MA1 · MH4 · HGZ · HGW · HGD · HG1

DESCRIPTION

The high performance models, MA1, MH4, HGZ, HGW, HGD and HG1 offer the cleanest switching transition available. The mercury-to-mercury contacts eliminate bounce after initial closure and provide high reliability when switching low level or high power loads. The patented MYAD® switch allows all-position mounting while maintaining the benefits of a mercury contact. All of the switches have hermetically sealed contacts and offer a wide range of available magnetic sensitivities.

FEATURES

- Small size
- Mercury contacts
- Hermetically sealed contacts
- Fast switching speed — up to 500Hz
- Wide range of available magnetic sensitivities
- No contact bounce
- Extremely long life

APPLICATIONS

- Process Control
- High Voltage Circuits
- Telephone Switching
- Bounce Free Relays

AGENCY APPROVALS

- UL pending

RATINGS (@ 25°C)

Parameter	Min	Typ	Max	Units
Switching Voltage				
MYAD/HGZ/HGW/HG			500	Volts
MH4			1000	Volts
Switching Current				
MYAD/MH4/HGZ/HGW			2	Amps
MH4			2	Amps
Carry Current				
MYAD/MH4			4	Amps
HGZ			3	Amps
HGW			5	Amps
HG			10	Amps
Switching Frequency				
MYAD			300	Hz
HGZ			100	Hz
MH4/HGW			200	Hz
HG			80	Hz
Contact Resistance				
MYAD			65	mΩ
MH4/HGZ/HGW/HG			30	mΩ

(See detailed specifications for more information.)

HIGH PERFORMANCE REED SWITCH SPECIFICATIONS

All parameters are at 25°C unless otherwise stated.

PARAMETER	CONDITIONS	SYMBOL	Mount **MA1** MYAD® Form-A Non-Position Sensitive			Mount **MH4** Form-A Vertical			Mount **HGZ** Form-C Vertical			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Contact Ratings												
Operate Ampere Turns	EIA/NARM 1	AT	35	-	65	20	-	40	35	-	70	NI
Release Ampere Turns	STD Coil	AT	14	-	50	12	-	32	14	-	56	NI
Switching Voltage	Max DC/PeakAC Resistive	V_L	-	-	500	-	-	1000	-	-	500	VDC
Switching Current	Max DC/PeakAC Resistive	I_L	-	-	2	-	-	2	-	-	2	Amps
Carry Current	Max DC/PeakAC Resistive	I_C	-	-	4	-	-	4	-	-	3	Amps
Contact Rating	Max DC/PeakAC Resistive	-	-	-	50	-	-	50	-	-	50	Watts
Life Expectancy	1V, 10mA Signal Level	-	-	300	-	-	2000	-	-	2000	-	$x10^6$ Ops
	50V, 100mA Telecom Load	-	-	100	-	-	2000	-	-	2000	-	$x10^6$ Ops
	100V, 100mA Rated Loads	-	-	50	-	-	50	-	-	50	-	$x10^6$ Ops
Static Contact Resistance	50mV, 10mA(1)	CR	-	-	60	-	-	30	-	20	25	mΩ
Operating Frequency		f	-	-	300	-	-	200	-	-	100	Hz
Contact Material		-	-	Hg	-	-	Hg	-	-	Hg	-	-
Hg Content		-	-	16	-	-	40	-	-	72	-	mgrams
Switch Specifications												
Insulation Resistance(2)	100V, 25°C, 40% RH	IR	10^9	10^{12}	-	10^{10}	10^{12}	-	10^9	10^{11}	-	Ω
Capacitance	Across Open Contacts	-	-	-	0.3	-	-	0.3	-	-	0.7	pF
Dielectric Strength AC	Between Contacts	-	2000	-	-	2000	-	-	1000	-	-	VDC/Peak
Operate Time	1.5 times operate NI											
up to 75Hz Sq. Wave	50% DC	T_{OP}	-	0.9	1.2	-	-	2	-	2	3	ms
75-200Hz Sq. Wave	50% DC	T_{OP}	-	N/A	-	-	-	2.5	-	N/A	-	ms
Release Time	Zener-Diode Suppression(3)	T_{REL}	-	0.9	1.2	-	-	1.5	-	-	2	ms
Transfer Time		-	-	N/A	-	-	N/A	-	50	-	700	µs
Bridging Time		-	-	N/A	-	-	N/A	-	50	-	700	µs
Drain Time		-	-	-	-	-	-	-	-	-	5	s
Environmental Ratings												
Storage Temperature		T_A	-40	-	+125	-40	-	+125	-40	-	+125	°C
Operating Temperature		T_O	-38		+125	-38	-	+105	-38	-	+125	°C
Soldering Temperature		-	-	+260	-	-	+260	-	-	+260	-	°C
Vibration Resistance	1Hz - 2000Hz	G	-	-	20	-	-	10	-	-	10	Gs
Shock Resistance	11±1ms, 1/2 Sine Wave	S	-	-	50	-	-	30	-	-	30	Gs
	Free fall from height on steel surface	-	-	-	-	-	-	20	-	-	20	cm
Mounting Position	All position	-	-	all	-	-	up-right(4)	-	-	up-right(4)	-	-
Weight		-	-	0.25	-	-	0.24	-	-	0.28	-	grams/unit

(1) Contact resistance measured with 4 terminal method, 1.0" between test leads
(2) $>10^{12}$ Ω is available upon request
(3) A 24V zener in series with a diode across the coil
(4) ±30°

HIGH PERFORMANCE REED SWITCH SPECIFICATIONS

All parameters are at 25°C unless otherwise stated.

