QR код

рычаг, ролик, регулируемый, шток, пружина, металл, металлический, степень, защиты, ip67, ip65,
Limit Switches,

Производитель, торговая марка:

BAUMER ,
CROUZET ,
EATON ELECTRIC ,
HIGHLY ,
HONEYWELL ,
OMRON ,
PANASONIC ,
PIZZATO ELETTRICA ,
POKÓJ ,
PROMET ,
SAIA-BURGESS ,
SCHNEIDER ELECTRIC ,
SIEMENS

Конфигурация выхода ,
NC + NO x2 ,
NC x2 ,
NC x2 + NO ,
NC x2 + NO x2 ,
NC x2 independent ,
NO ,
NO + NC ,
NO x2 ,
PNP / 2 x NC ,
PNP / NO + NC ,
SPDT ,
,
,
Ток контактов макс. ,
1A ,
3A ,
4A ,
5A ,
6A ,
10A ,
15A ,
16A ,
,
,
,
Вид головки ,
lever with termoplastic rod ,
без рычага ,
длинный толкатель ,
кнопка гриб ,
кольцо ,
металлический ролик ,
металлический ролик Ø10мм ,
металлический ролик Ø11,6мм ,
металлический ролик Ø12,7мм ,
металлический ролик Ø17мм ,
металлический толкатель с пластмассовым роликом ,
пластиковый ролик Ø 22 мм ,
пластмассовый ролик Ø10,5мм ,
пластмассовый ролик Ø10мм ,
пластмассовый ролик Ø11мм ,
пластмассовый ролик Ø12,5мм ,
пластмассовый ролик Ø13мм ,
пластмассовый ролик Ø14мм ,
пластмассовый ролик Ø20мм ,
пластмассовый ролик Ø9,3мм ,
пластмассовый ролик Ø9,5мм ,

пластмассовый стержень на пружинном элементе полной длиной 100мм ,
пластмассовый стержень на пружинном элементе полной длиной 106мм ,
пластмассовый стержень на пружинном элементе полной длиной 115мм ,
пластмассовый стержень на пружинном элементе полной длиной 121,8мм ,
пластмассовый стержень на пружинном элементе полной длиной 122мм ,
пластмассовый стержень на пружинном элементе полной длиной 90мм ,
плоский рычаг ,
поворотный рычаг с роликом ,
полимерный ролик Ø11мм ,
поперечный металлический ролик Ø 10,4 мм и дополнительное крепление ,
поперечный металлический ролик Ø 10,5 мм и дополнительное крепление ,
поперечный металлический ролик Ø12,4мм ,
поперечный металлический ролик Ø12мм ,
поперечный пластиковый ролик ,
поперечный пластиковый ролик Ø 10,4 мм и дополнительное крепление ,
поперечный пластиковый ролик Ø 11 мм ,
поперечный пластиковый ролик Ø 12 мм ,
поперечный пластиковый ролик Ø 12,7 мм ,
продольный металлический ролик Ø 10 мм и дополнительное крепление ,
продольный металлический ролик Ø 10,4 мм и дополнительное крепление ,
продольный металлический ролик Ø 10,5 мм и дополнительное крепление ,
продольный металлический ролик Ø 10,6 мм и дополнительное крепление ,
продольный металлический ролик Ø12,4мм ,
продольный металлический ролик Ø12мм ,
продольный металлический ролик Ø14мм ,
продольный пластиковый ролик ,
продольный пластиковый ролик Ø 10,4 мм и дополнительное крепление ,
продольный пластиковый ролик Ø 11 мм ,
продольный пластиковый ролик Ø 12 мм ,
продольный пластиковый ролик Ø 12,7 мм ,
продольный пластиковый ролик Ø 22 мм и дополнительное крепление ,
пружина ,
пружина из нержавеющей стали, общая длина 110мм ,
пружина из нержавеющей стали, общая длина 135мм ,
пружина из нержавеющей стали, общая длина 95мм ,
пружина, общая длина 100мм ,
пружина, общая длина 101,5мм ,
пружина, общая длина 103мм ,
пружина, общая длина 104,5мм ,
пружина, общая длина 110мм ,
пружина, общая длина 116,8мм ,
пружина, общая длина 117мм ,
пружина, общая длина 128мм ,
пружина, общая длина 142,5мм ,
пружина, общая длина 60мм ,
пружина, общая длина 80мм ,
регулируемый алюминиевый стержень длиной 200мм ,
регулируемый пластмассовый стержень длиной 200мм ,
регулируемый рычаг R 19-91мм с пластмассовым роликом Ø18мм ,
регулируемый рычаг R 19-91мм с резиновым роликом Ø50мм ,

регулируемый рычаг R 20-65мм с металлическим роликом Ø17мм ,
регулируемый рычаг R 20-65мм с пластмассовым роликом Ø17,5мм ,
регулируемый рычаг R 20-65мм с резиновым роликом Ø50мм ,
регулируемый рычаг R 20-72мм с роликом Ø18мм ,
регулируемый рычаг R 20-92мм с пластмассовым роликом Ø18мм ,
регулируемый рычаг R 20-95мм с пластмассовым роликом Ø17,5мм ,
регулируемый рычаг R 21,5-91,5мм с отверстиями и пластмассовым роликом Ø19мм ,
регулируемый рычаг R 21,5-91,5мм с пластмассовым роликом Ø19мм ,
регулируемый рычаг R 25-89мм с пластмассовым роликом Ø17,5мм ,
регулируемый рычаг R 25-89мм с пластмассовым роликом Ø19мм ,
регулируемый рычаг R 25-89мм с резиновым роликом Ø50мм ,
регулируемый рычаг R 30-70мм с пластмассовым роликом Ø18мм ,
регулируемый рычаг R 31-65мм с резиновым роликом Ø50мм ,
регулируемый рычаг R 33-93мм с пластмассовым роликом Ø22мм ,
регулируемый рычаг R 33,5-83,5м с пластмассовым роликом Ø16мм ,
регулируемый рычаг R 34-79мм с металлическим роликом Ø19мм ,
регулируемый рычаг R 34-79мм с пластмассовым роликом Ø19мм ,
регулируемый рычаг R 34-93мм с пластмассовым роликом Ø20мм ,
регулируемый рычаг R 35,5-84,5мм с пластмассовым роликом Ø19мм ,
регулируемый рычаг R 38,1-88,9мм с пластмассовым роликом Ø19,05мм ,
регулируемый рычаг R 45,5-117,5мм с металлическим роликом Ø18мм ,
регулируемый рычаг R 45,5-117,5мм с пластмассовым роликом Ø18мм ,
регулируемый рычаг R 53-112мм с роликом Ø20мм ,
регулируемый рычаг R 60-100мм с пластмассовым роликом Ø50мм ,
регулируемый рычаг R 72,5-131мм с резиновым роликом Ø50мм ,
регулируемый рычаг R 72,5...131мм с резиновым роликом Ø50мм ,
регулируемый рычаг R 90мм с металлическим роликом Ø17,5мм ,
регулируемый рычаг с роликом ,
регулируемый стержень ,
регулируемый стержень длиной R 19-116мм ,
регулируемый стержень длиной R 25-140мм ,
регулируемый стержень длиной R 30-118мм ,
регулируемый стержень длиной R 92-136мм ,
регулируемый стержень из стекловолокна R 19-189 мм ,
регулируемый стержень из стекловолокна макс. длиной 187 мм ,
регулируемый стержень макс. длиной 141мм ,
регулируемый стержень макс. длиной 145мм ,
регулируемый стержень макс. длиной 170мм ,
регулируемый стержень макс. длиной 177,5мм ,
резиновое уплотнение ,
ролик Ø10мм и дополнительное крепление ,
рычаг R 14мм с пластмассовым роликом Ø13мм ,
рычаг R 17мм с пластмассовым роликом Ø13мм ,
рычаг R 18мм с пластмассовым роликом Ø12,5мм ,
рычаг R 19мм с пластмассовым роликом Ø12мм ,
рычаг R 20,2мм с пластмассовым роликом Ø14мм ,
рычаг R 20,8мм с пластмассовым роликом Ø19мм ,
рычаг R 20мм с пластмассовым роликом Ø12мм ,
рычаг R 20мм с пластмассовым роликом Ø22мм ,
рычаг R 22мм с пластмассовым роликом Ø14мм ,

рычаг R 25мм с металлическим роликом Ø17мм ,
рычаг R 25мм с пластмассовым роликом Ø13,5мм ,
рычаг R 26,5мм с пластмассовым роликом Ø18мм ,
рычаг R 26,5мм с резиновым роликом Ø50мм ,
рычаг R 26мм с металлическим роликом Ø17,5мм ,
рычаг R 26мм с пластмассовым роликом Ø17,5мм ,
рычаг R 27мм с двойным пластиковым роликом Ø19мм ,
рычаг R 27мм с металлическим роликом Ø14мм ,
рычаг R 27мм с пластмассовым роликом Ø14мм ,
рычаг R 27мм с пластмассовым роликом Ø18мм ,
рычаг R 27мм с пластмассовым роликом Ø19мм ,
рычаг R 27мм с пластмассовым роликом Ø22мм ,
рычаг R 30мм с пластмассовым роликом Ø18мм ,
рычаг R 30мм с пластмассовым роликом Ø22мм ,
рычаг R 30мм с роликом Ø18мм ,
рычаг R 31,5мм с пластмассовым роликом Ø17,5мм ,
рычаг R 33мм с пластмассовым роликом Ø22мм ,
рычаг R 34,4мм с металлическим роликом Ø16мм ,
рычаг R 34,4мм с пластмассовым роликом Ø16мм ,
рычаг R 34,5мм с пластмассовым роликом Ø18мм ,
рычаг R 34мм с металлическим роликом Ø14мм ,
рычаг R 34мм с пластмассовым роликом Ø14мм ,
рычаг R 35,5мм с металлическим роликом Ø18мм ,
рычаг R 35,5мм с пластмассовым роликом Ø18мм ,
рычаг R 35,5мм с пластмассовым роликом Ø19мм ,
рычаг R 35мм с пластмассовым роликом Ø18мм ,
рычаг R 38,1мм с двойным пластиковым роликом Ø19,05мм ,
рычаг R 38,1мм с пластмассовым роликом Ø19,05мм ,
рычаг R 38мм с металлическим роликом Ø17,5мм ,
рычаг R 38мм с металлическим роликом Ø17,5мм, двойной ,
рычаг R 38мм с пластмассовым роликом Ø19мм ,
рычаг R 40 мм с пластиковым роликом Ø 20 мм, двойной ,
рычаг R 40мм с пластмассовым роликом Ø18мм ,
рычаг R 40мм с пластмассовым роликом Ø20мм ,
рычаг R 43,5мм с пластмассовым роликом Ø18мм ,
рычаг R 43мм с пластмассовым роликом Ø20мм ,
рычаг R 46,5мм с металлическим роликом Ø19мм ,
рычаг R 46,5мм с пластмассовым роликом Ø19мм ,
рычаг R 49мм с пластмассовым роликом Ø20мм ,
рычаг в виде металлического стержня ,
рычаг одностороннего действия R 21,5мм с пластиковым роликом ,
рычаг с плечом, отогнутым на 90° ,
рычаг с пружиной 110мм ,
рычаг с роликом ,
рычаг с роликом сверху ,
со сбросом ,
стальной ролик Ø11мм ,
стальной ролик Ø12мм ,
стальной ролик Ø13мм ,
стальной ролик Ø20мм ,

стержень на пружинном элементе R 106 мм ,
стержень на пружинном элементе общей длиной 100 мм ,
стержень на пружинном элементе общей длиной 106,5 мм ,
стержень на пружинном элементе общей длиной 116,5 мм ,
стержень на пружинном элементе общей длиной 116,8 мм ,
стержень на пружинном элементе общей длиной 135 мм ,
стержень на пружинном элементе общей длиной 142 мм ,
стержень на пружинном элементе общей длиой 117 мм ,
Стержень с резьбой M12x0.75 ,
стержень с резьбой M4 ,
Стержень с резьбой M10x1 ,
Стержень с резьбой M16x1 ,
толкатель ,
толкатель Ø10,5мм ,
толкатель Ø10мм ,
толкатель Ø6,8мм ,
толкатель Ø6мм ,
толкатель Ø7мм ,
толкатель Ø7мм и дополнительное крепление ,
толкатель Ø7мм с пылезащитной крышкой ,
толкатель Ø8мм ,
толкатель Ø8мм и дополнительное крепление ,
толкатель Ø8мм с пылезащитной крышкой ,
толкатель Ø9,2мм ,
толкатель Ø9мм ,
толкатель с горизонтальным рычагом и пластмассовым роликом Ø12,5мм ,
толкатель с металлическим роликом Ø 11 мм ,
толкатель с металлическим роликом Ø 12 мм ,
толкатель с металлическим роликом Ø 12,5 мм ,
толкатель с металлическим роликом Ø10,4мм ,
толкатель с металлическим роликом Ø12,4мм ,
толкатель с параллельным роликом ,
толкатель с перпендикулярным роликом ,
толкатель с пластмассовым роликом Ø10,4мм ,
толкатель с пластмассовым роликом Ø11мм ,
толкатель с пластмассовым роликом Ø12мм ,
угловой рычаг ,
угловой рычаг с роликом ,
фарфоровый вал Ø 9x57 мм R 80 мм ,
фарфоровый ролик ,
шар Ø 12,7 мм из нержавеющей стали ,
шар Ø 8 мм из нержавеющей стали ,
,
,
Класс защиты ,
IP00 ,
IP40 ,
IP56 ,
IP64 ,
IP65 ,

IP66 ,
IP67 ,
,
,
Подключение ,
1/2" NPT ,
3/4" 14NPT ,
M16 x 1,5 ,
M20 ,
M20 x 1 ,
M20 x 1,5 ,
PF1/2 ,
PG11 ,
PG13,5 ,
амортизатор ,
винтовые клеммники ,
коннектор M12 ,
провод 1м ,
провод 2м ,
провод 3ft ,
провод 3м ,
провод 5м ,
провод 6ft ,
провод 9ft ,
,
,
,
Коммутируемое напряжение ,
макс. 30мВ DC ,
макс. 24В DC ,
макс. 28В DC ,
макс. 30В DC ,
макс. 50В AC ,
макс. 125В DC ,
макс. 125В AC ,
макс. 220В DC ,
макс. 240В AC ,
макс. 240В DC ,
макс. 250В DC ,
макс. 250В AC ,
макс. 300В AC ,
макс. 400В AC ,
макс. 480В AC ,
макс. 500В AC ,
макс. 600В DC ,
макс. 600В AC ,
Комплектующие систем... ,
вспомогательные контакты ,
головка привода ,
пластина монтажная ,

пластина монтажная потолочная ,
привод монтируется на панель ,

- EA080-11100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA150-30014 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA150-30274 | Namco Controls | Limit Switches | Industrial Limit Switches
- EL010-53420 | Namco Controls | Limit Switches | Operating Levers
- E47BLS06 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- EA700-20100 | Namco Controls | Limit Switches | Industrial Limit Switches
- E47BMS30 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS22 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS04 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E49M11AP1 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- 2006-402-L-40-A | Gemco | Limit Switches | Rotary Limit Switches
- EA700-10100 | Namco Controls | Limit Switches | Industrial Limit Switches
- 54-404-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- EL010-53338 | Namco Controls | Limit Switches | Operating Levers
- E50AR1 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Industrial Limit Switches
- E47BCC06 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E47BCC07 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E47BLS33 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS10 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- EA150-30500 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA170-31100 | Namco Controls | Limit Switches | Industrial Limit Switches
- LS45M51B11 | ABB | Limit Switches | Compact Limit Switches
- E49S71UP7 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- EA700-80100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA700-40100 | Namco Controls | Limit Switches | Industrial Limit Switches
- 10316H89 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- 54-419-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-409-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-410-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-417-BP | NTE Electronics | Limit Switches | Miniature Limit Switches

- A102-41251A-1 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- E47BCC15 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E47BLS05 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BLS08 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS02 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS42 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- EA060-11100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA080-21100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA150-30275 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA700-10000 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA700-70100 | Namco Controls | Limit Switches | Industrial Limit Switches
- 608.6153.012 | Bernstein | Limit Switches | Compact Limit Switches
- EL060-58920 | Namco Controls | Limit Switches | Operating Levers
- EL130-64410 | Namco Controls | Limit Switches | Operating Levers
- A102-80577A-1 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- 10316H1028 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- 54-403-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-432-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-452-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- E47BCC08 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E47BMS41 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47CLS05 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47CMS04 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47CMS22 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E49M11BP1 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E49M11UP1 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- EA170-11100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA170-21100 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA700-70000 | Namco Controls | Limit Switches | Industrial Limit Switches
- EA700-80000 | Namco Controls | Limit Switches | Industrial Limit Switches
- EL120-60400 | Namco Controls | Limit Switches | Operating Levers
- 54-425-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- E47CLS32 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches

- EL010-58451 | Namco Controls | Limit Switches | Operating Levers
- EL060-55520 | Namco Controls | Limit Switches | Operating Levers
- EL140-58500 | Namco Controls | Limit Switches | Operating Levers
- KBF1L20N | Lovato | Limit Switches | Industrial Limit Switches
- 54-424-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-441-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- E49M11VP1 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Compact Limit Switches
- E50AR1P5 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Industrial Limit Switches
- E50BLT3 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Industrial Limit Switches
- EL010-58423 | Namco Controls | Limit Switches | Operating Levers
- EL060-50930 | Namco Controls | Limit Switches | Operating Levers
- EL120-69421 | Namco Controls | Limit Switches | Operating Levers
- 10316H2006 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BML30 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- KBE1S11N | Lovato | Limit Switches | Industrial Limit Switches
- 2006-404-L-40-A | Gemco | Limit Switches | Rotary Limit Switches
- 54-400-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-406-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-408-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-411-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-413-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-426-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-433-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 54-438-BP | NTE Electronics | Limit Switches | Miniature Limit Switches
- 831395CAB.5.F | Crouzet | Limit Switches | Miniature Limit Switches
- 831618C3.0 | Crouzet | Limit Switches | Miniature Limit Switches
- 831700C2.AL | Crouzet | Limit Switches | Miniature Limit Switches
- 831700C3.EL | Crouzet | Limit Switches | Miniature Limit Switches
- 831704C1.EL | Crouzet | Limit Switches | Miniature Limit Switches
- 831709C1.CL | Crouzet | Limit Switches | Miniature Limit Switches
- A102-231413A-1 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- A102-41251A-3 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- A102-54635A-1 | Joslyn Clark | Limit Switches | Industrial Limit Switches

- A102-54635A-3 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- A102-54635A-4 | Joslyn Clark | Limit Switches | Industrial Limit Switches
- E47BLS07 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47BMS11 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches
- E47CMS42 | Cutler Hammer, Div of Eaton Corp | Limit Switches | Miniature Limit Switches

E47 Precision Switch

Compact Prewired Switch

LS-Titan Miniature DIN Switch

E49 Compact Metal Switch

Heavy-Duty Factory Sealed 6P+ Switch

Unless otherwise noted, the products contained in this section should not be used for functional safety applications. These products were not designed or tested to IEC 60947-5-3 or recommended for functional safety.

Learn Online

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273),
in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada
call 1-800-426-9184.

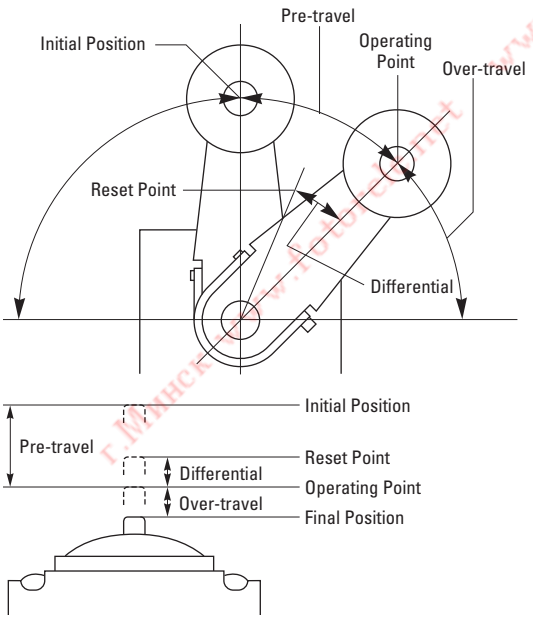
Technical Reference

Limit Switches

Mechanical Limit Switches are contact sensors widely used for detecting the presence or position of objects in industrial applications.

Limit Switches offer high precision in terms of accuracy and repeatability. This is primarily due to the fact that they make direct contact with the target. When an object contacts the limit switch lever (or plunger) the lever moves a pre-travel distance to the operating point where the contacts are tripped. Movement of the lever beyond this point is called the over-travel.

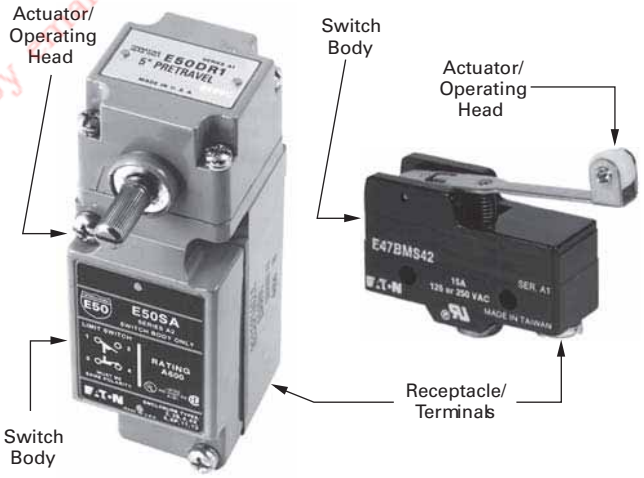
Lever Type Actuator



Refer to Sensor Learning Course, **Page V8-T12-4**, for a complete description of limit switch terminology.

Limit switches contain the following major components. These may be modular or part of a single-piece switch.

Limit Switch Components



Actuator

This is the part of the switch that contacts the target. Typical actuators are levers and plungers. Several styles are available, see Sensor Learning Course, **Page V8-T12-4**, for more information.

Switch Body

This part contains the electrical contact mechanism. For complete information on electrical outputs, see Sensor Learning Course, **Page V8-T12-4**.

Terminals

The terminals are the point of connection for the wiring. These terminals may be on the body itself, or housed in a removable receptacle. The limit switch may also come equipped with a factory installed cable or pin-connector.

Product Selection Guide

E47 Precision Switches

Page V8-T2-6

Overview

Specified when accurate repeatability, choice of operating forces and travel characteristics and tightly controlled action of cam or target in space restricted areas are of prime importance. Cost effective and compact.

Applications

Overhead, folding and elevator doors, sliding gates, automated guided vehicles and commercial instrumentation

Product Features

Self-contained switches or with an enclosed cast housing for increased durability and conduit connection (1/2 in NPT)

High current capacity for power load switching and motor handling capability

Screw and solder terminations

Booted enclosed version shields actuators from debris

Mounting centers—1.0 in (25.4 mm), #8 screw size

Technical Data and Specifications

Mechanical life: 3,000,000 operations min.

Electrical life: 500,000 operations min.

Contact ratings—
NEMA A600, R300, AC-15, DC-13
15A/20A, 125 or 250 Vac

Enclosure ratings—
Enclosed: NEMA 1

Construction—
Basic: Phenolic
Enclosed: Aluminum die cast

Approvals

UL® Recognized
CSA® Certified
CE

Compact Prewired Switches

Page V8-T2-15

Overview

Designed to be a versatile, slim device for hard to fit applications where sealing integrity is required.

Applications

Machine tool, food processing and packaging

Product Features

Rugged aluminum alloy die cast housing

Sealed construction with enclosure ratings of NEMA 4, 6 and 13

Prewired with 3m of 18 AWG, AWM 2517, 300V cable

Stackable ridge for ganged operation

Technical Data and Specifications

Mechanical life: 10,000,000 operations min.

Electrical life: 200,000 operations
30 operations min.

Contact ratings—
NEMA B300

Enclosure ratings—
NEMA 4, 6 and 13; IP67, IP69K

Construction—
Aluminum alloy die cast

Approvals

cULus

c UL us Listed

LS-Titan Miniature DIN Switches

Page V8-T2-21

Overview

Safety position switches with insulated plastic or rugged metal enclosures. Approved for worldwide safety application.

Applications

Automatic vending machines, electronic assembly machines, elevators and lifts, injection molding, packaging and safety applications

Product Features

Modular plug-in head and body components

Positive opening NC contacts for safety applications

Operating heads can be rotated 90 degrees to suit specific direction of operation

Technical Data and Specifications

Mechanical life: 8,000,000 operations

Contact ratings—
AC-15, 6A at 24V, 6A at 230/240V,
4A at 400/415V;
DC-13, 3A at 24V, 800 mA at 110V,
300 mA at 220V

Enclosure ratings—
IP66, IP67 (by model)

Construction—
Plastic or metal (by model)

Approvals

Safety function, IEC/EN 60947-5-1
TÜV-Rheinland certified (LSE models)
CSA certified
UL listed
CE
CCC

Listed

E49 Mini Metal Switches

Page V8-T2-43

Overview

Suitable for OEMs who require a small, cost-effective solution but cannot sacrifice durability and mechanical life as they would if they chose a plastic IEC style switch.

Applications

Automatic vending machines, electronic assembly machines, elevators and lifts, injection molding, packaging

Product Features

Pre-wired units with custom cable lengths available for high volume customers

"Fingerproof" terminals protect against accidental shock

Double-spring mechanism for contact reliability

Grounding terminal included

Captive screws on enclosure cover make wiring hassle-free

SPDT double break

Technical Data and Specifications

Contact ratings—
5A at 250 Vac
5A at 30 Vdc

Enclosure ratings—
IP65

Construction—
Zinc alloy

Approvals

UL Recognized
CE

E49 Compact Metal Switches

Page V8-T2-49

Overview

Designed with high mechanical strength for robust environments. The rugged Aluminum die cast construction provides reliable, oil-tight, waterproof and dustproof sealing for a variety of applications. Snap action 1NO-1NC contacts provide flexibility in design.

Applications

Packaging, material handling conveyors, end-of-travel and guarding operations, baler/compactor, industrial door lifts

Product Features

Rigid die cast switch housing

Set position indicator plate for easy maintenance

High mechanical strength

Oiltight, waterproof and dustproof construction

Technical Data and Specifications

Mechanical life: 15,000,000 operations min.

Electrical life: 500,000 operations min. at full load

Contact ratings—
NEMA A600, R300; AC-15, DC-13

Enclosure ratings—
NEMA 4, 4X, 6, 6P, 12, 13; IP65, IP67

Construction—
Aluminum die cast

Approvals

cULus
IP67

c UL us Listed

E50 Heavy-Duty Plug-In Switches

Page V8-T2-54

Overview

Versatile in design. High reliability. Low maintenance costs with installation ease. BEST CHOICE for Heavy-Duty Limit Switch applications. Withstands physical and chemical abuse of harsh industrial environments.

Applications

Punch presses, waste water treatment, machine tool, automotive, retrieval systems, industrial truck, car wash lines

Product Features

Modular operating heads, switch bodies and receptacles are interchangeable without field adjustment

Order as complete assemblies or components for stocking and manufacturing flexibility

90 degree total travel, 5 degree pre-travel characteristics are standard features

Viton® gasket, boot, and seal material offers exceptional chemical resistance

Rotary head operating mode from CW, CCW or CW and CCW is easily changed without tools

Technical Data and Specifications

Mechanical life: 13,000,000 operations min.

Electrical life: 1,000,000 operations min. at full load (single-pole)

Contact ratings—
NEMA A600, R300
Lighted versions A150, R150
6A, 120 Vac; 10A continuous

Enclosure ratings—
NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13; IP67

Construction—Zinc die cast

Approvals

UL Listed
CSA Certified
IEC 947-5-1
TUV
CE (some models)

E50 Heavy-Duty Factory Sealed 6P+ Switches

Page V8-T2-68

Overview

Designed specifically to withstand the penetrating properties of new cutting fluids (coolants), acid or caustic washes, salt spray, severe vibration, shock and temperature fluctuations, grit and debris.

Applications

Automotive, pulp and paper, food processing, waste management, primary metals, machine tool (cutting, forming, bending)

Product Features

Tamperproof, one-piece switch body assembly, epoxy filled

Factory sealed. 6P submersible. Pre-wired with cable, pigtail or pin connector options. All with ground connection

Utilizes E50 modular operating heads

Special V-seal on switch body/head connection provides hermetic barrier against fluid ingress

LED indicating light, 24V–120 Vac/dc neon version too

Peel off see-through painting mask over nameplate

Technical Data and Specifications

Mechanical life: 35,000,000 operations min.

Electrical life: 1,000,000 operations min. at full load

Contact ratings—
NEMA A600, R300
Lighted versions A150, R150
6A, 120 Vac; 10A continuous

Enclosure ratings—
NEMA 1, 2, 3, 3S, 4, 4X, 6, 6P, 13; IP67, IP69K

Construction—Zinc die cast

Approvals

UL Listed
CSA Certified
IEC 947-5-1
TUV
CE (some models)

Operators

Page V8-T2-80

Overview

Wide variety of operator types for rotary and wobble style limit switches.

Applications

Used with E50, E50 6P+ and 10316 limit switches

Product Features

Rollers and rods available in metal and nonmetal contact surfaces

Technical Data and Specifications

Varies by model

Approvals

Varies by model

Non Plug-In Switches

Page V8-T2-89

Overview

The Industrial standard for Non Plug-In Heavy-Duty Limit Switches. Sold as complete assembled units only.

Applications

Serving MRO and USER replacement requirements with broad
d market coverage

Product Features

Side and top rotary, side and top push or wobble operation

CW, CCW or CW and CCW operating modes are field convertible

Double break-make snap action contacts, same polarity each pole

Captive saddle clamp terminals accept up to #12 wire

Head can be mounted in any of four discrete positions, intervals of 90 degrees

Technical Data and Specifications

Mechanical life: 10,000,000 operations min.

Electrical life: 500,000 operations at full load

Contact ratings—NEMA A600, R300
6A, 120 Vac; 10A continuous

Enclosure ratings—NEMA 1, 4, 13

Construction—
Zinc die cast

Approvals

UL Listed
CSA Certified

Hazardous Location Switches

Page V8-T2-92

Overview

Designed for severe environmental service in locations where there exists a danger of an internal or external explosion of flammable gases, vapors, metal alloy or grain dust.

Applications

Mining, metal cutting, grain storage, forest products, petrochemical, waste and sewage management, pharmaceutical

Product Features

Sealed and unsealed versions available

One-way gasket on sealed version keeps liquids out, yet allows a harmless release of gases in the event of an internal explosion

Silicon bronze housing provides excellent corrosion resistant properties in extreme NEMA 4X applications

Temperature build-up on limit switch surface is dissipated by housing design and materials used

Utilizes the operating heads and internal switch mechanisms of the 10316
Non Plug-In line

Technical Data and Specifications

NEMA 7, Div. 1, Class I, BCD

NEMA 9, Div. 1, Class II, EFG

Contact ratings—NEMA B600
3A, 120 Vac; 5A continuous

Enclosure ratings—LX: NEMA 7, 9
CX: NEMA 1, 4, 7, 9
CB: NEMA 1, 4, 4X, 13
CBX: NEMA 1, 4, 4X, 7, 9, 13

Construction—LX, CX: Aluminum die cast
CB, CBX: Silicon bronze

Approvals

cUL® Listed

Special Purpose Switches

Page V8-T2-96

Overview

Variety of special function limit switch products.

Applications

Serving MRO and USER replacement requirements with broad market coverage

Product Features

Special function switch lines include:

Cabinet door interlocks — when plunger is pulled out, red band indicator visually shows that interlock is defeated

Precision switches—1NO-1NC,
2NO-2NC, or operator only. Variety of mounting brackets available

Pneumatic time delay—ON delay and OFF delay. Timing range—0.05 to 60 seconds

Rotating cam shaft switches

Technical Data and Specifications

See **Page V8-T2-99** for more information

Enclosure ratings—
NEMA 1 or NEMA 4 versions

Construction—
Zinc die cast
PS: Phenolic

Approvals

UL Listed
CSA Certified (PS and J only)

E47 Precision Switches

Contents

Drawings Online

E47 Precision Switches

Product Description

E47 Precision Switches from Eaton's electrical sector provide high accuracy switching at an affordable price. A variety of standard features, such as current capacity, operating force, travel characteristics and actuators, lets you custom fit the switch to your application.

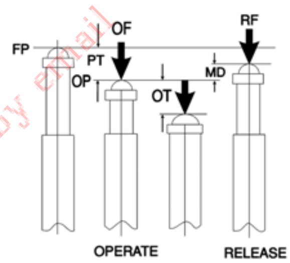
The switches are available in their compact basic form, or enclosed in a rugged, metal housing.

Features

- Compact housings are ideal for use where space is restricted
- Precision, snap-action operators provide accurate repeatability of electrical and mechanical operating characteristics
- High current capacity (up to 20A) allows power load switching and motor handling capability
- Enclosed booted versions shield actuators from debris

Operating Characteristics

Definitions



- OF—Operating Force
- RF—Return Force
- PT—Pre-Travel
- OT—Over-Travel
- MD—Movement Differential
- FP—Free Position
- OP—Operating Position

Standards and Certifications

- UL Recognized
- CSA Certified
- CE
- RoHS

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Basic Switches

E47 Precision Switches—Basic

	Type	Specifications ①	15A Catalog Number	20A Catalog Number
Pin Plunger 	**Pin Plunger**			
	Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.005 in (0.13 mm) MD max.—0.002 in (0.05 mm) OP—0.626 in (15.9 mm)	**E47BMS01**	**E47CMS01**
	Solder terminal		**E47BML01**	**E47CML01** ②
Extended Plunger 	**Extended Plunger**			
	Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.063 in (1.6 mm) MD max.—0.002 in (0.05 mm) OP—1.11 in (28.2 mm)	**E47BMS03**	—
	Solder terminal		**E47BML03**	—
Straight Plunger 	**Straight Plunger**			
	Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.063 in (1.6 mm) MD max.—0.002 in (0.05 mm) OP—0.846 in (21.5 mm)	**E47BMS02**	**E47CMS02**
	Solder terminal		**E47BML02**	**E47CML02**
Reversed Lever 	**Reversed Lever**			
	Screw terminal	OF max.—5.29 oz (150g) RF max.—0.49 oz (14g) PT max.—0.16 in (4 mm) OT max.—0.063 in (1.6 mm) MD max.—0.051 in (1.3 mm) FP max.—0.81 in (20.6 mm) OP—0.685 in (17.4 mm)	**E47BMS21**	—
	Solder terminal		**E47BML21**	—
	Spade terminal		**E47BMT21**	—
Straight Lever 	**Straight Lever**			
	Screw terminal	OF max.—2.47 oz (70g) RF min.—0.49 oz (14g) PT max.—0.394 in (10 mm) OT max.—0.220 in (5.6 mm) MD max.—0.051 in (1.3 mm) FP max.—1.11 in (28.2 mm) OP—0.748 in (19 mm)	**E47BMS22**	**E47CMS22**
	Solder terminal		**E47BML22**	—
Standard Lever 	**Standard Lever**			
	Screw terminal	OF max.—3.53 oz (100g) RF min.—0.99 oz (28g) PT max.—0.197 in (5.0 mm) OT max.—0.079 in (2.0 mm) MD max.—0.039 in (1.0 mm) FP max.—0.976 in (24.8 mm) OP—0.748 in (19 mm)	**E47BMS20**	—
	Solder terminal		**E47BML20**	—
Extended Straight Plunger 	**Extended Straight Plunger**			
	Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.217 in (5.5 mm) MD max.—0.002 in (0.05 mm) OP—0.858 in (21.8 mm)	**E47BMS04**	**E47CMS04**
	Screw terminal (with space lugs)		**E47BMT04**	—
	Solder terminal		**E47BML04**	**E47CML04**

Notes

① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

② Contact Eaton's Sensor Applications Department at 1-800-426-9184 for approval status.

