

MODEL HEA

Multicontact Auxiliary

Application

HEA high-speed multicontact auxiliary relays are applicable where it is desired that a number of operations be performed simultaneously from the operation of a single relay.

Typical functions that can be performed by these relays are:

1. trip the main circuit breaker of a system
2. trip station auxiliary breakers
3. trip main or auxiliary field breakers
4. trip and lock out all breakers on a bus

Perhaps the most important use of the HEA relay is in conjunction with differential relays which protect transformers, rotating apparatus, buses, etc.



Features and Benefits

- Electrically separate outputs available
- Various shaft lengths available
- Locks equipment out of service

Applications

- Contact multiplication

Protection and Control

- Trip and/or block close breaker control



Construction

The HEA multicontact, hand-reset auxiliary relays are built with many parts common to the wellknown Type SB-1 control and transfer switches. The mechanical target on the escutcheon plate assembly indicates the position of the relay. The black target indicates the reset position and the orange target, the tripped position. To reset the relay after being tripped, the handle is turned clockwise as indicated by the arrow on the escutcheon plate.

Since the HEA relay is basically similar to the SB-1 switch, it is available with a shaft long enough to allow it to be mounted on panels with a thickness of from 1/8 inch to 2 inches thick, in increments of 1/16 inch.

Like the SB-1 switch, all HEA relays must be ordered for the specific panel thickness, otherwise the relay will be supplied with a shaft long enough to be mounted only on a 1/8 inch panel.

EXAMPLE: HEA61A222 for 3/4 inch panel relay number would be HEA61A222X12 (3/4 inch = 12/16 = _____ X12).

EXAMPLE: HEA63F272 for 1 1/2 inch panel relay number would be HEA6313272X24 (1-1/2 inch = 24/16 = _____ X24).

HEA61, HEA62, and HEA63

Operation

The operating shaft is held in the reset position by a positive roller latch which is especially constructed to resist shock and vibration. It is released through the action of the operating coil, in attracting a hinged element.

All HEA relays are made so that they should not normally be tripped manually, although it is possible by removing the rear cover and releasing the hinged armature element.

Special Mounting

HEA61A, 61B, 61C, 62C, 63C and 63G relays can be supplied with a bevel-gear drive which allows the relay to be mounted in locations where normally the depth is not sufficient. The relays can be mounted like the standard but the bevel-gear drive changes the direction by 90° of that portion of the relay that is behind the panel. The bevel-gear drive is available to change the direction up, down, left, or right.

To select the proper model number of the special relay, select the number of the standard relay desired (example: HEA61C230X2). If a right angle drive upward is desired, add the letters "Right-angle Up" to the standard model number. Hence, the model number would be HEA61CRU230X2 (for 1/8 inch panel).

Contact Ratings

The current-closing rating of the contacts is 50 A for voltages not exceeding 600 V. The contacts have a current-carrying capacity of 20 A continuously or 50 A for one minute. The interrupting ability of the contacts varies with the inductance of the circuit. The values (in amperes) given in Table 1, for DC inductive circuits, are based on the average trip coil.

Burdens

The burdens for the Type HEA relays are given in Table 2.

Model HEA - Table 1. Contact interrupting ratings

| CIRCUIT VOLTS | Amps NONINDUCTIVE CIRCUITS NUMBER OF CONTACTS | | | Amps INDUCTIVE CIRCUIT NUMBER OF CONTACTS | | |
|---------------|---|-------------|-------------|---|-------------|-------------|
| | 1 | 2 IN SERIES | 4 IN SERIES | 1 | 2 IN SERIES | 4 IN SERIES |
| 24 DC | 6.0 | 30.0 | ---- | 4.0 | 20.0 | 30.0 |
| 48 DC | 5.0 | 25.0 | 40.0 | 3.0 | 15.0 | 25.0 |
| 125 DC | 2.5 | 11.0 | 25.0 | 2.0 | 6.25 | 9.5 |
| 250 DC | 0.75 | 2.0 | 8.0 | 0.7 | 1.75 | 6.5 |
| 600 DC | 0.25 | 0.45 | 1.35 | 0.15 | 0.35 | 1.25 |
| 115 AC | 40.0 | 50.0 | ---- | 24.0 | 50.0 | ---- |
| 230 AC | 25.0 | 50.0 | ---- | 12.0 | 25.0 | 40.0 |
| 460 AC | 12.0 | 25.0 | ---- | 5.0 | 12.0 | 20.0 |
| 550 AC | 6.0 | 12.0 | ---- | 4.0 | 10.0 | 15.0 |

HEA61 Hand Reset

Application

The HEA61 relay is a hand-reset high speed auxiliary relay. When it is used in conjunction with differential relays which are protecting transformers, rotating machines, buses, etc., it is preferred that the auxiliary relay be hand reset to prevent accidental reclosing of breakers when an internal fault has caused the differential relay to operate.

