Air Cylinder/Non-rotating Rod

Series MBK

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Standard MBK L 32 □ 50 □

With auto switch MDBK L 32 □ 50 □ Y7BW □

Built-in magnet

Mounting

B	Basic/Without bracket
L	Axial foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis
T	Center trunnion

Bore size

32	32mm
40	40mm
50	50mm
63	63mm
80	80mm
100	100mm

Port thread type

Symbol	Type
—	Rc
TN	NPT
TF	G

Stroke (mm)

Refer to standard stroke table.

Auto switch

—	Without auto switch

∗ Refer to table below for selection of applicable auto switch.
∗ The auto switches for D-Z7□, Z80, Y59□, Y69□, Y7□□ are included but unmounted.
(Only the switch mounting brackets for the above models are mounted.)

Number of auto switches

—	2
S	1
3	3
n	n

Rod boot/Cushion

Rod boot	—	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	—	Both ends
	N Note 1)	None

Note 1) Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushions because the bumpers are attached to the both sides of the piston as follows.
ø32, ø40: +6mm, ø50, ø63: +8mm, ø80, ø100: +10mm

Applicable Auto Switches/ For detailed specifications, please refer to Best Pneumatics vol.2 page 5.3-2.

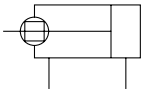
Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Tie rod mounting	Auto switch model: Band mounting	Lead wire length∗(m): 0.5 (--)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5V	—	Z76	—	●	●	—	—	IC circuit	—
				2-wire	24V	12V	100V	Z73	—	●	●	●	—	—	Relay PLC
							100V, 200V	A54	—	●	●	●	—		
		Terminal conduit					—	—	A33	—	—	—	—		PLC
							100V, 200V	—	A34	—	—	—	—		Relay PLC
		DIN terminal						—	A44	—	—	—	—		
	Diagnostic indication (2-color display)	Grommet				—	—	A59W	—	●	●	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	Y59A	—	●	●	○	○	IC circuit	Relay PLC
				3-wire (PNP)				Y7P	—	●	●	○	○		
				2-wire	—	—	100V, 200V	J51	—	●	●	○	—	—	
					24V	12V	—	Y59B	—	●	●	○	○		
		Terminal conduit		3-wire (NPN)		5V, 12V		—	G39	—	—	—	—	IC circuit	
				2-wire		12V		—	K39	—	—	—	—	—	
	Diagnostic indication (2-color display)	Grommet		3-wire (NPN)		5V, 12V		Y7NW	—	●	●	○	○	IC circuit	
				3-wire (PNP)				Y7PW	—	●	●	○	○		
				2-wire		12V		Y7BW	—	●	●	○	○	—	
	Water resistance (2-color display)							Y7BA	—	—	●	○	○		
	Diagnostic output (2-color display)			4-wire (NPN)		5V, 12V		F59F	—	●	●	○	○	IC circuit	
	Latch type diagnostic output (2-color display)					—		F5LF	—	●	●	○	○	—	
	Strong magnetic field registance			2-wire				P5DW	—	—	●	●	○		

∗ Lead wire length 0.5m····· – (Example): A54
3m····· L (Example): A54L
5m····· Z (Example): A54Z

∗∗Solid state switches marked with a "○" are produsued upon receipt of order.

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 11.

JIS Symbol
Double acting



Made to Order

(Refer to page 38 for made to order products of service MBK)

Symbol	Specifications/Descriptions
—XA□	**Change of rod end shape**
—XC3	**Special port position**
—XC6	**Piston rod and rod end nut made of stainless steel**
—XC7	**Tie rod, cushion valve, tie rod nut, etc. made of stainless steel**
—XC8	**Adjustable stroke cylinder/Adjustable extend stroke**
—XC9	**Adjustable stroke cylinder/Adjustable retract stroke**
—XC10	**Dual stroke cylinder/Double rod**
—XC14	**Change of trunnion bracket mounting position**
—XC27	**Double clevis pin and double knuckle pin made of stainless steel**
—XC29	**Double knuckle joint with spring pin**
—XC30	**Front trunnion**

