

# 3 Series Thumbwheel Switches

## Features/Benefits

- Most complete product offering in the industry
- Spacers available to fit most panel cutouts
- Front or rear mounting options
- Test & measurement equipment
- Industrial equipment
- Computer devices



## Specifications

### CONTACT RATING:

CARRY: 1 AMP continuous.

SWITCH: 100 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC or 120 V AC.

ELECTRICAL LIFE: 100,000 actuations.

CONTACT RESISTANCE: Below 100 m  $\Omega$  typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10<sup>9</sup>  $\Omega$  min.

DIELECTRIC STRENGTH: 500 Vrms min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: -40°C to 65°C.

## Materials

HOUSING: ABS plastic.

THUMBWHEEL: ABS plastic.

ROTOR CONTACTS: Precious metal on copper alloy.

STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

\* Note: All models listed are RoHS compliant. See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages M-4 thru M-10. For additional options not shown in catalog, consult Customer Service Center.

Consult factory for illumination availability.

|                     |                                                                                                                                                                                                                                          |                                                                                                                                                                                    |                                                                                                                           |                                                                                                                                        |                                                      |                                                                                |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>Series</b>       | <b>Number of Sections</b>                                                                                                                                                                                                                | <b>Function Code</b>                                                                                                                                                               | <b>Mounting Style</b>                                                                                                     | <b>Terminations</b>                                                                                                                    | <b>Color/Marking/Stops</b>                           | <b>Seal</b>                                                                    |
| 3 Thumbwheel switch | 0 Switch section<br>1 1 Switch section<br>2 2 Switch sections<br>3 3 Switch sections<br>4 4 Switch sections<br>5 5 Switch sections<br>6 6 Switch sections<br>7 7 Switch sections<br>8 8 Switch sections<br>9 More than 8 switch sections | 11 Decimal, SP, 10 position<br>14 Resistor decade<br>21 BCD, 10 position<br>23 Complement of BCD, 10 position<br>27 BCD, 10 position<br>31 BCD, 10 position<br>71 BCH, 16 position | 00 Snap-in, front mount<br>09 Snap-in, front mount*<br>10 Rear mount<br>19 Rear mount*<br>20 Rear mount<br>29 Rear mount* | 0 Type 0<br>1 Type 1, extended type 0<br>N Solder pins with .100" spacing**<br>P Solder pins with .156" spacing**<br>9 Any combination | 0 Matte black body, gloss black wheel, white marking | 0 No seal<br>1 Sealed contacts<br>2 Dust lens<br>3 Sealed contacts & dust lens |

\*X9 mounting styles must be ordered with '0' number of sections.

\*\* Note: Termination option N (RoHS compliant) replaced termination option 3 (Non-RoHS compliant).  
Termination option P (RoHS compliant) replaced termination option B (Non-RoHS compliant).

Thumbwheel



M



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# 3 Series Thumbwheel Switches

## SERIES

### 3 THUMBWHEEL SWITCHES



## NUMBER OF SECTIONS

- 0 Switch section only, no assembly. Blank bodies are considered sections; endplates are not sections. Must be ordered with 09 or 19 mounting style options, see pages M-5 and M-6.
- 1-8 Number of switch sections in assembly, includes endplates.
- 9 More than 8 switch sections, specify on CONFIGURATION FORM, page M-10 and consult Customer Service Center.

NOTE: Endplates and blank sections available separately, see pages M-13 and M-14.

## FUNCTION CODE

- 11 DECIMAL-1 POLE; 10 POSITION
- 14 RESISTOR DECADE; 1-2-2-2-2 CODE (RESISTORS NOT SUPPLIED)
- 21 BCD 1-2-4-8; 10 POSITION

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |    |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | C  |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    | ●  |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    | ●  |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    | ●  |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    | ●  |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    | ●  |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    | ●  |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    | ●  |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    | ●  |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    | ●  |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  | ●  |
| TERM. LOCATION        |                                      |   |   |   |   |   |   |   |    |    |    |
|                       | 2                                    | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

Available Terminations: 0, 1, N  
See fig. 1, page M-7.