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E47 Precision Switches—Basic, continued

Type	Specifications ①	15A Catalog Number	20A Catalog Number
Roller Plunger			
			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.14 in (3.6 mm) MD max.—0.002 in (0.05 mm) OP—1.315 in (33.4 mm)	**E47BMS10**	**E47CMS10**
Solder terminal		**E47BML10**	—
Cross Roller Plunger			
			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.14 in (3.6 mm) MD max.—0.002 in (0.05 mm) OP—1.315 in (33.4 mm)	**E47BMS11**	**E47CMS11**
Solder terminal		**E47BML11**	—
Reversed Roller Lever			
			
Screw terminal	OF max.—5.29 oz (150g) RF max.—0.49 oz (14g) PT max.—0.16 in (4 mm) OT max.—0.063 in (1.6 mm) MD max.—0.051 in (1.3 mm) FP max.—1.252 in (31.8 mm) OP—1.126 in (28.6 mm)	**E47BMS41**	—
Solder terminal		**E47BML41**	—
Extended Roller Lever			
			
Screw terminal	OF max.—5.64 oz (160g) RF min.—0.78 oz (22g) PT max.—0.28 in (7.1 mm) OT max.—0.16 in (4 mm) MD max.—0.04 in (1.02 mm) FP max.—1.437 in (36.5 mm) OP—1.189 in (30.2 mm)	**E47BMS42**	**E47CMS42**
Solder terminal		**E47BML42**	—
Roller Lever			
			
Screw terminal	OF max.—5.64 oz (160g) RF min.—1.48 oz (42g) PT max.—0.106 in (2.7 mm) OT max.—0.094 in (2.4 mm) MD max.—0.02 in (0.5 mm) FP max.—1.28 in (32.5 mm) OP—1.189 in (30.2 mm)	**E47BMS30**	**E47CMS30**
Solder terminal		**E47BML30**	—
Spade terminal		**E47BMT30**	**E47CMT30**
One-Way Roller			
			
Screw terminal	OF max.—5.64 oz (160g) RF min.—1.48 oz (42g) PT max.—0.106 in (2.7 mm) OT max.—0.094 in (2.4 mm) MD max.—0.02 in (0.5 mm) FP—1.717 in (43.6 mm) OP—1.697 in (43.1 mm)	**E47BMS31**	—
Solder terminal		**E47BML31**	—
Integral Leaf			
			
Screw terminal	OF max.—0.35 oz (10g) RF min.—0.106 oz (3.0g) PT max.—0.787 in (20.0 mm) OT max.—0.22 in (5.6 mm) MD max.—0.118 in (3.0 mm) OP—0.748 in (19.0 mm)	**E47BMS23**	**E47CMS23**
Solder terminal		**E47BML23**	—

Note

① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

E47 Precision Switches—Basic, continued

Type	Specifications ①	15A Catalog Number	20A Catalog Number
Adjustable Roller			
			
Adjustable Roller			
Screw terminal	OF max.—17.64 oz (500g) RF min.—6.0 oz (170g) PT max.—0.197 in (5.0 mm) OT max.—0.5 in (12.7 mm) MD max.—0.087 in (2.2 mm) FP max.—1.752 in (44.5 mm) OP—1.591 in (40.4 mm)	**E47BMS40**	—
Solder terminal		**E47BML40**	—
Extended Adjustable Roller			
			
Extended Adjustable Roller			
Screw terminal	OF max.—21.16 oz (600g) RF min.—10.58 oz (300g) PT max.—0.118 in (3.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.079 in (2.0 mm) FP max.—1.614 in (41 mm) OP—1.591 in (40.4 mm)	**E47BMS43**	—
Solder terminal		**E47BML43**	—

Enclosed Switches

E47 Precision Switches—Enclosed

Specifications ①	Catalog Number
Plunger Actuator	
	
Plunger Actuator	
OF max.—8.82–12.3 oz (250–350g) RF min.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.217 in (5.5 mm) MD max.—0.002 in (0.05 mm) OP—1.504 in (38.2 mm)	**E47BLS05**
	E47CLS05 ②③
Booted Plunger	
	
Booted Plunger	
OF max.—28.22 oz (800g) RF min.—8.46 oz (240g) PT max.—0.079 in (2.0 mm) OT max.—0.197 in (5.0 mm) MD max.—0.004 in (0.1 mm) OP—1.803 in (45.8 mm)	**E47BLS06**
	E47CLS06 ②③
Roller Lever	
	
Roller Lever	
OF max.—20.1 oz (570g) RF min.—6.0 oz (170g) PT max.—0.157 in (4.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	**E47BLS32**
	E47CLS32 ②③

Specifications ①	Catalog Number
Booted Roller Lever	
	
Booted Roller Lever	
OF max.—22.57 oz (640g) RF min.—8.11 oz (230g) PT max.—0.197 in (5.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	**E47BLS33**
Roller Plunger	
	
Roller Plunger	
OF max.—8.82–12.3 oz (250–350g) RF min.—4.02 oz (114g) PT max.—0.02 in (0.5 mm) OT max.—0.142 in (3.6 mm) MD max.—0.002 in (0.05 mm) OP—1.957 in (49.7 mm)	**E47BLS07**
	E47BLS11 ④
Booted Roller Plunger	
	
Booted Roller Plunger	
OF max.—17.64 oz (500g) RF min.—3.53 oz (100g) PT max.—0.039 in (1.0 mm) OT max.—0.138 in (3.5 mm) MD max.—0.005 in (0.12 mm) OP—1.957 in (49.7 mm)	**E47BLS08**
	E47BLS12 ④

Notes

① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

② Contact Eaton's Sensor Applications Department at 1-800-426-9184 for approval status.

③ 20 ampere version.

④ Cross roller unit.

2

E47 Precision Switches—Enclosed, continued

	Specifications ①	Catalog Number
One-Way Roller	**One-Way Roller**	
	OF max.—20.1 oz (570g) RF min.—6.0 oz (170g) PT max.—0.157 in (4.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	**E47BLS34**
Booted One-Way Roller	**Booted One-Way Roller**	
	OF max.—22.57 oz (640g) RF min.—8.11 oz (230g) PT max.—0.197 in (5.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	**E47BLS35**

E47 Precision Switches—Enclosed, continued

	Specifications ①	Catalog Number
Booted Wobble	**Booted Wobble**	
	OF max.—2.11 oz (60g) RF min.—0.88 oz (25g) PT max.—0.520 in (13.2 mm) OT max.—0.315 in (8.0 mm) MD max.—0.039 in (1.0 mm)	**E47BLS14**

Accessories

Terminal Wire Covers for Basic Switches

	Description	Catalog Number
45°	Terminal wire cover with 45° conduit interface	**E47PA1**
90°	Terminal wire cover with 90° conduit interface	**E47PA2**

Technical Data and Specifications

E47 Precision Switches

Description	Specification
Operating speed	0.01m/second to 1m/second
Operating Frequency	
Mechanical	120 operations/minute
Electrical	20 operations/minute
Mechanical life	3,000,000 operations minimum
Electrical life	500,000 operations minimum
Contact resistance	15M ohms maximum, initial
Insulation resistance	100M ohms minimum at 500 Vdc
Dielectric Strength	
Between non-current carrying parts	1000 Vac, 50/60 Hz for 1 minute
Between current carrying parts and ground	2000 Vac, 50/60 Hz for 1 minute

Notes

① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

② Cross roller unit.

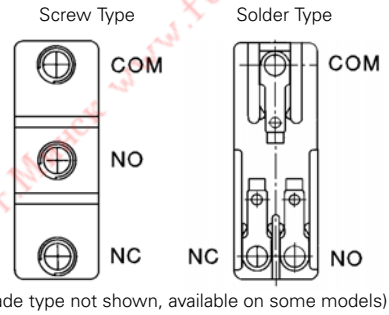
E47 Precision Switches, continued

Description	Specification
Ambient Operating Temperature	
Basic	–13° to 176°F (–25° to 80°C)
Enclosed	5° to 176°F (–15° to 80°C)
Environmental rating enclosed, booted	NEMA 1
Mounting centers	1.0 in (25.4 mm), #8 screw size
Terminal screws	Bottom facing M4 x 0.7 (8–32) Screws with cup washers will accept 22–12 AWG (2.5 sq. mm maximum) Maximum torque: 10 in-lbs.
Threaded bushing	15/32 in
Material of construction	Mineral filled phenolic
Enclosure rating	Aluminum die casting (ADC-3/A380); Seal boot: nitrile, butyl rubber (NBR)
Conduit fitting on enclosed type	1/2 in NPT

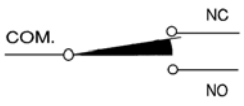
Maximum Ampere Ratings ①②

		Non-Inductive Load (A)			Inductive Load (A)				
		Resistive Load	Lamp Load		Inductive Load	Motor Load		Inrush Current (A)	
Model	Rated Voltage	NC and NO	NC	NO	NC and NO	NC	NO	NC	NO
15A	125 Vac	15	3	1.5	15	5	2.5	30 max.	15 max.
	250 Vac	15	2.5	1.25	15	3	1.5		
	500 Vac	3	1.5	0.75	2.5	1.5	0.75		
	8 Vdc	15	3	1.5	15	5	2.5		
	14 Vdc	15	3	1.5	10	5	2.5		
	30 Vdc	6 (2)	3	1.5	5	5	2.5		
	125 Vdc	0.4	0.4	0.4	0.05	0.05	0.05		
	250 Vdc	0.2	0.2	0.2	0.03	0.03	0.03		
20A	125 Vac	20	7.5	7.5	20	12.5	12.5	60 max.	30 max.
	250 Vac	20	7.5	7.5	20	8.3	8.3		
	500 Vac	6	4	4	5	2	2		
	8 Vdc	20	3	1.5	20	12.5	12.5		
	14 Vdc	20	3	1.5	15	12.5	12.5		
	30 Vdc	6	3	1.5	5	5	5		
	125 Vdc	0.5	0.5	0.5	0.05	0.05	0.05		
	250 Vdc	0.25	0.25	0.25	0.03	0.03	0.03		

Terminal Configurations



(Spade type not shown, available on some models)



Contact Configuration—
Form C Precision Snap Action

Notes

① Inductive load has a power factor of 0.04 minimum (AC) and a time constant of 7 m/second (DC).

② Lamp load has an inrush current of six times steady-state current.

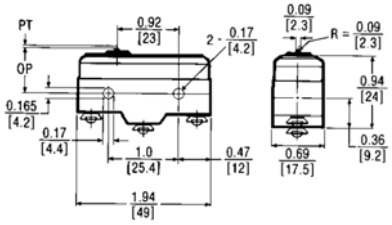
Dimensions

Approximate Dimensions in Inches [mm]

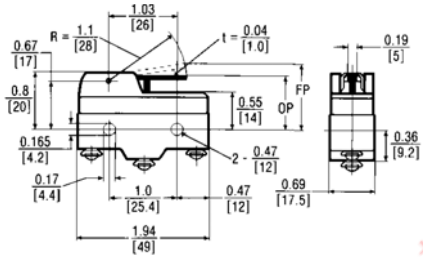
2

Basic Switches

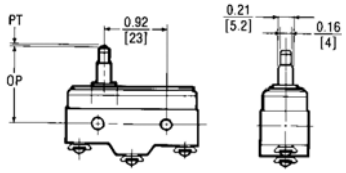
Pin Plunger



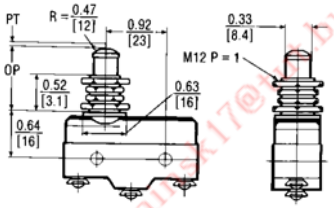
Standard Lever



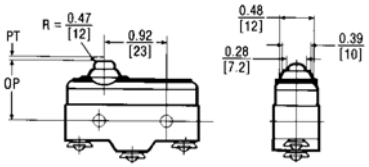
Extended Plunger



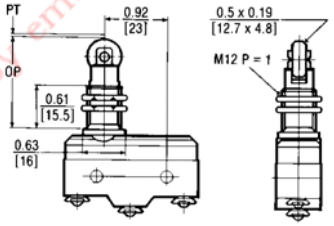
Extended Straight Plunger



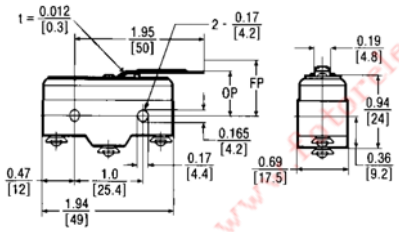
Straight Plunger



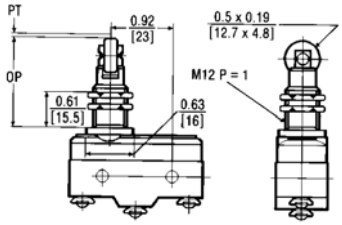
Roller Plunger



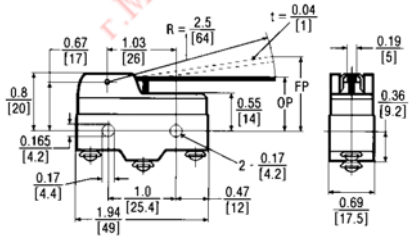
Reversed Lever



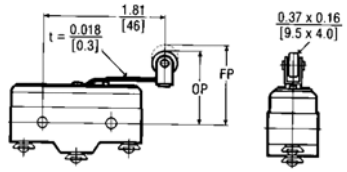
Cross Roller Plunger



Straight Lever

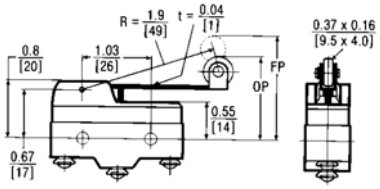


Reversed Roller Lever

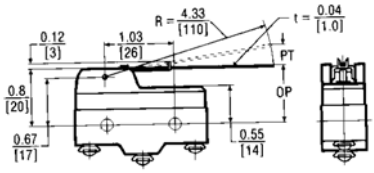


Approximate Dimensions in Inches [mm]

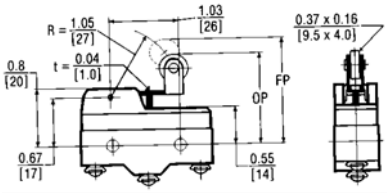
Extended Roller Lever



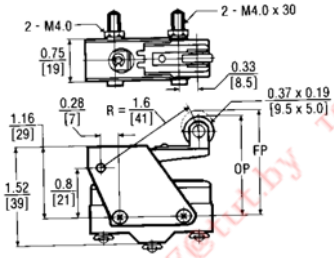
Integral Leaf



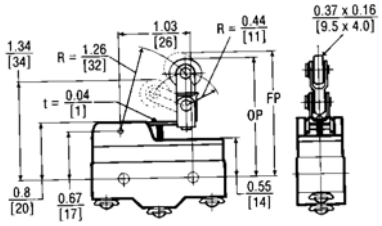
Roller Lever



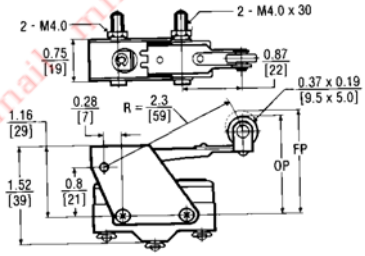
Adjustable Roller



One-Way Roller

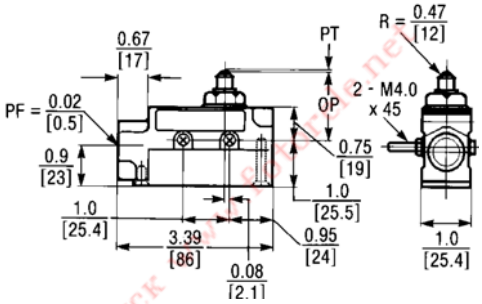


Extended Adjustable Roller

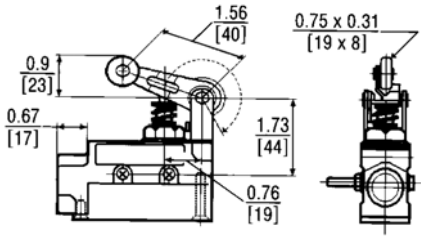


Enclosed Switches

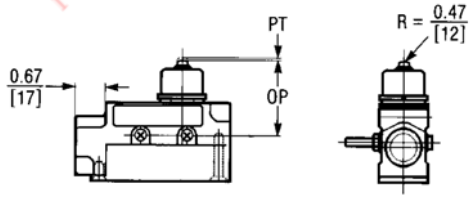
Plunger Actuator



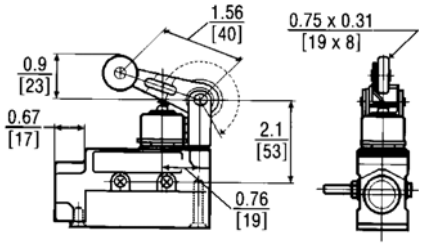
Roller Lever



Booted Plunger

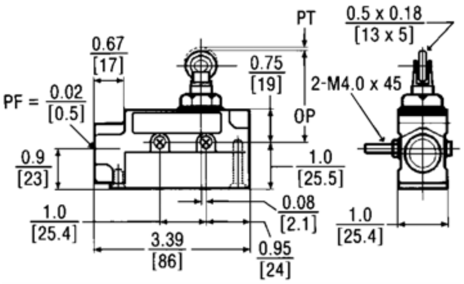


Booted Roller Lever

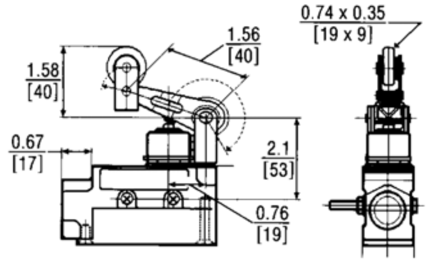


Approximate Dimensions in Inches [mm]

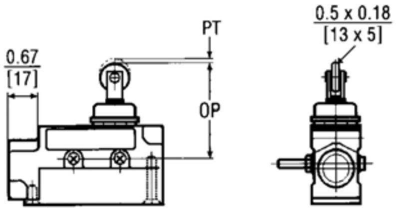
Roller Plunger



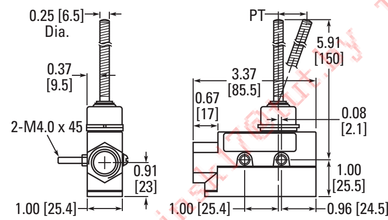
Booted One-Way Roller



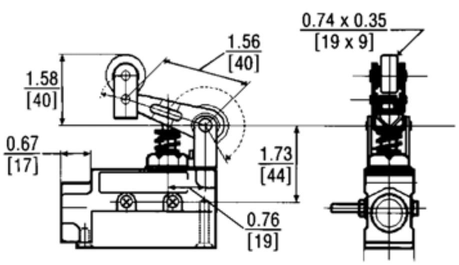
Booted Roller Plunger



Booted Wobble



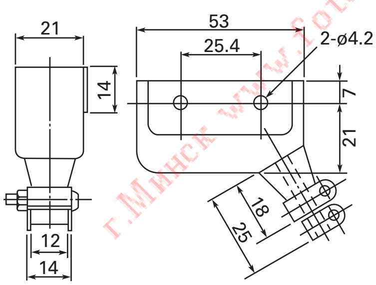
One-Way Roller



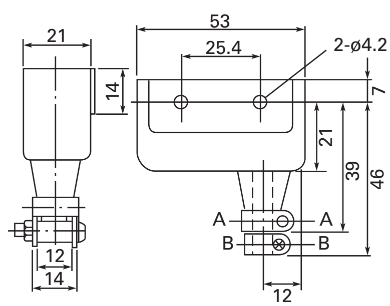
Accessories

Approximate Dimensions in mm

Terminal Wire Cover with 45° Conduit Interface



Terminal Wire Cover with 90° Conduit Interface



Compact Prewired Switches

Contents

Compact Prewired Switches

Product Description

The E47 Compact Prewired Limit Switch by Eaton's electrical sector is designed to be a versatile, slim device for hard to fit applications where sealing integrity is required. The rugged die cast aluminum alloy housing, cable connection and switch mechanism are encapsulated for protection against extreme temperature (–10° to 70°C [14° to 158°F]), contaminants, moisture, shock and vibration. This factory wired (3m) device has NEMA® enclosure ratings of 4, 6 and 13, making it suitable for applications such as machine tool, food processing and packaging.

Features

- Rugged aluminum alloy die cast housing
- Sealed construction with enclosure ratings of NEMA 4, 6 and 13
- Prewired with 3m of 18 AWG, AWM 2517, 300V cable, or micro-connector version also available
- Stackable ridge for ganged operation

Standards and Certifications

- cULus (cable versions only)
- UL (cable versions only)
- NEMA 4, 6 and 13
- IEC IP67, IP69K
- RoHS

c UL us Listed UL RoHS COMPLIANT

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

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Compact Prewired Switches

Actuator Type	Operating Force (Maximum)	Reset Force (Minimum)	Over-Travel (Maximum)	Pre-Travel	Movement Differential (Maximum)	Operating Position	Standard Version Catalog Number	Connector Version Catalog Number
Pin Plunger	**Pin Plunger**							
	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	0.62 ± 0.04 in (15.7 ± 1 mm)	**E47BCC05**	**E47BCC05P4**
Sealed Plunger	**Sealed Plunger**							
	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	0.99 ± 0.04 in (24.9 ± 1 mm)	**E47BCC06**	**E47BCC06P4**
Roller Plunger	**Roller Plunger**							
	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	**E47BCC07**	**E47BCC07P4**
Sealed Roller Plunger	**Sealed Roller Plunger**							
	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.35 ± 0.04 in (34.3 ± 1 mm)	**E47BCC08**	**E47BCC08P4**
Cross Roller Plunger	**Cross Roller Plunger**							
	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	**E47BCC11**	**E47BCC11P4**
Sealed Cross Roller Plunger	**Sealed Cross Roller Plunger**							
	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.35 ± 0.04 in (34.3 ± 1 mm)	**E47BCC12**	**E47BCC12P4**
Bevel Plunger	**Bevel Plunger**							
	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	**E47BCC13**	**E47BCC13P4**

Compact Prewired Switches, continued

Actuator Type	Operating Force (Maximum)	Reset Force (Minimum)	Over-Travel (Maximum)	Pre-Travel	Movement Differential (Maximum)	Operating Position	Standard Version Catalog Number	Connector Version Catalog Number
Roller Lever	**Roller Lever**							
	20.5 oz (580g)	5.3 oz (150g)	40°	25° max.	3°	—	**E47BCC15**	**E47BCC15P4**
Wobble Stick	**Wobble Stick**							
	5.3 oz (150g)	—	—	15° max.	—	—	**E47BCC20**	**E47BCC20P4**
Rod Lever	**Rod Lever**							
	20.5 oz (580g)	5.3 oz (150g)	40°	25° max.	3°	—	—	**E47BCC21P4**
Adjustable Level Arm	**Adjustable Level Arm**							
	20.5 oz (580g)	5.3 oz (150g)	40°	25° max.	3°	—	**E47BCC22**	**E47BCC22P4**

Technical Data and Specifications

Compact Prewired Switches

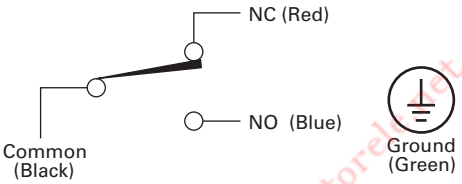
Description	Specification
Contacts	1-SPDT (Form C)
Mechanical life	10,000,000 operations
Electrical life	200,000 operations, 30 operation/min. at rated load
Operating speed	30 operations per minute maximum
Operating temperature range	–10° to 70°C (14° to 158°F)
Storage temperature range	–10° to 70°C (14° to 158°F)
Humidity	95% maximum non-condensing
Vibration	Malfunction durability, 10 to 55 Hz 1.5 mm double amplitude
Shock	Malfunction durability, approximately 50G
Enclosure ratings	NEMA 4, 6 and 13; IEC IP67

Maximum Ampere Ratings ①

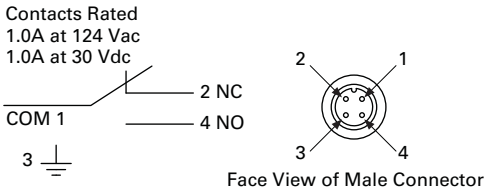
Rated Voltage	Non-Inductive Load (A) Resistive Load NC	NO	Inductive Load (A) Inductive Load NC	NO	Motor Load NC	NO	Inrush Current (A) NC	NO
125 Vac	5	5	3	3	2.5	1.3	20 max.	10 max.
250 Vac	5	5	2	2	1.5	0.8		
8 Vdc	5	5	5	4	1.5	1.5		
14 Vdc	5	5	4	4	1.5	1.5		
30 Vdc	4	4	3	3	1.5	1.5		
125 Vdc	0.4	0.4	0.4	0.4	0.05	0.05		
250 Vdc	0.2	0.2	0.2	0.2	0.03	0.03		

Wiring Diagram

Compact Prewired Switches



Micro-Connector Switches



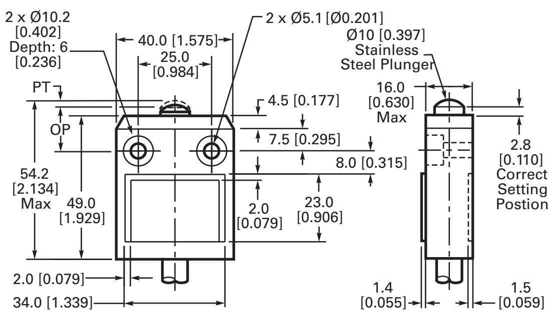
Note

① Inductive load ratings are tested at a power factor 0.4 min. for AC power and a time constant of 7 ms max. for DC power. Inrush current for motor load is six times the steady state current.

Dimensions

Approximate Dimensions in mm [in]

E47BCC05



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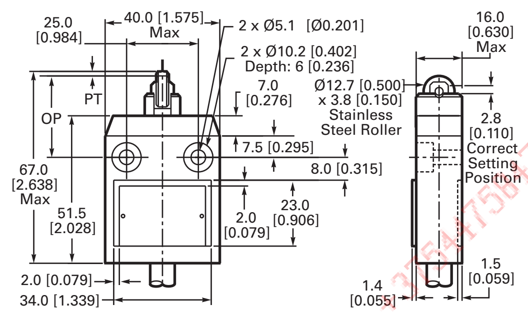
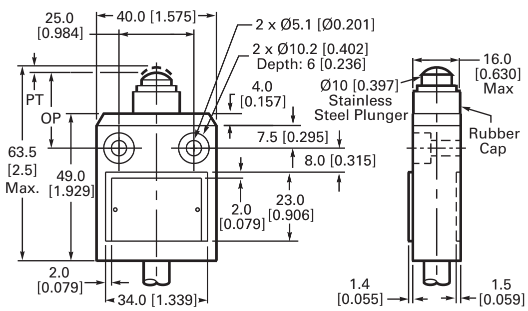
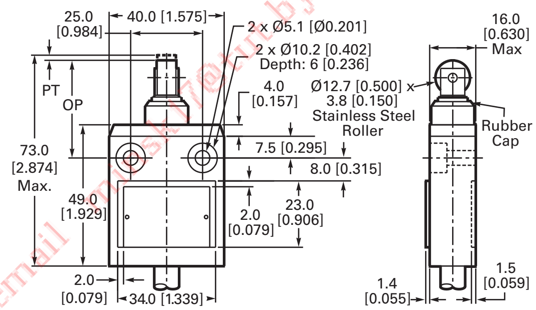


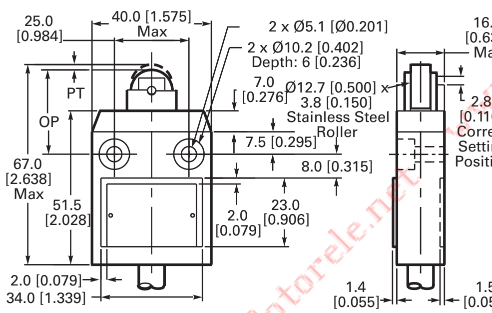
E47BCC06



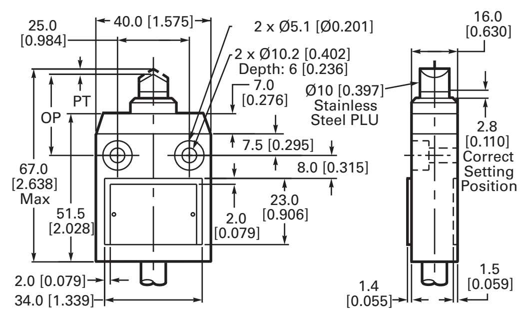
E47BCC12



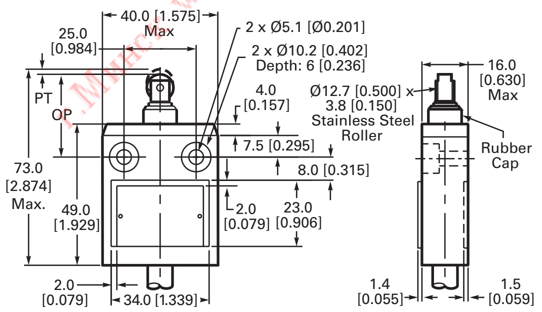
E47BCC07



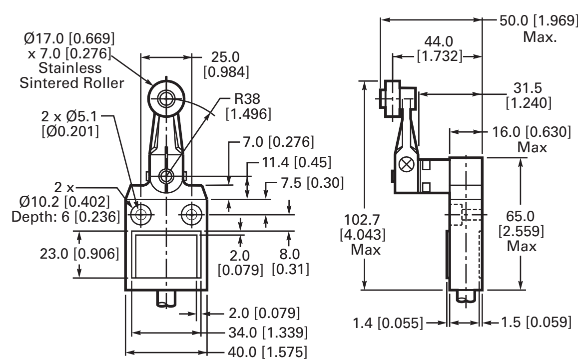
E47BCC13



E47BCC08



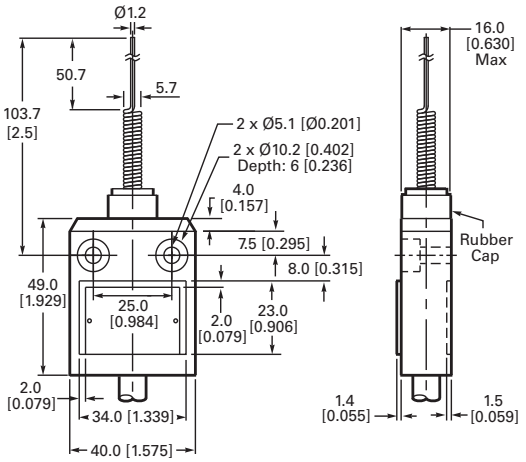
E47BCC15


Ø17.0 [0.669]
x 7.0 [0.276]
Stainless
Sintered Roller
25.0
[0.984]
R38
[1.496]
2 x Ø5.1
[Ø0.201]
7.0 [0.276]
11.4 [0.45]
7.5 [0.30]
2 x
Ø10.2 [0.402]
Depth: 6 [0.236]
23.0 [0.906]
2.0
[0.079]
8.0
[0.31]
2.0 [0.079]
34.0 [1.339]
40.0 [1.575]
50.0 [1.969]
Max.
44.0
[1.732]
31.5
[1.240]
16.0 [0.630]
Max
102.7
[4.043]
Max
65.0
[2.559]
Max
1.4 [0.055]
1.5 [0.059]

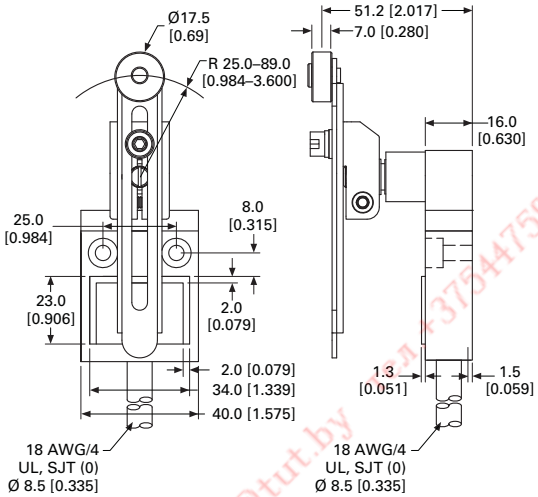
Approximate Dimensions in mm [in]

2

E47BCC20



E47BCC22



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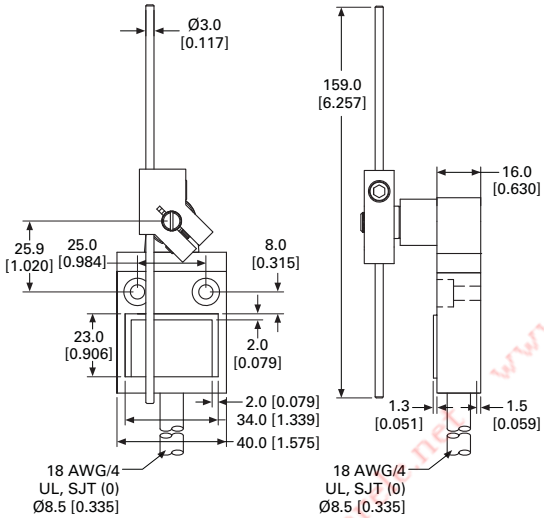


LS-Titan Miniature DIN Switches

Contents

Description **Page**

LS-Titan Miniature DIN Switches

Product Description

Eaton's LS-Titan™ limit switch line is a complete offering of safety position switches designed for worldwide application. Economical insulated plastic or rugged metal enclosures and modular, plug-in operating heads and bodies make LS-Titan a flexible switching solution.

A highlight of the LS-Titan switch line is the world's first electronic position switch (LSE models). These switches feature freely programmable operating points that can be set individually at any time. Additional LSE models provide analog outputs proportional to the actuator position.

LS-Titan switches are suitable for use in safety applications designed to protect persons or processes.

Features

- Modular, plug-in system (head and body components)
- Positive opening NC contacts for safety applications
- Wide variety of economical plastic and rugged metal versions available
- Operating heads can be rotated 90 degrees to suit specific direction of operation
- Unique electronic safety position switches (LSE models) provide analog (0–10 Vdc or 4–20 mA) outputs proportional to the actuator position and allow for easy configuration of a custom trip point
- Can be ordered as separate components (head and body) or as completely assembled switches
- Screw and Cage Clamp® (standard on LSE models and optionally available on mechanical models) connections provide larger wiring areas for easier installation
- Approved for worldwide application

Standards and Certifications

- Safety function by positive opening contacts per IEC/EN 60947-5-1 up to Category 4 per EN 954-1
- TÜV-Rheinland Certified for Functional-Safety (LSE models)
- CSA certified
- UL listed
- CE
- CCC

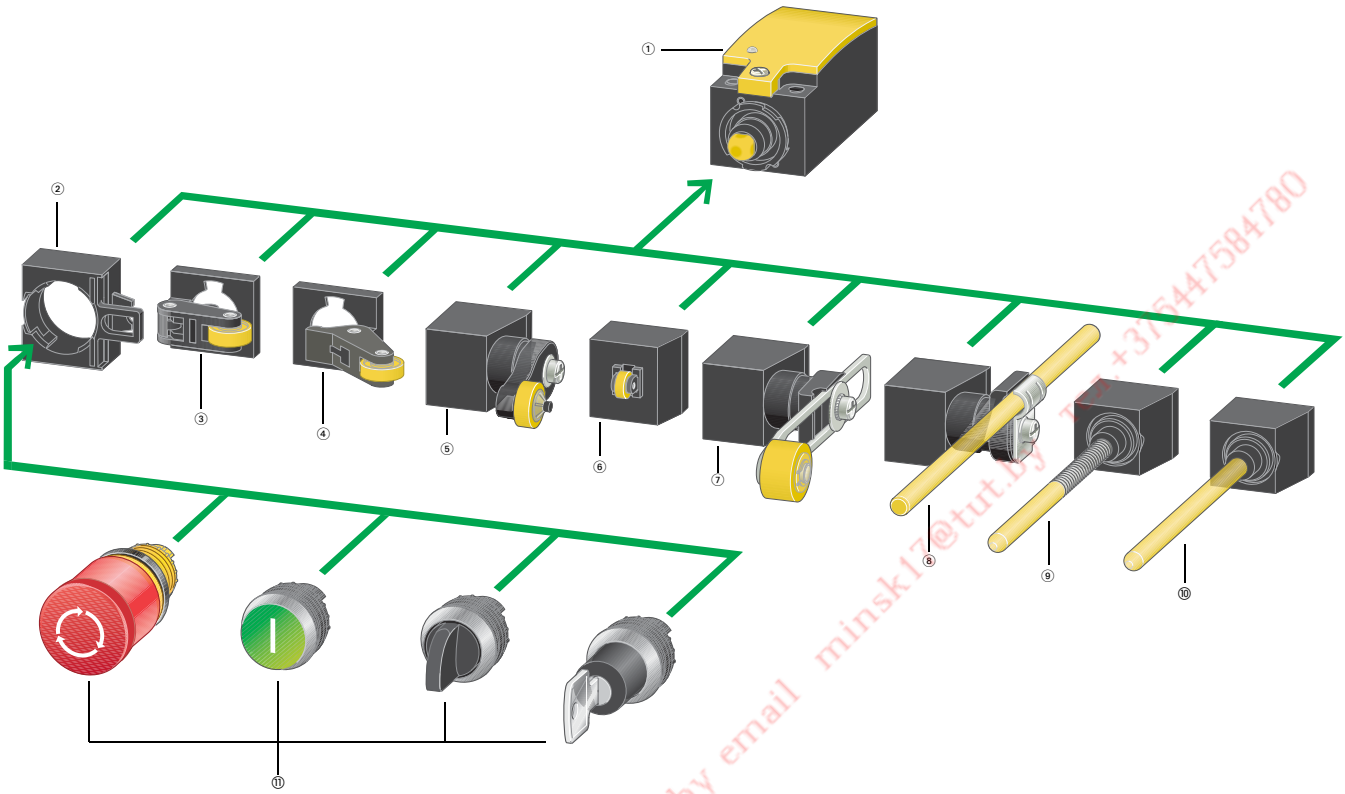
Listed

Note: Cage Clamp is a registered trademark of Wago Kontakttechnik, 32423 Minden, Germany.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Identification



Notes

① **Basic device**
(see **Pages V8-T2-23** to **V8-T2-31**)
According to EN 50047
With screw-on cover
Contacts: 1NO-1NC, 2NO, 2NC
Cage Clamp, screw terminal
As snap-action or standard-action switch
As electronic snap-action switch
(individually adjustable)
As 4–20 mA analog signal encoder
As 0–10 Vdc analog signal encoder

② **Fixing adapter** (see **Page V8-T2-33**)
Allows mounting of M22 pushbuttons

③ **Roller lever**
(see **Pages V8-T2-23** and **V8-T2-26**)
For one-sided operation with higher operating speed

④ **Angled roller lever**
(see **Pages V8-T2-23**, **V8-T2-26** and **V8-T2-30**)
For actuation along the unit axis

⑤ **Rotary lever** (see **Pages V8-T2-23**, **V8-T2-27** and **V8-T2-30**)
For actuation from the side, for pendulum movements

⑥ **Roller plunger** (see **Pages V8-T2-23**, **V8-T2-26** and **V8-T2-30**)
For actuation from the side with low actuating force

⑦ **Adjustable roller lever**
(see **Pages V8-T2-24**, **V8-T2-27**, **V8-T2-28** and **V8-T2-30**)
For length adjustment as required

⑧ **Actuating rod** (see **Pages V8-T2-25**, **V8-T2-29** and **V8-T2-31**)
On conveyor belts for lightweight goods

⑨ **Spring-rod** (see **Pages V8-T2-25**, **V8-T2-29** and **V8-T2-31**)
For flexible actuation from all sides

j **Actuating rod** (see **Pages V8-T2-25**, **V8-T2-29** and **V8-T2-31**)
Withdrawable mechanism from front

k Pushbuttons from the M22 family; see M22 catalog (CA04716001E) or www.eaton.com/m22

Operating heads can be rotated by 90 degrees.