Standard Stroke

Bore size (mm)	Standard stroke (mm)
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800
100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800

Intermediate strokes are available.
(No spacer is used)

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Fluid	Air					
Proof pressure	1.5MPa					
Max. operating pressure	1.0MPa					
Min. operating pressure	0.05MPa					
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing)					
	With auto switch: –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Operating piston speed	50 to 1000mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion (1)	Both ends (Air cushion)					
Thread tolerance	JIS class 2					
Port size (Rc, NPT, G)	Rc(PT)1/8	Rc(PT)1/4	Rc(PT)1/4	Rc(PT)3/8	Rc(PT)3/8	Rc(PT)1/2
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion					

Non-rotating accuracy	ø32, ø40	±0.5°
	ø50, ø63	±0.5°
	ø80, ø100	±0.3°

Allowable rotating torque Nm max.	ø32	0.25	ø80	0.79
	ø40	0.45	ø100	0.93
	ø50, ø63	0.64	—	—

Note 1) Absorbable kinetic energy by cushion mechanism is identical to double acting single rod. When requesting a cylinder without air cushion, cylinder utilizes rubber bumpers which increases cylinders overall length.

Accessories

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

Weight/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.66	1.21	1.51	2.58	3.73
	Foot	0.62	0.83	1.41	1.75	3.23	4.36
	Flange	0.79	1.03	1.64	2.30	4.03	7.04
	Single clevis	0.75	0.89	1.55	2.14	3.69	6.90
	Double clevis	0.76	0.93	1.64	2.30	3.98	7.42
	Trunnion	0.79	1.02	1.69	2.31	4.13	7.40
Additional weight per 50 stroke	All mounting bracket	0.11	0.15	0.26	0.27	0.40	0.52
Accessories	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27
Square tube	Additional weight to the basic weight*	0.03	0.03	0.05	0.07	0.11	0.13
	Additional weight per 50 stroke	0.16	0.21	0.33	0.37	0.56	0.72

Calculation example: **MBKB32-100** (Basic, ø32, 100st)
- Basic weight ····· 0.50 (Basic ø32)
- Additional weight ··· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke

0.50+0.11X100/50=0.72kg

Material of Rod Boot

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Max. ambient temperature for rod boot itself.

Theoretical Force

OUT side is identical to double acting single rod.
Refer to table below for IN side.

Bore size (mm)	Rod diameter (mm^2)	Bore size (mm)	Rod diameter (mm^2)
32	675	**63**	2804
40	1082	**80**	4568
50	1651	**100**	7223

Theoretical force (N) =
Pressure (MPa) X Piston area (mm^2)

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch model	Bore size					
	32	40	50	63	80	100
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F5□F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063

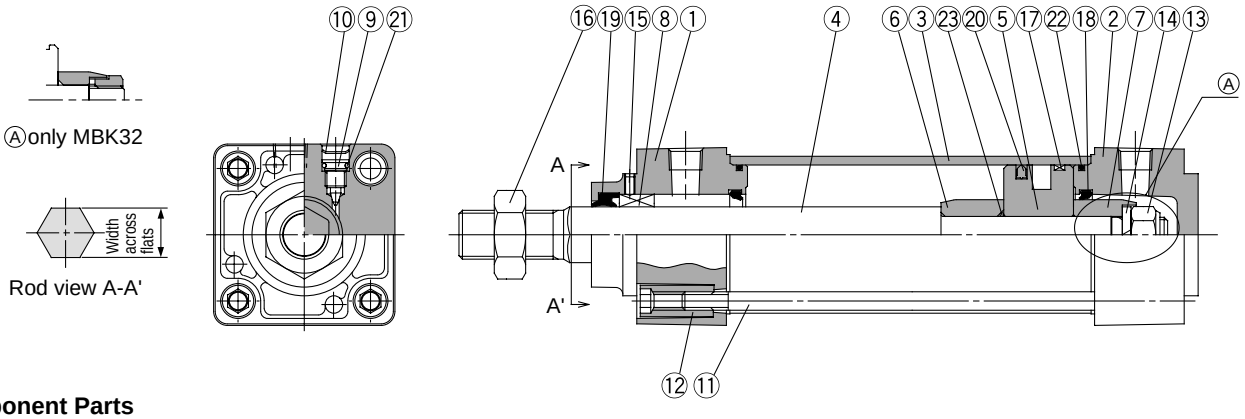
[A set of stainless steel mounting screws]
A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)
BBA1: D-A5/A6/F5/J5 types
*"D-F5BAL" switch is set on the cylinder with the screws above when shipped.
When a switch only is shipped, "BBA1" screws are attached.