Operation

The HEA61 relay is available with 6, 10, or 16 main electrically separate contacts. In addition, there are 2 normally closed contacts that are wired for opening the operating coil circuit. See Figure 2.

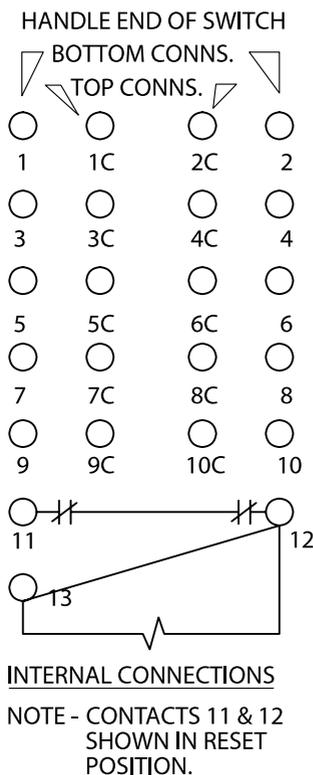


Fig. 2. Typical HEA61B relay contact arrangement

Model HEA

Table 2. Burden data of trip coil

| INTERMITTENT RATING VOLTS | FREQUENCY | COIL RESIS. Ohms AT 25°C | AC COIL CURRENT Amps AT (RATED VOLTS) | OPERATING RANGE VOLT | RATING OF PROTECTIVE RELAY TARGET COIL Amps | |
|---------------------------|-----------|--------------------------|---------------------------------------|----------------------|---|-----------------------------|
| | | | | | UNIVERSAL TARGET SEAL-IN | SEPARATE TARGET AND SEAL-IN |
| 24 | DC | 1.2 | ---- | 14-30 | 2.0 | 1.0 |
| 48 | DC | 4.5 | ---- | 28-60 | 2.0 | 1.0 |
| 125 | DC | 23 | ---- | 70-140 | 0.2 | 1.0 |
| 250 | DC | 103 | ---- | 140-280 | 0.2 | 0.2 |
| 115 | 50/60 Hz | ---- | 25 | 95-125 | 2.0 | ---- |
| 230 | 50/60 Hz | ---- | 14 | 190-250 | 2.0 | ---- |
| 460 | 50/60 Hz | ---- | 7 | 380-500 | 2.0 | ---- |

The time required to trip the relay, from the instant of energization of the coil to the closing of the contacts, is approximately 15 ms (1 cycle on 60 Hz basis)-slightly less for opening of the contacts. See Figure 3.

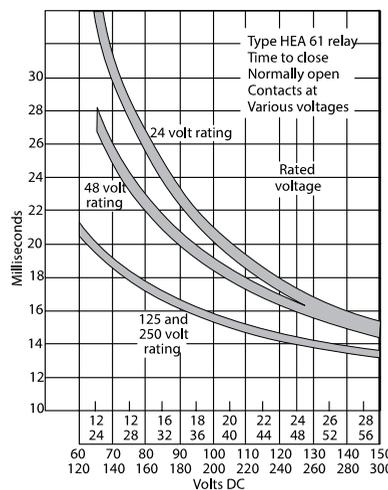


Fig. 3. Typical time-voltage characteristics of Type HEA61 relay

NOTE: When viewed from the handle end of the relay, the odd contacts are on the right-hand side and the even contacts are on the left-hand side starting at the handle end and proceeding to the rear of the relay. Normally, open contacts are the first contacts (nearest the handle) on the relay, in the reset position.