Product Selection

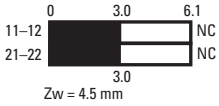
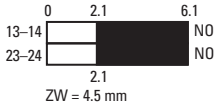
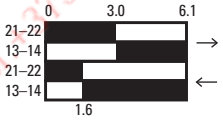
LS-Titan Plastic Safety Switches

2

Plastic Safety Switch Body

Assembled Switch

Plastic Safety Switches

Switch Body Catalog Number	LS-S02	LS-S20A	LS-S11S
Output Function	2NC with positive opening contacts	2NO with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Screw terminal ①	Screw terminal ①	Screw terminal ①
Contact Sequence			
Contact Travel ■ = contact closed ☐ = contact open			Snap-action contact 
Operating Head Type ②			
Head Only Catalog Number	**Assembled Switch Catalog Number**		
Top Push Roller Plunger 	LS-XP	LS-S02-P	LS-S20A-P	LS-S11S-P
Long Roller Lever 	LS-XL	LS-S02-L	LS-S20A-L	LS-S11S-L
Short Roller Lever 	LS-XLS	LS-S02-LS	LS-S20A-LS	LS-S11S-LS
Large Roller Lever 	LS-XLB	LS-S02-LB	LS-S20A-LB	LS-S11S-LB
Angled Roller 	LS-XLA	LS-S02-LA	LS-S20A-LA	LS-S11S-LA
Rotary Lever 	LS-XRL	LS-S02-RL	LS-S20A-RL	LS-S11S-RL

Notes

① Cage Clamp versions available. Contact Application Engineering.

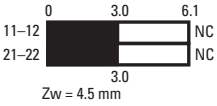
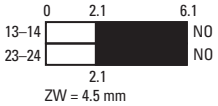
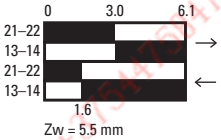
② For operating head dimensions, see **Page V8-T2-40**.

2

Plastic Safety Switches, continued

Plastic Safety Switch Body

Assembled Switch

Switch Body Catalog Number	LS-S02	LS-S20A	LS-S11S
Output Function	2NC with positive opening contacts	2NO with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Screw terminal ①	Screw terminal ①	Screw terminal ①
Contact Sequence			
Contact Travel ■ = contact closed □ = contact open			Snap-action contact 
Operating Head Type ②			
Head Only Catalog Number / **Assembled Switch Catalog Number**			
Adjustable Roller Lever (with 18 mm Roller) 	**LS-XRLA** / **LS-S02-RLA**	**LS-S20A-RLA**	**LS-S11S-RLA**
Adjustable Roller Lever (with 30 mm Roller) 	**LS-XRLA30** / **LS-S02-RLA30**	**LS-S20A-RLA30**	**LS-S11S-RLA30**
Adjustable Roller Lever (with 40 mm Roller) 	**LS-XRLA40** / **LS-S02-RLA40**	**LS-S20A-RLA40**	**LS-S11S-RLA40**
Adjustable Roller Lever (with 40 mm Rubber Roller) 	**LS-XRLA40R** / **LS-S02-RLA40R**	**LS-S20A-RLA40R**	**LS-S11S-RLA40R**

Notes

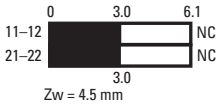
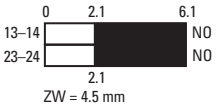
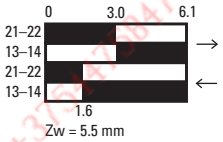
① Cage Clamp versions available. Contact Application Engineering.

② For operating head dimensions, see **Page V8-T2-40**.

Plastic Safety Switches, continued

Plastic Safety Switch Body

Assembled Switch

Switch Body Catalog Number	LS-S02	LS-S20A	LS-S11S
Output Function	2NC with positive opening contacts	2NO with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Screw terminal ①	Screw terminal ①	Screw terminal ①
Contact Sequence			
Contact Travel ■ = contact closed ☐ = contact open			Snap-action contact 
Operating Head Type ②			
Head Only Catalog Number	**Assembled Switch Catalog Number**		
Plastic Rod Lever 	**LS-XRR**	**LS-S02-RR**	**LS-S20A-RR**	**LS-S11S-RR**
Metal Rod 	**LS-XRRM**	**LS-S02-RRM**	**LS-S20A-RRM**	**LS-S11S-RRM**
Spring Rod (Wobble) ③ 	**LS-XS**	**LS-S02-S**	**LS-S20A-S**	**LS-S11S-S**
Actuating Rod 	**LS-XOR**	**LS-S02-OR**	**LS-S20A-OR**	**LS-S11S-OR**

Notes

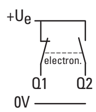
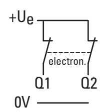
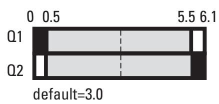
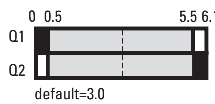
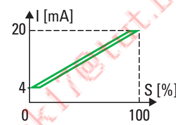
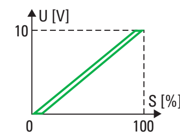
① Cage Clamp versions available. Contact Application Engineering.
② For operating head dimensions, see **Page V8-T2-40**.
③ Not to be used as a safety position switch. Use only in conjunction with snap-action contact.

2

LS-Titan Plastic Electronic Safety Position Switches

Plastic Electronic Safety Position Switch Body

Plastic Electronic Safety Position Switches

Switch Body Catalog Number	LSE-11	LSE-02	LSE-AI	LSE-AU
Output Function	1NO and 1 NC	2NC	Analog 4–20 mA	Analog 0–10V
Terminal Connections	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①
Safety Functions and Approvals	These models may be used in safety-oriented circuits. Visual status LED indication is comparable to positive opening contacts. Certified by TÜV as a "Functional-Safety" device. Suitable for protection of people or processes.		Additional diagnostic output that registers a 0V signal in the event of a fault. Self-test function continuously tests both outputs for overloads, short circuits to 0V and short circuits to $+U_e$. Certified by TÜV to EN 954-1, Category 3 or 4. Suitable for protection of people or processes.	
Contact Sequence			Analog 4–20 mA	Analog 0–10V
Contact Travel ■ = contact closed □ = contact open				

Assembled Switch

Operating Head Type ②

	Head Only Catalog Number	Assembled Switch Catalog Number			
Top Push Roller Plunger 	LS-XP	LSE-11-P	LSE-02-P	LSE-AI-P	LSE-AU-P
Long Roller Lever 	LS-XL	LSE-11-L	LSE-02-L	LSE-AI-L	LSE-AU-L
Short Roller Lever 	LS-XLS	LSE-11-LS	LSE-02-LS	LSE-AI-LS	LSE-AU-LS
Large Roller Lever 	LS-XLB	LSE-11-LB	LSE-02-LB	LSE-AI-LB	LSE-AU-LB
Angled Roller 	LS-XLA	LSE-11-LA	LSE-02-LA	LSE-AI-LA	LSE-AU-LA

Notes

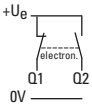
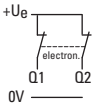
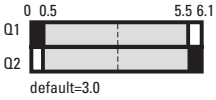
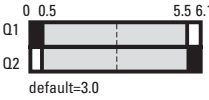
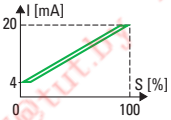
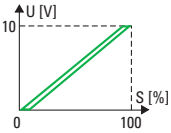
① A compatible Cage Clamp tool is available as an accessory on **Page V8-T2-33**.

② For operating head dimensions, see **Page V8-T2-40**.

Plastic Electronic Safety Position Switches, continued

Plastic Electronic Safety Position Switch Body

Assembled Switch

Switch Body Catalog Number	LSE-11	LSE-02	LSE-AI	LSE-AU
Output Function	1NO and 1NC	2NC	Analog 4–20 mA	Analog 0–10V
Terminal Connections	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①
Safety Functions and Approvals	These models may be used in safety-oriented circuits. Visual status LED indication is comparable to positive opening contacts. Certified by TÜV as a "Functional-Safety" device. Suitable for protection of people or processes.		Additional diagnostic output that registers a 0V signal in the event of a fault. Self-test function continuously tests both outputs for overloads, short circuits to 0V and short circuits to $+U_e$. Certified by TÜV to EN 954-1, Category 3 or 4. Suitable for protection of people or processes.	
Contact Sequence			Analog 4–20 mA	Analog 0–10V
Contact Travel ■ = contact closed □ = contact open				

Operating Head Type ②

Head Only Catalog Number	Assembled Switch Catalog Number			
Rotary Lever				
LS-XRL	LSE-11-RL	LSE-02-RL	LSE-AI-RL	LSE-AU-RL
Adjustable Roller Lever (with 18 mm Roller)				
LS-XRLA	LSE-11-RLA	LSE-02-RLA	LSE-AI-RLA	LSE-AU-RLA
Adjustable Roller Lever (With 30 mm Roller)				
LS-XRLA30	LSE-11-RLA30	LSE-02-RLA30	LSE-AI-RLA30	LSE-AU-RLA30

Notes

① A compatible Cage Clamp tool is available as an accessory on **Page V8-T2-33**.

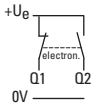
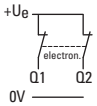
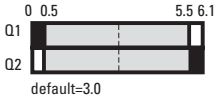
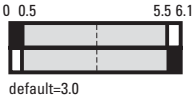
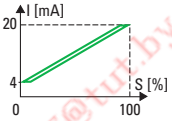
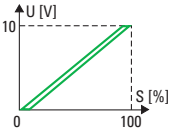
② For operating head dimensions, see **Page V8-T2-40**.

2

Plastic Electronic Safety Position Switches, continued

Plastic Electronic Safety Position Switch Body

Assembled Switch

Switch Body Catalog Number	LSE-11	LSE-02	LSE-AI	LSE-AU
Output Function	1NO and 1NC	2NC	Analog 4–20 mA	Analog 0–10V
Terminal Connections	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①
Safety Functions and Approvals	These models may be used in safety-oriented circuits. Visual status LED indication is comparable to positive opening contacts. Certified by TÜV as a "Functional-Safety" device. Suitable for protection of people or processes.		Additional diagnostic output that registers a 0V signal in the event of a fault. Self-test function continuously tests both outputs for overloads, short circuits to 0V and short circuits to $+U_e$. Certified by TÜV to EN 954-1, Category 3 or 4. Suitable for protection of people or processes.	
Contact Sequence			Analog 4–20 mA	Analog 0–10V
Contact Travel ■ = contact closed □ = contact open				

Operating Head Type ②

Head Only Catalog Number	Assembled Switch Catalog Number			
Adjustable Roller Lever (With 40 mm Roller)				
LS-XRLA40	LSE-11-RLA40	LSE-02-RLA40	LSE-AI-RLA40	LSE-AU-RLA40

Adjustable Roller Lever (With 40 mm Roller)				
LS-XRLA40R	LSE-11-RLA40R	LSE-02-RLA40R	LSE-AI-RLA40R	LSE-AU-RLA40R

Plastic Rod Lever				
LS-XRR	LSE-11-RR	LSE-02-RR	LSE-AI-RR	LSE-AU-RR

Notes

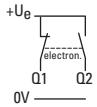
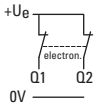
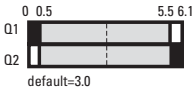
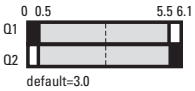
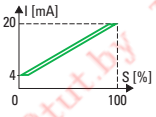
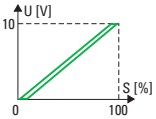
① A compatible Cage Clamp tool is available as an accessory on **Page V8-T2-33**.

② For operating head dimensions, see **Page V8-T2-40**.

Plastic Electronic Safety Position Switches, continued

Plastic Electronic Safety Position Switch Body

Assembled Switch

Switch Body Catalog Number	LSE-11	LSE-02	LSE-AI	LSE-AU
Output Function	1NO and 1NC	2NC	Analog 4–20 mA	Analog 0–10V
Terminal Connections	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①	Cage Clamp ①
Safety Functions and Approvals	These models may be used in safety-oriented circuits. Visual status LED indication is comparable to positive opening contacts. Certified by TÜV as a "Functional-Safety" device. Suitable for protection of people or processes.		Additional diagnostic output that registers a 0V signal in the event of a fault. Self-test function continuously tests both outputs for overloads, short circuits to 0V and short circuits to $+U_e$. Certified by TÜV to EN 954-1, Category 3 or 4. Suitable for protection of people or processes.	
Contact Sequence			Analog 4–20 mA	Analog 0–10V
Contact Travel ■ = contact closed □ = contact open				

Operating Head Type ②

Head Only Catalog Number	Assembled Switch Catalog Number			
Metal Rod				
LS-XRRM	**LSE-11-RRM**	**LSE-02-RRM**	**LSE-AI-RRM**	**LSE-AU-RRM**
				
Spring Rod (Wobble) ③				
LS-XS	**LSE-11-S**	**LSE-02-S**	**LSE-AI-S**	**LSE-AU-S**
				
Actuating Rod				
LS-XOR	**LSE-11-OR**	**LSE-02-OR**	**LSE-AI-OR**	**LSE-AU-OR**
				

Notes

① A compatible Cage Clamp tool is available as an accessory on **Page V8-T2-33**.
② For operating head dimensions, see **Page V8-T2-40**.
③ Not to be used as a safety position switch. Use only in conjunction with snap-action contact.

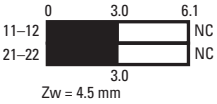
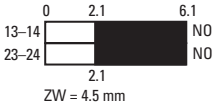
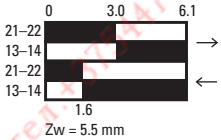
LS-Titan Metal Safety Switches

2

Metal Safety Switches

Metal Safety Switch Body

Assembled Switch

Switch Body Catalog Number	LSM-02	LSM-20A	LSM-11S
Output Function	2NC with positive opening contacts	2NO with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Cage Clamp	Cage Clamp	Cage Clamp
Contact Sequence			
Contact Travel ■ = contact closed □ = contact open			Snap-action contact 
Operating Head Type ①			
Head Only Catalog Number	**Assembled Switch Catalog Number**		
Top Push Roller Plunger 	**LSM-XP**	**LSM-02-P**	**LSM-20A-P**	**LSM-11S-P**
Long Roller Lever 	**LSM-XL**	**LSM-02-L**	**LSM-20A-L**	**LSM-11S-L**
Angled Roller 	**LSM-XLA**	**LSM-02-LA**	**LSM-20A-LA**	**LSM-11S-LA**
Rotary Lever 	**LSM-XRL**	**LSM-02-RL**	**LSM-20A-RL**	**LSM-11S-RL**
Adjustable Roller Lever 	**LSM-XRLA**	**LSM-02-RLA**	**LSM-20A-RLA**	**LSM-11S-RLA**

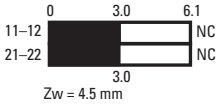
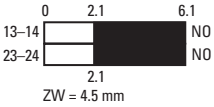
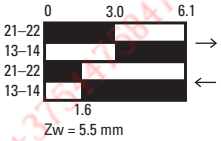
Note

① For operating head dimensions, see **Page V8-T2-40**.

Metal Safety Switches, continued

Metal Safety Switch Body

Assembled Switch

Switch Body Catalog Number	**LSM-02**	**LSM-20A**	**LSM-11S**
Output Function	2NC with positive opening contacts	2NO with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Cage Clamp	Cage Clamp	Cage Clamp
Contact Sequence			
Contact Travel ■ = contact closed □ = contact open			Snap-action contact 
Operating Head Type ①			
Head Only Catalog Number	**Assembled Switch Catalog Number**		
Plastic Rod Lever	**LSM-XRR**	**LSM-02-RR**	**LSM-20A-RR**	**LSM-11S-RR**
Metal Rod Lever	**LSM-XRRM**	**LSM-02-RRM**	**LSM-20A-RRM**	**LSM-11S-RRM**
Spring Rod (Wobble)	**LSM-XS**	**LSM-02-S**	**LSM-20A-S**	**LSM-11S-S**

Note

① For operating head dimensions, see **Page V8-T2-40**.

2

Understanding LS-Titan Electronic Safety Position Switches

All four LS-Titan LSE switch bodies are safety-rated products. The LSE-11 and LSE-02 switch bodies both have a freely programmable operating point and can be individually adjusted to suit the application, and can be changed as often as required. These devices feature an LED on the body, providing simple indication during programming and operation.

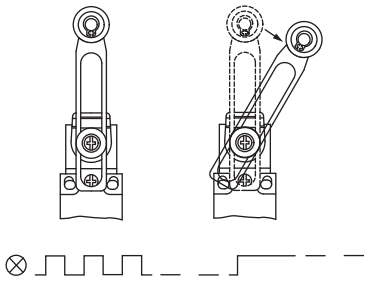
The LSE-AI (4–20 mA) and LSE-AU (0–10V) analog position switches take position data and convert to an analog current or voltage value that can then be continuously fed into an automation system. These two switches also feature a diagnostic output for additional data processing.

This ensures that a safe operating state can be monitored and evaluated at any time. A self-test function is also present on these models. Outputs Q1 and Q2 are continuously tested for overloads, short circuits to 0V and short circuits to $+U_e$.

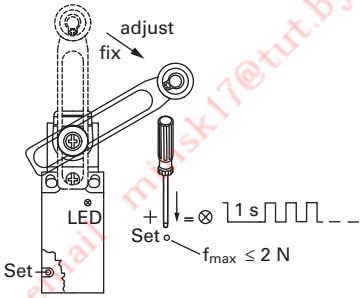
Like the electromechanical position switches, LS-Titan electronic position switches meet Category 3 or 4 of the EN 954-1 standard for machine safety when configured as a redundant system. All devices are thus suitable for safety applications that are used for the protection of persons or processes.

Operating Point Adjustment

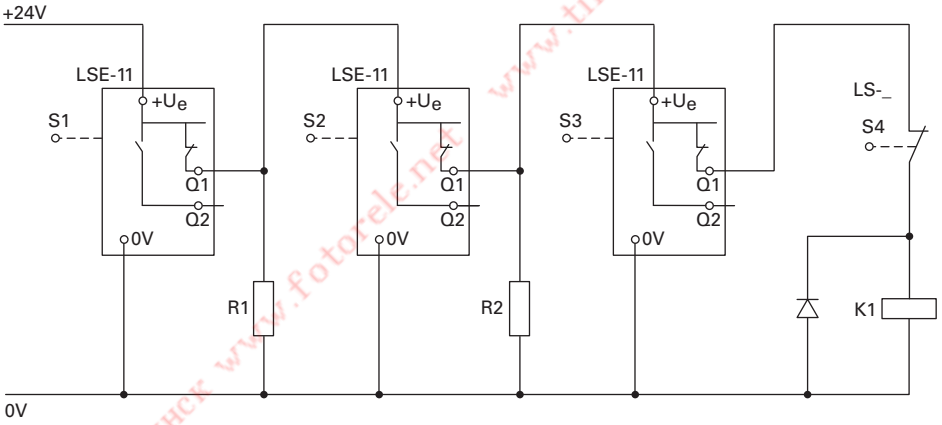
LSE-11



LSE-02



Example of LS-Titan LSE Models in a Safety-Oriented Circuit



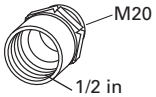
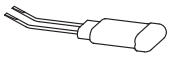
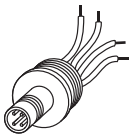
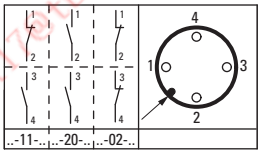
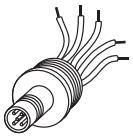
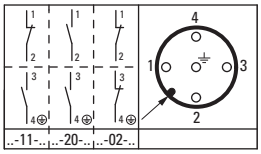
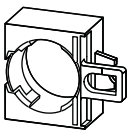
Notes

LSE-11 and LSE-02—individual operating point adjustment.

LSE-11 and LSE-02 can be used in safety circuits.
S1 is connected to 24 Vdc
S2, S3 each switch with a delay of 0.7s
R1, R2, for example, series element M22-XLED60 (2820 ohms/0.5W)

Accessories

LS-Titan Safety Switches

	For Use With	Description	Notes	Catalog Number
V1-2-M20 	Any	M20 screw terminal in 1/2 in. For use with American pipe thread, metal.	The screw connection must be earthed. Not total insulation.	**V1-2-M20-NA**
	Any	M20 screw terminal in 1/2 in. For use with American pipe thread, molded material.	—	**V1-2-M20**
EMS20 	Any	M20 diaphragm bolt. With internal push-through membrane. Will fit cable with an external diameter of up to 13 mm. Rated IP65 with cable inserted.	—	**EMS20**
LS-XTW 	Any	Cage Clamp tool.	—	**LS-XTW**
M12A 	LS-Titan plastic bodies (LS-_)	Plug connector, 12 mm, 4-pin male connector M12x1 (M12x1). Rated IP65. Molded material. Color coded to IEC/EN 60947-5-2.		**M12A**
M12A5 	LS-Titan metal bodies (LSM-_)	Plug connector, 12 mm, 5-pin male connector (M12x1). Rated IP65. Molded material. Color coded to IEC/EN 60947-5-2.		**M12A5**
M22-LS 	Any	Allows mounting of M22 pushbuttons. (See the M22 catalog, CA04716001E, for a full selection of pushbuttons.)	—	**M22-LS**

Technical Data and Specifications

LS-Titan Miniature DIN Switches—IP66, IP67 Complete Units

	Units		LS, LSM	LSE-11/LSE-02	LSE-AI ①	LSE-AU ①
General						
Standards			IEC/EN 60947	IEC/EN 60947 EN 61000-4	IEC/EN 60947 EN 61000-4	IEC/EN 60947 EN 61000-4
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; damp heat, cyclical, to IEC 60068-2-30	Damp heat, constant, to IEC 60068-2-78; damp heat, cyclical, to IEC 60068-2-30	Damp heat, constant, to IEC 60068-2-78; damp heat, cyclical, to IEC 60068-2-30	Damp heat, constant, to IEC 60068-2-78; damp heat, cyclical, to IEC 60068-2-30
Ambient temperature		°F (°C)	–13° to 158°F (–25° to 70°C)	–13° to 158°F (–25° to 70°C)	–13° to 158°F (–25° to 70°C)	–13° to 158°F (–25° to 70°C)
Mounting position			As required	As required	As required	As required
Protection type			IP66, IP67	IP66, IP67	IP66, IP67	IP66, IP67
Terminal capacity of screw terminal and Cage Clamp						
Solid		mm^2	1 x (0.5–2.5)	1 x (0.5–2.5)	1 x (0.5–2.5)	1 x (0.5–2.5)
Flexible with ferrules to DIN 46228		mm^2	1 x (0.5–1.5)	1 x (0.5–1.5)	1 x (0.5–1.5)	1 x (0.5–1.5)
Power Supply						
Rated voltage	U_e	Vdc	N/A	12–30	24 (–15%/+20%)	24 (–15%/+20%)
Burden current						
12V	I_e	mA	N/A	15	N/A	N/A
24V	I_e	mA	N/A	18	28–45	24
30V	I	mA	N/A	19	N/A	N/A
Contacts/Switching Capacity						
Rated impulse withstand voltage	U_{imp}	Vac	4000	N/A	N/A	N/A
Rated insulation voltage	U_i	V	400	N/A	N/A	N/A
Overvoltage category/ pollution degree			III/3	III/3	N/A	N/A
Rated Operational Current						
AC–15						
24V	I_e	A	6	N/A	N/A	N/A
230V/240V	I_e	A	6	N/A	N/A	N/A
400V/415V	I_e	A	4	N/A	N/A	N/A
DC-13						
24V	I_e	A	3	0.2	N/A	N/A
110V	I_e	A	0.8	N/A	N/A	N/A
220V	I_e	A	0.3	N/A	N/A	N/A

Note

① The following applies for LSE-11 and LSE-02: ensure that the power supply operates correctly when setting the operating point.

LS-Titan Miniature DIN Switches—IP66, IP67 Complete Units. continued

	Units		LS, LSM	LSE-11/LSE-02	LSE-AI ①	LSE-AU ①
Burden Current						
Analog output Q1						
Output voltage (max. 10 mA)		Vdc	N/A	N/A		0–10
Output current		mA	N/A	N/A	4–20	
Fault scenario		V	N/A	N/A	0	0
Resolution		Steps	N/A	N/A	100	100
Step tolerance		Steps	N/A	N/A	1	1
Shunt resistor, resistive load		ohms	N/A	N/A	<400	>1000
Digital diagnostics output Q2 (switching to + pole PNP)						
Response threshold		V	N/A	N/A	Approx. U_e	Approx. U_e
		mA	N/A	N/A	<200	<200
Control circuit reliability						
At 24 Vdc/5 mA	H_F	Fault probability	$<10^{-7}$, <1 fault in 10^7 operations	N/A	N/A	N/A
At 5 Vdc/1 mA	H_F	Fault probability	$<10^{-6}$, <1 failure at 5 x 10^6 operations	N/A	N/A	N/A
Supply frequency		Hz	Max. 400	N/A	N/A	N/A
Short-circuit rating to IEC/EN 60947-5-1						
Maximum fuse		A gG/gL	6	N/A	N/A	N/A
Repetition accuracy		mm	±0.02	±0.02	±0.02	±0.02

Note

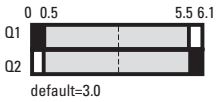
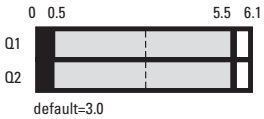
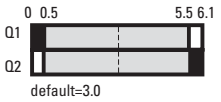
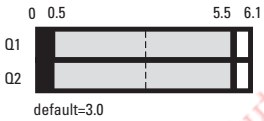
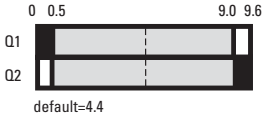
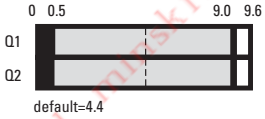
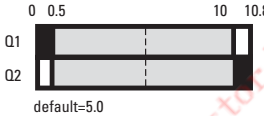
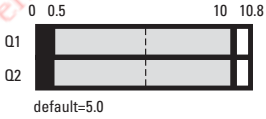
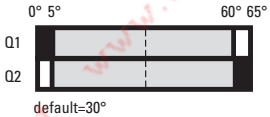
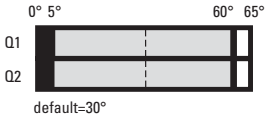
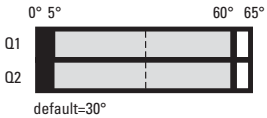
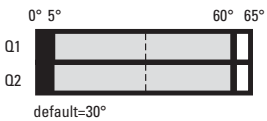
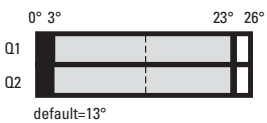
① The following applies for LSE-11 and LSE-02: ensure that the power supply operates correctly when setting the operating point.

LS-Titan Miniature DIN Switches—IP66, IP67 Complete Units

	Units		LS, LSM	LSE-11/LSE-02	LSE-AI/LSE-AU	LSE-AI/LSE-AU
Mechanical Variables						
Lifespan						
Standard-action contact	Operations	X 10^6	8	N/A	N/A	N/A
Snap-action contact	Operations	X 10^6	8	3 (electronic)	N/A	N/A
Contact temperature of roller head		°C	≤100	≤100	≤100	≤100
Mechanical shock resistance (half-sinusoidal shock, 20 ms)						
Standard-action contact		g	25	N/A	N/A	N/A
Snap-action contact		9	N/A	N/A	N/A	N/A
Basic unit		g	N/A	30	30	30
Operating frequency	Operations/h		≤6000	≤3000	≤3000	≤3000
Switching point			N/A	0.5–5.5 mm freely adjustable	N/A	N/A
Hysteresis		mm	N/A	0.4	0.4	0.4
Contact sequence (contact closed open Zw = positive opening clearance)		mm	N/A	0.04	0.06	0.06
Actuation						
Mechanical						
Actuating force at beginning/ end of stroke						
Basic units		N	1.0/8.0	3.5/8.0	3.5/8.0	3.5/8.0
LS(M)-XP		N	1.0/8.0	1.0/8.0	1.0/8.0	1.0/8.0
LS(M)-XL		N	1.0/8.0	1.0/8.0	1.0/8.0	1.0/8.0
LS(M)-XLA		N	1.0/8.0	1.0/8.0	1.0/8.0	1.0/8.0
Actuating torque of rotary drives		Nm	0.2	0.2	0.2	0.2
Maximum operating speed with DIN cam						
Basic units for angle of actuation	α = 0°/30°	m/s	1/0.5	1/0.5	1/0.5	1/0.5
LS(M)-XRL for angle of actuation	α = 0°	m/s	1.5	1.5	1.5	1.5
LS(M)-XRLA for angle of actuation	α = 30°, L = 125 mm	m/s	1.5	1.5	1.5	1.5
LS(M)-XRR for angle of actuation	L = 130 mm	m/s	1.5	1.5	1.5	1.5
LS(M)-XL for angle of actuation	α = 30°/45°	m/s	1	1	1	1
LS(M)-XLA for angle of actuation	α = 30°/45°	m/s	1	1	1	1
LS(M)-XP for angle of actuation	α = 0°/30°	m/s	1/1	1/1	1/1	1/1
Electromagnetic Compatibility (EMC)						
Electrostatic discharge (IEC/EN 61000-4-2, Level 3 ESD)						
Air discharge		kV		8	8	8
Contact discharge		kV		4	4	4
Electromagnetic fields (IEC/EN 61000-403, RFI)		V/m		10	10	10
Burst pulses (IEC/EN 61000-4-4, Level 3)						
Supply cables		kV		2	2	2
Signal lines		kV		2	2	2
High-energy pulses (surge) (IEC/EN 61000-4-5)		kV		0.5	0.5	0.5
Immunity to line-conducted interference to (IEC/EN 610000-4-6)		V		10	10	10

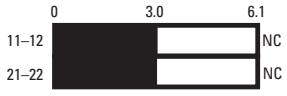
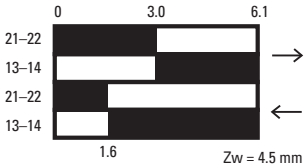
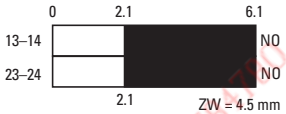
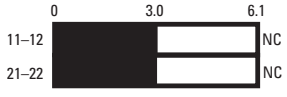
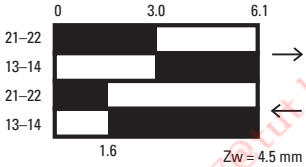
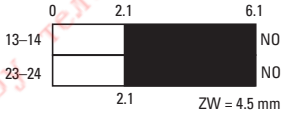
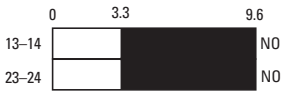
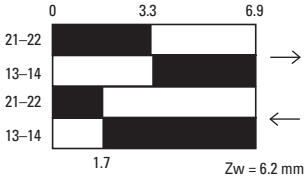
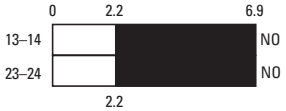
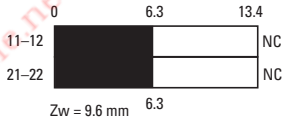
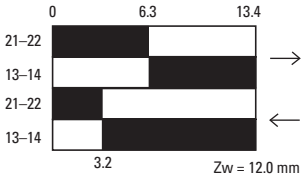
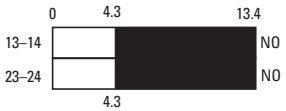
Contact Travel Diagrams

LSE

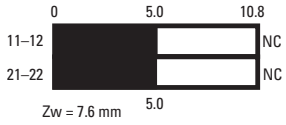
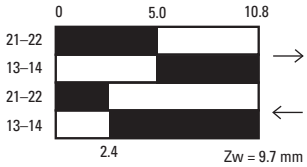
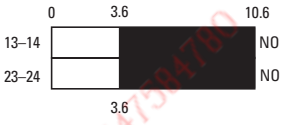
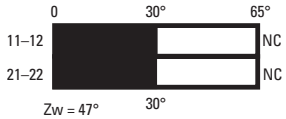
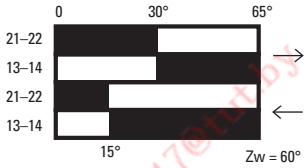
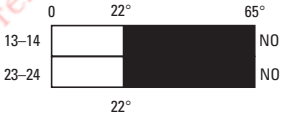
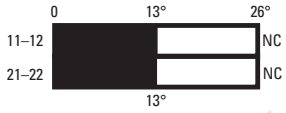
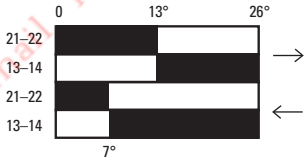
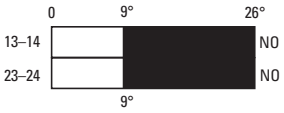
Description	Contact Travel ■ = contact closed □ = contact open	LSE-11 Q1 Q2	LSE-02 Q1 Q2
Basic Units			
			
Operating Heads			
Roller plunger			
LS-XP LSM-XP			
Roller lever			
LS-XL LSM-XL LS-XL LS-XLB			
Angled roller lever			
LS-XLA LSM-XLA			
Rotary lever			
LS-XRL LSM-XRL			
Adjustable roller lever			
LS-XRLA LSM-XRLA LS-XRLA30 LS-XRLA40 LS-XRLA40R			
Actuating rod			
LS-XRR LSM-XRR LS-XRRM LSM-XRRM			
Spring rod			
LS-XS LSM-XS			

LS and LSM

2

Description	Contact Travel ■ = contact closed □ = contact open	LS-02, LS-S02, LSM-02 NC 12–11, NC 22–21	LS-11S, LS-S11S, LSM-11S NO 14–13, NC 22–21	LS-20A, LS-S20A, LSM-20A NO 14–13, NO 24–23
Basic Units				
Operating Heads				
Roller plunger				
LS-XP, LSM-XP				
Roller lever				
LS-XL, LSM-XL				
Roller lever, short				
LS-XLS				
Roller lever, large				
LS-XLB				

LS and LSM, continued

Description	Contact Travel ■ = contact closed □ = contact open	LS-02, LS-S02, LSM-02 NC 12 11 NC 22 21	LS-11S, LS-S11S, LSM-11S NO 14 13 NC 22 21	LS-20A, LS-S20A, LSM-20A NO 14 13 NO 24 23
Operating Heads				
Angled roller lever				
LS-XLA, LSM-XLA				
Rotary lever				
LS-XRL, LSM-XRL				
Adjustable roller lever				
LS-XRLA, LSM-XRLA LS-XRLA30, LS-XRLA40 LS-XRLA40R				
Actuating rod				
LS-XRR, LSM-XRR LS-XRRM, LSM-XRRM				
Spring rod				
LS-XS, LSM-XS				

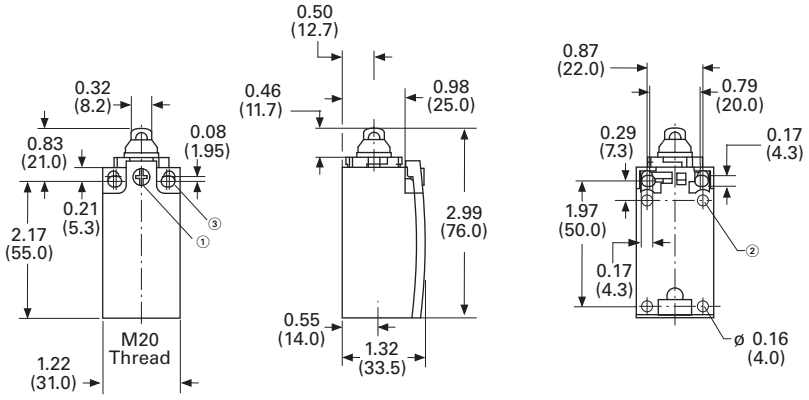
Dimensions

Approximate Dimensions in Inches (mm)

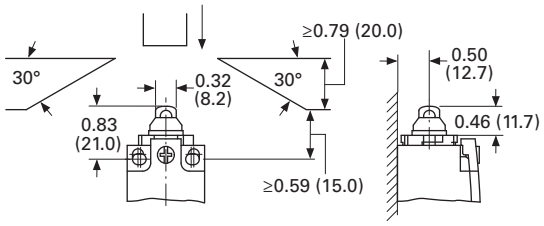
2

Position Switches

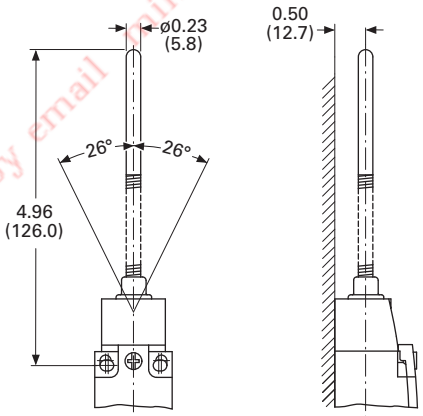
LS-_, LSM-_, LSE-_



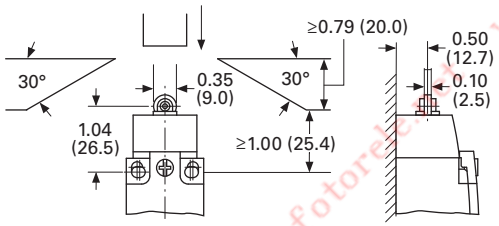
LS-_, LSM-_, LSE-_



LS(M)-_/S



LS(M)-_/P



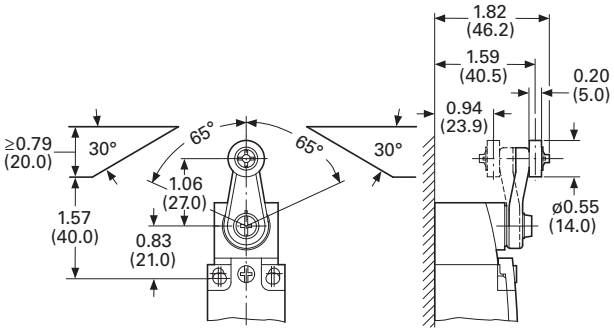
Notes

① Tightening torque of cover screws: 0.8 Nm ±0.2 Nm.
② Only with LS (insulated version).
③ Fixing screws 2 x M4 ≥30
M_A = 1.5 Nm

Approximate Dimensions in Inches (mm)

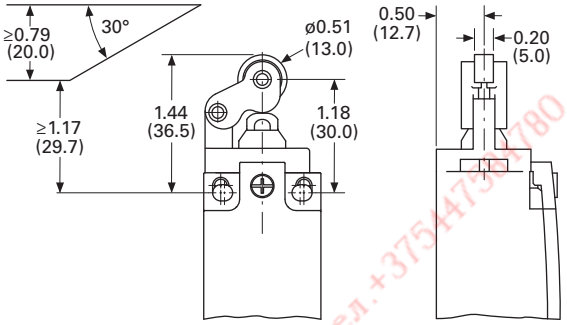
Rotary Lever

LS(M)-_/RL



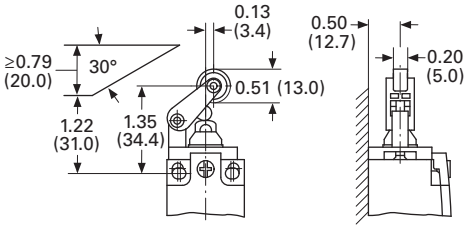
Roller Lever, Short

LS(M)-_/LS



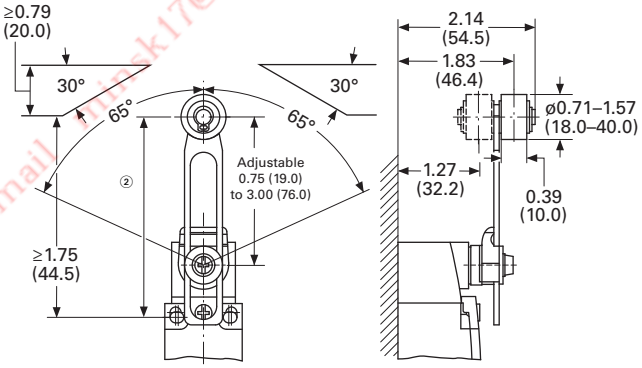
Roller Lever

LS(M)-_/L



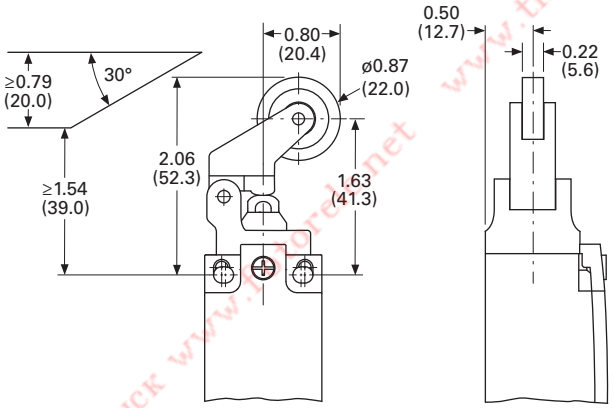
Adjustable Roller Lever

LS(M)-_/RLA



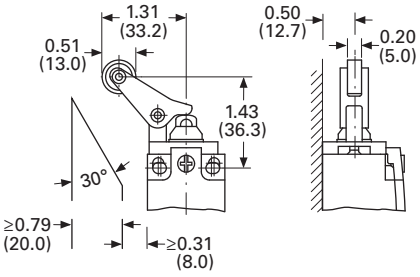
Roller Lever, Large

LS(M)-_/LB ①



Angled Roller Lever

LS(M)-_/XLA



Notes

① Tightening torque of cover screws: 0.8 Nm ±0.2 Nm.