| W<br>H<br>E<br>E<br>L | SWITCH CIRCUIT |   |   |   |   |     |    |   |   |   |   |
|-----------------------|----------------|---|---|---|---|-----|----|---|---|---|---|
|                       | 0              | 1 | 2 | 3 | 4 | 5   | 6  | 7 | 8 | 9 | C |
| 0                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 1                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 2                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 3                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 4                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 5                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 6                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 7                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 8                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| 9                     | ●              | ● | ● | ● | ● | ●   | ●  | ● | ● | ● | ● |
| TERM. LOCATION        |                |   |   |   |   |     |    |   |   |   |   |
|                       | 11             | 9 | 7 | 5 | 3 | 1,2 | 12 |   |   |   |   |

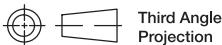
Available Terminations: 1  
See fig. 1, page M-7.



| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |    |   |  |  |  |  |  |  |
|-----------------------|-------------------------------|---|---|----|---|--|--|--|--|--|--|
|                       | 1                             | 2 | 4 | 8  | C |  |  |  |  |  |  |
| 0                     |                               |   |   |    | ● |  |  |  |  |  |  |
| 1                     | ●                             |   |   |    | ● |  |  |  |  |  |  |
| 2                     |                               | ● |   |    | ● |  |  |  |  |  |  |
| 3                     |                               |   | ● |    | ● |  |  |  |  |  |  |
| 4                     |                               |   |   | ●  | ● |  |  |  |  |  |  |
| 5                     | ●                             |   |   |    | ● |  |  |  |  |  |  |
| 6                     |                               | ● |   |    | ● |  |  |  |  |  |  |
| 7                     |                               |   | ● |    | ● |  |  |  |  |  |  |
| 8                     |                               |   |   | ●  | ● |  |  |  |  |  |  |
| 9                     | ●                             |   |   |    | ● |  |  |  |  |  |  |
| TERM. LOCATION        |                               |   |   |    |   |  |  |  |  |  |  |
|                       | 3                             | 5 | 7 | 11 | 9 |  |  |  |  |  |  |

Available Terminations: 0, 1, N  
See fig. 1, page M-7.

NOTE: For terminal location diagram, see page M-7.



Third Angle  
Projection

Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



3 Series  
Thumbwheel Switches

FUNCTION CODE

23 COMPLEMENT OF BCD 1-2-4-8;  
10 POSITION

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO<br>COMM. SIG. C |   |   |   |
|-----------------------|----------------------------------|---|---|---|
|                       | 1                                | 2 | 4 | 8 |
| 0                     | ●                                | ● | ● | ● |
| 1                     | ●                                | ● | ● | ● |
| 2                     | ●                                | ● | ● | ● |
| 3                     | ●                                | ● | ● | ● |
| 4                     | ●                                | ● | ● | ● |
| 5                     | ●                                | ● | ● | ● |
| 6                     | ●                                | ● | ● | ● |
| 7                     | ●                                | ● | ● | ● |
| 8                     | ●                                | ● | ● | ● |
| 9                     | ●                                | ● | ● | ● |
| TERM. LOCATION        |                                  |   |   |   |

Available Terminations: 0, 1, N  
See fig. 1, page M-7.

27 BCD 1-2-4-8; 10 POSITION

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO<br>COMM. SIG. C |   |   |   |
|-----------------------|----------------------------------|---|---|---|
|                       | 1                                | 2 | 4 | 8 |
| 0                     | ●                                | ● | ● | ● |
| 1                     | ●                                | ● | ● | ● |
| 2                     | ●                                | ● | ● | ● |
| 3                     | ●                                | ● | ● | ● |
| 4                     | ●                                | ● | ● | ● |
| 5                     | ●                                | ● | ● | ● |
| 6                     | ●                                | ● | ● | ● |
| 7                     | ●                                | ● | ● | ● |
| 8                     | ●                                | ● | ● | ● |
| 9                     | ●                                | ● | ● | ● |
| TERM. LOCATION        |                                  |   |   |   |

Available Terminations: P  
See fig. 2, page M-7.

31 BCD 1-2-4-8; 10 POSITION

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO<br>COMM. SIG. C |   |   |   |
|-----------------------|----------------------------------|---|---|---|
|                       | 1                                | 2 | 4 | 8 |
| 0                     | ●                                | ● | ● | ● |
| 1                     | ●                                | ● | ● | ● |
| 2                     | ●                                | ● | ● | ● |
| 3                     | ●                                | ● | ● | ● |
| 4                     | ●                                | ● | ● | ● |
| 5                     | ●                                | ● | ● | ● |
| 6                     | ●                                | ● | ● | ● |
| 7                     | ●                                | ● | ● | ● |
| 8                     | ●                                | ● | ● | ● |
| 9                     | ●                                | ● | ● | ● |
| TERM. LOCATION        |                                  |   |   |   |

Available Terminations: 0, 1, N  
See fig. 1, page M-7.