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot Note 1)	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Foot, Flange, Single clevis: Mounting bolts
Double clevis: Clevis pin, Cotter pin
→ Refer to page 8 for details.

Construction



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-cast	Metallic painted
2	**Head cover**	Aluminum die-cast	Metallic painted
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	Stainless steel	
5	**Piston**	Aluminum alloy	Chromated
6	**Cushion ring A**	Rolled steel	
7	**Cushion ring B**	Rolled steel	
8	**Non-rotating guide bearing**	Oil-impregnated sintered alloy	
9	**Cushion valve**	Steel wire	Nickel plated
10	**Snap ring**	Steel for spring	ø40 to ø100
11	**Tie rod**	Carbon steel	Uni-chromated
12	**Tie rod nut**	Carbon steel	Nickel plated

No.	Description	Material	Note
13	**Piston nut**	Rolled steel	
14	**Washer**	Steel wire	
15	**Lock nut**	Steel wire	
16	**Rod end nut**	Carbon steel	Nickel plated
17	**Wear ring**	Resin	
18*	**Cushion seal**	Urethane	
19*	**Rod seal**	NBR	
20*	**Piston seal**	NBR	
21	**Cushion valve seal**	NBR	
22*	**Cylinder tube gasket**	NBR	
23	**Piston gasket**	NBR	

Replacement Parts: Seal Kits

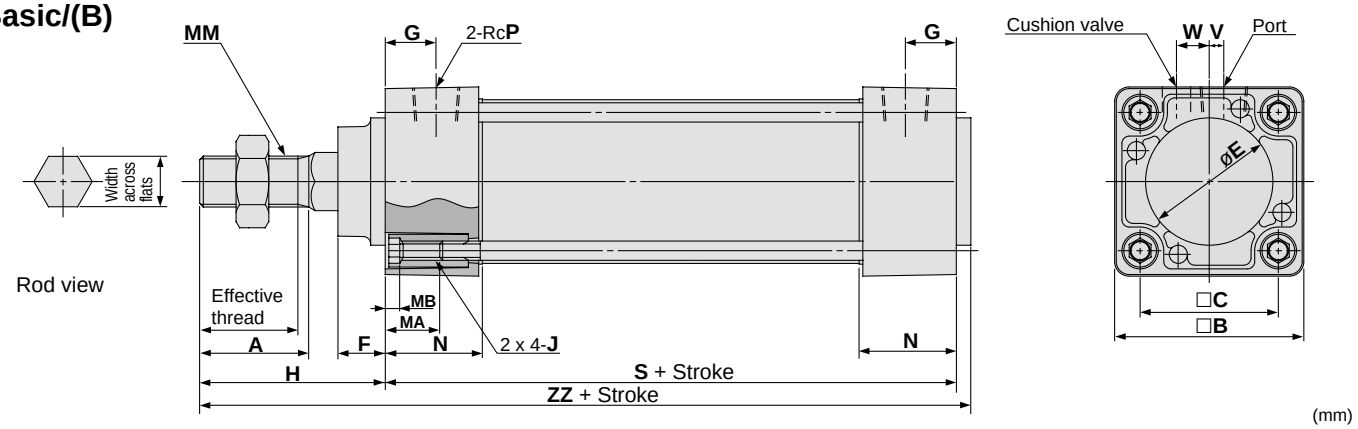
Bore size (mm)	Kit No.	Contents
32	MBK32–PS	Set of the No. 18, 19, 20 and 22.
40	MBK40–PS	
50	MBK50–PS	
63	MBK63–PS	
80	MBK80–PS	
100	MBK100–PS	

* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal, and 2 tube gaskets.

* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;
ø32, ø40: +6mm, ø50, ø63: +8mm, ø80, ø100: +10mm

Without Mounting Bracket

Basic/(B)



(mm)

Bore (mm)	Stroke range	Effective thread length	Width across flats	A	□B	□C	E	F	G	H	MA	MB	J	MM	N	P	S*	V	W	ZZ*
32	up to 500	19.5	12.2	22	46	32.5	30	13	13	47	16	4	M6 X 1.0	M10 X 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14.2	30	52	38	35	13	14	51	16	4	M6 X 1.0	M14 X 1.5	27	1/4	84	4	9	139
50	up to 600	32	19	35	65	46.5	40	14	15.5	58	16	5	M8 X 1.25	M18 X 1.5	31.5	1/4	94	5	10.5	156
63	up to 600	32	19	35	75	56.5	45	14	16.5	58	16	5	M8 X 1.25	M18 X 1.5	31.5	3/8	94	9	12	156
80	up to 800	37	23	40	95	72	45	20	19	72	16	5	M10 X 1.5	M22 X 1.5	38	3/8	114	11.5	14	190
100	up to 800	37	27	40	114	89	55	20	19	72	16	5	M10 X 1.5	M26 X 1.5	38	1/2	114	17	15	190

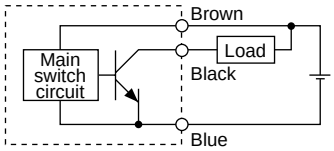
Dimensions with mounting support is same as the basic style (Double acting single rod). Also dimensions with boot is same as the basic style (Double acting single rod).

Auto Switch Connections and Examples

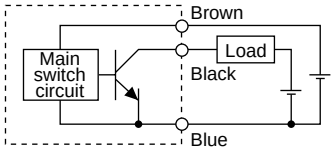
Basic Wiring

• Solid state switch

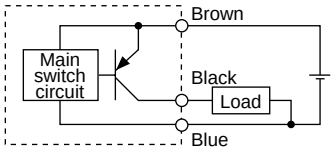
3 wire NPN



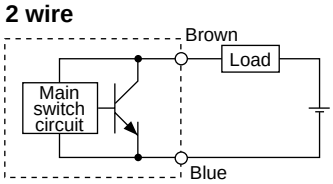
(When power source for switch and load is not common.)