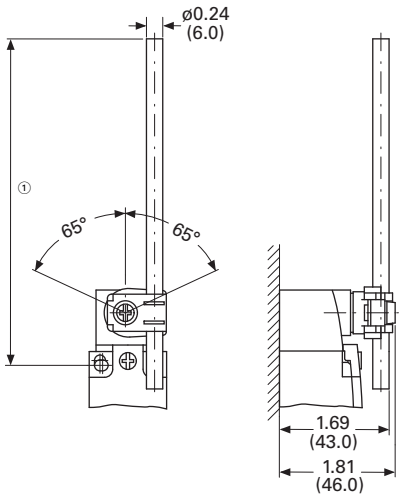
② Setting range of 54.5 to 97.

Approximate Dimensions in Inches (mm)

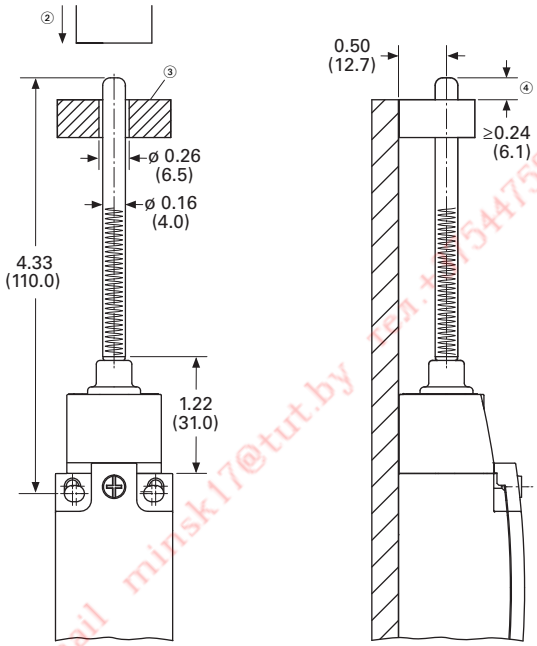
2

Actuating Rod

LS(M)-_/RR



LS(M)-_/OR



Notes

① LS_/RR ≤150
LS_/RRM ≤210
② Approach direction, vertical.
③ Guide is done by customer, not included.
④ Maximum push-through.

E49 Mini Metal Switches

Contents

Drawings Online

E49 Mini Metal Switches

Product Description

E49 Mini Metal Limit Switches from Eaton's electrical sector are designed small and tough, with machinery OEMs in mind. The small size, metal body and mechanical life make this product perfect for switching applications in packaging, material handling, elevators and lifts, electronic assembly equipment, injection molding machinery, and auto-vending machines. The E49 Mini Metal is the ideal switch for those who need a cost-effective, compact solution, but don't want to sacrifice durability in the process.

Features

- Long life—rated for 10 million operations
- Pre-wired units with custom cable lengths available for high volume customers
- "Fingerproof" terminals protect against accidental shock
- Double-spring mechanism for contact reliability
- Grounding terminal included
- Captive screws on enclosure cover make wiring hassle-free
- SPDT double break

Standards and Certifications

- UL Recognized
- CE
- RoHS

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

2

E49 Mini Metal Switches

Operating Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Assembled Unit (Switch Body and Head) 1NO-1NC Contacts Catalog Number
Side Rotary Lever	**Side Rotary Lever**					
	20°	12°	70°	750g	100g	**E49G31AP3**
Adjustable Side Rotary Lever	**Adjustable Side Rotary Lever**					
	20°	12°	70°	750g	100g	**E49G31UP3**
Top Pushbutton	**Top Pushbutton**					
	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	**E49G31BP3**
Top Push Roller	**Top Push Roller**					
	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	**E49G31CP3**
Top Push Roller (90° Roller)	**Top Push Roller (90° Roller)**					
	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	**E49G31C1P3**
Adjustable Rod Lever	**Adjustable Rod Lever**					
	20°	12°	70°	750g	100g	**E49G31DP3**

E49 Mini Metal Switches, continued

Operating Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Assembled Unit (Switch Body and Head) 1NO-1NC Contacts Catalog Number
Wobble Stick (Nylon Coil)					
	1.18 in (30 mm)	—	—	150g	**E49G31NP3**
Wobble Stick (Metal Coil)					
	1.18 in (30 mm)	—	—	150g	**E49G31VP3**
Wobble Stick (Metal Rod)					
	1.18 in (30 mm)	—	—	150g	**E49G31MP3**
Wobble Stick (Whisker)					
	1.18 in (30 mm)	—	—	150g	**E49G31XM3**

Technical Data and Specifications

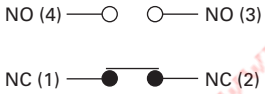
E49 Mini Metal Switches

Description	Specification
Operating speed	0.19 in (5 mm) to 19.7 in/s (50 cm/s)
Operating frequency	120 operations/min
Contact resistance	25M ohms (initial)
Insulation resistance	100M ohms min (at 500 Vdc)
Dielectric strength	1000 Vac, 50/60 Hz for one minute between non-continuous terminals
	1500 Vac, 50/60 Hz for one minute between current-carrying and non-current-carrying parts and between each terminal and ground
Vibration	10 to 55 Hz, 1.5 mm double amplitude
Shock	Approx. 300 m/s^2 (approx. 30Gs)
Ambient operating temperature	23° to 149°F (–5° to 65°C)
Humidity	95% RH max.
Service life	Mechanical: 10,000,000 operations min.
	Electrical: 500,000 operations min.
Weight	Approx. 130 to 190g
Degree of protection	IEC: IP65
Material of construction	Shaft: stainless SUS303 Arm: stainless SUS304 Head and body: zinc alloy Terminal cover: PC/ABS plastic Rubber grommet: NBR rubber

Maximum Ampere Ratings

Rated Voltage	Non-Inductive Load (A) Resistive Load NC	NO	Lamp Load ② NC	NO	Inductive Load (A) ① Inductive Load NC	NO	Motor Load NC	NO
125 Vac	5	5	1.5	0.7	3	3	2	1
250 Vac	5	5	1	0.5	3	3	1.5	0.8
8 Vdc	5	5	3	3	5	4	3	3
14 Vdc	5	5	3	3	4	4	3	3
30 Vdc	5	5	3	3	4	4	3	3
125 Vdc	0.4	0.4	—	—	—	—	—	—
250 Vdc	0.2	0.2	—	—	—	—	—	—

Terminal Configuration



Notes

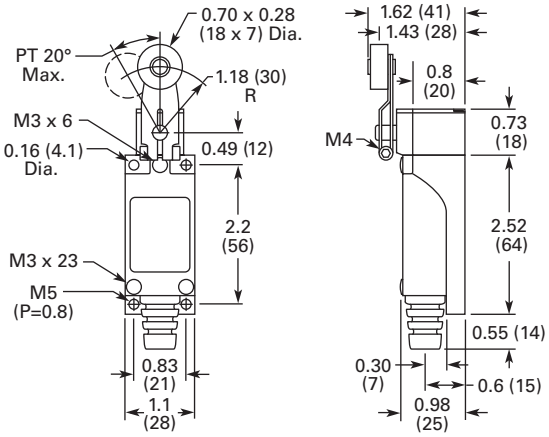
① Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 msec. max. (DC).

② Lamp load has an inrush current of ten times the steady-state current, while motor load has an inrush current of six times the steady-state current.

Dimensions

Approximate Dimensions in Inches (mm)

E49G31AP3



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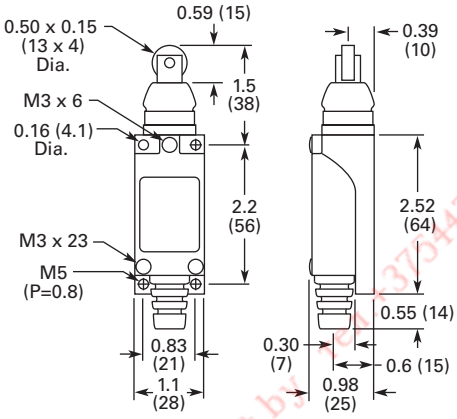

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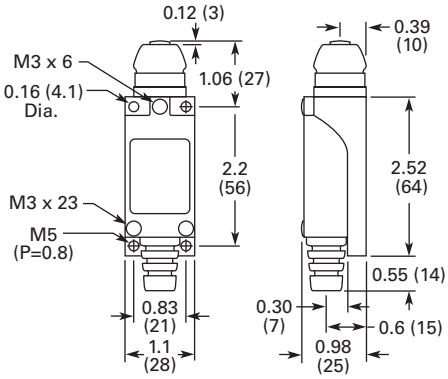

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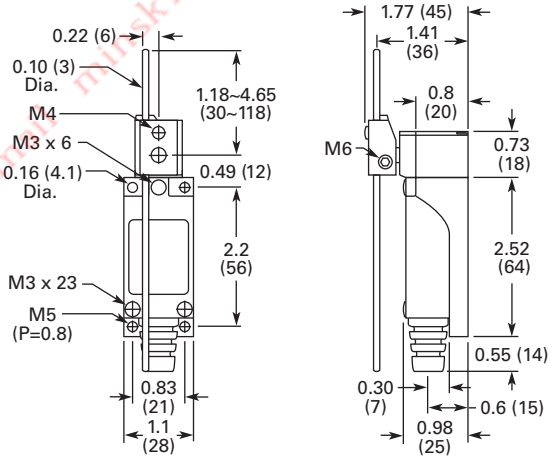

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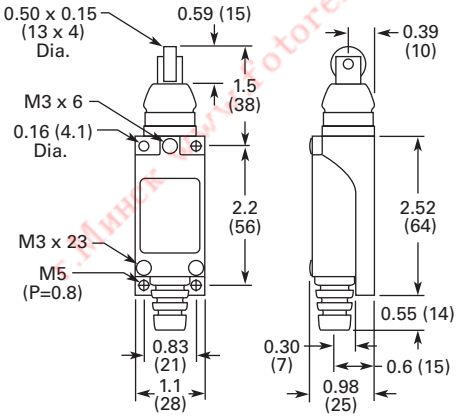

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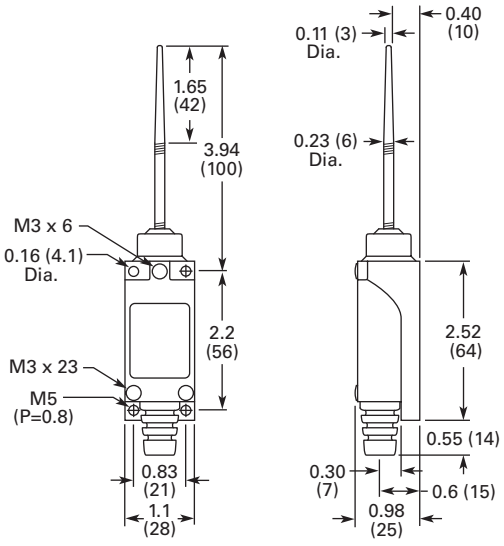

Approximate Dimensions in Inches (mm)

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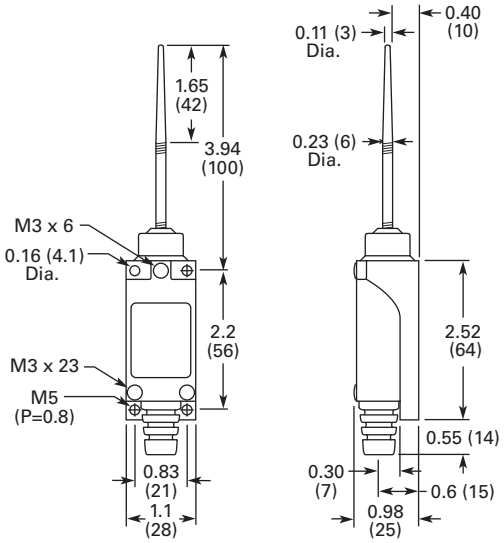

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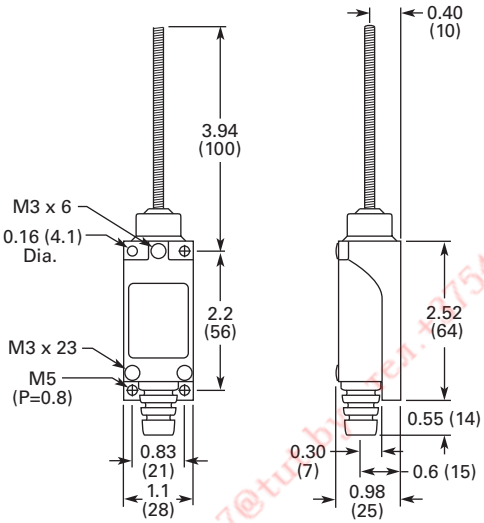

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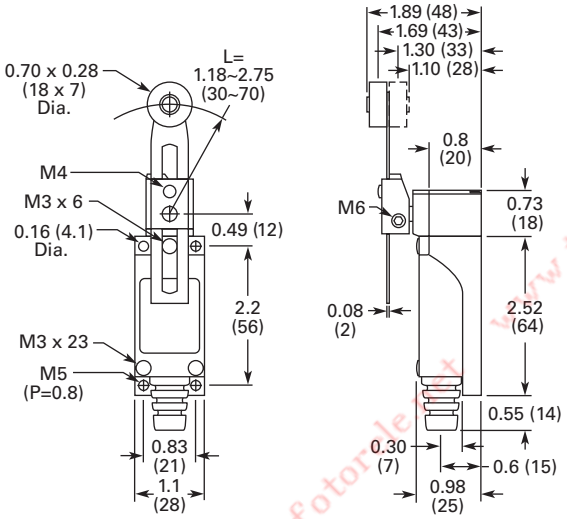

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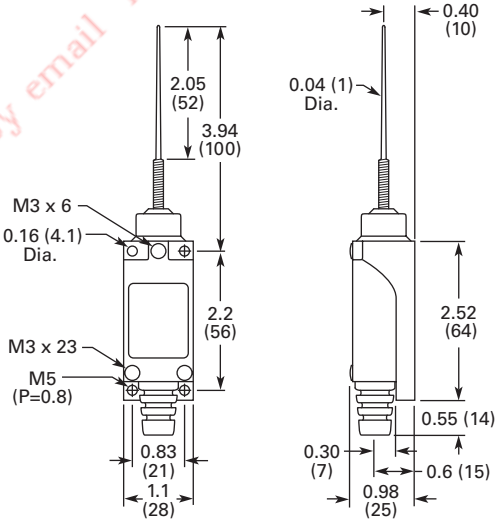

E49 Compact Metal Switches

Contents

Drawings Online

E49 Compact Metal Switches

Product Description

E49 Compact Metal Switches by Eaton's electrical sector are designed with high mechanical strength for robust environments. The rugged aluminum die cast construction provides reliable, oil-tight, waterproof and dustproof sealing for a variety of applications. Snap action 1NO-1NC contacts provide flexibility in design.

Features

- Rigid die cast switch housing
- High mechanical strength
- Oil-tight, waterproof and dustproof construction

Standards and Certifications

- cULus
- NEMA A600 (AC-15)
- NEMA R300 (DC-13)
- IP67
- RoHS

c UL us Listed

RoHS COMPLIANT

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

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E49 Compact Metal Switches

Operating Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts (Maximum)	Minimum Return Force	Assembled Unit (Switch Body and Head) 1NO-1NC Contacts Catalog Number
Roller Lever	**Roller Lever**					
	20°	12°	50°	2.99 lbs	0.50 lb	**E49M11AP1**
Top Push	**Top Push**					
	0.067 in (1.7 mm)	0.04 in (1.0 mm)	—	6.02 lbs	2.01 lbs	**E49M11BP1**
Top Push Roller	**Top Push Roller**					
	0.067 in (1.7 mm)	0.04 in (1.0 mm)	0.25 in (6.5 mm)	6.02 lbs	2.01 lbs	**E49M11CP1** (as pictured) **E49M11CP2** 90° Cross Roller
Rod Lever	**Rod Lever**					
	20°	12°	50°	0.31 lb	0.06 lb	**E49M11DP1**

E49 Compact Metal Switches, continued

Operating Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts (Maximum)	Minimum Return Force	Assembled Unit (Switch Body and Head) 1NO-1NC Contacts Catalog Number
Adjustable Roller Lever	**Adjustable Roller Lever**					
	20°	12°	50°	2.99 lbs	0.50 lb	**E49M11UP1**
Wobble	**Wobble**					
	1.10 in (28 mm)	N/A	N/A	0.33 lb	N/A	**E49M11VP1**
Cat Whisker	**Cat Whisker**					
	1.10 in (28 mm)	N/A	N/A	0.064 lb	N/A	**E49M11XM1**

Technical Data and Specifications

E49 Compact Metal Switches

Description	Specification
Operating speed	1 mm to 2m/sec
Operating frequency	Mechanically: 120 operations/min.; Electronically: 30 operations/min.
Contact resistance	15M ohms max. (initial)
Insulation resistance	100M ohms min. (at 500 Vdc)
Dielectric strength	1000 Vac, 50/60 Hz for 1 minute between non-continuous terminals; 2200 Vac, 50/60 Hz for 1 minute between each terminal and non-current carrying metal part and between each terminal and ground
Vibration	Malfunction durability: approx. 1000 m/sec^2 (approx. 100 Gs); Malfunction durability: approx. 300/sec^2 (30 Gs)
Ambient operating temperature	14° to 176°F (–10° to 80°C)
Humidity	95% RH max.
Service life	Mechanically: 15,000,000 operations/minute; Electronically: 500,000 operations/minute

Maximum Ampere Ratings—Isolated Contacts, No Polarity Restriction

NEMA A600 (AC-15) 50 or 60 Hz

Rated Voltage	Current Continuous	Make	Break	Voltamperes Make	Break
24 Vac	10A	60A	6.0A	7200 VA	720 VA
120 Vac	10A	60A	6.0A	7200 VA	720 VA
250 Vac	10A	30A	3.0A	7200 VA	720 VA
480 Vac	10A	15A	1.5A	7200 VA	720 VA
600 Vac	10A	12A	1.2A	7200 VA	720 VA

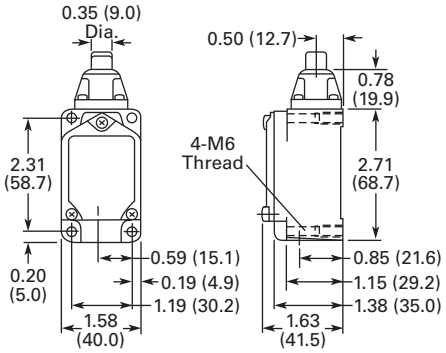
NEMA R300 (DC-13)

Rated Voltage	Current
24 Vdc	1.5A
120 Vdc	0.22A
250 Vdc	0.11A

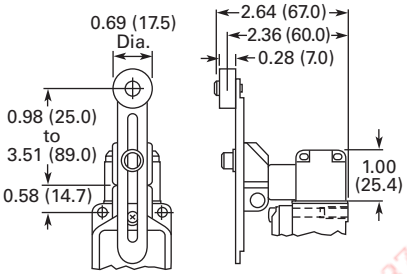
Dimensions

Approximate Dimensions in Inches (mm)

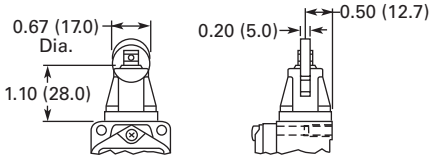
Switch Body with E49M11BP1



E49M11UP1



E49M11CP1/E49M11CP2



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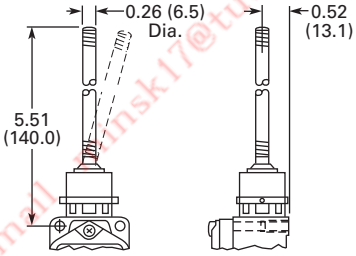

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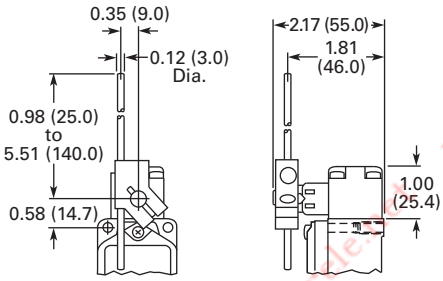

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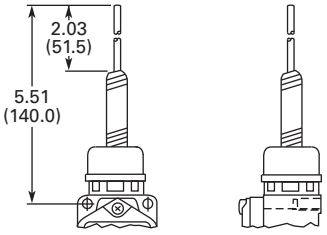
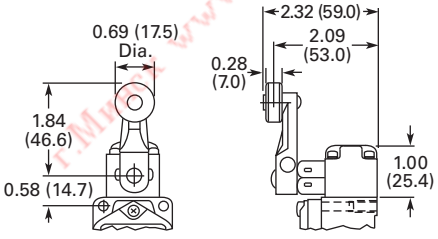


E49M11AP1



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E50 Heavy-Duty Plug-In Switches

Contents

Drawings Online

E50 Heavy-Duty Plug-In Switches

Product Description

E50 Modular Plug-In Limit Switch Components from Eaton's electrical sector are the industry standard with versatility of design and high reliability for low maintenance, installation and inventory costs. Standard Viton gaskets, seals and boots and a zinc die cast enclosure provide exceptional chemical resistance to the common coolants, cleansing agents, and hydraulic fluids found in machine tool, automotive, waste water treatment and other heavy-duty industrial applications. Mounting dimensions accommodate both U.S. and DIN standards for easy retrofit installations. Super bright 24–120 Vac/dc LED indicating light versions simplify setup and troubleshooting operations.

Features

- Modular, plug-in components (head, body and receptacle) provide application flexibility, reduced inventory and less downtime
- Manufactured to take the physical and environmental abuse (including cutting fluids and chemicals) of harsh industrial environments
- Chemical resistant Viton gaskets, seals and boots are standard, and so are captive, posi-drive screws
- The switches have terminal identification on the nameplate for a visual wiring checkout without guesswork. Heads and switch bodies can be replaced without rewiring
- E50 devices can be ordered in separate components or as complete assembled switches
- 600V rating, ridge-topped contacts and wiping action assure continuity even to logic level circuits
- Keyed, four direction head positioning
- Standard 5° pre-travel and 90° total travel
- 24–120 Vac/dc LED and 120 Vac neon indicating lights available
- Rotary heads are field convertible CW, CCW, or both, without special tools
- Epoxy filled, pin connector or pigtail pin connector receptacles available

Standards and Certifications

- UL Listed
- CSA Certified
- IEC.947.5.1
- TUV—E9271605E02
- CE (where shown)

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Assembled Switches—Standard

Assembled Switch

E50 Heavy-Duty Plug-In Switches, Assembled—Standard

	Single-Pole (5 Terminal Receptacle)			Two-Pole (9 Terminal Receptacle)				
Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
Switch Body:	**E50SA 1NO-1NC**	**E50SAL 1NO-1NC**	**E50SAN 1NO-1NC**	**E50SB 2NO-2NC**	**E50SBL 2NO-2NC**	**E50SBN 2NO-2NC**	**E50SCL 1NO-2NC**	—
Receptacle: ①	**E50RA**	**E50RA**	**E50RA**	**E50RB**	**E50RB**	**E50RB**	**E50RB**	**E50RB**
Operating Head Type ② **Description**	**Assembled Switch (Head + Receptacle + Body) Catalog Number**			**Assembled Switch (Head + Receptacle + Body) Catalog Number**				
Side Rotary (requires an operating lever, see **Page V8-T2-80**)								
Standard spring return—E50DR1 ③	**E50AR1** CE	**E50ALR1**	**E50ANR1**	**E50BR1**	**E50BLR1**	**E50BNR1**	—	—
Low force spring return—E50DL1 ③	**E50AL1** CE	**E50ALL1**	**E50ANL1**	**E50BL1**	**E50BLL1**	**E50BNL1**	—	—
Maintained two-position—E50DM1	**E50AM1** CE	**E50ALM1**	**E50ANM1**	**E50BM1**	**E50BLM1**	**E50BNM1**	—	—
Side Pushbutton								
Spring return—E50DS1	**E50AS1** CE	**E50ALS1**	**E50ANS1**	**E50BS1**	**E50BLS1**	**E50BNS1**	**E50CLS1**	—
Adjustable spring return—E50DS2	**E50AS2** CE	**E50ALS2**	**E50ANS2**	**E50BS2**	**E50BLS2**	**E50BNS2**	**E50BLS2**	**E50CNS2**

Spring Return

Adjustable Spring Return

Circuit Diagrams, see **Page V8-T2-65**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Mating Cordset Catalog Number	Code Suffix
Mini-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**P5** ⑤
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**P9** ⑤
Micro-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	**CSDS5A5CY2202**	**A5** ⑤
Cable connection (with epoxy filled receptacle)	8 ft cable length	—	**S**
	12 ft cable length	—	**S12**
	20 ft cable length	—	**S20**
Manifold mount (rear wiring entrance)		—	**M**
20 mm conduit entrance		—	**20**

② For operating head specifications, see **Page V8-T2-59**.
③ CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.
④ For a full selection of cable connectors, see **Tab 10**, **section 10.1**.
⑤ Refer to **Page V8-T2-65** for wiring diagrams.

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E50 Heavy-Duty Plug-In Switches, Assembled—Standard, continued

Assembled Switch

		Single-Pole (5 Terminal Receptacle)			Two-Pole (9 Terminal Receptacle)				
	Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
	Switch Body:	**E50SA 1NO-1NC**	**E50SAL 1NO-1NC**	**E50SAN 1NO-1NC**	**E50SB 2NO-2NC**	**E50SBL 2NO-2NC**	**E50SBN 2NO-2NC**	**E50SCL 1NO-1NC**	**—**
	Receptacle: ①	**E50RA**	**E50RA**	**E50RA**	**E50RB**	**E50RB**	**E50RB**	**E50RB**	**E50RB**
Operating Head Type ②	**Description**	**Assembled Switch (Head + Receptacle + Body) Catalog Number**			**Assembled Switch (Head + Receptacle + Body) Catalog Number**				
Side Push Roller	**Side Push Roller**								
	Spring return—E50DS3 ③	**E50AS3** CE	**E50ALS3**	**E50ANS3**	**E50BS3**	**E50BLS3**	**E50BNS3**	**E50BLS3**	**—**
Side Pushbutton	**Side Pushbutton**								
	Maintained—E50DH1	**E50AH1** CE	**E50ALH1**	**E50ANH1**	**E50BH1**	**E50BLH1**	**E50BNH1**	**E50BLH1**	**—**
	Top Pushbutton								
Spring Return									
	Spring return—E50DT1	**E50AT1** CE	**E50ALT1**	**E50ANT1**	**E50BT1**	**E50BLT1**	**E50BNT1**	**E50CLT1**	**E50BNT1**
Adjustable Spring Return									
	Adjustable spring return—E50DT2	**E50AT2** CE	**E50ALT2**	**E50ANT2**	**E50BT2**	**E50BLT2**	**E50BNT2**	—	—

Circuit Diagrams, see **Page V8-T2-65**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Mating Cordset Catalog Number	Code Suffix
Mini-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**P5** ⑤
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**P9** ⑤
Micro-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	**CSDS5A5CY2202**	**A5** ⑤
Cable connection (with epoxy filled receptacle)	8 ft cable length	—	**S**
	12 ft cable length	—	**S12**
	20 ft cable length	—	**S20**
Manifold mount (rear wiring entrance)		—	**M**
20 mm conduit entrance		—	**20**

② For operating head specifications, see **Page V8-T2-59**.
③ Roller can be converted in the field between horizontal and vertical.
④ For a full selection of cable connectors, see **Tab 10**, **section 10.1**.
⑤ Refer to **Page V8-T2-65** for wiring diagrams.

E50 Heavy-Duty Plug-In Switches, Assembled—Standard, continued

Assembled Switch

	Single-Pole (5 Terminal Receptacle)			Two-Pole (9 Terminal Receptacle)				
Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
Switch Body:	**E50SA 1NO-1NC**	**E50SAL 1NO-1NC**	**E50SAN 1NO-1NC**	**E50SB 2NO-2NC**	**E50SBL 2NO-2NC**	**E50SBN 2NO-2NC**	**E50SCL 1NO-2NC**	**—**
Receptacle: ①	**E50RA**	**E50RA**	**E50RA**	**E50RB**	**E50RB**	**E50RB**	**E50RB**	**E50RB**
Operating Head Type ② **Description**	**Assembled Switch (Head + Receptacle + Body) Catalog Number**			**Assembled Switch (Head + Receptacle + Body) Catalog Number**				
Top Push Roller								
Spring return E50DT3 ③	**E50AT3** CE	**E50ALT3**	**E50ANT3**	**E50BT3**	**E50BLT3**	**E50BNT3**	—	—
Wobble Head, Spring Return (requires a wobble operator, see **Page V8-T2-80**)								
Standard duty—E50DW1	**E50AW1** CE	**E50ALW1**	**E50ANW1**	**E50BW1**	**E50BLW1**	**E50BNW1**	**EB50BLW1**	—
Heavy-duty high strength steel—E50DW2	**E50AW2** CE	**E50ALW2**	**E50ANW2**	**E50BW2**	**E50BLW2**	**E50BNW2**	**E50CLW2**	**E50BNW2**

Top Push Roller

Wobble Head, Spring Return

Circuit Diagrams, see **Page V8-T2-65**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Mating Cordset Catalog Number	Code Suffix
Mini-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**P5** ⑤
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**P9** ⑤
Micro-connector ④ (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	**CSDS5A5CY2202**	**A5** ⑤
Cable connection (with epoxy filled receptacle)	8 ft cable length	—	**S**
	12 ft cable length	—	**S12**
	20 ft cable length	—	**S20**
Manifold mount (rear wiring entrance)		—	**M**
20 mm Conduit Entrance		—	**20**

② For operating head specifications, see **Page V8-T2-59**.
③ Roller can be converted in the field between horizontal and vertical.
④ For a full selection of cable connectors, see **Tab 10**, **section 10.1**.
⑤ Refer to **Page V8-T2-65** for wiring diagrams.

Assembled Switches—Special Purpose

E50 Heavy-Duty Plug-In Switches, Assembled—Special Purpose

Operating Data—Nominal Switches	Assembled Switch Catalog Number	Switch Body Only Catalog Number	Receptacle Only Catalog Number	Operating Head Only Catalog Number
Neutral Position	**Neutral Position** (requires an operating lever, see **Page V8-T2-80**)			
 5° Travel	**E50NN1** ①	**E50SN**	**E50RB**	**E50DN1** ①
5° Travel; stainless steel shaft	**E50NN1SPL** ②	—	—	—
15° Travel	**E50NN2**	**E50SN**	**E50RB**	**E50DN2** ①
Travel to operate contacts: Travel to reset contacts: Total travel: Force to operate contacts: Minimum return force: Operating temperature:	—	—	—	5° or 15° ③ 2° 90° 1.8 in-lbs 2.5 in-oz 14° to 200°F (–10° to 94°C)
Two-Step	**Two-Step CW, CCW, or both, Convertible** (requires an operating lever, see **Page V8-T2-80**)			
 —	**E50TD1**	**E50ST**	**E50RB**	**E50DD1**
Travel to operate contacts: Travel to reset contacts: Total travel: Force to operate contacts: Minimum return force: Operating temperature:	—	—	—	1st step 10°; 2nd step 20° 4° each 90° 3 in-lbs 4.5 in-oz CW or CCW: 14° to 250°F (–10° to 121°C) CW and CCW: 14° to 200°F (–10° to 94°C)
Gravity Return	**Gravity Return** (requires E50KL220, E50KL226 or equivalent operating lever, see **Page V8-T2-80**)			
 Without indicating light	**E50GG1**	**E50SG**	**E50RA**	**E50DG1**
With LED indicating light (24–120 Vac/dc)	**E50GLG1**	**E50SGL**	**E50RA**	**E50DG1**
With neon indicating light (120 Vac)	**E50GNG1**	**E50SGN**	**E50RA**	**E50DG1**
Travel to operate contacts: Travel to reset contacts: Total travel: Force to operate contacts: Minimum return force: Operating temperature:	—	—	—	10° to 170° 8° 360° 3.0 in-oz Gravity 14° to 200°F (–10° to 94°C)
Circuit Diagrams, see **Page V8-T2-65**.				