71 BINARY CODED HEXADECIMAL,  
16 POSITION

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO<br>COMM. SIG. C |   |   |   |
|-----------------------|----------------------------------|---|---|---|
|                       | 1                                | 2 | 4 | 8 |
| 0                     | ●                                | ● | ● | ● |
| 1                     | ●                                | ● | ● | ● |
| 2                     | ●                                | ● | ● | ● |
| 3                     | ●                                | ● | ● | ● |
| 4                     | ●                                | ● | ● | ● |
| 5                     | ●                                | ● | ● | ● |
| 6                     | ●                                | ● | ● | ● |
| 7                     | ●                                | ● | ● | ● |
| 8                     | ●                                | ● | ● | ● |
| 9                     | ●                                | ● | ● | ● |
| A                     | ●                                | ● | ● | ● |
| B                     | ●                                | ● | ● | ● |
| C                     | ●                                | ● | ● | ● |
| D                     | ●                                | ● | ● | ● |
| E                     | ●                                | ● | ● | ● |
| F                     | ●                                | ● | ● | ● |
| TERM. LOCATION        |                                  |   |   |   |

Available Terminations: 0, 1, N  
See fig. 1, page M-7.

NOTE: For terminal location diagram, see page M-7.

MOUNTING STYLE

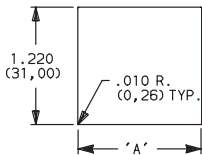
Type 0 Snap-In Front Mount

| MOUNTING<br>STYLE | DIM. 'A'                                 |
|-------------------|------------------------------------------|
| 00                | (.315 x N) + .326<br>(8,00 x N) + (8,28) |

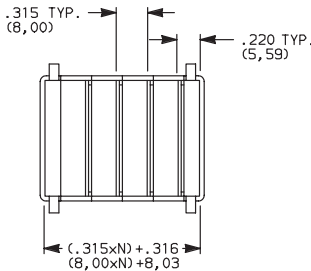
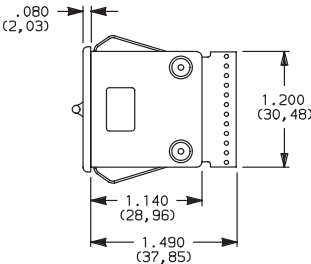
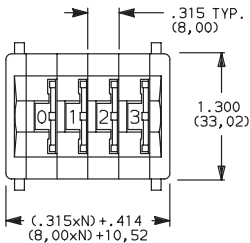
N = Number of sections.

Recommended panel thickness:  
0.46-.125  
(1,16-3,18)

PANEL MOUNTING



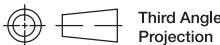
00 SWITCH ASSEMBLY W/ ENDPLATES-.315 (8,00) SECTION PITCH



N = Number of sections.

09 SWITCH SECTION ONLY-UNASSEMBLED WITHOUT ENDPLATES OR SPACERS  
(Must be ordered with number of sections option "0", see Page M-4.)

NOTE: Endplates, blank sections, spacers  
and assembly hardware available separately, see pages M-8 and M-9.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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# 3 Series Thumbwheel Switches

## MOUNTING STYLE

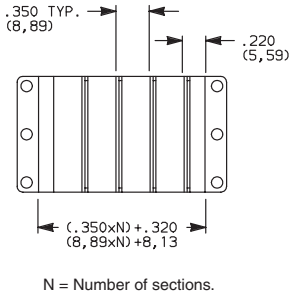
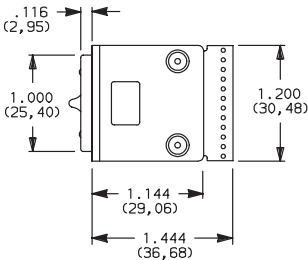
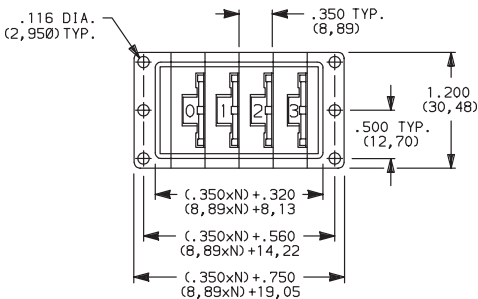
### Type 1 Rear Mount

| MOUNTING STYLE | DIM. 'A'                                 | DIM. 'B'                                  |
|----------------|------------------------------------------|-------------------------------------------|
| 10             | (.350 x N) + .340<br>(8,89 x N) + (8,64) | (.350 x N) + .560<br>(8,89 x N) + (14,22) |