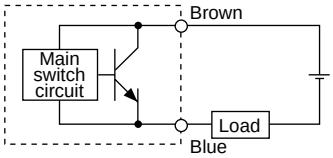


3 wire PNP



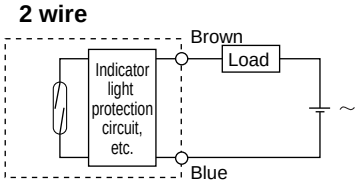
2 wire

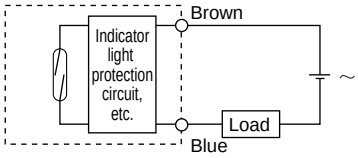




• Reed switch

2 wire

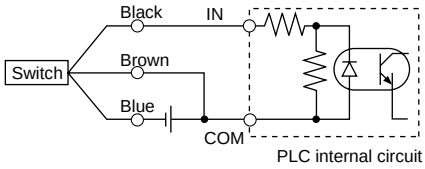




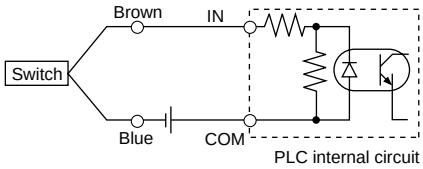
Examples of Connection to PLC

• Sink input specifications

3-wire NPN

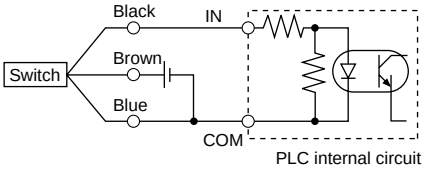


2 wire

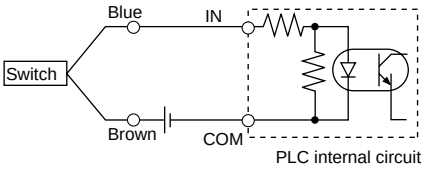


• Source input specifications

3-wire PNP



2 wire

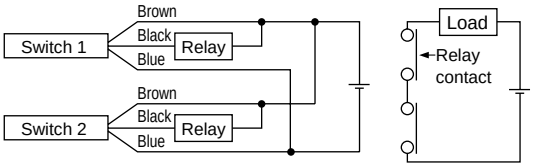


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

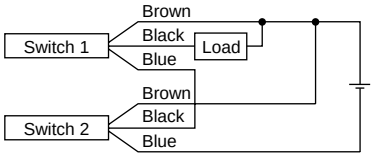
Connection Examples for AND (Serial) and OR (Parallel)

• 3-wire

AND connection for NPN output (using relays)

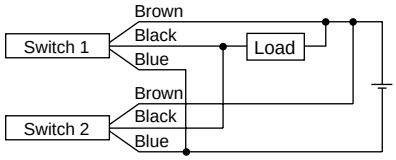


AND connection for NPN output (performed with switches only)

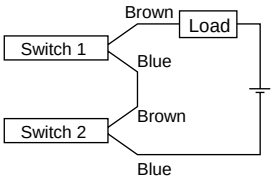


The indicatior lights will light up when both switches are turned ON.

OR connection for NPN output



2-wire with 2 switch AND connection



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

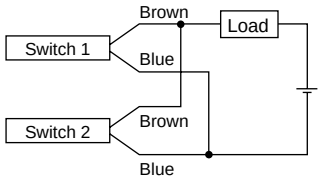
$$\text{Load voltage at ON} = \left(\text{Power Supply voltage} - \text{Internal voltage drop}\right) \times 2 \text{ pcs.}$$

$$= 24\text{V} - 4\text{V} \times 2 \text{ pcs.}$$

$$= 16\text{V}$$

Example: Power supply is 24V DC,
Internal voltage drop in switch is 4V

2-wire with 2 switch OR connection



<Solid state>
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

$$\text{Load voltage at OFF} = \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance}$$

$$= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega$$

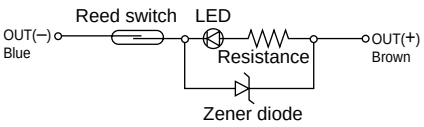
$$= 6\text{V}$$

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA

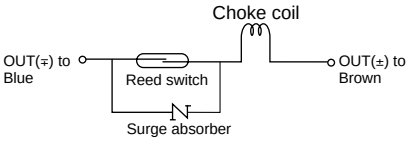
<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