Example: HEA61B233 rated 125 VDC
3 NO (contact numbers 1, 2, and 3) 7 NC (contact numbers 4, 5, 6, 7, 8, 9, 10)

HEA62 Hand Reset

The HEA62 relay is identical to the HEA61 with the exception that on the HEA62 there is a diode-resistor combination inserted across the coil circuit. See Fig. 4. This diode-resistor suppresses the surge sometimes caused by the interruption of the coil contacts on a DC circuit.

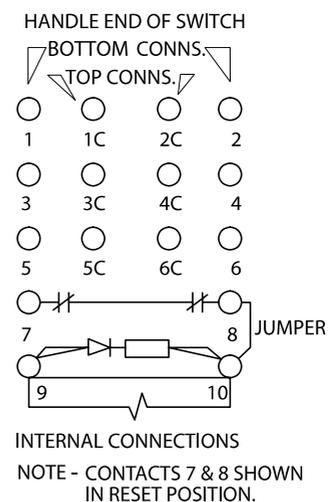


Fig. 4. Typical HEA62A relay contact arrangement

The diode-resistor combination is mounted on a small board that is mechanically attached beneath the trip coil frame. Although in most cases this diode-resistor combination is unnecessary, it is offered for those unusual conditions where the user might feel it necessary. The HEA62 is available only in the 62A, 62B, and 62C DC series.

HEA63 Hand and Electric Reset

Application

The HEA63 relay is basically a standard HEA61 except it has a rotary solenoid which is used to electrically reset the relay and there are only certain contact sequences available (see Selection Guide). This relay is especially useful where the operator and the HEA63 relay are some distance apart.

Operation

The operation of the relay may be understood by referring to Fig. 5. When electrical resetting is desired, a contact or switch is closed which completes the HGA33 relay (which is a part of the overall HEA63 relay and is supplied automatically with the relay) coil circuit through a contact of the HEA relay. This contact is closed in the trip position. Closure of the HGA33 contacts energizes the rotary solenoid which imparts enough rotational force to the HEA shaft through a coupling to cause the HEA to reset and latch. When the HEA resets, the contact which energized the HGA33 coil opens and de-energizes the HGA33 relay. This HGA is of the time delay drop out variety with approximately 0.25 sec drop out time. The time delay insures that the HEA has fully latched. The contacts of the HGA33 then interrupt the rotary solenoid operating current. The HGA33 contacts have a high interrupting rating which is required because the rotary solenoid current is of a relatively high inductive magnitude.

Fig. 6. Typical HEA63B contact arrangement

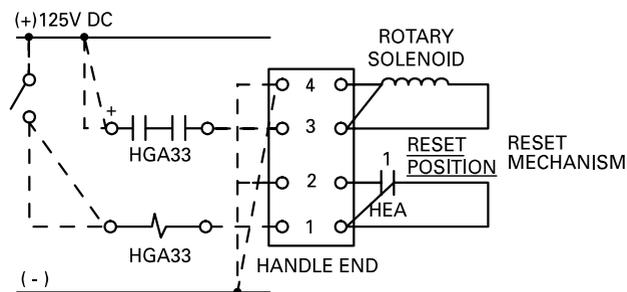
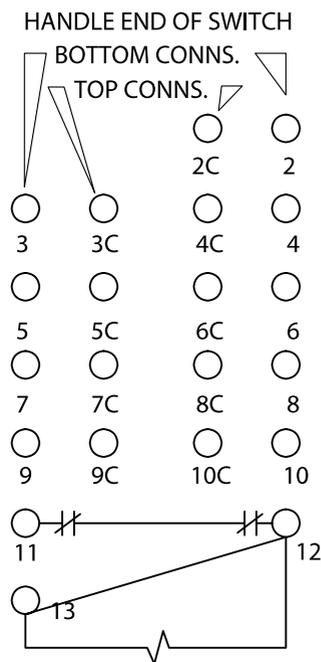


Fig. 6. Typical HEA63B contact arrangement

Model HEA

| RATING (VOLTS) | ROTARY SOLENOID COIL CURRENT (Amps) |
|----------------|-------------------------------------|
| 24 | 26.8 |
| 48 | 13.5 |
| 125 | 5.5 |
| 250 | 2.8 |



HEA INTERNAL CONNECTIONS

NOTE - CONTACTS 11 & 12 SHOWN IN RESET POSITION.

