

INDUSTRIAL TUBE INTERCHANGEABILITY

ETP

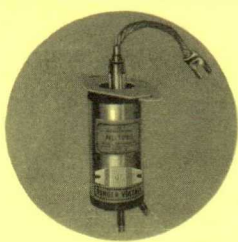
NATIONAL INTERCHANGEABILITY LIST FOR INDUSTRIAL ELECTRONIC TUBES

NATIONAL ELECTRONICS, INC.

a varian subsidiary

GENEVA, ILLINOIS, 60134

TELEPHONE 312 232-4300
TWX 910 237-1685



NATIONAL INTERCHAN

OTHER TUBE
TYPE NO.

+NATIONAL TYPE NO.

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TYPE NO.

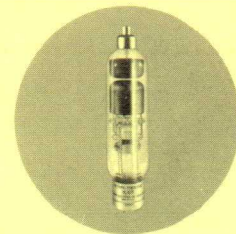
+NATIONAL TYPE NO.

SDR NL-5555
SDS NL-5553B
TGRA NL-575A
EL-C1J NL-6014/C1K
EL-C1K NL-6014/C1K
C1K NL-6014/C1K
C1K/6014 NL-6014/C1K
M-1K-5 NL-617
2AC15 NL-623
TX-2/3 NL-734/5544
TX-2/6 NL-C6J/K
2AC15A NL-623
2G57 NL-5557/FG17/715
M-2K-215 NL-615
2RA6 NL-619
TQ2 NL-5557/FG17/715
XGQ2-6400 FG-105
EL-3B NL-610/7723
EL-3C NL-604*
EL-3C/L NL-604L*
C3J NL-5632/C3J
C3J/A NL-5684/C3J/A
C3J/5632 NL-5632/C3J
EL-C3J NL-5632/C3J
EL-C3J/A NL-5684/C3J/A
EL-C3J/L NL-C3J/L
BR3 NL-653/5835
3C23 NL-3C23
WL-3C23 NL-3C23
AX3C23 NL-3C23
3G501A NL-C6J/K
3V390A NL-5559/FG57
EL-C4H-1 NL-740*
EL-C4H-2 NL-740P*
EL-C4H-3 NL-740L*
EL-C4J NL-740
EL-C4J/F NL-740P*
4B24 NL-604*
WL-4B24 NL-604*
WL-4B24/3C NL-604*
5C21 NL-C6J
5C21/C6J NL-C6J
WL-5C21 NL-C6J
BT5 NL-5559/FG57
M-5-15 NL-623
XG5-500 NL-5557/FG17/715
BR6 NL-619
C6J NL-C6J
C6J/A NL-C6J/K
C6J/L NL-C6J/L
C6J/P NL-C6J/P
DQ6 NL-869B
6G10 FGL05
6G45 NL-C6J/K
EL-C6H-1 NL-C6J/K
WL-C6H-1 NL-C6J/K
EL-C6H-2 NL-C6J/KP
WL-C6H-2 NL-C6J/KP
EL-C6H-3 NL-6989/C6J/KL
WL-C6H-3 NL-6989/C6J/KL
EL-C6J NL-C6J
EL-C6J/A NL-C6J/K
EL-C6J/F NL-C6J/P
EL-C6J/K NL-C6J/K
EL-C6J/KP NL-C6J/KP
EL-C6J/KL NL-6989/C6J/KL
EL-C6J/L NL-C6J/L
EL-6B NL-660
EL-6B/L NL-660L/7786
EL-6C NL-606*
EL-6C/L NL-606L*
EL-6F NL-660P
HW-6 NL-619
M-7-15 NL-643
M-9-15 NL-625
AR14 NL-1051A**
AR14T NL-1051A**
AR14TP NL-1051A**
AR14TWS NL-1051A**
P14 NL-5557/FG17/715
15-M NL-623
HW-15 NL-623
M-15 NL-623
C16J NL-5665/C16J
EL-C16H NL-780
EL-C16J NL-5665/C16J
17 NL-5557/FG17/715
FG17 NL-5557/FG17/715
HT17 NL-5557/FG17/715