Reed switch

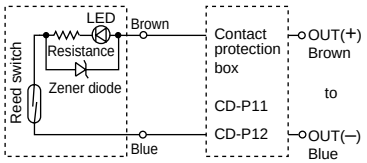
D-A53



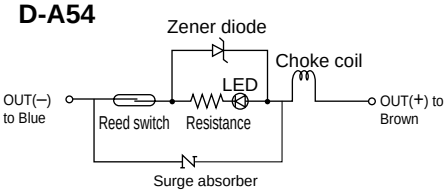
D-A64



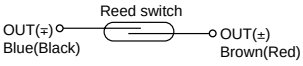
D-Z73



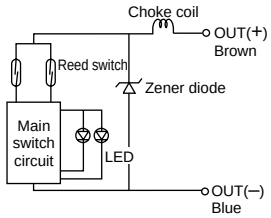
D-A54



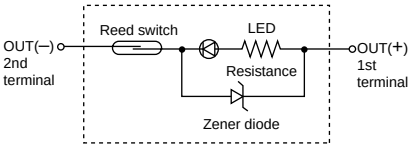
D-A67/Z80



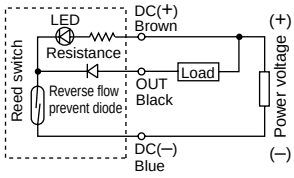
D-A59W



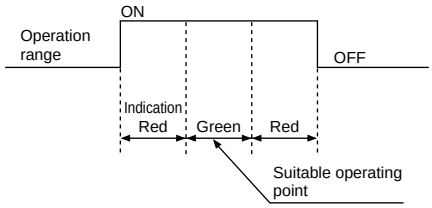
D-A33



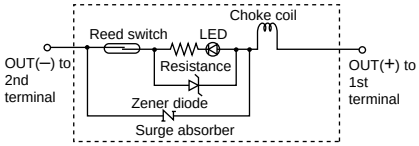
D-A56/Z76



Indicator light/Operation

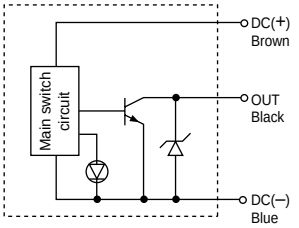


D-A34/D-A44

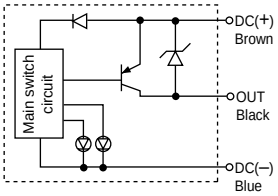


Solid state switch

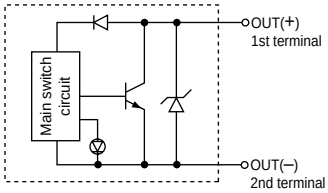
D-F59/Y59A



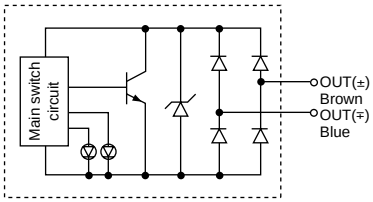
D-F5PW/Y7PW



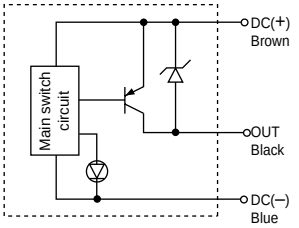
D-K39



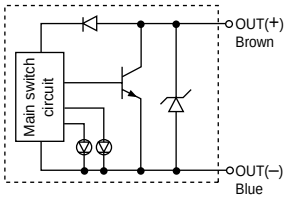
D-P5DWL



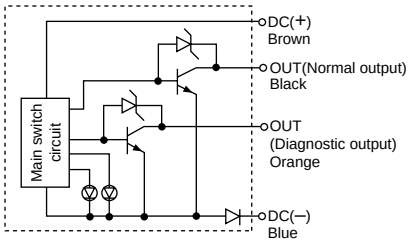
D-F5P/Y7P



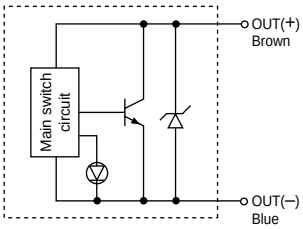
D-J59W/Y7BW/Y7BAL
D-F5BAL



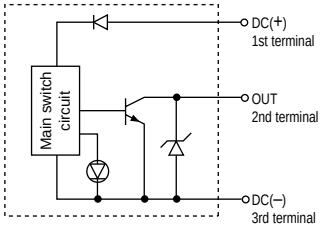
D-F59F



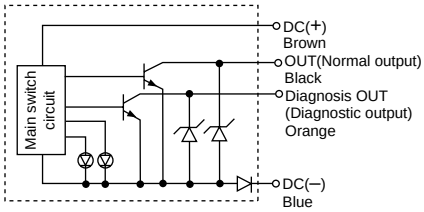
D-J59/Y59B



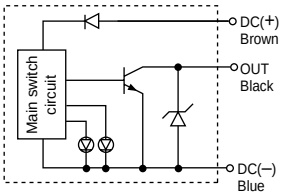
D-G39



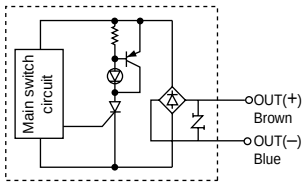
D-F5LF



D-F59W/Y7NW



D-J51



D-F5NTL