Fig. 5. Typical schematic of HEA63 relay

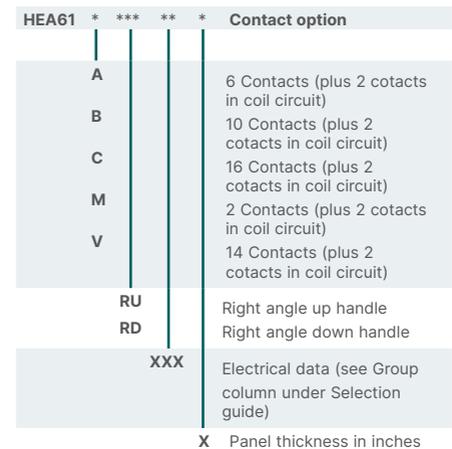
Model HEA61 Hand Reset Selection Guide

| CONTACT OPTION | GROUP | | | | | | | CONTACT ARRANGEMENT | | APPROX. WT. IN lbs (kg) | | | | |
|----------------|--------|--------|---------|---------|---------|----------------|----------------|---------------------|---------------------|-------------------------|-------------|-------------|------------|------------|
| | 24 VDC | 48 VDC | 125 VDC | 220 VDC | 250 VDC | 115 V 50/60 Hz | 230 V 50/60 Hz | CONTACT NUMBERS N.O | CONTACT NUMBERS N.C | NET | SHIP | | | |
| M | 40 | 30 | 20 | 80 | 10 | 90 | 100 | 3-4 | None | 3 (1.3) | 5 (2.2) | | | |
| | 41 | 31 | 21 | 81 | 11 | 91 | 101 | 3 | 4 | | | | | |
| | 42 | 32 | 22 | 82 | 12 | 92 | 102 | None | 3-4 | | | | | |
| A | 240 | 230 | 220 | 280 | 210 | 290 | 300 | None | 1-6 | 4 (1.8) | 6 (2.7) | | | |
| | 241 | 231 | 221 | 281 | 211 | 291 | 301 | 1 | 2-6 | | | | | |
| | 242 | 232 | 222 | 282 | 212 | 292 | 302 | 1-2 | 3-6 | | | | | |
| | 243 | 233 | 223 | 283 | 213 | 293 | 303 | 1-3 | 4-6 | | | | | |
| | 244 | 234 | 224 | 284 | 214 | 294 | 304 | 1-4 | 5-6 | | | | | |
| | 245 | 235 | 225 | 285 | 215 | 295 | 305 | 1-5 | 6 | | | | | |
| | 246 | 236 | 226 | 286 | 216 | 296 | 306 | 1-6 | None | | | | | |
| | B | 270 | 250 | 230 | 330 | 210 | 350 | 370 | None | | | 1-10 | 6 (2.7) | 8 (3.6) |
| 271 | | 251 | 231 | 331 | 211 | 351 | 371 | 1 | 2-10 | | | | | |
| 272 | | 252 | 232 | 332 | 212 | 352 | 372 | 1-2 | 3-10 | | | | | |
| 273 | | 253 | 233 | 333 | 213 | 353 | 373 | 1-3 | 4-10 | | | | | |
| 274 | | 254 | 234 | 334 | 214 | 354 | 374 | 1-4 | 5-10 | | | | | |
| 275 | | 255 | 235 | 335 | 215 | 355 | 375 | 1-5 | 6-10 | | | | | |
| 276 | | 256 | 236 | 336 | 216 | 356 | 376 | 1-6 | 7-10 | | | | | |
| 277 | | 257 | 237 | 337 | 217 | 357 | 377 | 1-7 | 8-10 | | | | | |
| 278 | | 258 | 238 | 338 | 218 | 358 | 378 | 1-8 | 9-10 | | | | | |
| 279 | | 259 | 239 | 339 | 219 | 359 | 379 | 1-9 | 10 | | | | | |
| 280 | | 260 | 240 | 340 | 220 | 360 | 380 | 1-10 | None | | | | | |
| V | | 70 | 50 | 30 | ---- | 10 | 90 | 110 | None | 1-14 | 8 (3.6) | 10 (4.5) | | |
| | | 71 | 51 | 31 | ---- | 11 | 91 | 111 | 1 | 2-14 | | | | |
| | 72 | 52 | 32 | ---- | 12 | 92 | 112 | 1-2 | 3-14 | | | | | |
| | 73 | 53 | 33 | ---- | 13 | 93 | 113 | 1-3 | 4-14 | | | | | |
| | 74 | 54 | 34 | ---- | 14 | 94 | 114 | 1-4 | 5-14 | | | | | |
| | 75 | 55 | 35 | ---- | 15 | 95 | 115 | 1-5 | 6-14 | | | | | |
| | 76 | 56 | 36 | ---- | 16 | 96 | 116 | 1-6 | 7-14 | | | | | |
| | 77 | 57 | 37 | ---- | 17 | 97 | 117 | 1-7 | 8-14 | | | | | |
| | 78 | 58 | 38 | ---- | 18 | 98 | 118 | 1-8 | 9-14 | | | | | |
