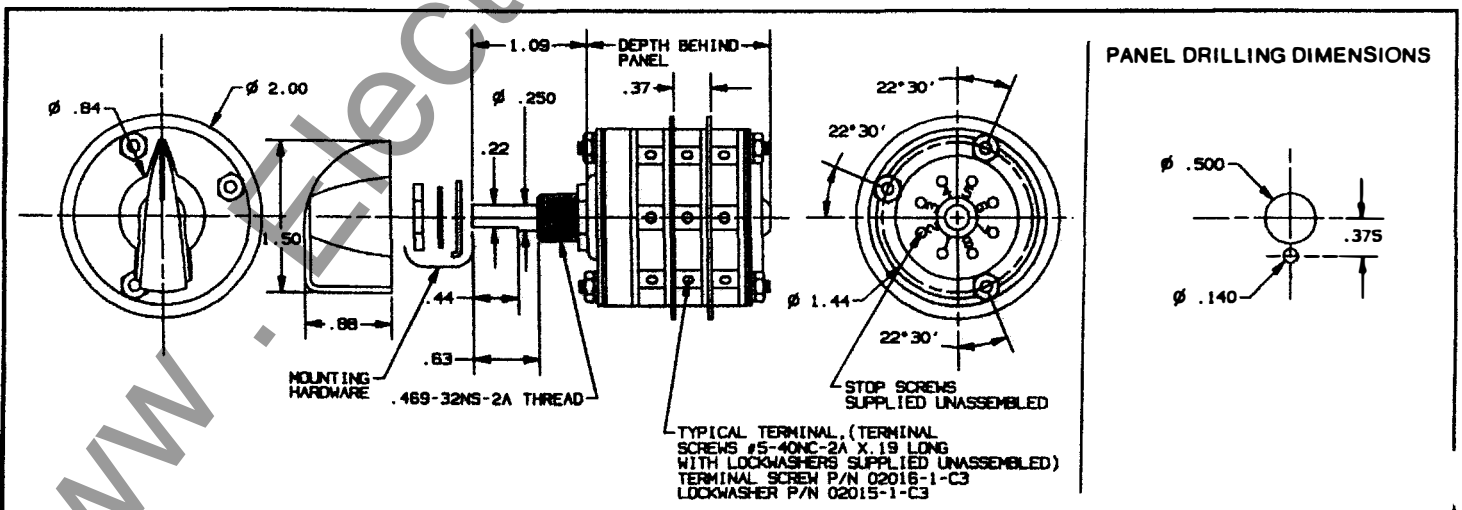
UL File No. E18174

Additional contact assemblages are available on request. See pages 4 & 5.

For make-before-break (shorting) contacts:  
 add "S" (e.g. 31201A-S).

Nameplates are optional and are only supplied if requested at additional cost.

No. Sec.	Catalog Number	No. Sec.	Catalog Number	Weight oz.	Torque lb.-in.	Depth behind Panel-inches	
						Assemblage 2	Assemblage 3 & 10
1	31201A	1	31301A	5	6	1.16	1.16
2	31202A	2	31302A	6	7	1.53	1.53
3	31203A	3	31303A	7	8	1.91	1.91
4	31204A	4	31304A	8	9	2.28	2.28
5	31205A	5	31305A	9	10	2.66	2.66
6	31206A	6	31306A	10	11	3.03	3.03
7	31207A	7	31307A	11	14	4.13	3.41
8	31208A	8	31308A	13	15	4.53	4.53
9	31209A	9	31309A	14	16	4.91	4.91
10	31210A	10	31310A	15	17	5.28	5.28



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## ALL ABOUT TESTING OF DETENT SWITCHES

Switches are tested in many ways to prove their capabilities and reliability. Electroswitch uses a combination of test methods to provide meaningful data for all applications. These include:

1. Cycle it mechanically until it breaks. This is usually an academic test since switches that do not switch electric power are not needed. An exception is a set-up switch whereby the switch sets up a complicated circuit and then a circuit breaker switches the power. All testing of detent switches is done under electrical load.
2. Test under an application oriented specification - something that simulates actual operating conditions such as environment, overloads, surges, etc. UL 1054 on SPECIAL USE SWITCHES and CSA C22.2 on INDUSTRIAL CONTROL EQUIPMENT for use in Ordinary (non-hazardous) Locations are probably the best specifications in widespread use. The series 21, 24, 25, 28 and 31 are UL recognized and CSA certified to these specifications.
3. Test at different ratings until destruction to determine ultimate life (destruction could be mechanical failure, shorting out, dielectric failure, excessive heat rise, etc.) The test conditions are outlined on the SELECTOR CHART on page 1. The results are summarized below:

Both UL and CSA testing consists of two parts:

1. Product testing to the specifications.
2. Follow-up service by UL and CSA personnel at the factory, including inspection and testing to insure that the quality and reliability is maintained.