MT17 NL-5557/FG17/715
RL-17 NL-5557/FG17/715
TT-17 NL-5557/FG17/715
WE-17 NL-5557/FG17/715
WL-17 NL-5557/FG17/715
18X NL-617
M-20 NL-643
20-M NL-643
20X NL-643
BK-24 NL-1052A
BK-24A NL-1052A**
BK-24B NL-1052A**
FG32 NL-5558/FG32
WL-32 NL-5558/FG32
BK-34 NL-5553B
BK-34A NL-5553B**
BK-34B NL-5553B**
BK-42 NL-1051A
BK-42A NL-1051A**
BK-42B NL-1051A**
L-F-TX44-5 NL-5665/C16J
TX-44-5 NL-5665/C16J
BK-46 NL-5555
57 NL-5559/FG57
FG57 NL-5559/FG57
GL57 NL-5559/FG57
MT-57 NL-5559/FG57
PL57 NL-5559/FG57
RL57 NL-5559/FG57
WL57 NL-5559/FG57
BK-66 NL-5550
BT77 NL-C6J/K
BT91 NL-734/5544
FG95 NL-5560/FG95
105A FG-105
AX105 FG-105
FG-105 FG-105
MT105 FG-105
PL105 FG-105
RL105 FG-105
WL105 FG-105
PL106 NL-760
RX-120 NL-625
RX-120A NL-625
WT-TL39 NL-C6J
BK-168B NL-1022A**
CE-202 NL-625
CE-202B NL-625
CE-203 NL-623
HW-203 NL-623
CE-205 NL-617
CE-206 NL-619
HD-206 NL-619
CE-207 NL-627
RX-212 NL-627
AH-213 NL-869B
CE215 NL-623
CE221 NL-606*
CE224 NL-604*
CE232 NL-5558/FG32
FG235A NL-1052A
238B NL-5555
FG238B NL-5555
GL238A NL-5555
GL238B NL-5555
CE245 NL-606*
249R NL-649/5834
249S NL-649/5834
GRG250/3000 NL-5557/FG17/715
255A NL-869B
255B NL-869B
HF-255 NL-869B
FG258A NL-5553B
WT-261 NL-2050A
FG271 NL-1051A
272 NL-5557/FG17/715
WT-272 NL-5557/FG17/715
CE306 NL-C6J/K
CE308 NL-C6J
309 NL-5557/FG17/715
CE309 NL-5557/FG17/715
CE311 NL-3C23
320A NL-710/6011
CE320 NL-710/6011
CE320A NL-710/6011
323A NL-323B
323B NL-323B
F369B NL-869B
F375A NL-575A

393A NL-393A
404 NL-625
406 NL-623
412 NL-619
GL415 NL-5550
424 NL-627
426 NL-615
440 NL-615
490 NL-660**
495 NL-660
GL506 NL-6228
575A NL-575A
AX575A NL-575A
EE575A NL-575A
F575A NL-575A
GL575A NL-575A
WL575 NL-575A
WL-575A NL-575A
617 NL-617
NL-618 NL-660
NL-618L NL-660L/7786
NL-618P NL-660P
623 NL-623
625 NL-625
627 NL-627
WL-630 NL-2050A
631 NL-5559/FG57
WL-631 NL-5559/FG57
WL-632A NL-632B
WL-632B NL-632B
651 NL-1052A
WL-651/656 NL-1052A
652 NL-1051A
WL-652 NL-1051A
WL-652/657 NL-1051A
653B NL-5555
WL-653B NL-5555
655 NL-5553B
WL-655/658 NL-5553B
656 NL-1052A
WL-656 NL-1052A
657 NL-1051A
WL-657 NL-1051A
WL-658 NL-5553B
WL-670 NL-606*
673 NL-673
AX673/6693 NL-673
GL673 NL-673
ML673 NL-673
WL673 NL-673
677 NL-677
WL-677 NL-677
WL-681/686 NL-5550
WL-682 NL-5550
WL-686 NL-5550
WL-689 NL-6228
NL-710 NL-710/6011
715 NL-5557/FG17/715
NL-715 NL-5557/FG17/715
ML-728 NL-5557/FG17/715
NL-730 NL-734/5544
740 NL-740
740L NL-740L
740P NL-740P
760 NL-760
760L NL-760L
760P NL-760P
869 NL-869B
869A NL-869B
869B NL-869B
AG869B NL-869B
CE869B NL-869B
DR869B NL-869B
EE869B NL-869B
F869B NL-869B
GL-869B NL-869B
ML869B NL-869B
WL869B NL-869B
WL869BL NL-869B
869BL NL-869BL
872 NL-872A
872A NL-872A
872AX NL-872A
872A/872 NL-872A
ML-872A/872 NL-872A
DR-872A NL-872A
EE-872A NL-872A
F-872A NL-872A
GL-872A NL-872A

ELECTRONIC TUBES



OTHER TUBE TYPE NO.