| | 79 | 59 | 39 | ---- | 19 | 99 | 119 | 1-9 | 10-14 | | | | | |
| | 80 | 60 | 40 | ---- | 20 | 100 | 120 | 1-10 | 11-14 | | | | | |
| | 81 | 61 | 41 | ---- | 21 | 101 | 121 | 1-11 | 12-14 | | | | | |
| | 82 | 62 | 42 | ---- | 22 | 102 | 122 | 1-12 | 13-14 | | | | | |
| | 83 | 63 | 43 | ---- | 23 | 103 | 123 | 1-13 | 14 | | | | | |
| 84 | 64 | 44 | ---- | 24 | 104 | 124 | 1-14 | None | | | | | | |
| C | 270 | 250 | 230 | 290 | 210 | 310 | 350 | None | 1-16 | 8 (3.6) | 10 (4.5) | | | |
| | 271 | 251 | 231 | 291 | 211 | 311 | 351 | 1 | 2-16 | | | | | |
| | 272 | 252 | 232 | 292 | 212 | 312 | 352 | 1-2 | 3-16 | | | | | |
| | 273 | 253 | 233 | 293 | 213 | 313 | 353 | 1-3 | 4-16 | | | | | |
| | 274 | 254 | 234 | 294 | 214 | 314 | 354 | 1-4 | 5-16 | | | | | |
| | 275 | 255 | 235 | 295 | 215 | 315 | 355 | 1-5 | 6-16 | | | | | |
| | 276 | 256 | 236 | 296 | 216 | 316 | 356 | 1-6 | 7-16 | | | | | |
| | 277 | 257 | 237 | 297 | 217 | 317 | 357 | 1-7 | 8-16 | | | | | |
| | 278 | 258 | 238 | 298 | 218 | 318 | 358 | 1-8 | 9-16 | | | | | |
| | 279 | 259 | 239 | 299 | 219 | 319 | 359 | 1-9 | 10-16 | | | | | |
| | 280 | 260 | 240 | 300 | 220 | 320 | 360 | 1-10 | 11-16 | | | | | |
| | 281 | 261 | 241 | 301 | 221 | 321 | 361 | 1-11 | 12-16 | | | | | |
| | 282 | 262 | 242 | 302 | 222 | 322 | 362 | 1-12 | 13-16 | | | | | |
| | 283 | 263 | 243 | 303 | 223 | 323 | 363 | 1-13 | 14-16 | | | | | |
| 284 | 264 | 244 | 304 | 224 | 324 | 364 | 1-14 | 15-16 | | | | | | |
| 285 | 265 | 245 | 305 | 225 | 325 | 365 | 1-15 | 16 | | | | | | |
| 286 | 266 | 246 | 306 | 226 | 326 | 366 | 1-16 | None | | | | | | |

Choosing an HEA

1. Decide if a Hand Reset or both Hand and electric Reset HEA is required
2. For an Electric Reset HWA go to step 3
For a Hand Reset HWA go to step 4
3. An HGA33 Auxiliary Relay will accompany the HEA. The HGA is available as front or back connected.
4. Choose the number of contacts required and their action N.O and N.C)
5. Opening voltage of the HEA must be known

Order Code breakdown



| HEA63 | * | *** | ** | * | Order Code Breakdown |
|-------|---|-----|-----|---|---|
| A | | | | | Contact Option 5 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected 9 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected 15 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected 5 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected 9 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected 15 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected |
| B | | | | | |
| C | | | | | |
| D | | | | | |
| F | | | | | |
| G | | | | | |
| | | RU | | | |
| | | | XXX | | Electrical data (see Group column under Selection guide) |
| | | | | X | Panel thickness in inches |