If all conditions are met, the switches are considered "certified electrical equipment" by CSA and "recognized components" by UL and the applications are subject to review by these agencies to assure suitability.

### UL AND CSA RATINGS

SERIES	UL Recognized	CSA Certified
21	15A - 120 VAC 7½A - 240 VAC 4A - 600 VAC	10A - 125 VAC
24	20A - 120 VAC 15A - 240 VAC 6A - 600 VAC 3A - 125 VDC 1A - 250 VDC	20A - 600 VAC 10A - 30 VDC 2A - 125 VDC 2HP - 240/480 VAC
25	10A - 120 VAC 5A - 240 VAC 3A - 600 VAC	7½A - 125 VAC
28	5A - 120 VAC 3A - 240 VAC 2A - 600 VAC	5A - 125 VAC
31	10A - 125 VAC 5A - 250 VAC 3A - 600 VAC 5A - 30 VDC 1A - 125 VDC	10A - 125 VAC 5A - 250 VAC

These recognized or certified ratings are not necessarily the limits of switch capacity. They represent the acceptable tested ratings to comply with individual standards.

Tests include:

1. Overload -- 50 cycles of operation.  
UL -- 0-10A at 150% rating ... over 10A, 125% rating  
CSA -- 150% rating
2. Endurance -- 6000 operations  
(DC resistive; AC at .75 to .80 pf)
3. Temperature rise of contacts - 30° max. at maximum continuous current rating
4. Dielectric Voltage Withstand UL - 2200VRMS
5. Spacings (between live parts or live parts to ground)  
UL - 0-250V (3/64 in. min.). 251-600V (1/8 in. min.)

CSA	through air	over surface
51-150V	.12 inches	.25 inches
151-300V	.25	.37
301-600V	.37	.50

### LIFE EXPECTANCY under ELECTRICAL LOAD — make & break operations

These tables show the results of life-tests performed in our standardization laboratory under a variety of service conditions.

SWITCH SERIES		Alternating Current — 60 Hz						Direct Current			
		Amps	125 VAC		250 VAC		600 VAC		24 VDC		125 VDC
			Resistive	Inductive	Resistive	Inductive	Resistive	Inductive	Resistive	Inductive	Resistive   Inductive
21	10		40,000	40,000	—	—	—	—	40,000	—	—
	5		—	—	40,000	40,000	—	—	—	—	—
	2		—	—	—	—	—	—	—	—	40,000
24	20		10,000	10,000	10,000	10,000	10,000	10,000	—	—	—
	3		—	—	—	—	—	—	—	—	10,000   10,000
25	7½		40,000	40,000	—	—	—	—	40,000	—	—
	3		—	—	40,000	40,000	—	—	—	—	—
28	5		40,000	40,000	—	—	—	—	40,000	—	—
	2		—	—	40,000	40,000	—	—	—	—	—
31	10		22,000	18,000	—	—	—	—	7,000	—	—
	5		42,000	38,000	22,000	18,000	—	—	38,000	10,000	—
	3		52,000	48,000	32,000	28,000	—	—	48,000	20,000	—
	1		70,000	65,000	50,000	45,000	30,000	25,000	65,000	37,000	40,000   15,000
	0.5		75,000	70,000	55,000	50,000	35,000	30,000	70,000	42,000	50,000   30,000

Hot-filament load — series 31 for 40,000 operations at 3A-125 VAC

Inductive loads — AC (60-400 Hz) — power factor: to 0.75

DC — 24 VDC at .15 henry, 125 VDC at .075 henry



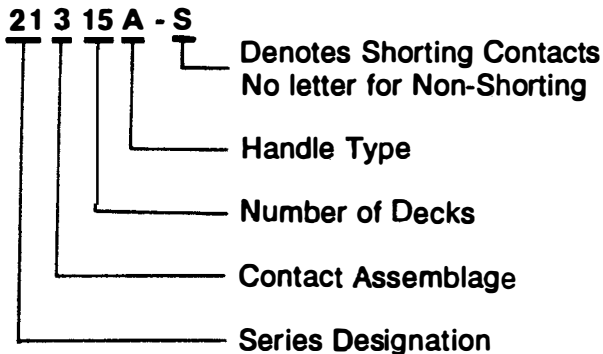
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## HOW TO ORDER:

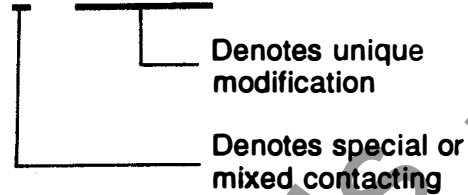
### BASIC NUMBERING SYSTEM

**Standard Switches** - Each Catalog Number identifies a specific switch that is furnished with the contact assemblage and handle as shown on pages 6 to 11.



**Non-Standard Switches** - The following codes are used to specify variations from Standard Switch Numbers.

**21915 LA or 001**



### SPECIAL PURPOSE SWITCHES

When the application requires a switch not shown in this catalog, please complete the Application Worksheet on Page 17 and forward to the factory.

## Standard Contact Assemblages and Diagrams

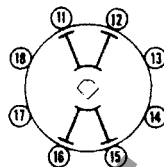
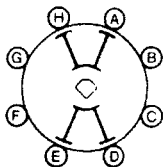
The contact diagrams are shown for 8 position switches, Series 21, 24 & 31. Other detent switches which have more than eight positions (Series 25 has 12 and Series 28 has 16) will have similar contact diagrams except with more positions.

The Series 21 shows the alphabet markings of terminals on the 21, 25 & 28. The Series 24 and 31 (both single and 4-hole mounts) have the numerical terminal markings as shown.

The many Contacting Variations that can be utilized with Electro Switch Detent Switches and which can be combined in the same switch are shown in the assemblage diagrams below. All are shown with the handle in the 12 o'clock (0°) position. They can be furnished with either make-before-break (shorting) or break-before-make (non-shorting) contacts except as noted below.

### Assemblage 2

Two poles per section; double-break switching. This assemblage is normally limited to three positions.



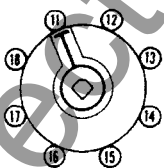
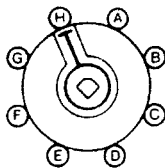
### SERIES 21

### SERIES 24 & 31

DECK	CONTACTS HANDLE END	POSITIONS			CONTACTS HANDLE END
		1	2	3	
1	HO	11	12	13	11
	AO	12	13	14	12
	BO	13	14	15	13
	DO	14	15	16	14
	EO	15	16	17	15
	FO	16	17	18	16
	GO	17	18	19	17
	HO	18	19	20	18

### Assemblage 3

One pole per section; provides "OFF" and 7 tap positions.



8 on positions are available - contact factory

### SERIES 21

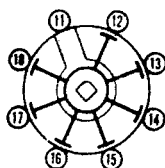
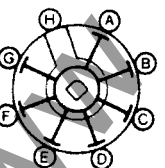
### SERIES 24 & 31

DECK	CONTACTS HANDLE END	POSITIONS							CONTACTS HANDLE END
		OFF	1	2	3	4	5	6	
1	HO	11	12	13	14	15	16	17	11
	AO	12	13	14	15	16	17	18	12
	BO	13	14	15	16	17	18	19	13
	CO	14	15	16	17	18	19	20	14
	DO	15	16	17	18	19	20	21	15
	EO	16	17	18	19	20	21	22	16
	FO	17	18	19	20	21	22	23	17
	GO	18	19	20	21	22	23	24	18

### Assemblage 11

Allows any one circuit to be opened while the rest are closed; make-before-break (shorting) only.

This assemblage is not available in Series 28.



### SERIES 21

### SERIES 24 & 31

DECK	CONTACTS HANDLE END	POSITIONS																CONTACTS HANDLE END
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1	HO	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	11
	AO	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	12
	BO	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	13
	CO	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	14
	DO	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	15
	EO	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	16
	FO	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	17
	GO	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	18



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# Non-standard Contact Assemblages and Diagrams

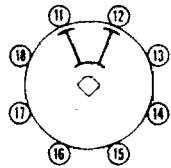
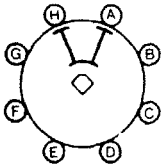
Available with Factory Authorization only.