Notes

① Add **9** suffix to the model number for low temperature –40° to 174°F (–40 to 79°C) versions.
② Low temperature rating –40° to 174°F (–40° to 79°C)
③ Depending upon model selected.

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Operating Heads

E50 Heavy-Duty Plug-In Switches, Operating Heads

	Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature ① Without Cable	Operating Temperature ① With Pre-Wired Cable	Catalog Number
Side Rotary 	**Side Rotary** (requires an operating lever, see **Page V8-T2-80**)								
	Standard spring return ②	5°	2°	90°	3 in-lbs	4.5 in-oz	10° to 200°F (–12° to 94°C) ③	10° to 200°F (–12° to 94°C) ③	**E50DR1**
	Low temperature spring return ②	5°	2°	90°	3 in-lbs	4.5 in-oz	–40° to 175°F (–40° to 79°C)	–31° to 175°F (–34° to 79°C)	**E50DR19**
	Low force spring return ②	15°	6°	90°	1.5 in-lbs	2.5 in-oz	10° to 200°F (–12° to 94°C) ③	10° to 200°F (–12° to 94°C) ③	**E50DL1**
	Maintained two-position	50°	50°	90°	3 in-lbs	—	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DM1**
	Side Pushbutton								
Spring Return 	Spring return	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS1**
Adjustable Spring Return 	Adjustable spring return	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS2**
Side Push Roller 	**Side Push Roller**								
	Spring return ④	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS3** ⑤
		0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS4** ⑤
Side Pushbutton 	**Side Pushbutton**								
	Maintained	0.200 in	0.130 in	0.320 in	5 lbs	5 lbs	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DH1**
	Top Pushbutton								
Spring Return 	Spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT1**
Adjustable Spring Return 	Adjustable spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT2**

Notes

① Temperature ranges below 32°F (0°C) are based on absence of freezing moisture or water.
② CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.
③ For CW and CCW operation. For CW only or CCW only operation, high temperature limit increases to 250°F (121°C) without cable, and 221°F (105°C) with pre-wired cable.
④ Roller can be converted in the field between horizontal and vertical.
⑤ Roller shaft is 0.38 in (9.5 mm) longer on E50DS4, see Dimensions on **Page V8-T2-66**.

2

E50 Heavy-Duty Plug-In Switches, Operating Heads, continued

Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature ① Without Cable	Operating Temperature ① With Pre-wired Cable	Catalog Number
Top Push Roller								
Spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT3**
Wobble Head, Spring Return (requires a wobble operator, see **Page V8-T2-80**)								
Standard duty	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DW1**
Heavy-duty high strength steel	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DW2**

Top Push Roller

Wobble Head, Spring Return

Switch Bodies

E50 Heavy-Duty Plug-In Switches, Switch Bodies

Switch Body Construction ①	Single-Pole 1NO-1NC Catalog Number	Two-Pole 2NO-2NC Parallel Wired Indicator Light Catalog Number	Two-Pole 2NC-1NO Series Wired Indicator Light Catalog Number
Without indicating light	**E50SA** CE	**E50SB**	—
With LED indicating light 24–120 Vac/dc	**E50SAL**	**E50SBL**	**E50SCL**
With neon indicating light 120 Vac	**E50SAN**	**E50SBN**	—

Circuit Diagrams, see **Page V8-T2-65**.

Note

① Indicating lights are supplied from the factory wired as shown in Circuit Diagrams on **Page V8-T2-65**. However, they can be easily re-connected to terminals 1 and 2 if necessary (SPDT).

Receptacles

E50 Heavy-Duty Plug-In Switches, Receptacles

	Description	Poles	Conduit Entrance	Cable Length	Catalog Number
Surface Mount	**Surface Mount**				
	Conduit entrance, front or rear mounting	Single-pole (5 terminal)	1/2 NPT	—	**E50RA**
			20 mm	—	**E50RA20**
		Two-pole (9 terminal)	1/2 NPT	—	**E50RB**
			3/4 NPT	—	**E50RB34**
			20 mm	—	**E50RB20**
Manifold Mount	**Manifold Mount**				
	Rear wiring entrance instead of conduit hole, gasket on back for oil tightness	Single-pole (5 terminal)	—	—	**E50RAM**
		Two-pole (9 terminal)	—	—	**E50RBM**
Mini-Connector	**Mini-Connector**				
	Epoxy filled receptacle with pre-wired mini-connector. (The -W version is a wiring scheme typically used in automotive applications.)	Single-pole (5 terminal)	5-pin mini-connector	—	**E50RAP5** ⚽
				—	**E50RAP5-W** ⚽
		Two-pole (9 terminal)	9-pin mini-connector	—	**E50RBP9** ⚽
Micro-Connector	**Micro-Connector**				
	Epoxy filled receptacle with M12 DC micro-connector	Single-pole (5 terminal)	—	—	**E50RAA5** ①
Pre-Wired Cable	**Pre-Wired Cable**				
	Epoxy filled receptacle with pre-wired 16 gauge, yellow jacketed, type SOOW-A cable. Cable enters through hole threaded for conduit.	Single-pole (5 terminal)	1/2 NPT	8 ft	**E50RAS**
				12 ft	**E50RAS12**
				20 ft	**E50RAS20**
			20 mm	8 ft	**E50RA20S**
				12 ft	**E50RA20S12**
				20 ft	**E50RA20S20**
		Two-pole (9 terminal)	1/2 NPT	8 ft	**E50RBS**
				12 ft	**E50RBS12**
				20 ft	**E50RBS20**
			20 mm	8 ft	**E50RB20S**
				12 ft	**E50RB20S12**
				20 ft	**E50RB20S20**

Wiring Diagrams, see **Page V8-T2-65**.

Notes

⚽⚽ See listing of compatible connector cables on **Page V8-T2-62**.

① Model E50RAA5 is not UL listed or CSA certified.

2

Compatible Connector Cables

Standard Cables ①

Mini-style Straight Female

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/Wire Colors (Face View Female Shown)	Catalog Number
Mini-Style, Straight Female						
8A	—	5-pin	16 AWG	6 ft (2m)	 1-White 2-Red 3-Green 4-Orange 5-Black	**CSMS5D5CY1602**
7A	—	9-pin	16 AWG	12 ft (4m)	 1-Orange 2-Blue 3-Red/Black 4-Green/Black 5-White 6-Red 7-Green 8-White/Black 9-Black	**CSMS9D9CY1602**

Micro-Style

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/Wire Colors (Face View Female Shown)	Catalog Number
Micro-Style						
4A	—	5-pin, 5-wire	22 AWG	6.0 ft (2m)	 1-Brown 2-White 3-Blue 4-Black 5-Green/Yellow	**CSDS5A5CY2202**

Accessories

E50 Heavy-Duty Plug-In Switch Accessories

E50KH7

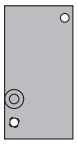
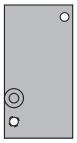
Description	Catalog Number
Adapter Plate	
Allows E50 to replace Square D Type AW Surface Mounting Non Plug-In Standard Box Limit Switch	**E50KH7**

Dimensions, see **Page V8-T2-67**.

Note

① For a full selection of connector cables, see **Tab 10**, **section 10.1**.

E50 Heavy-Duty Plug-In Switch Accessories, continued

	Description	Catalog Number
	Adapter Plate, continued	
E50KH4 	Allows E50 to replace National Acme, Type D-1200M, Style 2 Mounting. Denison LoxSwitch, Model L-100W, Style 2 Mounting. Square D 9007 Type T, Style B Mounting. (Adapter plate is 1/8 in thick, with 1/4 in mounting holes.) Namco® long mount.	**E50KH4** ①
E50KH5 	Allows E50 to replace National Acme, Type D-1200M, Style 1 Mounting. Denison LoxSwitch, Model L-100W, Style 1 Mounting. Square D 9007 Type T, Style C Mounting. (Adapter plate is 1/8 in thick, with 1/4 in mounting holes.)	**E50KH5** ①
E50KH2 	Allows E50 to replace Eaton's 10316 Type LT Non Plug-In Two-Pole Limit Switch	**E50KH2**
E50KH10 	Allows E50 to replace Allen-Bradley 802M Sealed Limit Switch	**E50KH10**
	Adjustable Mounting Plate	
E50KH3 	This is a mounting plate only 5/16 in thick and includes the proper mounting bolts and nuts. The slots in the plate allow a maximum horizontal adjustment of 1 in and vertical adjustment of 1-1/4 in	**E50KH3** ①
	Conduit Sealing Nut	
E50KH6 	1/2 in oiltight	**E50KH6**

Dimensions, see **Page V8-T2-67**.

Note

① Limit switch not included.

Technical Data and Specifications

E50 Heavy-Duty Plug-In Switches

Description	Specification
Environmental ratings	NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13, IP67
Material of construction	Zinc die cast
Switch gasket material	Viton
Universal U.S./DIN mounting dimensions	1.16 in (30 mm) x 2.34 in (60 mm)
Conduit entrance	1/2 in NPT or 20 mm threading
Contact ratings	See below
Contact operation	Snap action over center mechanism
Contact material	Fine silver
Maximum frequency of operation	8000 operations per hour
Mechanical life	
Side rotary	13,000,000 operations minimum
Side or top push	10,000,000 operations minimum
Electrical life	
Single-pole	1,000,000 operations typical at full load
Two-pole	100,000 operations typical at full load
Ambient temperature range—standard	
Standard without cable	14° to 250°F (–10° to 121°C)
Standard with cable	14° to 221°F (–10° to 105°C)
Low temperature without cable	–40° to 250°F (–40° to 121°C)
Low temperature with cable	–40° to 221°F (–40° to 105°C)
Repeat accuracy—standard	
Side operated	Within 0.0012 in
Top operated	Within 0.0003 in
Side rotary	Within 0.0014 in
Torque requirements:	
Switch body screws	25–30 lb-in
Operating head screws	14–18 lb-in
Wire size	Will accept AWG #22–#12, single or stranded wire

Electrical Data—Maximum Contact Ratings (Same polarity each pole)

	Current, Amperes			Voltamperes			Current, Amperes	
AC Volts	Make	Break	Cont. ①	Make	Break	DC Volts	Max. Make or Break	Cont. ①
All Switches Except Gravity Return and Indicating Light Versions								
NEMA A600 Rating						NEMA R300		
120	60	6	10	7200	720	125	0.22	1.0
240	30	3	10	7200	720	250	0.11	1.0
480	15	1.5	10	7200	720	250	0.11	1.0
600	12	1.2	10	7200	720	250	0.11	1.0
Switches with Indicating Lights (LED or Neon)								
NEMA A150 Rating						NEMA R150		
120	60	6	10	7200	720	125	0.22	1.0
Gravity Return Switches—Maximum Contact Ratings								
NEMA 6600 Rating—Contacts on same polarity								
120	30	3	5	3600	360	—	—	—
240	15	1.5	5	3600	360	—	—	—
480	7.5	0.75	5	3600	360	—	—	—
600	6	0.60	5	3600	360	—	—	—

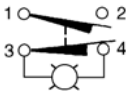
Note

① Thermal rating. Valid only if switch does not have to make or break.

Circuit Diagrams

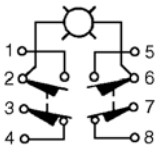
Standard Assembled Switches and Switch Bodies

Single-Pole 1NO-1NC



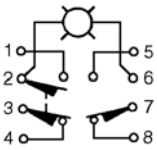
Must be same polarity.

Two-Pole 2NO-2NC



Parallel wired indicator light.
Same polarity each pole.

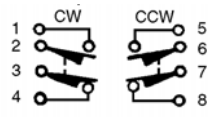
Two-Pole 1NO-2NC



Series wired indicator light.
Same polarity each pole.

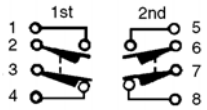
Special Purpose Assembled Switches

Neutral Position



Same polarity, each pole.

Two-Step (CW, CCW, or Both)



Same polarity, each pole.

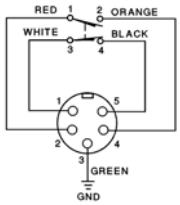
Gravity Return

Must be same polarity.

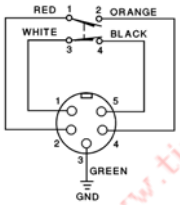
Wiring Diagrams

Receptacles ①

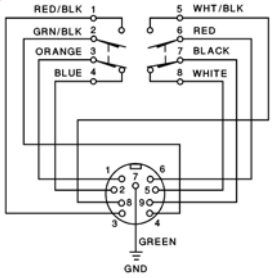
E50RAP5



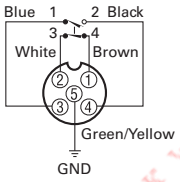
E50RAP5-W



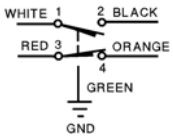
E50RBP9



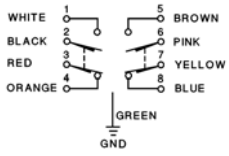
E50RAA5



E50RAS_



E50RBS_



Note

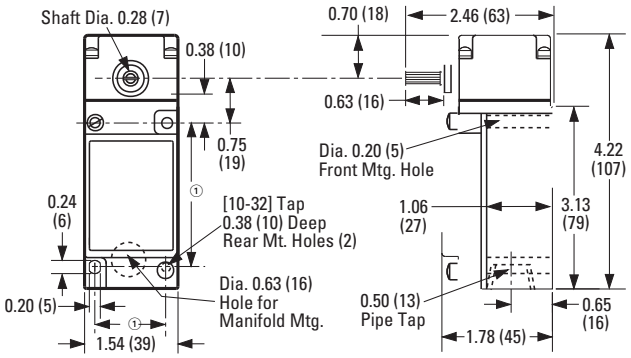
① The wire colors referenced on these diagrams are those internal to the switch itself.

Dimensions

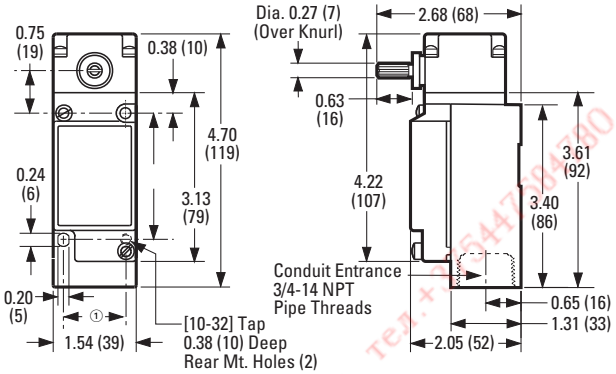
Approximate Dimensions in Inches (mm)

2

Standard



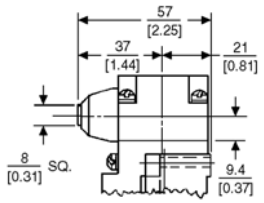
E50SB34



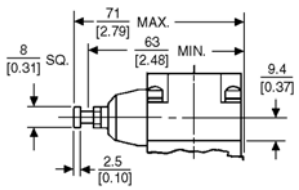
Side Push Operators

Approximate Dimensions in mm [in]

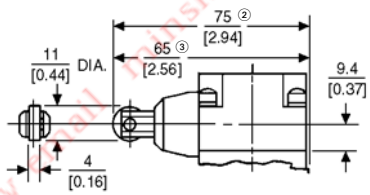
Pushbutton



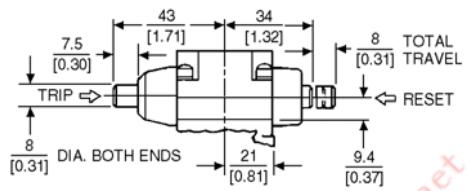
Adjustable Pushbutton



Roller

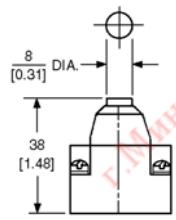


Maintained Pushbutton

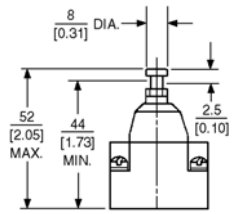


Top Push Operators

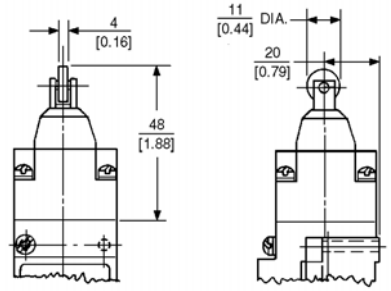
Pushbutton



Adjustable Pushbutton



Roller



Wobble Operators

See Operators on **Page V8-T2-80**.

Notes

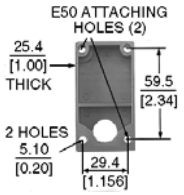
① Can accommodate both U.S., 1.16 (29.4) x 2.34 (59.5) and DIN, 1.18 (30) x 3.26 (60), mounting dimensions.
② For E50DS4.
③ For E50DS3.

Accessories

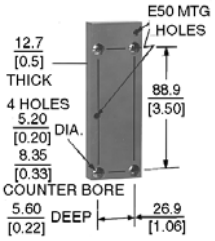
Approximate Dimensions in mm [in]

Adapter Plates

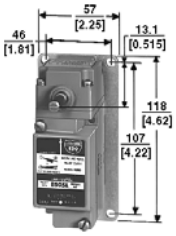
E50KH1M



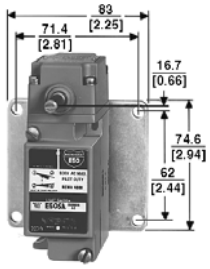
E50KH7



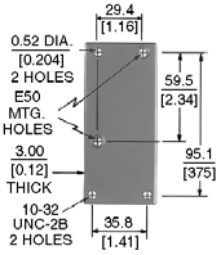
E50KH4



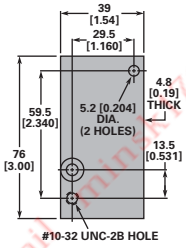
E50KH5



E50KH2

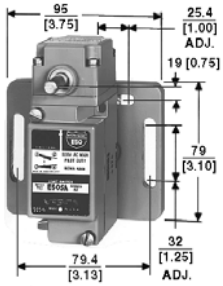


E50KH10



Adjustable Mounting Plate

E50KH3



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E50 Heavy-Duty Factory Sealed 6P+ Switches

Contents

Drawings Online

E50 Heavy-Duty Factory Sealed 6P+ Switches

Product Description

E50 6P+ Limit Switches by Eaton's electrical sector were specifically designed to withstand the penetrating properties of cutting fluids and coolants, such as those used in the automotive industry, as well as extreme shock, vibration and temperature fluctuations. The one-piece, epoxy filled switch body is prewired at the factory to ensure leak-proof, submersible performance. This unique construction positively stops fluid from finding its way to any and all critical connections.

Our 6P+ switches can be ordered in separate components or as complete assembled devices. They are available with prewired 16 AWG cables or mini-connectors. Standard and custom cable lengths are available. As part of the E50 line, the 6P+ switches use the same operating heads as the standard E50 plug-in models to reduce the components you need to inventory.

Features

- Manufactured to take the physical and environmental abuse (including cutting fluids and chemicals) of harsh industrial environments
- Modular, plug-in components (head and switch body) provide application flexibility, reduced inventory and less downtime
- Chemical resistant Viton gaskets, seals and boots are standard, and so are captive, posi-drive screws
- A special tertiary seal on the switch body prevents fluid from entering even when the operating head is not attached
- 600V rating, ridge-topped contacts and wiping action assure continuity even to logic level circuits
- Factory wired cable features a 350 pound pullout capacity
- Keyed, four direction head positioning. Standard 5° pre-travel and 90° total travel
- 24–120 Vac/dc LED and 120 Vac neon indicating lights available
- Rotary heads are field convertible CW, CCW, or both, without special tools

Standards and Certifications

- UL Listed
- CSA Certified
- IEC.947.5.1
- TUV—E9271605E02
- CE (where shown)

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Assembled Switches—Standard

Connection is by 8 ft cable ①.

Assembled Switch

Lever sold separately

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P 1NO-1NC**	**E50SAL6P 1NO-1NC**	**E50SAN6P 1NO-1NC**	**E50SB6P 2NO-2NC**	**E50SBL6P 2NO-2NC**	**E50SBN6P 2NO-2NC**
Operating Head Type ② **Description**	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		
Side Rotary (requires an operating lever, see **Page V8-T2-80**)						
Side Rotary — Standard spring return—E50DR1 ③	**E50AR16P** CE	**E50ALR16P**	**E50ANR16P**	**E50BR16P**	**E50BLR16P**	**E50BNR16P**
Side Rotary — Low force spring return—E50DL1 ③	**E50AL16P** CE	**E50ALL16P**	**E50ANL16P**	**E50BL16P**	**E50BLL16P**	**E50BNL16P**
Side Rotary — Maintained two-position—E50DM1	**E50AM16P** CE	**E50ALM16P**	**E50ANM16P**	**E50BM16P**	**E50BLM16P**	**E50BNM16P**
Side Pushbutton						
Spring Return — Spring return—E50DS1	**E50AS16P** CE	**E50ALS16P**	**E50ANS16P**	**E50BS16P**	**E50BLS16P**	**E50BNS16P**
Adjustable Spring Return — Adjustable spring return—E50DS2	**E50AS26P** CE	**E50ALS26P**	**E50ANS26P**	**E50BS26P**	**E50BLS26P**	**E50BNS26P**

Circuit Diagrams, see **Page V8-T2-77**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ④	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page V8-T2-72**.

③ CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.

④ For a full selection of connector cables, see **Tab 10**, **section 10.1**.

Connection is by 8 ft cable ①.

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E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard, continued

Assembled Switch

Lever sold separately

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P 1NO-1NC**	**E50SAL6P 1NO-1NC**	**E50SAN6P 1NO-1NC**	**E50SB6P 2NO-2NC**	**E50SBL6P 2NO-2NC**	**E50SBN6P 2NO-2NC**
Operating Head Type ② **Description**	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		
Side Push Roller						
Side Push Roller						
Spring return—E50DS3 ③	**E50AS36P** CE	**E50ALS36P**	**E50ANS36P**	**E50BS36P**	**E50BLS36P**	**E50BNS36P**
Side Pushbutton						
Side Pushbutton						
Maintained—E50DH1	**E50AH16P** CE	**E50ALH16P**	**E50ANH16P**	**E50BH16P**	**E50BLH16P**	**E50BNH16P**
Spring Return						
Top Pushbutton						
Spring return—E50DT1	**E50AT16P** CE	**E50ALT16P**	**E50ANT16P**	**E50BT16P**	**E50BLT16P**	**E50BNT16P**
Adjustable Spring Return						
Adjustable spring return—E50DT2	**E50AT26P** CE	**E50ALT26P**	**E50ANT26P**	**E50BT26P**	**E50BLT26P**	**E50BNT26P**

Circuit Diagrams, see **Page V8-T2-77**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ④	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page V8-T2-72**.

③ Roller can be converted in the field between horizontal and vertical.

④ For a full selection of connector cables, see **Tab 10**, **section 10.1**.

Connection is by 8 ft cable ①.

Assembled Switch

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard, continued

Lever sold separately

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/dc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P 1NO-1NC**	**E50SAL6P 1NO-1NC**	**E50SAN6P 1NO-1NC**	**E50SB6P 2NO-2NC**	**E50SBL6P 2NO-2NC**	**E50SBN6P 2NO-2NC**
Operating Head Type ② **Description**	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		
Top Push Roller						
Top Push Roller						
Spring return—E50DT3	**E50AT36P** CE	**E50ALT36P**	**E50ANT36P**	**E50BT36P**	**E50BLT36P**	**E50BNT36P**
Wobble Head, Spring Return						
Wobble Head, Spring Return (requires a wobble operator, see **Page V8-T2-80**)						
Standard duty—E50DW1	**E50AW16P** CE	**E50ALW16P**	**E50ANW16P**	**E50BW16P**	**E50BLW16P**	**E50BNW16P**
Heavy-duty high strength steel— E50DW2	**E50AW26P** CE	**E50ALW26P**	**E50ANW26P**	**E50BW26P**	**E50BLW26P**	**E50BNW26P**

Circuit Diagrams, see **Page V8-T2-77**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ③	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Double-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page V8-T2-72**.

③ For a full selection of connector cables, see **Tab 10**, **section 10.1**.

Operating Heads

E50 Heavy-Duty Factory Sealed 6P+ Switches, Operating Heads

	Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature ① Without Cable	Operating Temperature ① With Pre-wired Cable	Catalog Number
Side Rotary 	**Side Rotary** (requires an operating lever, see **Page V8-T2-80**)								
	Standard spring return ②	5°	2°	90°	3 in-lbs	4.5 in-oz	10° to 200°F (–12° to 94°C) ③	10° to 200°F (–12° to 94°C) ③	**E50DR1**
	Low temperature spring return ②	5°	2°	90°	3 in-lbs	4.5 in-oz	–40° to 175°F (–40° to 79°C)	–31° to 175°F (–34° to 79°C)	**E50DR19**
	Low force spring return ②	15°	6°	90°	1.5 in-lbs	2.5 in-oz	10° to 200°F (–12° to 94°C) ③	10° to 200°F (–12° to 94°C) ③	**E50DL1**
	Maintained two-position	50°	50°	90°	3 in-lbs	—	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DM1**
	Side Pushbutton								
Spring Return 	Spring return	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS1**
Adjustable Spring Return 	Adjustable spring return	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS2**
Side Push Roller 	**Side Push Roller**								
	Spring return ④	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS3** ⑤
		0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DS4** ⑤
Side Pushbutton 	**Side Pushbutton**								
	Maintained	0.200 in	0.130 in	0.320 in	5 lbs	5 lbs	14° to 200°F (–10° to 94°C)	14° to 200°F (–10° to 94°C)	**E50DH1**
	Top Pushbutton								
Spring Return 	Spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT1**
Adjustable Spring Return 	Adjustable spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT2**

Notes

① Temperature ranges below 32°F (0°C) are based on absence of freezing moisture or water.
② CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.
③ For CW and CCW operation. For CW only or CCW only operation, high temperature limit increases to 250°F (121°C) without cable, and 221°F (105°C) with pre-wired cable.
④ Roller can be converted in the field between horizontal and vertical.
⑤ Roller shaft is 0.38 in (9.5 mm) longer on E50DS4, see Dimensions on **Page V8-T2-78**.

E50 Heavy-Duty Factory Sealed 6P+ Switches, Operating Heads, continued

Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature ① Without Cable	Operating Temperature ① With Pre-Wired Cable	Catalog Number
Top Push Roller								
Top Push Roller								
Spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DT3**
Wobble Head, Spring Return								
Wobble Head, Spring Return (requires a wobble operator, see **Page V8-T2-80**)								
Standard duty	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DW1**
Heavy-duty high strength steel	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (–10° to 121°C)	14° to 221°F (–10° to 105°C)	**E50DW2**

Circuit Diagrams, see **Page V8-T2-77**.

Switch Bodies

E50 Heavy-Duty Factory Sealed 6P+, Switch Bodies

Circuit	Switch Body Construction	Cable Length	Catalog Number
Pre-Wired Cable			
Single-pole 1NO-1NC	Without indicating light	8 ft	**E50SA6P**
		12 ft	**E50SA6P12**
		20 ft	**E50SA6P20**
	With LED indicating light 24 –120 Vac/dc	8 ft	**E50SAL6P**
		12 ft	**E50SAL6P12**
		20 ft	**E50SAL6P20**
	With neon indicating light 120 Vac	8 ft	**E50SAN6P**
		12 ft	**E50SAN6P12**
		20 ft	**E50SAN6P20**
Two-pole 2NO-2NC	Without indicating light	8 ft	**E50SB6P**
		12 ft	**E50SB6P12**
		20 ft	**E50SB6P20**
	With LED indicating light 24–120 Vac/dc	8 ft	**E50SBL6P**
		12 ft	**E50SBL6P12**
	With neon indicating light 120 Vac	8 ft	**E50SBN6P**
		12 ft	**E50SBN6P12**
		20 ft	**E50SBN6P20**
Mini-Connector			
Single-pole 1NO-1NC	Without indicating light normal wiring	—	**E50SA6PC** ⚽
	Without indicating light alternate wiring	—	**E50SA6PC-W** ⚽
	With LED indicating light 24–120 Vac/dc	—	**E50SAL6PC** ⚽
	With neon indicating light 120 Vac	—	**E50SAN6PC** ⚽
Two-pole 2NO-2NC	Without indicating light	—	**E50SB6PC** ⚽⚽
	With LED indicating light 24–120 Vac/dc	—	**E50SBL6PC** ⚽⚽
	With neon indicating light 120 Vac	—	**E50SBN6PC** ⚽⚽

Notes

⚽⚽ See listing of compatible connector cables on **Page V8-T2-74**.

① Temperature ranges below 32°F (0°C) are based on absence of freezing moisture or water.

Compatible Connector Cables

2

Standard Cables ①

Mini-Style, Straight Female

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/Wire Colors (Face View Female Shown)	Catalog Number
Mini-Style, Straight Female						
8A	—	5-pin	16 AWG	6 ft (2m)	 1-White 2-Red 3-Green 4-Orange 5-Black	**CSMS5D5CY1602**
7A	—	9-pin	16 AWG	12 ft (4m)	 1-Orange 2-Blue 3-Red/Black 4-Green/Black 5-White 6-Red 7-Green 8-White/Black 9-Black	**CSMS9D9CY1602**

Accessories

E50 Heavy-Duty Factory Sealed 6P+ Switch Accessories

E50KH1M

E50KH7

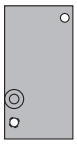
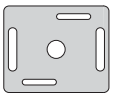
	Catalog Number
Adapter Plate	
Allows E50 to replace Eaton's 10316 Type LP Manifold Mounting Plug-In Limit Switch	**E50KH1M**
Allows E50 to replace Square D Type AW Surface Mounting Non Plug-In Standard Box Limit Switch	**E50KH7**

Dimensions, see **Page V8-T2-78**.

Note

① For a full selection of connector cables, see **Tab 10**, **section 10.1**.

E50 Heavy-Duty Factory Sealed 6P+ Switch Accessories, continued

		Catalog Number
	Adapter Plate, continued	
E50KH4 	Allows E50 to replace National Acme, Type D-1200M, Style 2 Mounting. Denison LoxSwitch, Model L-100W, Style 2 Mounting. Square D 9007 Type T, Style B Mounting. (Adapter plate is 1/8 in thick, with 1/4 in mounting holes.) Namco® long mount.	**E50KH4** ①
E50KH5 	Allows E50 to replace National Acme, Type D-1200M, Style 1 Mounting. Denison LoxSwitch, Model L-100W, Style 1 Mounting. Square D 9007 Type T, Style C Mounting. (Adapter plate is 1/8 in thick, with 1/4 in mounting holes.)	**E50KH5** ①
E50KH2 	Allows E50 to replace Eaton's 10316 Type LT Non Plug-In Two-Pole Limit Switch	**E50KH2**
E50KH10 	Allows E50 to replace Allen-Bradley 802M Sealed Limit Switch	**E50KH10**
	Adjustable Mounting Plate	
E50KH3 	This is a mounting plate only 5/16 in thick and includes the proper mounting bolts and nuts. The slots in the plate allow a maximum horizontal adjustment of 1 in and vertical adjustment of 1-1/4 in	**E50KH3** ①
	Conduit Sealing Nut	
E50KH6 	1/2 in oiltight	**E50KH6**

Dimensions, see **Page V8-T2-78**.

Note

① Limit switch not included.

Technical Data and Specifications

E50 Heavy-Duty Factory Sealed 6P+ Switches

Description	Specification
Environmental ratings	NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13, IP67, IP69K
Material of construction	Zinc die cast
Switch gasket material	Viton
Universal U.S./DIN mounting dimensions	1.16 in (30 mm) x 2.34 in (60 mm)
Conduit entrance	1/2 in NPT or 20 mm threading
Contact ratings	See below
Contact operation	Snap action over center mechanism
Contact material	Fine silver
Maximum frequency of operation	8000 operations per hour
Mechanical life	
Side rotary	13,000,000 operations minimum
Side or top push	10,000,000 operations minimum
Electrical life	
Single-pole	1,000,000 operations typical at full load
Double-pole	100,000 operations typical at full load
Ambient temperature range—standard	
Standard without cable	14° to 250°F (–10° to 121°C)
Standard with cable	14° to 221°F (–10° to 105°C)
Low temperature without cable	–40° to 250°F (–40° to 121°C)
Low temperature with cable	–40° to 221°F (–40° to 105°C)
Repeat accuracy—standard	
Side operated	Within 0.0012 in
Top operated	Within 0.0003 in
Side rotary	Within 0.0014 in
Torque requirements	
Operating head screws	14–18 lb-in

Electrical Data—Maximum Contact Ratings (Same polarity each pole)

	Current, Amperes			Voltamperes			Current, Amperes	
AC Volts	Make	Break	Cont. ①	Make	Break	DC Volts	Max. Make or Break	Cont. ①
All Switches Except Gravity Return and Indicating Light Versions								
NEMA A600 Rating						NEMA R300		
120	60	6	10	7200	720	125	0.22	1.0
240	30	3	10	7200	720	250	0.11	1.0
480	15	1.5	10	7200	720	250	0.11	1.0
600	12	1.2	10	7200	720	250	0.11	1.0
Switches with Indicating Lights (LED or Neon)								
NEMA A150 Rating						NEMA R150		
120	60	6	10	7200	720	125	0.22	1.0

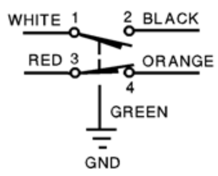
Note

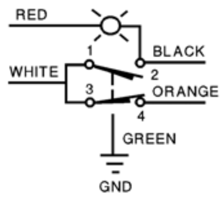
① Thermal rating. Valid only if switch does not have to make or break.

Circuit Diagrams ①

Standard Assembled Switches

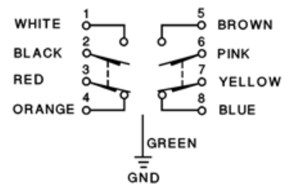
Single-Pole 1NO-1NC

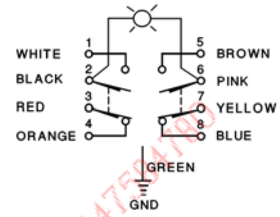




Must be same polarity.

Two-Pole 2NO-2NC



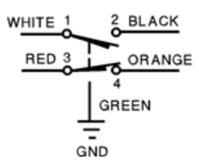


Same polarity, each pole.

Switch Bodies

Pre-Wired Cable—Single-Pole 1NO-1NC

E50SA6P_



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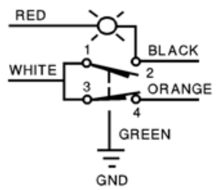
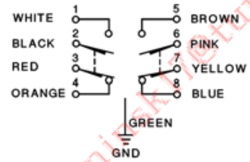
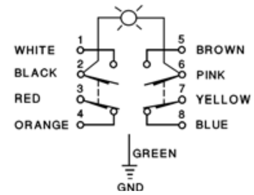


Pre-Wired Cable—Two-Pole 2NO-2NC

E50SB6P_



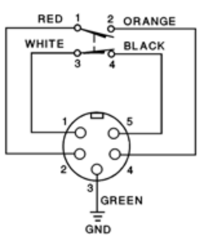
E50SBL6P_



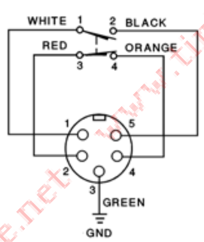
Wiring Diagrams ①

Mini-Connector—Single-Pole 1NO-1NC

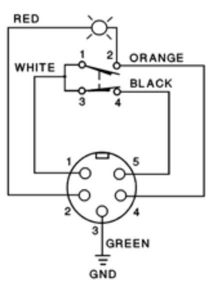
E50SA6PC



E50SA6PC-W

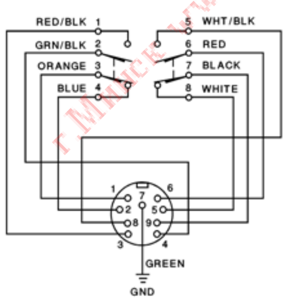


E50SAL6PC/E50SAN6PC

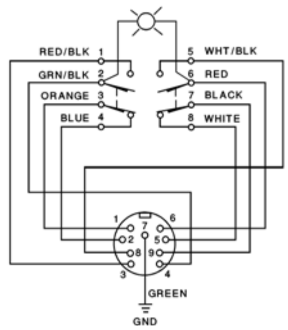


Mini-Connector—Two-Pole 2NO-2NC

E50SB6PC



E50SBL6PC/E50SBN6PC



Note

① The wire colors referenced on these diagrams are those internal to the switch itself.