+NATIONAL TYPE NO.

| | |
|---------------|----------------|
| 7022 | NL-760P |
| WL-7022 | NL-740L |
| 7023 | NL-760L |
| WL-7023 | NL-760L |
| TH-7030 | NL-1052A |
| TH-7031 | NL-1052A** |
| TH-7040 | NL-5553B |
| 7041 | NL-5553B |
| TH-7041 | NL-5553B** |
| 7136 | NL-575A |
| 7151 | NL-1054A |
| GL-7151 | NL-1054 |
| 7171 | NL-1036 |
| GL-7171 | NL-7171 |
| WL-7171 | NL-7171 |
| 7216 | NL-C3J/L |
| 7298 | NL-6989/C6J/KL |
| 7299 | NL-C6J/KP |
| 7306 | NL-5684/C3J/A |
| 7306A | NL-5684/C3J/A |
| WL-7306A | NL-5684/C3J/A |
| 7307 | NL-710/6011 |
| 7307A | NL-710/6011 |
| WL-7307A | NL-710/6011 |
| 7321 | NL-C6J/L |
| WL-7321 | NL-C6J/L |
| 7386 | NL-C6J/K |
| 7509 | NL-710L/7518 |
| WL-7509A | NL-710L/7518 |
| WL-7509A/710L | NL-710L/7518 |
| 7518 | NL-710L/7518 |
| GL-7518/710L | NL-710L/7518 |
| 7556 | NL-C3J/AL |
| 7556A | NL-C3J/AL |
| WL-7556A | NL-C3J/AL |
| AX7585 | NL-1052A |
| 7669 | NL-1061 |

OTHER TUBE TYPE NO.

+NATIONAL TYPE NO.

| | |
|-----------|--------------|
| GL-7669 | NL-1061 |
| WL-7669 | NL-1061 |
| 7669PC | NL-1061P |
| GL-7669PC | NL-1061P |
| WL-7669PC | NL-1061P |
| 7670 | NL-1066 |
| GL-7670 | NL-1066 |
| WL-7670 | NL-1066 |
| 7671 | NL-1062 |
| GL-7671 | NL-1062 |
| WL-7671 | NL-1062 |
| 7671PC | NL-1062P |
| GL-7671PC | NL-1062P |
| WL-7671PC | NL-1062P |
| 7672 | NL-1068 |
| GL-7672 | NL-1068 |
| WL-7672 | NL-1068 |
| 7673 | NL-7673 |
| GL-7673 | NL-7673 |
| WL-7673 | NL-7673 |
| 7673PC | NL-7673P |
| GL-7673PC | NL-7673P |
| WL-7673PC | NL-7673P |
| 7681 | NL-1009A |
| GL-7681 | NL-1009A |
| WL-7681 | NL-1009A |
| 7681PC | NL-1009AP |
| WL-7681PC | NL-1009AP |
| 7703 | NL-7703 |
| 7723 | NL-610/7723 |
| 7725 | NL-710A |
| 7726 | NL-710AL |
| GL-7726 | NL-710AL |
| 7786 | NL-660L/7786 |
| 7998 | NL-1069 |
| WL-7998 | NL-1069 |
| 8008 | NL-8008 |

OTHER TUBE TYPE NO.

+NATIONAL TYPE NO.

| | |
|---------------|-------------|
| DR-8008 | NL-8008 |
| EE-8008 | NL-8008 |
| GL-8008 | NL-8008 |
| ML-8008 | NL-8008 |
| VE-8008 | NL-8008 |
| WL-8008 | NL-8008 |
| 8205 | NL-1064 |
| 8306 | NL-1036 |
| WL-8306 | NL-1036 |
| WL-22994 | NL-734/5544 |
| WL-22994/5877 | NL-734/5544 |
| WL-23011 | NL-1011A |
| WL-23011PC | NL-1011AP |
| WL-23012 | NL-1012A |
| WL-23012PC | NL-1012AP |
| WL-23013 | NL-7673 |
| WL-23013PC | NL-7673P |
| WL-23014 | NL-1071 |
| WL-23014PC | NL-1071P |
| WL-23015 | NL-1072 |
| WL-23015PC | NL-1072P |
| WL-23016 | NL-1016 |
| WL-23017 | NL-1073 |
| WL-23018 | NL-1079 |
| GL-37207 | NL-1059A |
| GL-37228 | NL-7703 |
| GL-37250 | NL-1081 |
| GL-37250PC | NL-1081P |
| GL-37251 | NL-1091 |
| GL-37251PC | NL-1091P |
| GL-37252 | NL-1082 |
| GL-37252PC | NL-1082P |
| GL-37253 | NL-1092 |
| GL-37253PC | NL-1092P |
| GL-37254 | NL-1053A |
| GL-37255 | NL-1063 |

+ These types, offered by other suppliers, can be directly replaced with the listed NATIONAL POWER TUBE as indicated, but the reverse substitution cannot always be made.