## Assemblage 1

One pole per section; double-break switching.

### SERIES 21

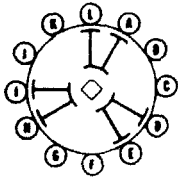
### SERIES 24 & 31



DECK	CONTACTS HANDLE END	POSITIONS								CONTACTS HANDLE END
		1	2	3	4	5	6	7	8	
1	H O	1	2	3	4	5	6	7	8	11 O
	A O	1	2	3	4	5	6	7	8	12 O
	B O	1	2	3	4	5	6	7	8	13 O
	C O	1	2	3	4	5	6	7	8	14 O
	D O	1	2	3	4	5	6	7	8	15 O
	E O	1	2	3	4	5	6	7	8	16 O
	F O	1	2	3	4	5	6	7	8	17 O
	G O	1	2	3	4	5	6	7	8	18 O

## Assemblage 5

Three poles per section; double-break switching. This assemblage is available in, and shown for Series 25 only.



### SERIES 25

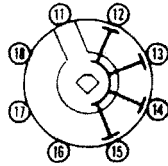
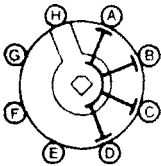
DECK	CONTACTS HANDLE END	POSITIONS		
		1	2	3
1	L O	1	2	3
	A O	1	2	3
	B O	1	2	3
	D O	1	2	3
	E O	1	2	3
	F O	1	2	3
	G O	1	2	3
	H O	1	2	3
	I O	1	2	3
	J O	1	2	3

## Assemblage 6

Cumulative tap switch; make-before-break (shorting) only. This assemblage is normally limited to four positions.

### SERIES 21

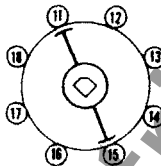
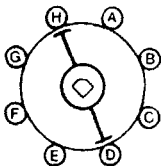
### SERIES 24 & 31



DECK	CONTACTS HANDLE END	POSITIONS				CONTACTS HANDLE END
		1	2	3	4	
1	H O	1	2	3	4	12 O
	A O	1	2	3	4	13 O
	B O	1	2	3	4	14 O
	C O	1	2	3	4	15 O
	D O	1	2	3	4	16 O
	E O	1	2	3	4	17 O
	F O	1	2	3	4	18 O
	G O	1	2	3	4	19 O

## Assemblage 7

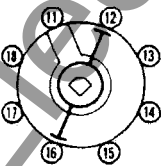
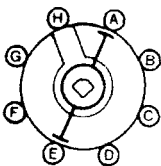
Provides double-break switching. This assemblage is normally limited to four positions.



DECK	CONTACTS HANDLE END	POSITIONS				CONTACTS HANDLE END
		1	2	3	4	
1	H O	1	2	3	4	11 O
	A O	1	2	3	4	12 O
	B O	1	2	3	4	13 O
	C O	1	2	3	4	14 O

## Assemblage 8

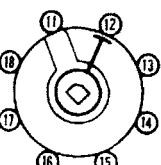
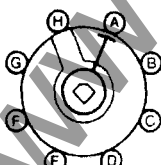
Allows pairs of circuits to be fed from a common source.



DECK	CONTACTS HANDLE END	POSITIONS			CONTACTS HANDLE END
		1	2	3	
1	H O	1	2	3	12 O
	A O	1	2	3	13 O
	B O	1	2	3	14 O
	C O	1	2	3	15 O
	D O	1	2	3	16 O
	E O	1	2	3	17 O
	F O	1	2	3	18 O
	G O	1	2	3	19 O

## Assemblage 10

Same as Assemblage 3 except first position is "On".



DECK	CONTACTS HANDLE END	POSITIONS								CONTACTS HANDLE END
		1	2	3	4	5	6	7	OFF	
1	H O	1	2	3	4	5	6	7	OFF	12 O
	A O	1	2	3	4	5	6	7	OFF	13 O
	B O	1	2	3	4	5	6	7	OFF	14 O
	C O	1	2	3	4	5	6	7	OFF	15 O
	D O	1	2	3	4	5	6	7	OFF	16 O
	E O	1	2	3	4	5	6	7	OFF	17 O
	F O	1	2	3	4	5	6	7	OFF	18 O
	G O	1	2	3	4	5	6	7	OFF	19 O

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