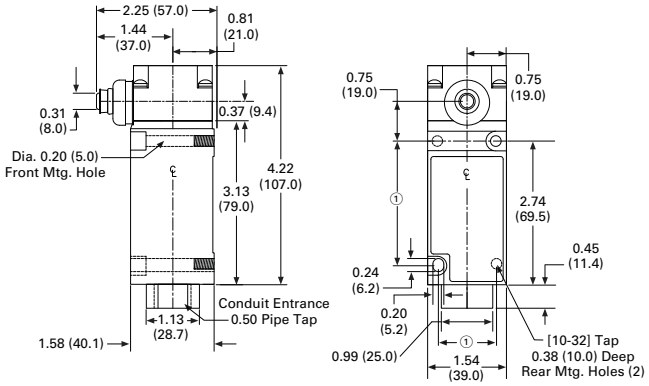
Dimensions

Approximate Dimensions in Inches (mm)

2

Standard

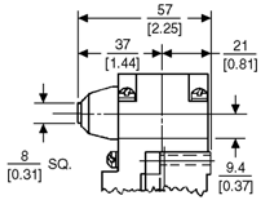
6P+ Limit Switch with Rotary Operating Head



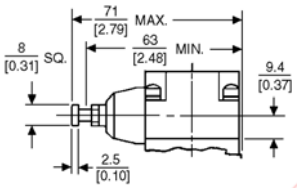
Side Push Operators

Approximate Dimensions in mm [in]

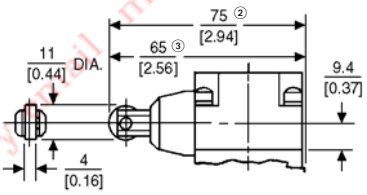
Pushbutton



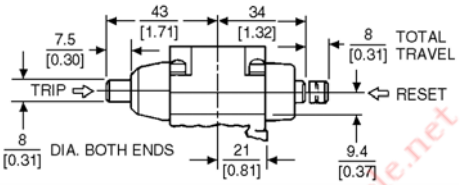
Adjustable Pushbutton



Roller

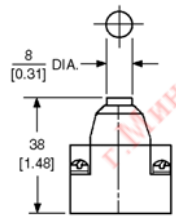


Maintained Pushbutton

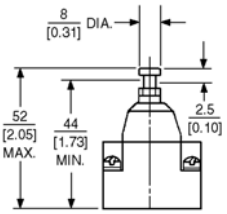


Top Push Operators

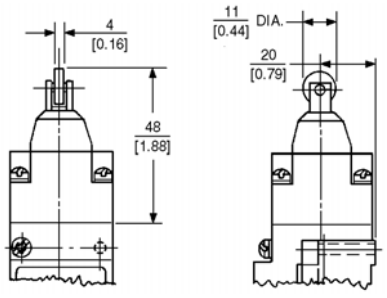
Pushbutton



Adjustable Pushbutton



Roller



Wobble Operators

See Operators on **Page V8-T2-80**.

Notes

① Can accommodate both U.S., 1.16 (29.4) x 2.34 (59.5) and DIN, 1.18 (30.0) x 3.26 (60.0), mounting dimensions.
② For E50DS4.
③ For E50DS3.

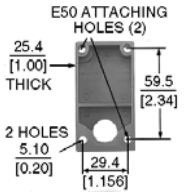
2

Accessories

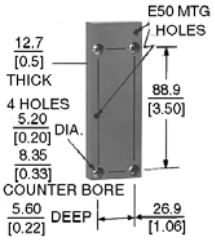
Approximate Dimensions in mm [in]

Adapter Plates

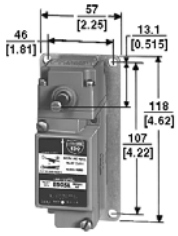
E50KH1M



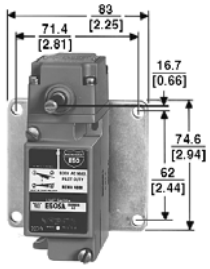
E50KH7



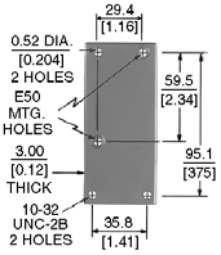
E50KH4



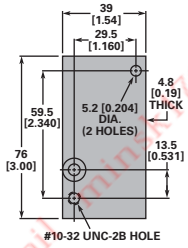
E50KH5



E50KH2

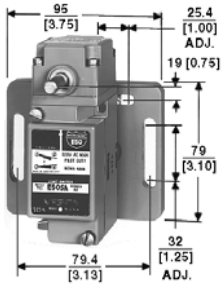


E50KH10



Adjustable Mounting Plate

E50KH3



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Operators

Contents

Drawings Online

Operators

Product Description

The Operators presented here are used with Eaton's E50 Plug-In and 6P+ limit switches, as well as our 10316 rotary type limit switches. A wide variety of styles and sizes are available to provide optimum performance for nearly any application.

Features

- Wide variety of operator types for rotary and wobble style limit switches
- Rollers and rods available in metal and nonmetal contact surfaces

⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Roller Type Operators

For rotary head switches: E50 Plug-In, E50 6P+, and 10316.

Note: Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

Operators—Roller Type

E50KL200

E50KL355

E50KL377

E50KL554

E50KL580

E50KL24

E50KL27

Roller Type	Minimum Required Return Torque ①	Approximate Dimensions in Inches (mm) A Lever Length ②	B Roller Diameter	C Roller Width	D	E	F	Catalog Number
Standard Roller (Stainless Steel)								
Metal	0.62 in-oz	0.88 (22.2)	0.75 (19.0)	0.32 (8.1)	0.31 (7.9)	0.20 (5.1)	0.24 (6.1)	**E50KL39**
Metal	0.95 in-oz	1.38 (34.9)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL40**
Ball bearing	0.77 in-oz	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)	**E50KL531**
Nylatron	0.53 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL200**
Metal	1.10 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL355**
Nylatron	0.96 in-oz	1.50 (38.1)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)	**E50KL377**
Without roller	0.32 in-oz	1.50 (38.1)	—	—	0.34 (8.6)	—	—	**E50KL32**
Ball bearing	1.10 in-oz	2.00 (50.8)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)	**E50KL552**
Nylatron	0.71 in-oz	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL546**
Metal	1.50 in-oz	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL549**
Nylatron	1.45 in-oz	2.00 (50.8)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)	**E50KL572**
Ball bearing	1.50 in-oz	2.50 (63.5)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)	**E50KL553**
Nylatron	1.00 in-oz	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL547**
Metal	2.00 in-oz	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL550**
Nylatron	1.80 in-oz	2.50 (63.5)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)	**E50KL573**
Nylatron	1.40 in-oz	2.50 (63.5)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)	**E50KL575**
Ball bearing	1.80 in-oz	3.00 (76.2)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)	**E50KL554**
Nylatron	1.30 in-oz	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL548**
Metal	2.50 in-oz	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)	**E50KL551**
Nylatron	2.30 in-oz	3.00 (76.2)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)	**E50KL574**
Nylatron	1.80 in-oz	3.00 (76.2)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)	**E50KL576**
Dimensions, see **Page V8-T2-84**.								
Roller On Reverse Side (Stainless Steel)								
Ball bearing	0.77 in-oz	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.18 (4.6)	0.24 (6.1)	**E50KL580**
Nylatron	0.53 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)	**E50KL310**
Metal	1.10 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)	**E50KL579**
Nylatron	0.96 in-oz	1.50 (38.1)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.23 (5.8)	0.31 (7.9)	**E50KL536**
Offset Inboard Roller (Stainless Steel)								
Nylatron	0.65 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)	—	—	**E50KL24**
Metal	1.20 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)	—	—	**E50KL25**
Ball bearing	0.90 in-oz	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.04 (1.0)	—	—	**E50KL26**
Offset Outboard Roller (Stainless Steel)								
Nylatron	0.65 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)	—	—	**E50KL27**
Metal	1.20 in-oz	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)	—	—	**E50KL28**
Ball bearing	0.90 in-oz	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.04 (1.0)	—	—	**E50KL29**
Nylatron	1.10 in-oz	1.50 (38.1)	0.75 (19.0)	1.00 (25.4)	—	—	—	**E50KL30**
Dimensions, see **Page V8-T2-85**.								

Notes

① **Caution:** When selecting lever, the minimum required return torque of lever should not exceed minimum return force available in operating head as given in operating head specifications.

② Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).

Note: Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

Operators—Roller Type, continued

Roller Type	Minimum Required Return Torque ①	Approximate Dimensions in Inches (mm) A Lever Length ②	B Roller Diameter	C Roller Width	D	E	F	Catalog Number
E50KL532								
								
Bantam Lever								
Metal	0.45 in-oz	0.69 (17.5)	0.85 (22.0)	0.18 (4.6)	—	—	—	**E50KL532**
E50KL340								
								
Precision Adjustment								
Nylatron	0.65 in-oz	0.69 (17.5) Roller length: 1.50 (38.1) ③	0.75 (19.0)	0.32 (8.1)	0.48 (12.2)	0.24 (6.1)	0.28 (7.1)	**E50KL340**
Metal	1.20 in-oz		0.75 (19.0)	0.32 (8.1)	0.48 (12.2)	0.24 (6.1)	0.28 (7.1)	**E50KL465**
Ball bearing	0.90 in-oz		0.69 (17.5)	0.25 (6.4)	0.48 (12.2)	0.16 (4.1)	0.22 (5.6)	**E50KL535**
E50KL201								
								
Dimensions, see **Page V8-T2-85**.								
Adjustable Roller (Stainless Steel)								
Ball bearing	2.50 in-oz ④	1.0 (25.4) to 3.75 (95.2) ⑤	0.69 (17.5)	0.25 (6.4)	0.23 (5.8)	0.30 (7.6)	—	**E50KL539**
Nylatron	1.90 in-oz ④		0.75 (19.0)	0.32 (8.1)	0.29 (7.4)	0.33 (8.4)	—	**E50KL201**
			0.75 (19.0)	0.32 (8.1)	0.29 (7.4)	0.33 (8.4)	—	**E50KL201SPL** ⑥
E50KL537								
								
Metal	3.40 in-oz ④		0.75 (19.0)	0.32 (8.1)	0.29 (7.4)	0.33 (8.4)	—	**E50KL538**
Nylatron	1.90 in-oz ④		0.75 (19.0)	0.50 (12.7)	0.46 (11.6)	0.48 (12.2)	—	**E50KL599**
Nylatron	3.10 in-oz ④		0.75 (19.0)	1.00 (25.4)	0.90 (22.9)	0.95 (24.1)	—	**E50KL537**
Large Nylatron	4.50 in-oz ④	0.5 (12.7) to 3.25 (82.6)	4.00 (102.0)	0.11 (2.8)	0.11 (2.8)	0.19 (4.8)	—	**E50KL598**
Without roller	1.20 in-oz ④	0.5 (12.7) to 3.75 (95.2)	—	—	—	—	—	**E50KL31**
Nylatron	2.50 in-oz ④	1.63 (41.3) to 3.75 (95.2) ⑤	1.50 (38.1)	0.29 (7.4)	0.26 (6.6)	0.32 (8.1)	—	**E50KL443**
Dimensions, see **Page V8-T2-86**.								

Operators—Roller Type, continued

Roller Type	Minimum Required Return Torque ①	Approximate Dimensions in Inches (mm) A Lever Length ②	B Roller Diameter	C Roller Width	D	E	F	G	Catalog Number
E50KL545									
									
Fork Lever—Both Rollers on One Side									
Ball bearing	—	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.08 (2.0)	0.14 (3.6)	—	—	**E50KL545**
Nylatron	—		0.75 (19.0)	0.32 (8.1)	0.16 (4.1)	0,20 (5.1)	—	—	**E50KL204**
Metal	—		0.75 (19.0)	0.32 (8.1)	0.16 (4.1)	0,20 (5.1)	—	—	**E50KL544**
Nylatron	—		0.75 (19.0)	1.00 (25.4)	0.84 (21.3)	0.88 (22.4)	—	—	**E50KL543**
E50KL542									
									
Fork Lever—One Roller Outside, One Inside									
Ball bearing	—	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.08 (2.0)	0.14 (3.6)	0.64 (16.3)	0.70 (17.8)	**E50KL542**
Nylatron	—		0.75 (19.0)	0.32 (8.1)	0.16 (4.1)	0.20 (5.1)	0.73 (18,5)	0.77 (19.6)	**E50KL203**
Metal	—		0.75 (19.0)	0.32 (8.1)	0.16 (4.1)	0.20 (5.1)	0.73 (18,5)	0.77 (19.6)	**E50KL541**
Dimensions, see **Page V8-T2-86**.									

Notes

① **Caution:** When selecting lever, the minimum required return torque of lever should not exceed minimum return force available in operating head as given in operating head specifications.
② Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).
③ Maximum length dimension between operating shaft axis to roller axis for comparison. Precision adjustable to lesser dimensions.
④ Applies when lever is extended to the maximum dimension.
⑤ By reassembling lever, minimum length can be reduced another 0.5 in (12.7 mm).
⑥ High-grade stainless steel.

Rod Type Operators

For rotary head switches: E50 Plug-In, E50 6P+, and 10316.

Note: Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

Operators—Rod Type

Rod Type	Minimum Required Return Torque ①	Approximate Dimensions in Inches (mm) A Rod Length (Maximum) ②	B Rod Diameter	Catalog Number
Nylon/Metal				
 **Adjustable Rod**				
Nylon	0.40 in-oz ③	5.50 (140.0)	0.19 (4.8)	**E50KL399**
Metal	0.92 in-oz ③		0.12 (3.2)	**E50KL202**
Metal	2.20 in-oz ③	8.75 (222.0)	Rod size (square): 0.12 (3.2) x 0.12 (3.2)	**E50KL581**
Metal/Steel				
 Stainless steel	7.00 in-oz ③	9.00 (229.0)	0.19 (4.8)	**E50KL220**
Bendable steel	5.00 in-oz ③	12.00 (305.0)	0.12 (3.2)	**E50KL226**
Clamps for Adjustable Rods (Rod not included)				
Clamp for …				
0.19 (4.8) diameter rods				**E50KL35**
0.12 (3.2) diameter rods				**E50KL36**
0.25 (6.4) diameter rods				**E50KL41**

Dimensions, see **Page V8-T2-87**.

Operators—Rod Type, continued

Rod Type	Minimum Required Return Torque ①	Approximate Dimensions in Inches (mm) A Rod Length ②	B Rod Diameter	C	D	Catalog Number
Nylon/Steel						
 **Spring Rod**						
Nylon	3.50 in-oz	—	—	—	—	**E50KL556**
Stainless steel	2.80 in-oz	—	—	—	—	**E50KL421**
Nylon Covered Wire						
 **Adjustable Wire**						
Nylon covered wire	1.50 in-oz ③	—	—	—	—	**E50KL533**
Nylatron						
 **Adjustable Wide Roller Lever**						
Nylatron	4.50 in-oz ③	—	—	—	—	**E50KL37**
Nylatron						
 **Nylatron Loop**						
Nylatron	0.40 in-oz	6.00 (152.0)	Ø: 0.158 (4.0)	—	—	**E50KL142**
Zinc-Plated Steel						
 **Eye Bolt**						
Zinc-plated steel	0.53 in-oz	150.00 (38.1)	Ø: 0.1875 (4.8) Loop ID: 0.375 (9.5)	0.52 (13.1)	0.24 (8.6)	**E50KL33**

Dimensions, see **Page V8-T2-87**.

Notes

① **Caution:** When selecting lever, the minimum required return torque of lever should not exceed minimum return force available in operating head as given in operating head specifications.

② Length from the operating shaft axis to tip.

③ Applies when lever is extended to the maximum dimension.

Wobble Type Operators

For E50DW1 and E50DWZ Operator Heads on E50 Plug-In and E50 6P+ Switches.

2

Note: Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

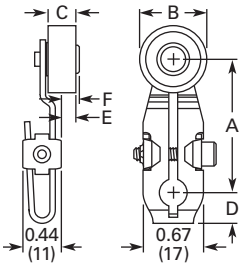
Operators—Wobble Type

	Wobble Type	Catalog Number
E50KW2	Nylon Rod	
		E50KW2
E50KW3	Stainless Steel Rod	
		E50KW3
E50KW4	Coil Spring	
		E50KW4

Dimensions, see **Page V8-T2-88**.

Dimensions

Roller Type Operators



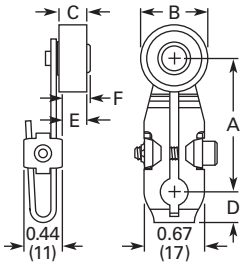
Standard Roller

Approximate Dimensions in Inches (mm)

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E	F
E50KL39	0.88 (22.2)	0.75 (19.0)	0.32 (8.1)	0.31 (7.9)	0.20 (5.1)	0.24 (6.1)
E50KL40	1.38 (34.9)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL531	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL200	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL355	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL377	1.50 (38.1)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL32	1.50 (38.1)	—	—	0.34 (8.6)	—	—
E50KL552	2.00 (50.8)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL546	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL549	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL572	2.00 (50.8)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL553	2.50 (63.5)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL547	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL550	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL573	2.50 (63.5)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL575	2.50 (63.5)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)
E50KL554	3.00 (76.2)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL548	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL551	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL574	3.00 (76.2)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL576	3.00 (76.2)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)

Note

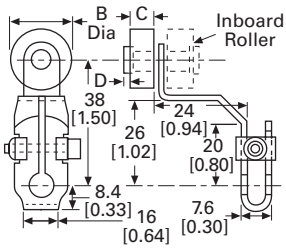
① Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).



Roller on Reverse Side

Approximate Dimensions in Inches (mm)

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E	F
E50KL580	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.18 (4.6)	0.24 (6.1)
E50KL310	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)
E50KL579	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)
E50KL536	1.50 (38.1)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.23 (5.8)	0.31 (7.9)



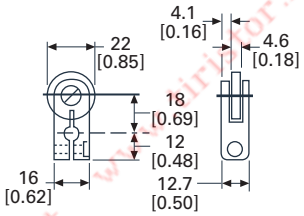
Offset Roller

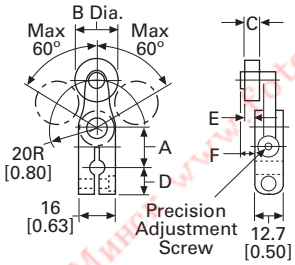
Approximate Dimensions in mm [in]

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D
Inboard				
E50KL24	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	0.8 [0.03]
E50KL25	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	0.8 [0.03]
E50KL26	38.1 [1.50]	17.5 [0.69]	6.4 [0.25]	1.0 [0.04]
Outboard				
E50KL27	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	0.8 [0.03]
E50KL28	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	0.8 [0.03]
E50KL29	38.1 [1.50]	17.5 [0.69]	6.4 [0.25]	1.0 [0.04]
E50KL30	38.1 [1.50]	19.0 [0.75]	25.4 [1.00]	—

Bantam Lever

Approximate Dimensions in mm [in]





Precision Adjustment

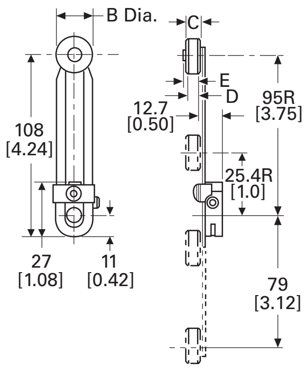
Approximate Dimensions in mm [in]

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E	F
E50KL340	17.5 [0.69] Roller length: 38.1 [1.50] ②	19.0 [0.75]	8.1 [0.32]	12.2 [0.48]	6.1 [0.24]	7.1 [0.28]
E50KL465		19.0 [0.75]	8.1 [0.32]	12.2 [0.48]	6.1 [0.24]	7.1 [0.28]
E50KL535		17.5 [0.69]	6.4 [0.25]	12.2 [0.48]	4.1 [0.16]	5.6 [0.22]

Notes

① Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).

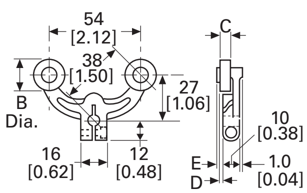
② Maximum length dimension between operating shaft axis to the roller axis for comparison. Precision adjustable to lesser dimensions.



Adjustable Roller

Approximate Dimensions in mm [in]

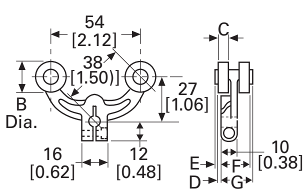
Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E
E50KL539	25.4 [1.0] to 95.2 [3.75] ②	17.5 [0.69]	6.4 [0.25]	5.8 [0.23]	7.6 [0.30]
E50KL201		19.0 [0.75]	8.1 [0.32]	7.4 [0.29]	8.4 [0.33]
E50KL201SPL ③		19.0 [0.75]	8.1 [0.32]	7.4 [0.29]	8.4 [0.33]
E50KL538		19.0 [0.75]	8.1 [0.32]	7.4 [0.29]	8.4 [0.33]
E50KL599		19.0 [0.75]	12.7 [0.50]	11.6 [0.46]	12.2 [0.48]
E50KL537		19.0 [0.75]	25.4 [1.00]	22.9 [0.90]	24.1 [0.95]
E50KL598	12.7 [0.50] to 82.6 [3.25]	102.0 [4.00]	2.8 [0.11]	4.8 [0.19]	24.1 [0.95]
E50KL31	12.7 [0.50] to 95.2 [3.75]	—	—	—	—
E50KL443	41.3 [1.63] to 95.2 [3.75] ②	38.1 [1.50]	7.4 [0.29]	6.6 [0.26]	8.1 [0.32]



Fork Lever—Both Rollers on One Side

Approximate Dimensions in mm [in]

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E
E50KL545	38.1 [1.50]	17.5 [0.69]	6.4 [0.25]	2.0 [0.08]	3.6 [0.14]
E50KL204	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	4.1 [0.16]	5.1 [0.20]
E50KL544	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	4.1 [0.16]	5.1 [0.20]
E50KL543	38.1 [1.50]	19.0 [0.75]	25.4 [1.00]	21.3 [0.84]	22.4 [0.88]



Fork Lever—One Roller Outside, One Inside

Approximate Dimensions in mm [in]

Catalog Number	A Lever Length ①	B Roller Diameter	C Roller Width	D	E	F	G
E50KL542	38.1 [1.50]	17.5 [0.69]	6.4 [0.25]	2.0 [0.08]	3.6 [0.14]	16.3 [0.64]	17.8 [0.70]
E50KL203	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	4.1 [0.16]	5.1 [0.20]	18.5 [0.73]	19.6 [0.77]
E50KL541	38.1 [1.50]	19.0 [0.75]	8.1 [0.32]	4.1 [0.16]	5.1 [0.20]	18.5 [0.73]	19.6 [0.77]

Notes

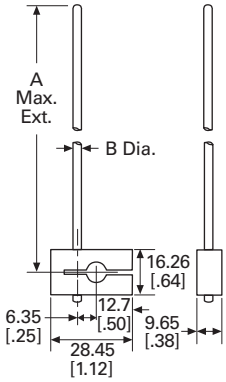
① Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).

② By reassembling lever, minimum length can be reduced another 12.7 mm [0.5 in].

③ High-grade stainless steel.

Approximate Dimensions in Inches or mm [in]

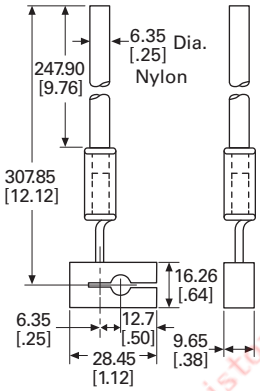
Rod Type Operators



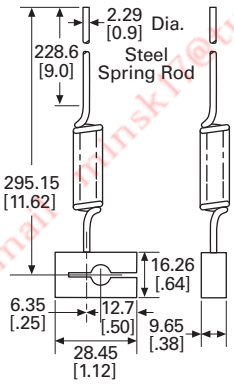
Adjustable Rod

Catalog Number	A Rod Length ①	B Rod Diameter
E50KL399	140.0 [5.50]	4.8 [0.19]
E50KL202		3.2 [0.12]
E50KL581	222.0 [8.75]	Rod size (square): 3.2 [0.12] x 3.2 [0.12]
E50KL220	229.0 [9.00]	4.8 [0.19]
E50KL226	305.0 [12.00]	3.2 [0.12]

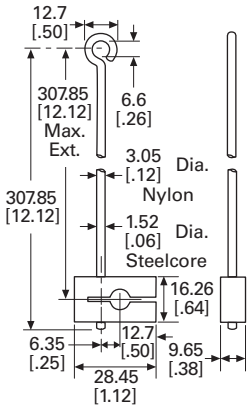
Spring Rod—E50KL556



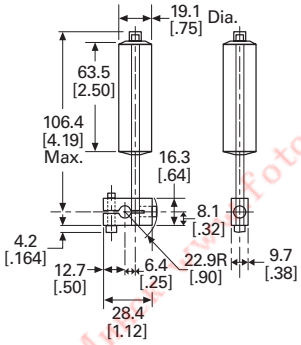
Spring Rod—E50KL421



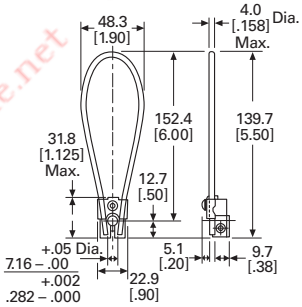
Adjustable Wire



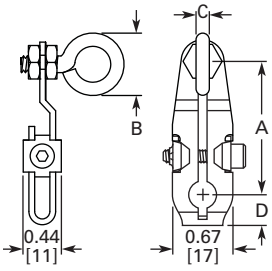
Adjustable Wide Roller Lever



Nylatron Loop—E50KL142



Eye Bolt



Catalog Number	A Rod Length ②	B Rod Diameter	C Rod Width	D
E50KL33	38.1 [1.50]	4.8 [0.1875] Loop ID: 9.5 [0.375]	13.1 [0.52]	8.6 [0.34]

Notes

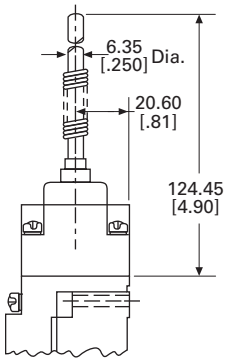
① Applies when lever is extended to the maximum dimension.

② Length from the operating shaft axis to tip.

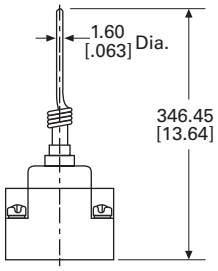
2

Wobble Type Operators

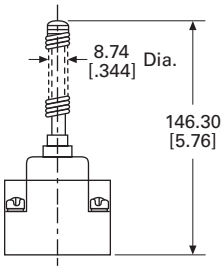
Nylon Rod



Stainless Steel Rod



Coil Spring



Non Plug-In Switches

Contents

Description	*Page*

Non Plug-In Switches

Product Description

10316 Type L non plug-in limit switches by Eaton's electrical sector are sold as complete assembled devices only with a wide array of operating head configurations. All switches are single-pole 1NO-1NC.

Features

- Side and top rotary, side and top push or wobble operation
- CW, CCW or CW and CCW operating modes are field convertible
- Double break-make snap action contacts, same polarity each pole
- Captive saddle clamp terminals accept up to #12 wire
- Head can be mounted in any of four discrete positions, intervals of 90°

Standards and Certifications

- UL Listed
- CSA Certified

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

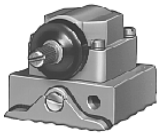
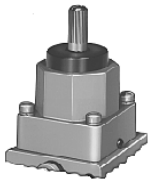
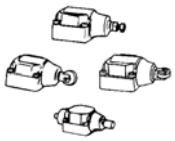
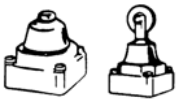
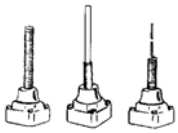
For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

2

Complete Assembled Switches Single-Pole 1NO-1NC

Operating Characteristics	Operating Data—Nominal Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Catalog Number
Side Rotary Operated						
 **Side Rotary Operated** ①						
Standard	10°	4°	50°	3 in-lbs	4.5 in-oz	**10316H187**
Top Rotary Operated						
 **Top Rotary Operated** ①						
Clockwise	20°	12°	140°	1.1 in-lbs	3 in-oz	**10316H700**
Counterclockwise	20°	12°	140°	1.1 in-lbs	3 in-oz	**10316H701**
Side Push Operated						
 **Side Push Operated**						
Adjustable pushbutton	0.07 in (1.8 mm)	0.03 in (0.8 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	**10316H621**
Vertical roller—0.44 in (11.2 mm) dia.	0.07 in (1.8 mm)	0.03 in (0.8 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	**10316H284**
Horizontal roller—0.44 in (11.2 mm) dia.	0.07 in (1.8 mm)	0.03 in (0.8 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	**10316H285**
Top Push Operated						
 **Top Push Operated**						
Pushbutton	0.04 in (1.0 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	**10316H281**
Roller—0.44 in (11.2 mm) dia.	0.04 in (1.0 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	**10316H283**
Roller—0.75 in (19.1 mm) dia.	0.04 in (1.0 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	**10316H577**
Wobble Operated						
 **Wobble Operated** ②						
Spring	10°	6°	15°	1 in-lb	2.4 in-oz	**10316H299**
Nylon rod	10°	6°	15°	2 in-lbs	2.4 in-oz	**10316H296**
Wire	10°	6°	15°	2 in-lbs	2.4 in-oz	**10316H484**
Cat whisker	15°	5°	30°	0.63 in-lb	1.7 in-oz	**10316H341**

Notes

① For operating levers, see **Page V8-T2-80**.

② For wobble operators, see **Page V8-T2-80**.

Technical Data and Specifications

Non Plug-In Switches

Description	Specification
Contact rating	NEMA A600, R300 double break-make snap action contacts
Electrical life	500,000 operations minimum
Mechanical life	5,000,000 operations minimum at full load
Conduit entrance	0.5 in (12.7 mm) NPT
Material of construction	Zinc die cast
Enclosure rating	NEMA 1, 4, 13
Ambient operating temperature	–20° to 200°F (–29° to 93°C) ①
Approximate shipping weight	2 lbs

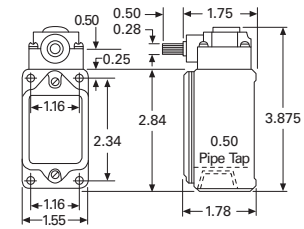
Electrical Data—Maximum Contact Ratings per Pole ②

	Current, Amperes			Volts, Amperes			
AC Volts	Make	Break	Cont. Thermal Ratings	Make	Break	DC Volts	DC Current, Ampere
NEMA A600, R300 Rating							
120	60	6	10	7200	720	125	0.22
240	30	3	10	7200	720	250	0.11
480	15	1.5	10	7200	720	250	0.11
600	12	1.2	10	7200	720	250	0.11

Dimensions

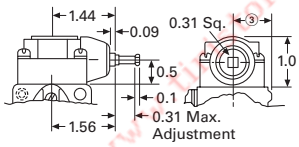
Approximate Dimensions in Inches or Inches (mm)

Side Rotary Operated Head with Switch

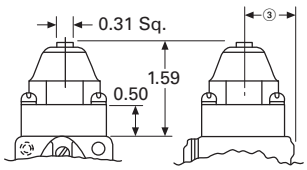


(2) 0.203 Dia. Holes for Front Mtg.
(2) 10-32 Tapped Holes 0.375 Deep for Rear Mtg.

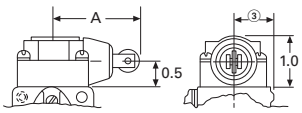
Side Pushbutton, Adjustable



Top Pushbutton



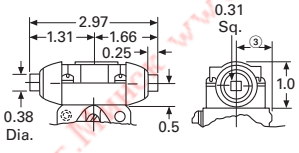
Side Push, Vertical Roller



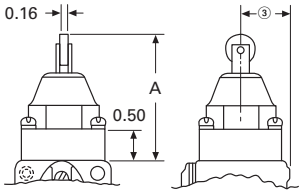
Dimension "A"

With 0.44 (11.2) dia. roller	1.78 (45.2)
With 0.75 (19.1) dia. roller	2.09 (53.1)

Side Push Maintained Contact



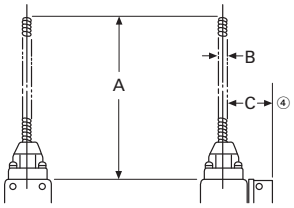
Top Push Roller



Dimension "A"

With 0.44 (11.2) dia. roller	2.03 (51.6)
With 0.75 (19.1) dia. roller	2.34 (59.4)

Wobble Operators



A	B	C
Wobble Spring		
5.44 (138.2)	0.31 (7.9)	0.81 (20.6)
Wire Wobble Stick		
12.5 (317.5)	0.08 (2.0)	0.81 (20.6)
Nylon Wobble Stick		
4.5 (114.3)	0.25 (6.4)	0.81 (20.6)

Notes

① Ranges below 32°F (0°C) are based on absence of freezing moisture or water.
② Contacts must be same polarity when both circuits are used.
③ Dimension from centerline of head to mounting surface is 0.78 in (20 mm).
④ Center to mounting surface.

Hazardous Location Limit Switches

Contents

Hazardous Location Limit Switches

Product Description

Type LX, CX and CBX limit switches by Eaton's electrical sector are designed for extreme environmental service in NEMA 7–9 locations where the danger of an internal or external explosion of flammable gases, vapors, metal alloy or grain dust exists. Type CB provides excellent corrosion resistant properties in NEMA 4X applications. Markets served include mining, grain storage, forest products, petrochemical, pharmaceutical and waste and sewage management.

Features

- Sealed and unsealed versions available
- One-way gasket on sealed version keeps liquids out, yet allows a harmless release of gases in the event of an internal explosion
- Silicon bronze housing provides excellent corrosion resistant properties in extreme NEMA 4X applications
- Temperature buildup on limit switch surface is dissipated by housing design and materials used
- Utilizes the operating heads and internal switch mechanisms of the 10316 L non plug-in line

Standards and Certifications

- cUL

c UL Listed

NEMA Ratings Comparison

Switch Type LX	CX	CBX	CB ①
NEMA 1, 4, 13			
—	✔	✔	✔
NEMA 4X			
—	—	✔	✔
NEMA 7 Division I, Class I, BCD			
✔	✔	✔	—
NEMA 9 Division I, Class II, EFG			
✔	✔	✔	—

Note

① Not rated for explosive locations.

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

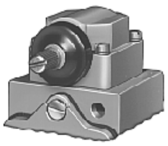
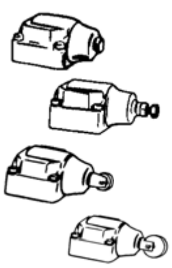
For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Complete Assembled Switches with Spring Return Heads ①

Operating Data—Nominal

Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Body Type	Contacts	Catalog Number
Side Rotary Operated ② 	**Standard, 10° Pre-Travel** ③							
	10°	4°	50°	3.0 in-lbs	4.5 in-oz	Type LX	1NO-1NC ④	**10316H1002**
							2NO	**10316H1039**
							1NO and 1NC ④	**10316H1049**
							2NC	**10316H1059**
						Type CX	1NO-1NC ④	**10316H2200**
							1NO and 1NC ④	**10316H2176**
							2NC	**10316H2178**
						Type CB	1NO-1NC ④	**10316H2149**
							2NC	**10316H2140**
						Type CBX	1NO-1NC ④	**10316H2168**
							2NC	**10316H2159**
	Narrow Differential 5° Pre-Travel ③							
	5°	2°	50°	6.0 in-lbs	4.5 in-oz	Type LX	1NO-1NC ④	**10316H1146**
						Type CX	1NO-1NC ④	**10316H2197**
	Neutral Position, 18° Pre-Travel ⑤							
	18°	6°	50°	1.8 in-lbs	2.5 in-oz	Type LX	2NO	**10316H1071**
							2NC	**10316H1072**
						Type CX	2NO	**10316H2179**
						Type CBX	2NC	**10316H2160**
Side Push Operated 	**Pushbutton**							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	Type LX	1NO and 1NC ④	**10316H1213**
	Adjustable Pushbutton							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	Type LX	1NO-1NC ④	**10316H1192**
	Vertical Roller, 0.44 in (11.2 mm) Diameter							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	Type LX	1NO-1NC ④	**10316H1007**
	Vertical Roller, 0.75 in (19.1 mm) Diameter							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	4 lbs	8 oz	Type LX	1NO-1NC ④	**10316H1194**

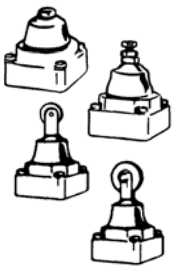
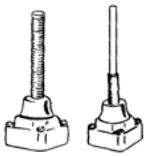
Notes

① Contact Eaton's Sensor Applications Engineering at 1-800-426-9184 for replacement contact blocks.
② For operating levers, see **Page V8-T2-80**. Only levers with Nylatron rods or rollers should be used with explosion-proof limit switches.
③ Field convertible to clockwise only or counterclockwise only operation.
④ 1NO-1NC contacts must be same polarity when both circuits are used—1NO and 1NC contacts have isolated poles and may be used on opposite polarity.
⑤ Neutral position switches operate one circuit in each direction.