Model HEA Hand and Electric Reset Selection Guide

| CONTACT ARRANGEMENT RESET (LATCHED) POSITION | | CONTACT OPTION | GROUP WITH FRONT-CONNECTED AUXILIARY (HGA33A) | | | | CONTACT OPTION | GROUP WITH BACK-CONNECTED AUXILIARY (HGA33B) | | | | APPROX WT IN lbs (kg) | | |
|---|--------------------------------------|-------------------|--|-------|--------|--------|-------------------|---|-------|--------|--------|--------------------------|-------------|--|
| CONTACT NUMBERS NORM OPEN | CONTACT NUMBERS NORM CLOSED | | 24VDC | 48VDC | 125VDC | 250VDC | | 24VDC | 48VDC | 125VDC | 250VDC | NET | SHIP | |
| 5 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit) | | | | | | | | | | | | | | |
| None | 2-6 | A | 241 | 331 | 221 | 211 | D | 241 | 331 | 221 | 211 | 14 (6.3) | 18 (8.2) | |
| 2 | 3-6 | | 242 | 332 | 222 | 212 | | 242 | 332 | 222 | 212 | | | |
| 2-3 | 4-6 | | 243 | 333 | 223 | 213 | | 243 | 333 | 223 | 213 | | | |
| 2-4 | 5-6 | | 244 | 334 | 224 | 214 | | 244 | 334 | 224 | 214 | | | |
| 2-5 | 6 | | 245 | 335 | 225 | 215 | | 245 | 335 | 225 | 215 | | | |
| 2-6 | None | | 246 | 336 | 226 | 216 | | 246 | 336 | 226 | 216 | | | |
| 9 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit) | | | | | | | | | | | | | | |
| 2 | 3-10 | B | 272 | 252 | 232 | 212 | F | 272 | 252 | 232 | 212 | 15 (6.8) | 19 (8.6) | |
| 2-3 | 4-10 | | 273 | 253 | 233 | 213 | | 273 | 253 | 233 | 213 | | | |
| 2-4 | 5-10 | | 274 | 254 | 234 | 214 | | 274 | 254 | 234 | 214 | | | |
| 2-5 | 6-10 | | 275 | 255 | 235 | 215 | | 275 | 255 | 235 | 215 | | | |
| 2-6 | 7-10 | | 276 | 256 | 236 | 216 | | 276 | 256 | 236 | 216 | | | |
| 2-7 | 8-10 | | 277 | 257 | 237 | 217 | | 277 | 257 | 237 | 217 | | | |
| 2-8 | 9-10 | | 278 | 258 | 238 | 218 | | 278 | 258 | 238 | 218 | | | |
| 2-9 | 10 | | 279 | 259 | 239 | 219 | | 279 | 259 | 239 | 219 | | | |
| 2-10 | None | | 280 | 260 | 240 | 220 | | 280 | 260 | 240 | 220 | | | |
| 15 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit) | | | | | | | | | | | | | | |
| 2-8 | 9-16 | C | 318 | 278 | 238 | 218 | G | 318 | 278 | 238 | 218 | 16 (7.2) | 20 (9) | |
| 2-9 | 10-16 | | 319 | 279 | 239 | 219 | | 319 | 279 | 239 | 219 | | | |
| 2-10 | 11-16 | | 320 | 280 | 240 | 220 | | 320 | 280 | 240 | 220 | | | |
| 2-11 | 12-16 | | 321 | 281 | 241 | 221 | | 321 | 281 | 241 | 221 | | | |
| 2-12 | 13-16 | | 322 | 282 | 242 | 222 | | 322 | 282 | 242 | 222 | | | |
| 2-13 | 14-16 | | 323 | 283 | 243 | 223 | | 323 | 283 | 243 | 223 | | | |
| 2-14 | 15-16 | | 324 | 284 | 244 | 224 | | 324 | 284 | 244 | 224 | | | |
| 2-15 | 16 | | 325 | 285 | 245 | 225 | | 325 | 285 | 245 | 225 | | | |
| 2-16 | None | | 326 | 286 | 246 | 226 | | 326 | 286 | 246 | 226 | | | |

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