* These types, offered by other suppliers, can be directly replaced with the NATIONAL type except in abnormal applications, especially those involving air temperatures above 140°F, where it is desirable to check detailed ratings.

** Replacement for listed type, but may require changes in thermostat and/or water flow switch.

NATIONAL ELECTRONICS, INC.

a varian subsidiary

GENEVA, ILLINOIS, 60134

The Weltronic type numbers listed below are the preferred replacements and should be purchased from the Weltronic Company, Detroit, Michigan. The National types listed below for your convenience, are satisfactory alternates in case of emergency.

| Weltronic Type | Alternate National Type | Weltronic Type | Alternate National Type | Weltronic Type | Alternate National Type |
|----------------|-------------------------|----------------|-------------------------|----------------|-------------------------|
| T104 | NL-575A | 210-0106 | NL-710/6011 | 210-0252 | NL-1052AP |
| T106 | NL-710/6011 | 210-0116 | NL-632B | 210-0258 | NL-1016A |
| T108 | NL-5632/C3J | 210-0143 | NL-623 | 210-0261 | NL-770L |
| T111 | NL-5559/FG57 | 210-0147 | NL-1052A | 210-0263 | NL-1064 |
| T112 | NL-5560/FG95 | 210-0149 | NL-1051A | 210-0274 | NL-1061 |
| T117 | NL-5557/FG17/715 | 210-0152 | NL-5553B | 210-0275 | NL-1062 |
| T118 | FG-105 | 210-0156 | NL-1051A | 210-0281 | NL-1069 |
| T133 | NL-393A | 210-0157 | NL-1052A | 210-0282 | NL-1063 |
| T134 | NL-5665/C16J | 210-0158 | NL-1051A | 210-0283 | NL-1066 |
| 210-0004 | NL-2050A | 210-0159 | NL-1052A | 210-0285 | NL-1062P |
| 210-0015 | NL-5557/FG17/715 | 210-0162 | NL-710L | 210-0290 | NL-1061P |
| 210-0017 | NL-740 | 210-0165 | NL-5553B | 210-0297 | NL-5684-Ne |
| 210-0043 | NL-5632/C3J | 210-0166 | NL-1054 | 210-0300 | NL-7556A-Ne |
| 210-0044 | NL-575A | 210-0170 | NL-1022A | 210-0305 | NL-1092P |
| 210-0047 | NL-5632/C3J | 210-0179 | NL-760 | 210-0306 | NL-1053A |
| 210-0056 | NL-5559/FG57 | 210-0180 | NL-740L | 272 | NL-5557/FG17/715 |
| 210-0057 | NL-5560/FG95 | 210-0181 | NL-760L | 373 | NL-615 |
| 210-0062 | NL-5684/C3J/A | 210-0183 | NL-C3J/L | 568 | NL-615 |
| 210-0063 | NL-C6J | 210-0188 | NL-6014/C1K | 1009/210-0246 | NL-1009A |
| 210-0066 | NL-5665/C16J | 210-0234 | NL-5665/C16J | 1022/210-0170 | NL-1022A |
| 210-0069 | NL-5557/FG17/715 | 210-0235 | NL-1012A | 1051A/210-0158 | NL-1051A |
| 210-0070 | NL-5550 | 210-0237 | NL-1011A | 1051A/210-0249 | NL-1051AP |
| 210-0071 | NL-1051A | 210-0240 | NL-1013A | 1052A/210-0159 | NL-1052A |
| 210-0072 | NL-1052A | 210-0242 | NL-778 | 1052P/210-0252 | NL-1052AP |
| 210-0073 | NL-5553B | 210-0243 | NL-778L | 1053A/210-0165 | NL-5553B |
| 210-0074 | FG-105 | 210-0245 | NL-C6J/KP | 5550/210-0070 | NL-5550 |
| 210-0075 | NL-1022A | 210-0246 | NL-1009A | 5551/210-0071 | NL-1051A |
| 210-0079 | FG-105 | 210-0249 | NL-1051AP | 5552/210-0072 | NL-1052A |

The Electro-Matic type numbers listed below are the preferred replacements and should be purchased from the Electro-Matic Company, Chicago, Illinois. The National types listed below for your convenience, are satisfactory alternates in case of emergency.

| Electro-Matic Type | Alternate National Type | Electro-Matic Type | Alternate National Type | Electro-Matic Type | Alternate National Type |
|--------------------|-------------------------|--------------------|-------------------------|--------------------|-------------------------|
| EM-2.5 | NL-615 | EM-5 | NL-617 | EM-15 | _____ |
| EM-2.5-GN | _____ | EMB-5 | _____ | EMB-15 | _____ |
| CR-5 | _____ | EMB-5GN | _____ | EMB-20 | _____ |