2

Complete Assembled Switches with Spring Return Heads, continued ①

Operating Data—Nominal

Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Body Type	Contacts	Catalog Number
Top Push Operated	**Pushbutton**							
	0.04 in (1 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	Type LX	1NO-1NC ②	**10316H1004**
						Type CX	1NO and 1NC ②	**10316H2188**
	Adjustable Pushbutton							
	0.04 in (1 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	Type LX	1NO-1NC ②	**10316H1191**
							1NO and 1NC ②	**10316H1212**
	Roller, 0.44 in (11.2 mm) Diameter							
	0.04 in (1 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	Type LX	1NO-1NC ②	**10316H1006**
						Type CBX	1NO-1NC ②	**10316H2170**
	Roller, 0.75 in (19.1 mm) Diameter							
	0.04 in (1 mm)	0.02 in (0.5 mm)	0.28 in (7.1 mm)	4 lbs	8 oz	Type LX	1NO-1NC ②	**10316H1193**
Wobble Operated	**Spring**							
	10° ③	6°	15°	1 in-lb	2.4 in-oz	Type LX	1NO-1NC ②	**10316H1237**
	Nylon Rod							
	10° ③	6°	15°	2 in-lbs	5.6 in-oz	Type LX	1NO-1NC ②	**10316H1009**

Technical Data and Specifications

Hazardous Location Limit Switches

Description	Specification
Material of construction	
LX, CX	Cast aluminum die cast
CB, CBX	Silicon bronze
Conduit entrance	
LX	1/2 in pipe tap
CB, CBX, CX	3/4 in pipe tap
Mounting	Surface mount
Enclosure rating	
LX, CX, CBX	NEMA 7 Div. 1, Class I BCD; NEMA 9 Div. 1, Class II, EFG ④
CB, CBX	NEMA 1, 4, 4X, 13 ④
CX	NEMA 1, 4, 13 ④
Ambient operating temperature	–20° to 200°F (–29° to 93°C) ⑤
Approximate shipping weight	
LX	2 lbs
CX	2.5 lbs
CB, CBX	6 lbs

Notes

① Contact Eaton's Sensor Applications Engineering at 1-800-426-9184 for replacement contact blocks.
② 1NO-1NC contacts must be same polarity when both circuits are used—1NO and 1NC contacts have isolated poles and may be used on opposite polarity.
③ Travel with force applied at one-in (25.4 mm) radius. Applied at end of operator, travel is approximately 14.
④ A conduit seal-off kit is required for these switches
⑤ Ranges below 32°F (0°C) are based on absence of freezing moisture or water.

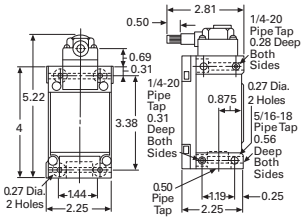
Electrical Data—Maximum Contact Ratings, per Pole

AC Volts	Current, Amperes Make	Break	Cont. ①	Volt Amperes Make	Break	DC Volts	DC Current, Ampere
1NO-1NC Switches							
NEMA A600, R300 rating							
120	60	6	10	7200	720	125	0.2
240	30	3	10	7200	720	250	0.1
480	15	1.5	10	7200	720	250	0.1
600	12	1.2	10	7200	720	250	0.1
All Other Switches, B600							
120	30	3	5	3600	360	120	0.1
240	15	1.5	5	3600	360	240	0.05
480	7.5	0.75	5	3600	360	240	0.05
600	6	0.60	5	3600	360	240	0.05

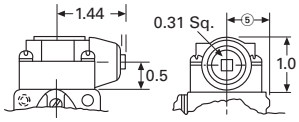
Dimensions

Approximate Dimensions in Inches or Inches (mm)

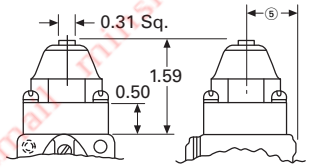
Type LX Switch with Side Rotary Head



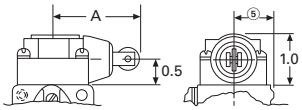
Side Pushbutton Head



Top Pushbutton Head



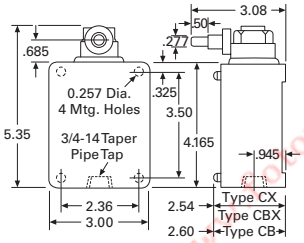
Side Push, Vertical Roller Head



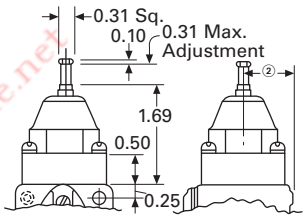
Dimension "A"

With 0.44 (11.2) dia. roller	1.78 (45.2)
With 0.75 (19.1) dia. roller	2.09 (53.1)

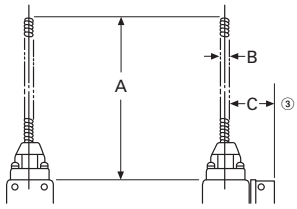
Type CX, CB and CBX Switches with Side Rotary Head



Adjustable Top Pushbutton Head

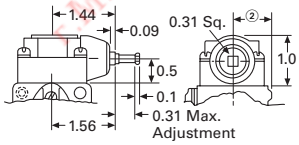


Wobble Operators

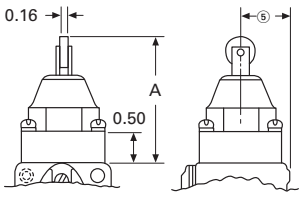


A	B	C
Wobble Spring		
5.44 (138.2)	0.31 (7.9)	0.94 (23.9)
Nylon Red		
4.5 (114.3)	0.25 (6.4)	0.94 (23.9)

Adjustable Side Pushbutton Head



Top Push Roller Head



Dimension "A"

With 0.44 (11.2) dia. roller	2.03 (51.6)
With 0.75 (19.1) dia. roller	2.34 (59.4)

Notes

① 1NO-1NC contacts must be same polarity when both circuits are used—1NO and 1NC contacts have isolated poles and may be used on opposite polarities.

② Dimension from centerline of head to mounting surface is 0.78 in (20 mm).

③ Center to mounting surface.

Special Purpose Limit Switches

Contents

Special Purpose Limit Switches

Product Description

Special Purpose (Type F), Rotating Shaft (Type J), Pneumatic Time Delay (Type LP) and Precision and Cabinet Door Interlock (Type PS) Limit Switches from Eaton's electrical sector serve a variety of special purpose industrial applications for MRO and User Replacement requirements.

Features

- UL Listed
- CSA Certified (PS and J only)

Standards and Certifications

Type F
- UL Listed

Type J
- UL Listed
- CSA Certified

Type LP
- UL Listed

Type PS
- UL Recognized
- CSA Certified

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Roller Lever Switches

Roller Lever

Type F Switches ①

Operator	Circuit	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Over-Travel	Catalog Number
Roller lever (CW and CCW operation, spring return)	1NO-1NC	40°	35°	65°	25°	**10316H18**
	2NO-2NC	17°	6°	60°	43°	**10316H320**

Rotating Shaft Switches

Type J

Rotating Shaft Limit Switches allow the shaft to be rotated a preset number of revolutions (adjustable from 1/2 to 100 with an accuracy of 1/20 of a turn) before the contacts will switch. A second set of contacts will trip when reaching a preset limit in the opposite direction. These switches are typically used in crane and hoist applications to provide end of travel stops for the hook assembly.

Rotating Shaft

Type J Switches

Shaft to Cam Ratio	Max. Turns to Trip Contacts	Min. Turns to Trip Contacts	Over-Travel Before Resetting Contacts	Reversal After Tripping to Reset Contacts	Circuit ②	Enclosure Rating	Catalog Number
103:1	100 input shaft turns	1/2 input shaft turns	103 input shaft turns max.	1/8 input shaft turns min.	2NC	NEMA 1	**10316H50**
					2NO-2NC ③	NEMA 4	**10316H54** ③

Notes

① Replacement operator head is available with part number **86-862-22**.
Replacement roller lever is available with part number **24-1712**.
Replacement key pin and washer for roller is available with part number **16-906**.

② For replacement NO contacts, order **17-1403**; NC contacts, order **17-702**.

③ 10316H54 has factory set circuits, but is easily convertible to any of three circuits (2NO-2NC, 4NO or 4NC). Full instructions enclosed with every switch.

Pneumatic Time Delay Switches

2

Pneumatic Time Delay

Type LP Switches

Operator	Total Travel	Pre-Travel	Circuit	Timed Contacts	Direction of Rotation ②	Catalog Number
Side rotary (Spring return to center) ①	50°	10°	1NO-1NC	ON delay	CW	**10316H1580**
					CW and CCW	**10316H1600**
				OFF delay	CW	**10316H1610**
					CW and CCW	**10316H1630**

Precision Switches

Cabinet Door Interlock

Type PS Switches

Operator	Circuits— SPDT 1NO-1NC Catalog Number	Circuits— DPDT 2NO-2NC Catalog Number	Operator Only Catalog Number
Precision Switch Devices			
Precision switch only	**10316H89**	**10316H2000**	—
Pushbutton with oiltight plunger	—	**10316H2006**	—
Roller with oiltight plunger perpendicular to mounting holes	—	**10316H2012**	—
Roller with oiltight plunger in line with mounting holes	**10316H110**	—	—
6 in lever with top and right-hand mounting bracket	**10316H113**	—	**10316H143**
6 in lever with top and left-hand mounting bracket	—	—	**10316H144**
Roller lever with top and right-hand mounting bracket	**10316H119**	—	**10316H145**
Roller lever with top and left-hand mounting bracket	**10316H122**	—	**10316H146**
One way roller lever with top and right-hand mounting bracket	—	—	**10316H147**
One way roller lever with top and left-hand mounting bracket	—	—	**10316H148**
Cabinet Door Interlocks			
Precision switch only	**10316H828**	**10316H829A**	—
Cabinet door interlock operator with one precision switch and with red (defeated ③) indicator	**10316H1028**	**10316H2042**	**10316H150**
Cabinet door interlock operator with two each of listed precision switches and with red (defeated ③) indicator	**10316H1029**	—	—

Notes

① Requires an operating lever, see **Page V8-T2-80**.
② Field convertible.
③ The plunger exposes a red band when pulled out to indicate that interlock is defeated.

Technical Data and Specifications

Special Purpose Limit Switches

Description	Specification
Roller Lever Switches—Type F	
Enclosure rating	NEMA 4
Operating temperature	0° to 180°F (–18° to 82°C)
Conduit entrance	0.5 in NPT
Shipping weight	4.0 lbs
Rotating Shaft Switches—Type J	
Shipping weight	
NEMA 1 models	5.5 lbs
NEMA 4 models	13 lbs
Pneumatic Time Delay Switches—Type LP	
Timing range	0.05 to 60 seconds
ON delay function	Timing begins when lever is actuated and held
OFF delay function	Timing begins when lever is released
Repeat accuracy ①	With 15 second or higher interval between timing periods: ±10% of setting maximum With less than 15 second interval between timing periods: ±25% of setting maximum
Operating frequency	250 operations per minute maximum
Enclosure rating	NEMA 4, 13
Ambient operating temperature	32° to 150°F (0° to 65°C)
Conduit entrance	0.5 in NPT
Shipping weight	2 lbs

Note

① To maintain operating accuracy during the timing cycle, the switch lever must be faster than the timed setting.

Type F—Maximum Ampere Ratings

		AC Volts				DC Volts		
Circuit	**State**	**120**	**240**	**480**	**600**	**120**	**240**	**600**
1NO-1NC	Make	60	30	20	15	—	—	—
	Break	6	3	1.5	1.2	2.2	1.1	0.40
2NO-2NC	Make	40	20	10	8	—	—	—
	Break	15	10	6	5	0.5	0.2	0.02

Type J—Maximum Ampere Ratings

	AC Volts				DC Volts		
State	**120**	**240**	**480**	**600**	**120**	**240**	**600**
Make	60	30	15	12	2.2	1.1	—
Break	6	3	1.5	1.2	2.2	1.1	—
Continuous①	10	10	10	10	10	10	—

Type LP— Electrical Data, Maximum Contact Ratings/Pole

	Current, Amperes			Volt Amperes			
AC Volts	**Make**	**Break**	**Cont.①**	**Make**	**Break**	**DC Volts**	**DC Current Amperes**
All Switches 1NO-1NC							
NEMA A600, R300 Rating							
120	60	6	10	7200	720	120	0.2
240	30	3	10	7200	720	240	0.1
480	15	1.5	10	7200	720	240	0.1
600	12	1.2	10	7200	720	240	0.1

Type PS—Maximum Ampere Ratings

		AC Volts				DC Volts Double Throw		
Type	**State**	**120**	**240**	**480**	**600**	**120**	**240**	**600**
Heavy-Duty 1/2 hp, 250 Vac Maximum								
Single-pole	Make	40	20	10	8	2.0	0.5	0.1
	Break	15	10	6	5	0.5	0.2	0.02
Double-pole	Make	30	15	8	6	0.5	0.2	0.2
	Break	3	1.5	1	0.8	0.2	0.1	—

Note

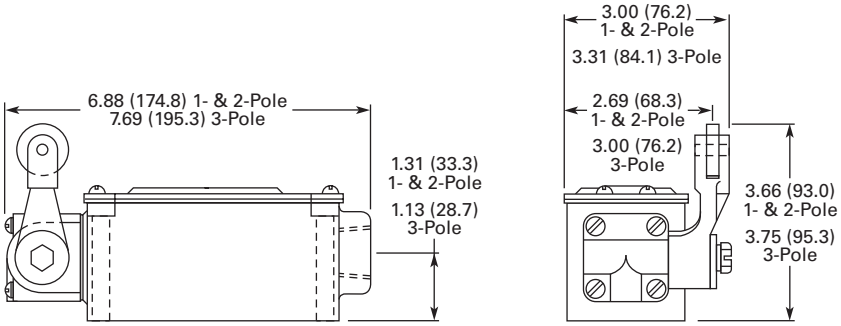
① Thermal rating. Valid only if switch does not have to make or break.

Dimensions

Approximate Dimensions in Inches (mm)

Roller Lever Switches

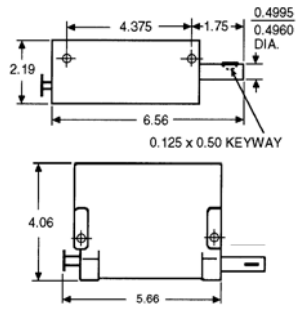
Type F



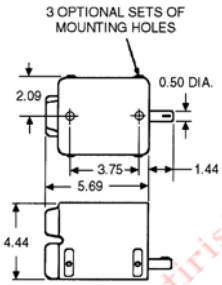
Approximate Dimensions in Inches only

Rotating Shaft Switches

Type J—NEMA 1 Models

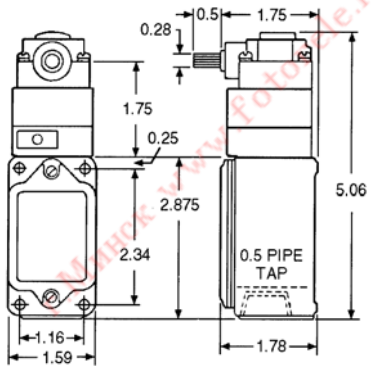


Type J—NEMA 4 Models



Pneumatic Time Delay Switches

Type LP

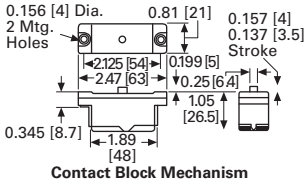


Approximate Dimensions in Inches [mm]

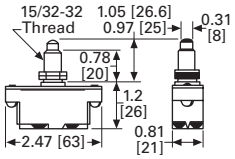
2

Precision Switches

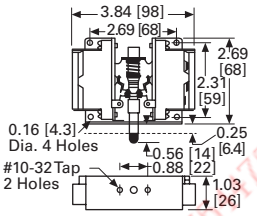
Type PS



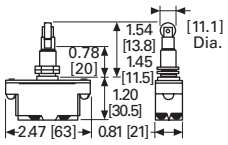
Contact Block Mechanism



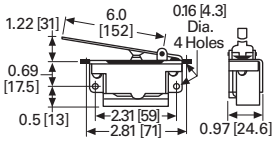
Pushbutton Type



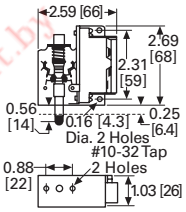
Cabinet Door Type
Two Contact Blocks



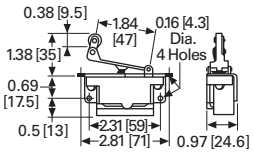
Push Roller Type



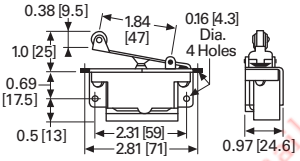
6 in Lever Type



Cabinet Door Type
One Contact Block



One Way Roller Type



Roller Lever Type

Safety Limit Switch

D4B-□N

CSM_D4B-_N_DS_E_5_1

Snap-action contact with certified direct opening operation certification ⊖. Maintenance, seal, and resistance to shock increased and direct opening mechanism added. Three-conduit switches and 2NC switches are also available.

- Direct opening mechanism (NC contacts only) added to enable opening contacts when faults occur, such as fused contacts.
- Safety of lever settings ensured using a mechanism that engages a gear between the operating position indicator plate and the lever.
- Equipped with a mechanism that indicates the applicable operating zone, as well as push-button switching to control left and right motion.
- Head seal structure strengthened to improve seal properties (TÜV: IEC IP67, UL: NEMA 3, 4, 4X, 6P, and 13).
- Wide standard operating temperature range: –40 to 80°C (standard type).
- Models with gold-plated contacts added to the series to enable handling microloads.
- Certified standards: UL, CSA, EN (TÜV), and CCC.

Note: Contact your sales representative for details on models with safety standard certification.

⚠ Be sure to read the *"Safety Precautions"* on page 14 and the *"Precautions for All Safety Limit Switches"* .

Model Number Structure

Model Number Legend

D4B-□□□□N

1 2 3

1. Conduit size
1: PG13.5 (1-conduit)
2: G1/2 (PF1/2) (1-conduit)
3: 1/2-14NPT (1-conduit)
4: M20 (1 conduit)
5: PG13.5 (3-conduit)
6: G1/2 (PF1/2) (3-conduit)
7: 1/2-14NPT (3-conduit)
8: M20 (3-conduit)

2. Built-in Switch
1: 1NC/1NO (snap-action)
3: 1NC/1NO (snap-action) gold-plated contacts
5: 1NC/1NO (slow-action) ✻
6: 1NC/1NO (slow-action) gold-plated contacts ✻
A: 2NC (slow-action)
B: 2NC (slow-action) gold-plated contacts
✻ Excluding D4B-□□81N and D4B-□□87N models.

3. Actuator
00: Switch box (without head)
11: Roller lever (resin roller)
15: Roller lever (stainless steel roller)
1R: Roller lever (conventional D4B-compatible)
16: Adjustable roller lever
17: Adjustable rod lever
70: Top plunger
71: Top roller plunger
81: Coil spring
87: Plastic rod

Ordering Information

Set Model Numbers

Consult with your OMRON representative when ordering any models that are not listed in this table.

Safety Limit Switches (with Direct Opening Mechanism)

Actuator	Conduit openings	1NC/1NO (Snap-action)		1NC/1NO (Slow-action)		2NC (Slow-action)	
		Model	Direct opening	Model	Direct opening	Model	Direct opening
Roller lever (resin roller)	Pg13.5	D4B-1111N	⊖	D4B-1511N	⊖	D4B-1A11N	⊖
	G1/2 (PF1/2)	D4B-2111N		D4B-2511N		D4B-2A11N	
	1/2-14NPT	D4B-3111N		D4B-3511N		D4B-3A11N	
	M20	D4B-4111N		D4B-4511N		D4B-4A11N	
	Pg13.5 (3-conduit)	D4B-5111N		D4B-5511N		D4B-5A11N	
	G1/2 (3-conduit)	D4B-6111N		D4B-6511N		D4B-6A11N	
	1/2-14NPT (3-conduit)	D4B-7111N		D4B-7511N		D4B-7A11N	
	M20 (3-conduit)	D4B-8111N		D4B-8511N		D4B-8A11N	
Roller lever (stainless steel roller)	Pg13.5	D4B-1115N	⊖	D4B-1515N	⊖	D4B-1A15N	⊖
	G1/2 (PF1/2)	D4B-2115N		D4B-2515N		D4B-2A15N	
	1/2-14NPT	D4B-3115N		D4B-3515N		D4B-3A15N	
	M20	D4B-4115N		D4B-4515N		D4B-4A15N	
	Pg13.5 (3-conduit)	D4B-5115N		D4B-5515N		D4B-5A15N	
Top plunger	Pg13.5	D4B-1170N	⊖	D4B-1570N	⊖	D4B-1A70N	⊖
	G1/2 (PF1/2)	D4B-2170N		D4B-2570N		D4B-2A70N	
	1/2-14NPT	D4B-3170N		D4B-3570N		D4B-3A70N	
	M20	D4B-4170N		D4B-4570N		D4B-4A70N	
	Pg13.5 (3-conduit)	D4B-5170N		D4B-5570N		D4B-5A70N	
	G1/2 (3-conduit)	D4B-6170N		D4B-6570N		D4B-6A70N	
	1/2-14NPT (3-conduit)	D4B-7170N		D4B-7570N		D4B-7A70N	
	M20 (3-conduit)	D4B-8170N		D4B-8570N		D4B-8A70N	
Top roller plunger	Pg13.5	D4B-1171N	⊖	D4B-1571N	⊖	D4B-1A71N	⊖
	G1/2 (PF1/2)	D4B-2171N		D4B-2571N		D4B-2A71N	
	1/2-14NPT	D4B-3171N		D4B-3571N		D4B-3A71N	
	M20	D4B-4171N		D4B-4571N		D4B-4A71N	
	Pg13.5 (3-conduit)	D4B-5171N		D4B-5571N		D4B-5A71N	
	G1/2 (3-conduit)	D4B-6171N		D4B-6571N		D4B-6A71N	
	1/2-14NPT (3-conduit)	D4B-7171N		D4B-7571N		D4B-7A71N	
	M20 (3-conduit)	D4B-8171N		D4B-8571N		D4B-8A71N	

General-purpose Limit Switches

Actuator	Conduit openings	1NC/1NO (Snap-action)		1NC/1NO (Slow-action)		2NC (Slow-action)	
		Model	Direct opening	Model	Direct opening	Model	Direct opening
Adjustable roller lever 	Pg13.5	D4B-1116N	---	D4B-1516N	---	D4B-1A16N	---
	G1/2 (PF1/2)	D4B-2116N		D4B-2516N		D4B-2A16N	
	1/2-14NPT	D4B-3116N		D4B-3516N		D4B-3A16N	
	Pg13.5 (3-conduit)	D4B-5116N		D4B-5516N		D4B-5A16N	
	G1/2 (3-conduit)	D4B-6116N		D4B-6516N		D4B-6A16N	
	1/2-14NPT (3-conduit)	D4B-7116N		D4B-7516N		D4B-7A16N	
Adjustable rod lever 	Pg13.5	D4B-1117N	---	D4B-1517N	---	D4B-1A17N	---
	G1/2 (PF1/2)	D4B-2117N		D4B-2517N		D4B-2A17N	
	1/2-14NPT	D4B-3117N		D4B-3517N		D4B-3A17N	
	Pg13.5 (3-conduit)	D4B-5117N		D4B-5517N		D4B-5A17N	
	G1/2 (3-conduit)	D4B-6117N		D4B-6517N		D4B-6A17N	
	1/2-14NPT (3-conduit)	D4B-7117N		D4B-7517N		D4B-7A17N	
Coil spring (non-directional) 	Pg13.5	D4B-1181N	---	---		D4B-1A81N	---
	G1/2 (PF1/2)	D4B-2181N				D4B-2A81N	
	1/2-14NPT	D4B-3181N				D4B-3A81N	
	Pg13.5 (3-conduit)	D4B-5181N				D4B-5A81N	
	G1/2 (3-conduit)	D4B-6181N				D4B-6A81N	
	1/2-14NPT (3-conduit)	D4B-7181N				D4B-7A81N	
Plastic rod (non-directional) 	Pg13.5	D4B-1187N	---			D4B-1A87N	---
	G1/2 (PF1/2)	D4B-2187N				D4B-2A87N	
	1/2-14NPT	D4B-3187N				D4B-3A87N	
	Pg13.5 (3-conduit)	D4B-5187N				D4B-5A87N	
	G1/2 (3-conduit)	D4B-6187N				D4B-6A87N	
	1/2-14NPT (3-conduit)	D4B-7187N				D4B-7A87N	

Note: 1. In addition to the above models, models compatible with the previous D4B Switches (with standard rotary levers) are available.
Model number examples: D4B-1□1RN(Pg13.5) or D4B-2□1RN(PF1/2)

2. Consult your OMRON representative for products.

Replacement Parts

Switch Boxes

Built-in switch \ Conduit	1-conduit type			3-conduit type		
	PG13.5	G1/2	1/2-14NPT	PG13.5	G1/2	1/2-14NPT
1NC/1NO (Snap-action)	D4B-1100N	D4B-2100N	D4B-3100N	D4B-5100N	D4B-6100N	D4B-7100N
1NC/1NO (Slow-action)	D4B-1500N	D4B-2500N	D4B-3500N	D4B-5500N	D4B-6500N	D4B-7500N
2NC (Slow-action)	D4B-1A00N	D4B-2A00N	D4B-3A00N	D4B-5A00N	D4B-6A00N	D4B-7A00N

Operating Heads

Actuator	Type	Model
Side rotary ✻	Standard	D4B-0010N
Top plunger	Plain	D4B-0070N
	Top roller plunger	D4B-0071N
Flexible-rod	Coil spring	D4B-0081N
	Plastic rod	D4B-0087N

✻ The Lever is not included with the Side Rotary Operating Head.

Levers

Actuator	Length (mm)	Diameter of roller	Model
Standard	31.5	17.5 dia.	D4B-0001N
Stainless steel roller lever	31.5	17.5 dia.	D4B-0005N
Adjustable roller lever	25 to 89	19 dia.	D4B-0006N
Adjustable rod lever	145 max.	---	D4B-0007N
Interchangeable with D4B-0001	33.7	19 dia.	D4B-000RN

Note: Other types of lever are also available.

Specifications

Standards and EC Directives

Conforms to the following EC Directives:

- Machinery Directive
- Low Voltage Directive
- EN1088
- EN50041

Certified Standards

Snap-action Models

Certification body	Standard	File No.
TÜV Rheinland	EN60947-5-1 (certified direct opening mechanism) GS-ET-15	J9851083
	EN60947-5-1 (uncertified direct opening mechanism)	J50005477 ✻
UL	UL508	E76675
CSA	C22.2 No. 14	LR45746
CQC (CCC)	GB14048.5	2003010305077612

✻ Adjustable roller lever, adjustable rod lever, coil spring, and plastic rod models only.

Slow-action Models

Certification body	Standard	File No.
TÜV Rheinland	EN60947-5-1 (certified direct opening mechanism) GS-ET-15	J9851083
	EN60947-5-1 (uncertified direct opening mechanism)	J50005477 ✻
UL	UL508	E76675
CSA	C22.2 No. 14	LR45746
CQC (CCC)	GB14048.5	2003010305077612

✻ Adjustable roller lever, adjustable rod lever, coil spring, and plastic rod models only.

Certified Standard Ratings

TÜV (EN60947-5-1), CCC (GB14048.5)

Item	Utilization category	AC-15
Rated operating current (I_e)		2 A
Rated operating voltage (U_e)		400 V

Note: As protection against short-circuiting, use either a gI-type or gG-type 10 A fuse that conforms to IEC60269.

UL/CSA: (UL508, CSA C22.2 No. 14)

A600

Rated voltage	Carry current	Current (A)		Volt-amperes (VA)	
		Make	Break	Make	Break
120 VAC 240 VAC 480 VAC 600 VAC	10 A	60 30 15 12	6 3 1.5 1.2	7,200	720

Ratings

Rated voltage (V)	Non-inductive load (A)				Inductive load (A)			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10		3	1.5	10		5	2.5
250	10		2	1	10		3	1.5
400	10		1.5	0.8	3		1.5	0.8
8 VDC	10		6	3	10		6	
14	10		6	3	10		6	
30	6		4	3	6		4	
125	0.8		0.2	0.2	0.8		0.2	
250	0.4		0.1	0.1	0.4		0.1	

Note: 1. The above values are continuous currents.
2. Inductive loads have a power factor of 0.4 or higher (AC) or a time constant of 7 ms or lower (DC).
3. Lamp loads have a inrush current of 10 times the normal current.
4. Motor loads have a inrush current of 6 times the normal current.

Inrush current	30 A max.

Characteristics

Degree of protection ✻1		IP67 (EN60947-5-1)
Durability ✻2	**Mechanical**	30,000,000 operations min. (snap-action) 10,000,000 operations min. (slow-action)
	Electrical	500,000 operations min. (10 A resistive load at 250 VAC)
Operating speed		1 mm/s to 0.5 m/s
Operating frequency	**Mechanical**	120 operations/minute
	Electrical	30 operations/minute
Contact resistance		25 mΩ max.
Minimum applicable load ✻4		General load 180 mA resistive load at 5 VAC Gold-clad contact 20 mA resistive load at 5 VAC (N-level reference value)
Rated insulation voltage (U_i)		600 V (EN60947-5-1)
Rated frequency		50/60 Hz
Protection against electric shock		Class I (with ground terminal)
Pollution degree (operating environment)		3 (EN60947-5-1)
Impulse withstand voltage (EN60947-5-1)	**Between terminals of same polarity**	2.5 kV (snap-action)/4 kV (slow-action)
	Between terminals of different polarity	4 kV (slow-action)
	Between each terminal and ground	4 kV
Insulation resistance		100 MΩ min. (at 500 VDC) between terminals of the same polarity and between each terminal and non-current-carrying part
Contact gap		2 × 2 mm min. (slow-action) 2 × 0.5 mm min. (snap-action)
Vibration resistance	**Malfunction**	10 to 55 Hz, 0.75 mm single amplitude
Shock resistance	**Destruction**	1,000 m/s^2 min.
	Malfunction	300 m/s^2 min.
Conditional short-circuit current		100 A (EN60947-5-1)
Conventional enclosed thermal current (I_{the})		20 A (EN60947-5-1)
Ambient operating temperature		–40 to 80°C (with no icing) ✻3
Ambient operating humidity		95% max.
Weight		Approx. 250 g

Note: 1. The above values are initial values.
2. The above values may vary depending on the model. Consult your OMRON sales representative for details.

✻1. The degree of protection is tested using the method specified by the standard (EN60947-5-1). Confirm that sealing properties are sufficient for the operating conditions and environment beforehand.

✻2. The durability is for an ambient temperature of 5 to 35°C and ambient humidity of 40% to 70%. For further conditions, consult your OMRON sales representative.

✻3. –20 to 80°C for the flexible-rod type.

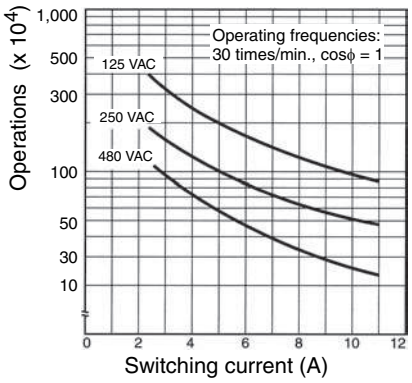
✻4. The above values may vary depending on switching frequency, environmental condition, and relativity level, consult your OMRON sales representative.

Engineering Data

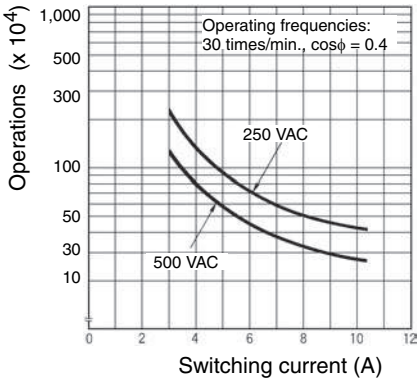
Electrical Durability (Snap-action)

(Ambient temperature: 5 to 30°C, ambient humidity: 40 to 70%)

(cosϕ = 1)



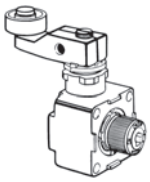
(cosϕ = 0.4)

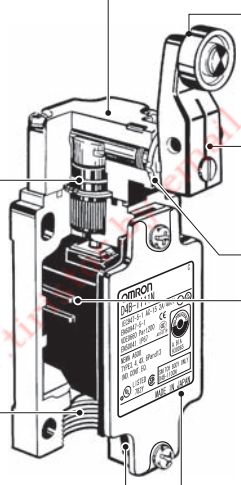


Structure and Nomenclature

Structure

The roller lever switch employs a system which allows selection of operation on only one side (left or right) or both sides without the use of any tools.





Head
Can be connected in any of four directions (except for Roller Plunger Models, which can be connected at either of 2 directions that differ by 90°)

Roller
Nylon rollers used for superior resistance to wear.

Lever (Form Lock Structure)
The lever has an operating position indication plate and grooves that mate every 90° to prevent slipping between the rotary axis and lever.

The operating position indicator plate

Seal Ring
Sealing properties improved by using a X ring and bearing-free structure.

Built-in Switch
Direct opening mechanism used for NC contact to separate contact for faults, such as contact welding. The heights of the NC and NO terminals are different to enable easier wiring.

Conduit Opening
Models are available with a wide range of conduits.

Size / Box	1-conduit model	2-conduit model
Pg13.5	Yes	Yes
G1/2	Yes	Yes
1/2-14NPT	Yes	Yes

Note: NBR is used for rubber parts.

Cover

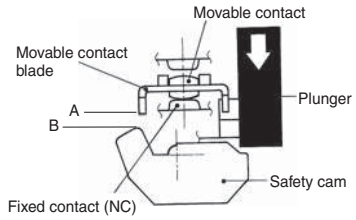
Ground Screw
Ground screws are provided on all models for increased safety.

Direct Opening Mechanism

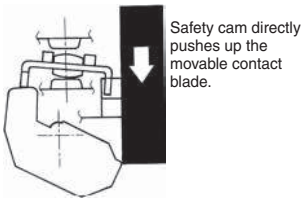
1NO/1NC Contact (Snap-action)

Conforms to EN60947-5-1 Direct Opening ⊖ (Only NC contact has a direct opening mechanism.)

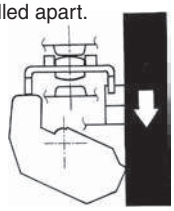
1. When contact welding occurs.



2. When contacts are being pulled apart.

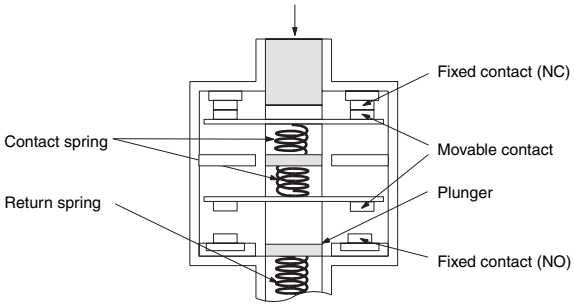


3. When contacts are completely pulled apart.



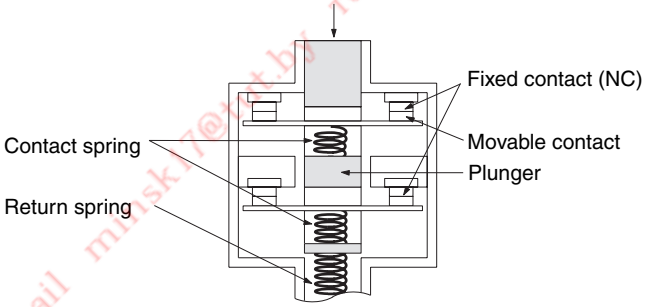
1NC/1NO Contact (Slow-action)

Conforms to EN60947-5-1 Direct Opening ⊖
(Only NC contact has a direct opening mechanism.)
When contact welding occurs, the contacts are separated from each other by the plunger being pushed in.

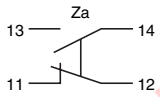
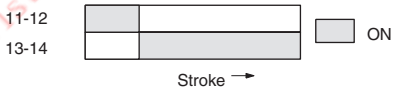
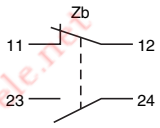
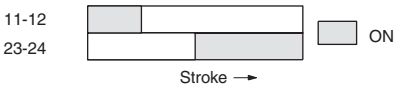
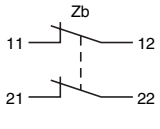
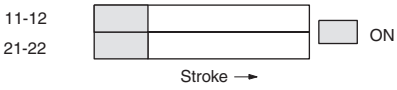


2NC Contact (Slow-action)

Conforms to EN60947-5-1 Direct Opening ⊖
(Both NC contacts have a direct opening mechanism.)
When contact welding occurs, the contacts are separated from each other by the plunger being pushed in.



Contact Form

Model	Contact	Contact form	Diagrams	Explanation
D4B-□1□N	1NC/1NO (Snap-action)			Only NC contact 11-12 has a certified direct opening mechanism. ⊖ Terminal numbers 11-12 and 13-14 cannot be used as unlike poles.
D4B-□5□N	1NC/1NO (Slow-action)			Only NC contact 11-12 has a certified direct opening mechanism. ⊖ Terminal numbers 11-12 or 23-24 can be used as unlike poles.
D4B-□A□N	2NC (Slow-action)			Both NC contacts 11-12 and 21-22 have a certified direct opening mechanism. ⊖ Terminal numbers 11-12 and 21-22 can be used as unlike poles.

Note: Terminal numbers are according to EN50013; contact symbols are according to IEC60947-5-1.