N = Number of sections.  
Recommended panel thickness:  
0.46-.125  
(1,16-3,18)



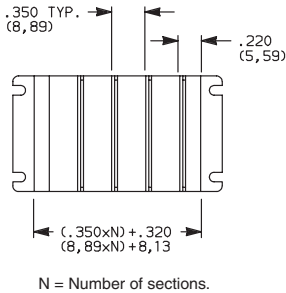
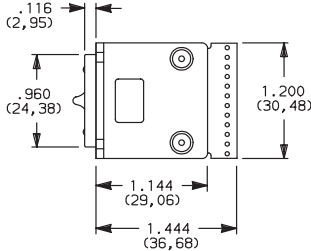
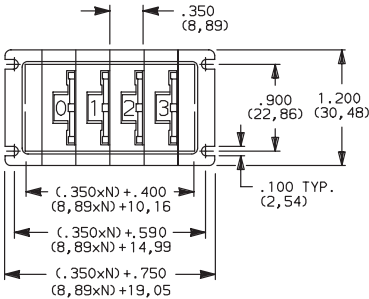
### 10 SWITCH ASSEMBLY W/ ENDPLATES-.350 (8,89) SECTION PITCH



### 19 SWITCH SECTION ONLY--UNASSEMBLED WITHOUT ENDPLATES OR SPACERS (Must be ordered with number of sections option "0", see Page M-4.)

### Type 2 Rear Mount

### 20 SWITCH ASSEMBLY W/ ENDPLATES-.350 (8,89) SECTION PITCH



### 29 SWITCH SECTION ONLY--UNASSEMBLED WITHOUT ENDPLATES OR SPACERS (Must be ordered with number of sections option "0", see Page M-4.)

Thumbwheel



M

**NOTE:** Endplates, blank sections, spacers and assembly hardware available separately, see pages M-8 and M-9.



Third Angle  
Projection

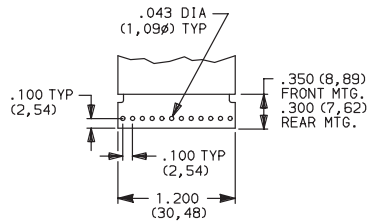
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



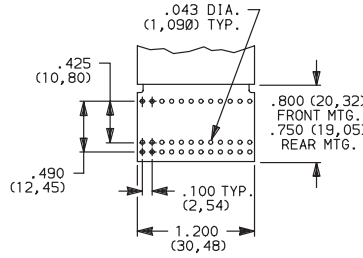
# 3 Series Thumbwheel Switches

## TERMINATIONS

### 0 TYPE 0

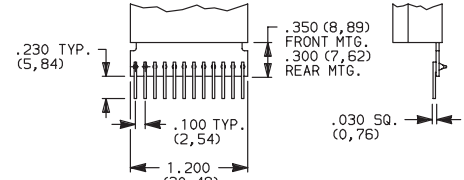


### 1 TYPE 1, EXTENDED TYPE 0



Signal traces cut except for common(s).

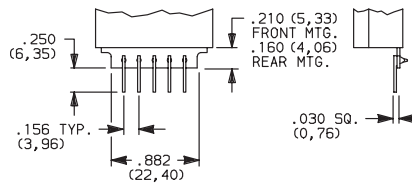
### N SOLDER PINS WITH .100" SPACING



### 9 ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS.

Specify on configuration form, page M-10 and consult Customer Service Center.

### P SOLDER PINS WITH .156" SPACING



PC Board 1/32" (0,79) thick.

**NOTE:** All terminal holes shown may not be present for all function codes, consult Customer Service Center. Terminal connector available for termination options 0 & 1, see page M-9.

**NOTE:** Termination option N (RoHS compliant) replaced termination option 3 (Non-RoHS compliant). Termination option P (RoHS compliant) replaced termination option B (Non-RoHS compliant).