Dimensions and Operating Characteristics

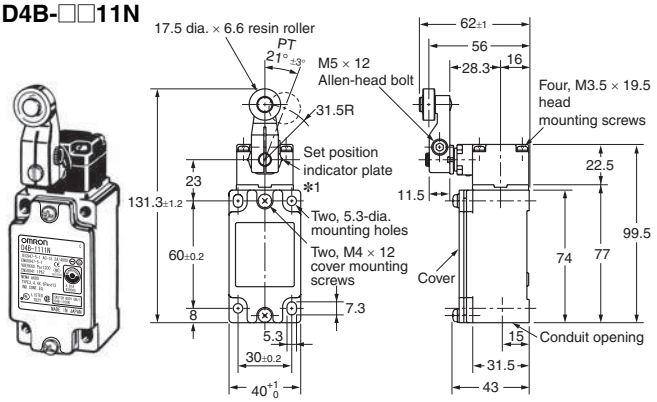
(Unit: mm)

Note: Omitted dimensions are the same as those for the Roller Lever Type Models
D4B-1□□□N and D4B-5□□□N have a PG13.5 conduit opening. D4B-2□□□N and D4B-6□□□N have a G1/2 conduit opening.
D4B-3□□□N and D4B-7□□□N have a 1/2-14NPT conduit opening.

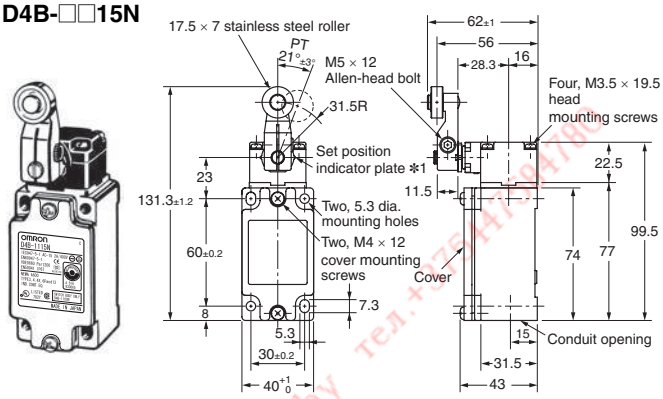
Switches

1-conduit Models

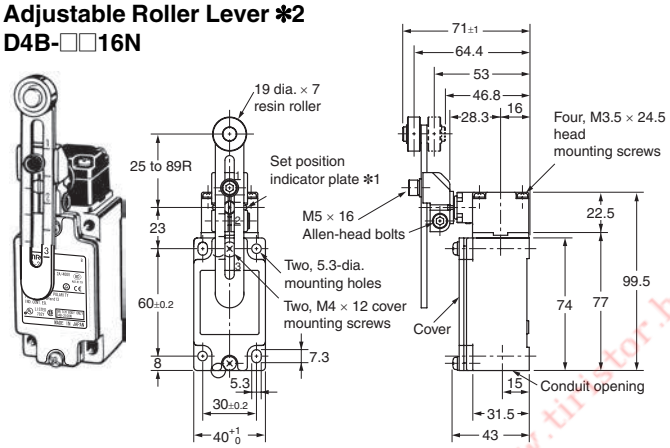
Roller Lever D4B-□□11N



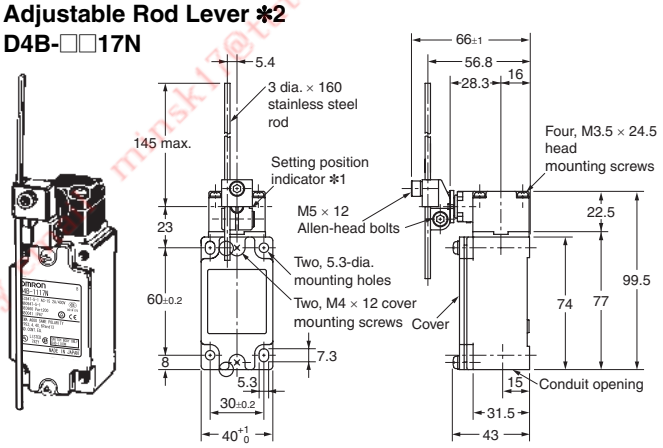
Roller Lever (Stainless Steel Roller) D4B-□□15N



Adjustable Roller Lever ✻2 D4B-□□16N



Adjustable Rod Lever ✻2 D4B-□□17N

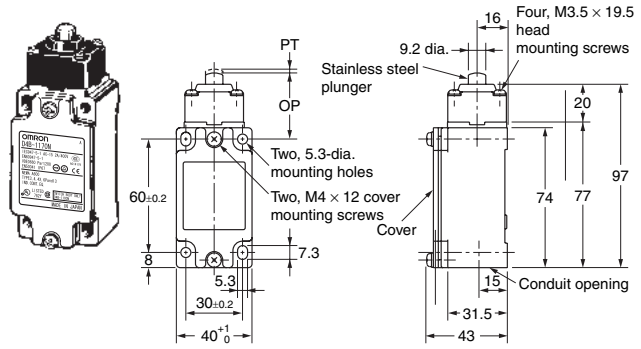


Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
✻1. The lever can be set to any desired position by turning the operating position indicator.
✻2. In terms of construction, the Switch is a General-purpose Limit Switch rather than a Safety Limit Switch.

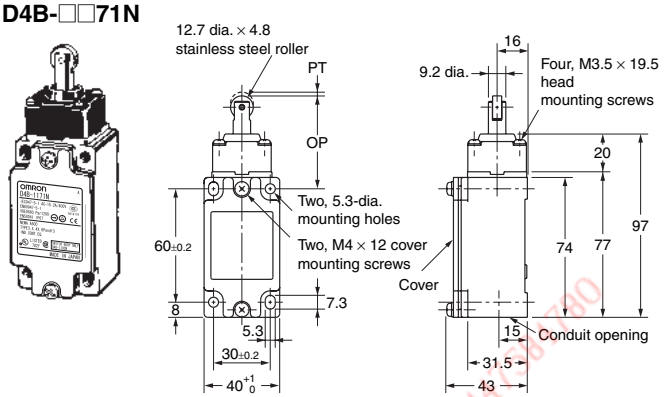
Operating characteristics	Model	D4B-□□11N	D4B-□□15N	D4B-□□16N ✻1	D4B-□□17N ✻2
Operating force	OF max.	9.41N	9.41N	9.41N	2.12N
Release force	RF min.	1.47N	1.47N	1.47N	0.29N
Pretravel	PT	21°±3°	21°±3°	21°±3°	21°±3°
	PT (2nd) ✻3 ✻5	(45°)	(45°)	(45°)	(45°)
Overtravel	OT min.	50°	50°	50°	50°
Movement differential	MD max. ✻4	12°	12°	12°	12°
Direct opening travel	DOT min. ✻3 ✻6	35°	35°	35°	35°
	✻4 ✻6	55°	55°	55°	55°
Direct opening force	DOF min. ✻6	19.61N	19.61N	19.61N	19.61N
Total travel	TT ✻5	(75°)	(75°)	(75°)	(75°)

Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.
✻1. The operating characteristics of these Switches were measured with the roller level set at 31.5 mm.
✻2. The operating characteristics of these Switches were measured with the rod level set at 140 mm.
✻3. Only for slow-action models.
✻4. Only for snap-action models.
✻5. Reference values.
✻6. Must be provided to ensure safe operation.

Top Plunger
D4B-□□70N



Top Roller Plunger
D4B-□□71N

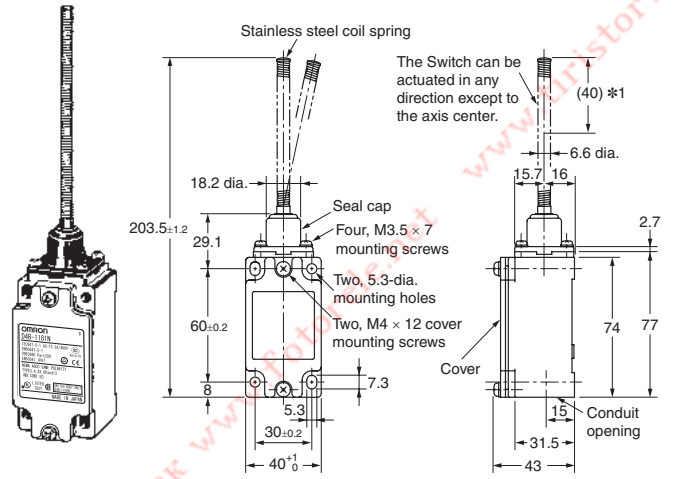


Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

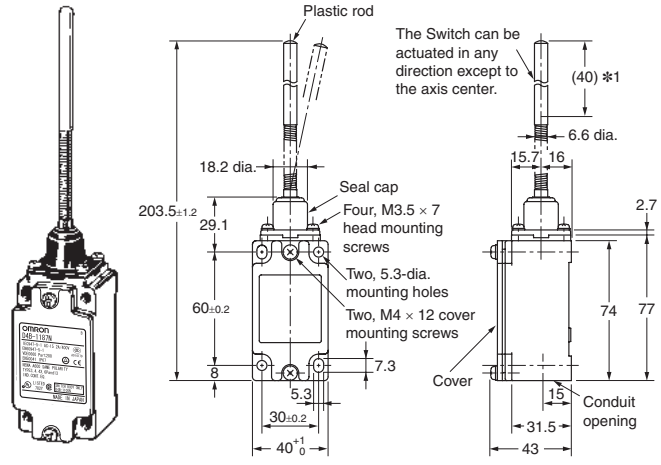
Operating characteristics	Model	D4B-□□70N	D4B-□□71N
Operating force	**OF max.**	18.63 N	18.63 N
Release force	**RF min.**	1.96 N	1.96 N
Pretravel	**PT max.**	2 mm	2 mm
	PT (2nd) ✻1 ✻3	(3 mm)	(3 mm)
Overtravel	**OT min.**	5 mm	5 mm
Movement differential	**MD max. ✻2**	1 mm	1 mm
Direct opening travel	**DOT min. ✻4**	3.2 mm	3.2 mm
Direct opening force	**DOF min. ✻4**	49.03 N	49.03N
Total travel	**TT ✻3**	(7 mm)	(7 mm)
Free position	**FP max.**	38 mm	51 mm
Operating position	**OP**	35±1 mm	48±1 mm

Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.
✻1. Only for slow-action models.
✻2. Only for snap-action models.
✻3. Reference values.
✻4. Must be provided to ensure safe operation.

Coil Spring (Non-directional) ✻2
D4B-□□81N



Plastic Rod (Non-directional) ✻2
D4B-□□87N



Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
✻1. Be sure to adjust the dog to within 40 mm from the top end of the coil spring.
✻2. In terms of construction, the Switch is a General-purpose Limit Switch rather than a Safety Limit Switch.

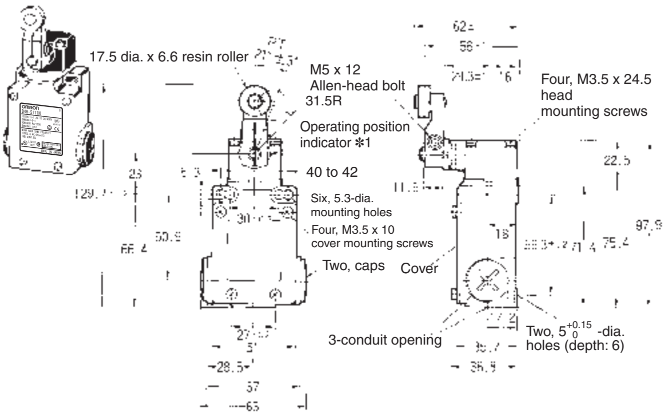
Operating characteristics	Model	D4B-□□81N	D4B-□□87N
Operating force	**OF max.**	1.47 N	1.47 N
Pretravel	**PT max.**	15°	15°

Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.

3-conduit Switches

Roller Lever

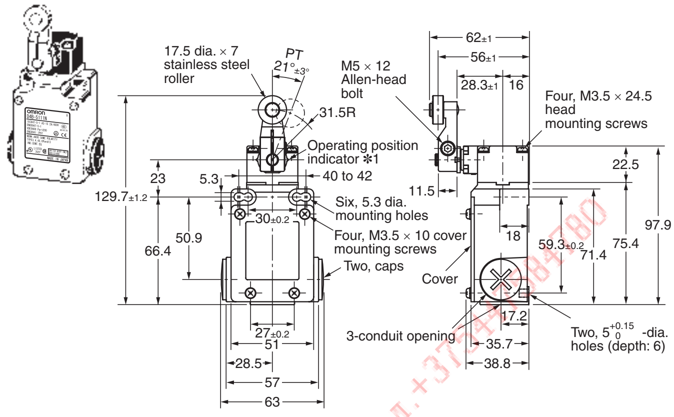
D4B-□□11N



17.5 dia. x 6.6 resin roller
M5 x 12 Allen-head bolt
31.5R
Operating position indicator ✻1
40 to 42
Six, 5.3-dia. mounting holes
Four, M3.5 x 10 cover mounting screws
Two, caps
Cover
Four, M3.5 x 24.5 head mounting screws
3-conduit opening
Two, 5 +0.15 0 -dia. holes (depth: 6)

Roller Lever

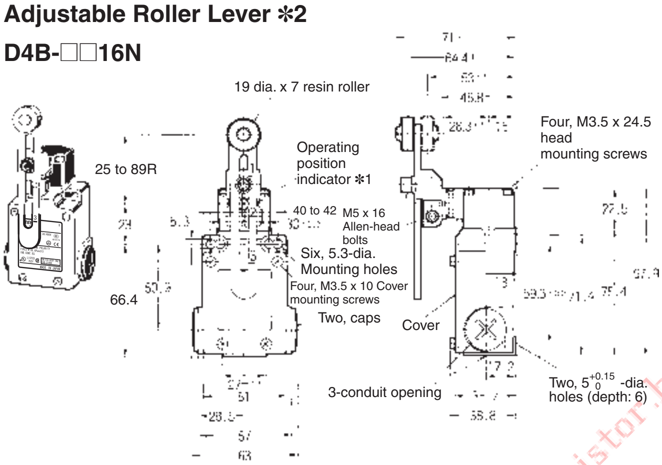
D4B-□□15N



17.5 dia. × 7 stainless steel roller
PT
21°±3°
M5 × 12 Allen-head bolt
31.5R
Operating position indicator ✻1
40 to 42
Six, 5.3 dia. mounting holes
Four, M3.5 × 10 cover mounting screws
Two, caps
Cover
Four, M3.5 × 24.5 head mounting screws
3-conduit opening
Two, 5 +0.15 0 -dia. holes (depth: 6)
62±1
56±1
28.3±1
16
22.5
11.5
18
59.3±0.2
71.4
75.4
97.9
17.2
35.7
38.8
23
5.3
129.7±1.2
30±0.2
50.9
66.4
27±0.2
51
28.5
57
63

Adjustable Roller Lever ✻2

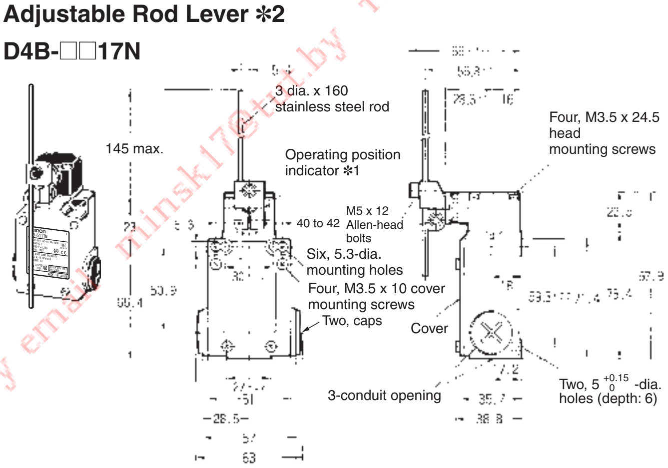
D4B-□□16N



19 dia. x 7 resin roller
25 to 89R
Operating position indicator ✻1
40 to 42
M5 x 16 Allen-head bolts
Six, 5.3-dia. Mounting holes
Four, M3.5 x 10 Cover mounting screws
Two, caps
Cover
Four, M3.5 x 24.5 head mounting screws
3-conduit opening
Two, 5 +0.15 0 -dia. holes (depth: 6)
66.4

Adjustable Rod Lever ✻2

D4B-□□17N



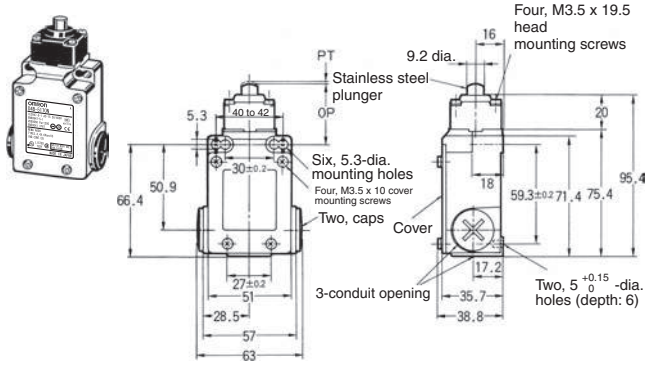
3 dia. x 160 stainless steel rod
145 max.
Operating position indicator ✻1
40 to 42
M5 x 12 Allen-head bolts
Six, 5.3-dia. mounting holes
Four, M3.5 x 10 cover mounting screws
Two, caps
Cover
Four, M3.5 x 24.5 head mounting screws
3-conduit opening
Two, 5 +0.15 0 -dia. holes (depth: 6)

Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
✻1. The lever can be set to any desired position by turning the operating position indicator.
✻2. In terms of construction, the Switch is a General-purpose Limit Switch rather than a Safety Limit Switch.

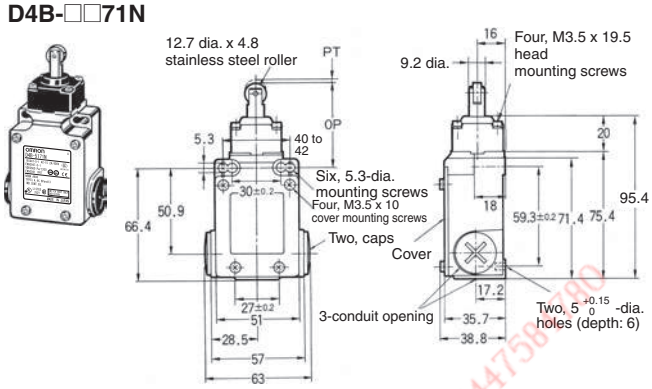
Operating characteristics	Model	D4B-□□11N	D4B-□□15N	D4B-□□16N ✻1	D4B-□□17N ✻2
Operating force	**OF max.**	9.41 N	9.41 N	9.41 N	2.12 N
Release force	**RF min.**	1.47 N	1.47 N	1.47 N	0.29 N
Pretravel	**PT**	21°±3°	21°±3°	21°±3°	21°±3°
	PT (2nd) ✻3 ✻5	(45°)	(45°)	(45°)	(45°)
Overtravel	**OT min.**	50°	50°	50°	50°
Movement differential	**MD max. ✻4**	12°	12°	12°	12°
Direct opening travel	**DOT min. ✻3 ✻6**	35°	35°	35°	35°
	✻4 ✻6	55°	55°	55°	55°
Direct opening force	**DOF min. ✻6**	19.61 N	19.61 N	19.61 N	19.61 N
Total travel	**TT ✻5**	(75°)	(75°)	(75°)	(75°)

Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.
✻1. The operating characteristics of these Switches were measured with the roller level set at 31.5 mm.
✻2. The operating characteristics of these Switches were measured with the rod level set at 140 mm.
✻3. Only for slow-action models.
✻4. Only for snap-action models.
✻5. Reference values.
✻6. Must be provided to ensure safe operation.

Top Plunger
D4B-□□70N



Top Roller Plunger
D4B-□□71N

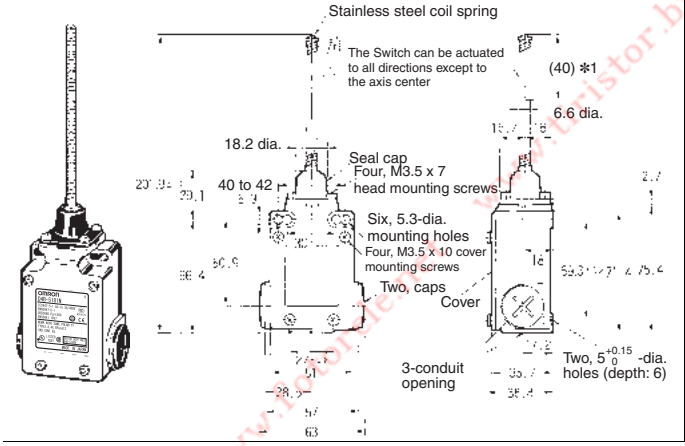


Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

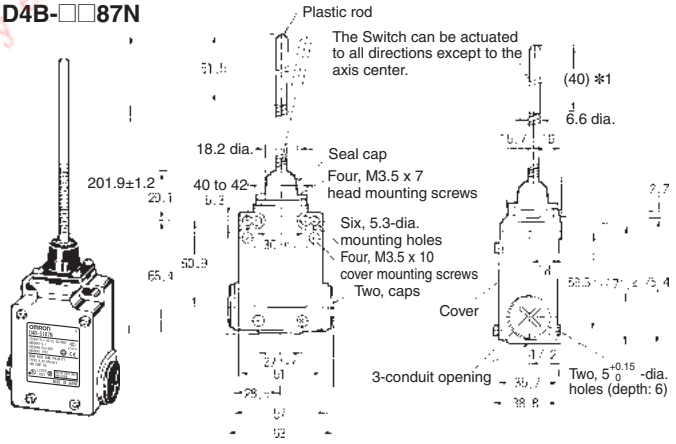
Operating characteristics	Model	D4B-□□70N	D4B-□□71N
Operating force	**OF max.**	18.63 N	18.63 N
Release force	**RF min.**	1.96 N	1.96 N
Pretravel	**PT max.**	2 mm	2 mm
	PT (2nd) ✻1 ✻3	(3 mm)	(3 mm)
Overtravel	**OT min.**	5 mm	5 mm
Movement differential	**MD max. ✻2**	1 mm	1 mm
Direct opening travel	**DOT min. ✻4**	3.2 mm	3.2 mm
Direct opening force	**DOF min. ✻4**	49.03 N	49.03N
Total travel	**TT ✻3**	(7 mm)	(7 mm)
Free position	**FP max.**	38 mm	51 mm
Operating position	**OP**	35±1 mm	48±1 mm

Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.
✻1. Only for slow-action models.
✻2. Only for snap-action models.
✻3. Reference values.
✻4. Must be provided to ensure safe operation.

Coil Spring ✻2
D4B-□□81N



Plastic Rod ✻2
D4B-□□87N



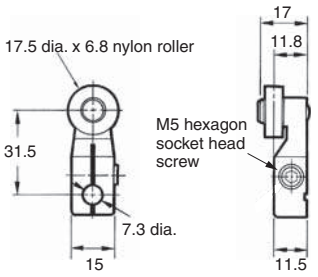
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
✻1. Be sure to adjust the dog to within 40 mm from the top end of the coil spring.
✻2. In terms of construction, the Switch is a General-purpose Limit Switch rather than a Safety Limit Switch.

Operating characteristics	Model	D4B-□□81N	D4B-□□87N
Operating force	**OF max.**	1.47 N	1.47 N
Pretravel	**PT max.**	15°	15°

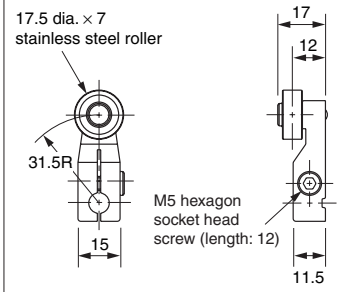
Note: Variation occurs in the simultaneity of contact opening/closing operations of 2NC contacts. Check contact operation.

Levers (Applicable for Roller Lever Models only)

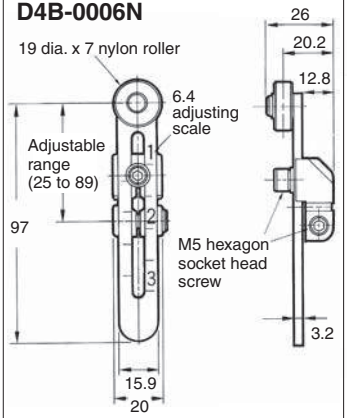
Roller Lever
D4B-0001N



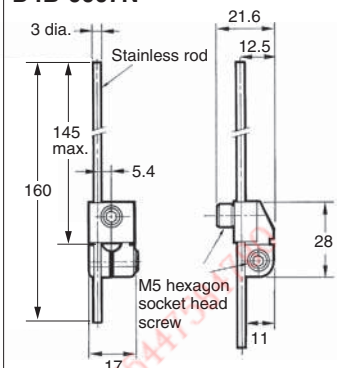
Roller Lever (Stainless Steel Roller)
D4B-0005N



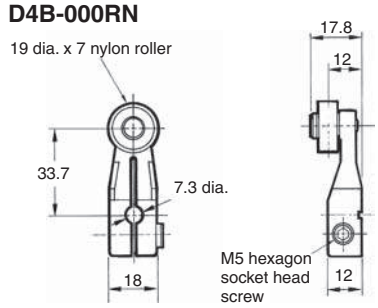
Adjustable Roller Lever
D4B-0006N



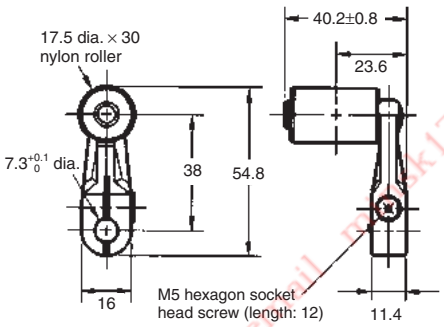
Adjustable Rod Lever
D4B-0007N



Roller Lever (Compatible with Previous D4B Model)
D4B-000RN

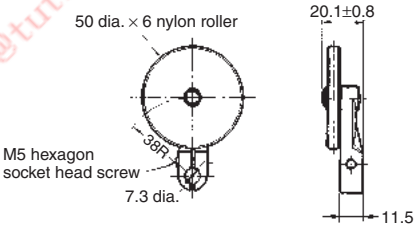


Roller Lever
WL-1A118



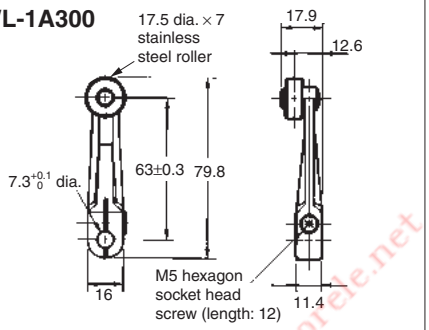
Note: Reverse the indicator plate when mounting.

Roller Lever
WL-1A106



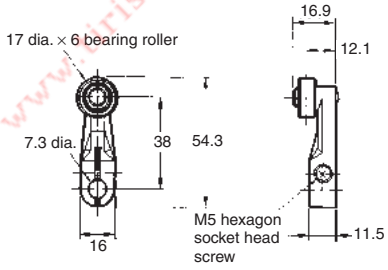
Note: Reverse the indicator plate when mounting.

Roller Lever
WL-1A300



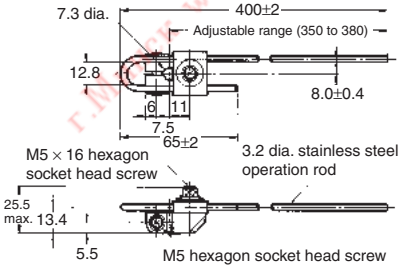
Note: Reverse the indicator plate when mounting.

Roller Lever
WL-1A400



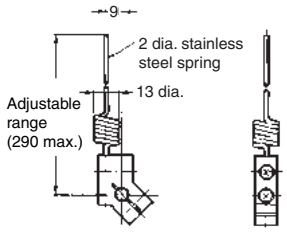
Note: Reverse the indicator plate when mounting.

Adjustable Rod Lever
WL-3A100



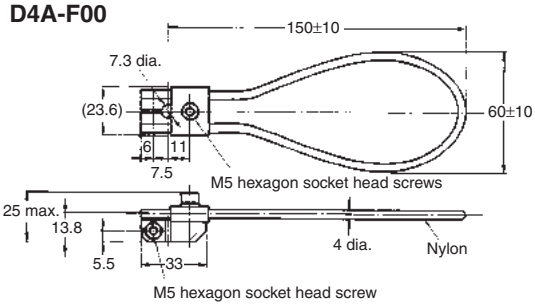
Note: Reverse the indicator plate when mounting.

Spring Rod Lever
WL-4A201



Note: Reverse the indicator plate when mounting.

Resin Loop Lever
D4A-F00



Note: Reverse the indicator plate when mounting.

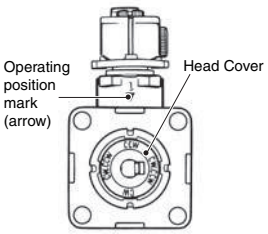
Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. Safety Limit Switch specifications are satisfied with D4B-□□□□N Levers only (example: D4B-0001N).
The D4B-0006N Adjustable Roller Lever and D4B-0007N Adjustable Rod Lever, however, cannot be used. Do not order them for a Side Rotary Operating Head.

Application Precaution

Changing the Operating Direction

Switches with Roller Levers

The operating direction of the lever can be easily changed without using any tools. It can be set to clockwise operation (CW) or counterclockwise (CCW) operation.
Use the procedure given at the right to change the operating direction.

Operating section (on back of Head)	Operating procedure
	**1.** Remove the four Head set screws and remove the Head from the Switch Box.
	2. Turn the bottom of the Head toward you, press in the Head Cover shown in the diagram at the left, and turn the Cover clockwise or counterclockwise. **Note:** The factory setting is for "CW.CCW."
	3. The "CW" setting is for clockwise operation and the "CCW" setting is for counterclockwise operation. Set the Cover to the desired position.

Safety Precautions

Refer to the *"Precautions for All Switches"* and *"Precautions for All Safety Limit Switches".*

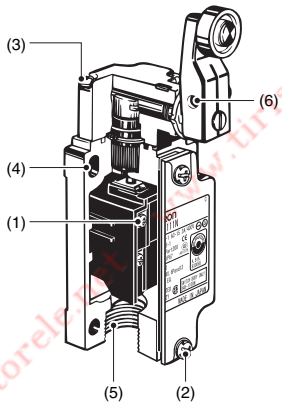
Precautions for Safe Use

- Do not use the Switch submerged in oil or water, or in locations continuously subject to splashes of oil or water. Doing so may result in oil or water entering the Switch interior. (The IP67 degree of protection specification for the Switch refers to water penetration while the Switch is submersed in water for a specified period of time.)
- Always attach the cover after completing wiring and before using the Switch. Also, do not turn ON the Switch with the cover open. Doing so may result in electric shock.

Precautions for Correct Use

Appropriate Tightening Torque

Be sure to tighten each screw of the D4B-□N properly, otherwise the D4B-□N may malfunction.



	Type	Appropriate tightening torque
1	M3.5 terminal screw	0.59 to 0.78 N·m
2	Cover mounting screw ✻	1.18 to 1.37 N·m
3	Head mounting screw	0.78 to 0.88 N·m
4	M5 body mounting screw	4.90 to 5.88 N·m
5	Connector	1.77 to 2.16 N·m
6	Lever Mounting Screws (Roller Levers)	4.90 to 5.88 N·m
---	Cap screw (for three-conduit models)	1.27 to 1.67 N·m

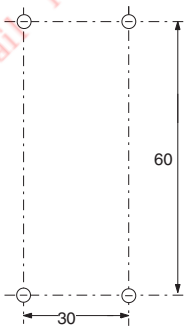
✻ Apply a tightening torque of 0.78 to 0.88 N·m to three-conduit models.

Mounting

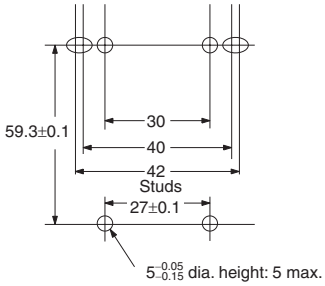
Use four M5 screws with washers to mount the standard model. Be sure to apply the proper torque to tighten each screw. The 3-conduit models can be mounted more securely by using the four screws plus two $5^{-0.05}_{-0.15}$ mm diameter studs, each of which has a maximum height of 4.8 mm as shown below.

Mounting Dimensions (M5)

Standard Model



3-conduit Model



Changes in Actuator Mounting Position

- To change the angle of the lever, loosen the Allen-head bolts on the side of the lever.
- The operating position indicator plate ✻ has protruding parts which engage with the lever, thus allowing changes to the lever position by 90°.
- The back of the operating position indicator plate ✻ has no protruding parts. If this plate is turned over and attached, any angle within a 360° range can be set. Do not turn over the plate, however, when using the D4B-□N as a switch with a certified direct opening mechanism. For an SUVA- or BIA-certified application, make sure that the lever engages with the operating position indicator plate securely so that the lever will not slip.

✻ The operating position indicator plate: Refer to page 7.

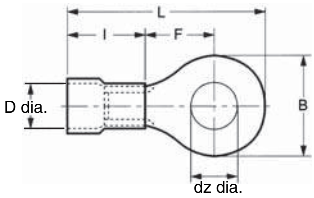
Changes in Head Mounting Position

By removing the screws on the four corners of the head, the head can be reset in any of four directions. Make sure that no foreign materials will penetrate through the head.

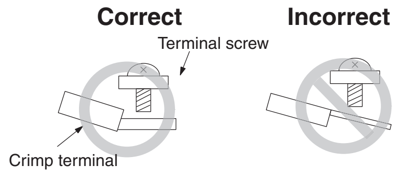
Wiring

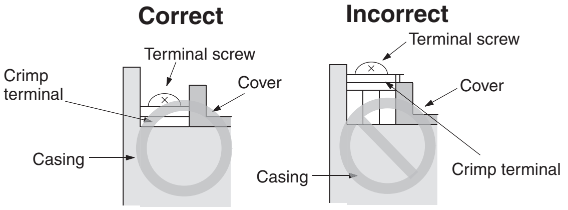
Do not connect the bare lead wires directly to the terminals but be sure to connect each of them by using an insulation tube and M3.5 round crimp terminals and tighten each terminal screw within the specified torque range.
The proper lead wire is 20 to 14 AWG (0.5 to 2.5 mm^2) in size.

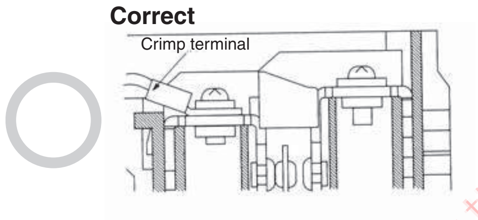
dz dia.:	3.7 mm
D dia.:	4.5 mm
B:	7.0 mm
L:	20.2 mm
F:	7.7 mm
I:	9.0 mm

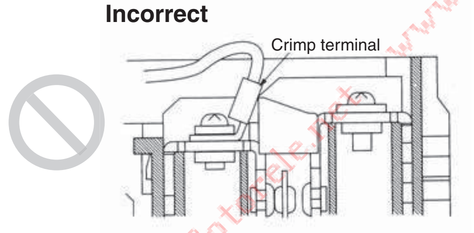


Make sure that all crimp terminals come into contact with the casing or cover as shown below, otherwise the cover may not be mounted properly or the D4B-□N may malfunction.







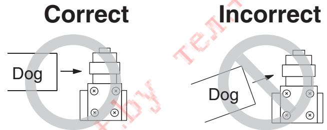


Conduit Opening

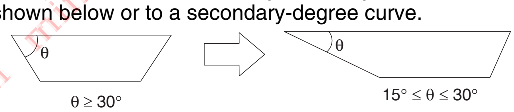
- Make sure that each connector is tightened within the specified torque range.
  The casing may be damaged if the connector is tightened excessively.
- If the 1/2-14NPT is used, cover the cable and conduit end with sealing tape in order to ensure IP67.
- The Pg13.5 connector must be Nippon Flex's ABS-08 Pg13.5 or ABS-12 Pg13.5.
- Use an OMRON SC-series Connector (sold separately) that is suited to the cable in diameter.
- Properly attach the provided conduit cap to the unused conduit opening and securely tighten the cap screw within the specified torque when wiring the D4B-□N.

Others

- The load for the actuator (roller) of the Switch must be imposed on the actuator in the horizontal direction, otherwise the actuator or the rotating axis may be deformed or damaged.



- When using a long lever model like the D4B-□□16N or D4B-□□17N, the Switch may telegraph. To avoid telegraphing, take the following precautions.
  1. Set the lever to operate in one direction.
  2. Modify the rear end of the dog to an angle of 15° to 30° as shown below or to a secondary-degree curve.



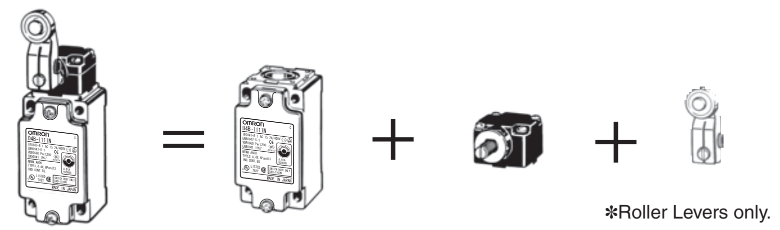
  3. Modify the circuit so as not to detect the wrong operating signals.

Ordering Method

The D4B-□N uses a block mounting method. Switches can be ordered either as sets or as individual parts. If a set is ordered, the Switch will be shipped with all parts assembled.

Note: For Switches with Roller Levers, do not order just the Head and Lever, or just the Switch Box and Lever.

		Individual model numbers				
Set model number	=	Switch Box	+	Head	+	Lever ✻
Example: D4B-2111N	=	D4B-2100N	+	D4B-0010N	+	D4B-0001N



✻Roller Levers only.

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2011.3

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