## Terminal Location Numbers

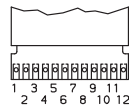


FIG. 1

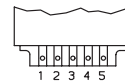
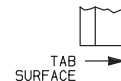


FIG. 2



**NOTE:** See function codes, pages M-4 and M-5, for signal locations.

## COLOR/MARKING/STOPS

### 0 MATTE BLACK HOUSING (Gloss black wheel with white characters; no stops.)

**NOTE:** Stop pins are available separately, see page M-8.

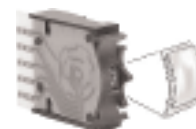
## SEAL

### 0 UNSEALED SWITCHING CONTACTS.

### 1 SEALED SWITCHING CONTACTS. (Sealing is by means of an o-ring rotary seal and a cured-in-place elastomer gasket. Switching contact area is protected from moisture, oil, and airborne contaminants.)

### 2 DUST LENS. (Protects the character face of the wheel from abrasion and dirt).

### 3 SEALED SWITCHING CONTACTS AND DUST LENS



Dust Lens



# 3 Series Thumbwheel Switches

## AVAILABLE HARDWARE



PART NO.  
**413602000** W/RIB-BLACK  
**400502000** W/RIB & W/OUT SPRINGS-BLACK



PART NO.  
**413502000** PLAIN-BLACK  
**400702000** PLAIN & W/OUT SPRINGS-BLACK



PART NO.  
**400602000** W/RIB-BLACK  
**400802000** PLAIN-BLACK



PART NO.  
**473402000** W/RIB-BLACK  
**473302000** PLAIN-BLACK



PART NO.  
**413402000** BLACK  
 Two required for complete assembly.



PART NO.  
**400402003** BLACK  
 Two required for complete assembly.



PART NO.  
**473202003** BLACK  
 Two required for complete assembly.



PART NO.  
**410802000** BLACK



PART NO.  
**402900000**

Thumbwheel



M

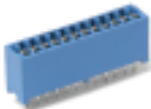


Dimensions are shown: Inches (mm)  
 Specifications and dimensions subject to change

3 Series  
Thumbwheel Switches

AVAILABLE HARDWARE

Terminal connector



605A00000



605A02000

PART NO.  
605A00000 PC  
605A02000 SOLDER LUG

Fits 0 & 1 terminations only.

Screws for field assembly of thumbwheel switches  
(2 screws needed per assembly + 403500000 nuts)

| SCREW PART NUMBER<br>(0-80 UNF THD. SIZE) | NUMBER OF SECTIONS IN ASSEMBLY |                 |
|-------------------------------------------|--------------------------------|-----------------|
|                                           | FRONT MOUNTING                 | REAR MOUNTING   |
|                                           | MTG. STYLE - 00                | MTG. STYLE - 10 |
| 412700000                                 | 1-2                            | 1-2             |
| 412701000                                 | 3-4                            | 3               |
| 412702000                                 | 5-7                            | 4-6             |

Nut



Two nuts required per assembly and screws.

PART NO.  
403500000

Nut driver (For 403500000 nut)



PART NO.  
406100652

Thumbwheel



M

# 3 Series Thumbwheel Switches

## Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY CUSTOMER SERVICE.

CATALOG PART NO.

**3**

C&K PART NUMBER

C&K PART NUMBER

COMPANY NAME

ADDRESS  TEL.#

CUSTOMER CONTACT  DATE

ORIGINATED BY  SALES REP.

CUSTOMER  
PRINT  
REVISION:

DETAILS:

| THUMBWHEEL<br>SECTIONS                                                              | NO.<br>OF<br>SEC. | FUNCTION CODE – TERMINATIONS –<br>COLOR/MARKING/STOPS/SEAL –<br>ILLUMINATION<br><small>ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION<br/>CODES INCLUDE BLANK SECTIONS (SEE PAGES M-9 &amp; M-10).</small> | DESCRIBE IN APPROPRIATE ROW |
|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|    | <b>1</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|    | <b>2</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|    | <b>3</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|   | <b>4</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>5</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>6</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>7</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>8</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>9</b>          | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>10</b>         | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |
|  | <b>11</b>         | <input type="text"/> 3 <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> – <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>            |                             |

QUALITY CONTROL INSTRUCTIONS

PRODUCTION APPROVAL

DATE

Q.C. APPROVAL

DATE

REV.

INITIALS

DATE

FOR SWITCHES WITH MORE THAN 11 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET \_\_\_\_ OF \_\_\_\_



Thumbwheel



M