PARAMETER	CONDITIONS	SYMBOL	HGW Form-C(4) / HGD Form-D(4) MIN	HGW Form-C(4) / HGD Form-D(4) TYP	HGW Form-C(4) / HGD Form-D(4) MAX	HG1 Form-D(4) MIN	HG1 Form-D(4) TYP	HG1 Form-D(4) MAX	UNITS
Contact Ratings									
Operate ampere turns range	EIA/NARM 1	AT	5	-	55	120	-	180	NI
Release ampere turns range	STD Coil	AT	5	-	55	60	-	120	NI
Delta ampere turns		AT	30	-	60	-	-	-	NI
Switching Voltage	Max DC/PeakAC Resistive	V_L	-	-	500	-	-	500	VDC
Switching Current	Max DC/PeakAC Resistive	I_L	-	-	2	-	-	5	Amps
Carry Current	Max DC/PeakAC Resistive	I_C	-	-	5	-	-	10	Amps
Contact Rating	Max DC/PeakAC Resistive	-	-	-	100	-	-	250	Watts
Life Expectancy	1V, 10mA Signal Level	-	-	2000	-	-	2000	-	$x10_6$ Ops
	10V, 10mA Low Level	-	-	2000	-	-	2000	-	$x10_6$ Ops
	50V, 100mA Telecom Load	-	-	2000	-	-	2000	-	$x10_6$ Ops
	500V, 200mA Rated Loads	-	-	100	-	-	500	-	$x10_6$ Ops
Static Contact Resistance	50mV, 10mA(1)	CR	-	-	30	-	25	30	mΩ
Operating Frequency		f	-	-	200	-	-	80	Hz
Contact Material		-	-	Hg	-	-	Hg	-	-
Hg Content		-	-	0.32	-	-	3	-	grams
Switch Specifications									
Insulation Resistance(2)	100V, 25°C, 40% RH	IR	10^8	10^{10}	-	10^8	10^9	-	Ω
Capacitance	Across Open Contacts	-	-	1	-	-	2	-	pF
Dielectric Strength	Between Contacts	I/O	3000	-	-	4000	-	-	VDC/Peak AC
Operate Time, including bounce	at 1.5 x Operate AT, 30Hz Square Wave	T_{OP}	-	-	1.5	-	4.5	7	ms
Release Time	Zener-Diode Suppression(3)	T_{REL}	-	-	1.5	-	4.5	6	ms
Static Transfer Time	(HGW only)	-	-	50	-	300	-	-	-	µs
Bridging Time	(HGD, HG1)	-	-	50	-	500	150	-	900	µs
Drain Time		-	-	-	5	-	-	15	s
Environmental Ratings									
Storage Temperature		T_A	-55	-	+125	-55	-	+125	°C
Operating Temperature		T_O	-38	-	+125	-38	-	+125	°C
Soldering Temperature		-	-	+260	-	-	+260	-	°C
Vibration Resistance	10Hz - 500Hz	G	-	-	10	-	-	10	Gs
Shock Resistance	11±1ms, 1/2 Sine Wave	S	-	-	30	-	-	30	Gs
Mounting Position		-	-	up(4) right	-	-	up(4) right	-	-
Weight		-	-	1.16	-	-	3.8	-	grams/unit

(1) Contact resistance measured with 4 terminal method, 1.0" between test leads
(2) $>10^{12}$ Ω is available upon request
(3) A 24V zener in series with a diode across the coil
(4) Must be mounted vertically ±30°

STANDARD TEST COIL

The magnetic force (expressed in NI, AT or Ampere Turns) required to cause the reed switch contacts to close is called the pull-in or operate value.

	MA1	MH4	HGZ	HGW(1)	HG1
Coil definition	CTC 02	NARM1 CTC01	CTC 02	CTC 05	CTC 07
Coil resistance	3500Ω	1200Ω	3500Ω	3420Ω	630Ω
Number of turns	10,000	5,000	10,000	10,000	10,000
Wire size (nom. diameter)	0.0315mm	0.0399mm	0.0315mm	0.0399mm	0.127mm
Bobbin diameter (inside coil)	4.2mm	3.96mm	4.2mm	6.8mm	9.35mm
Winding length	19mm	10.4mm	19mm	25.4mm	43mm

(1) Consult factory for test procedure.

The reed switch shall be placed in the test coil with the gap centered in the core of the coil winding.
Test leads and their clips must be non-magnetic.
The longitudinal axis of the test coil and the test switch shall be vertical.

ORDERING INFORMATION

A complete part number is represented by the digits below.

Hg-Wetted

XXX XXX XXX X XX

Series
MA1(MYAD®) (Form-A)
HGZ (Form-C)
MH4 (Form-A)
HGW (Form-C)
HGD (Form-D)
HG (Form-D)

Minimum operate value
(Delta for HGW/HGD)
(035 for 35 NI)

Maximum operate value
(Delta for HGW/HGD)
(050 for 50 NI)

Minimum insulation resistance (see below)

HG/HGW/HGD only (see below)

Minimum insulation resistance
0=10^{8}‰ Standard HGW/HGD (10^{7}‰ for HG)
1=10^{9}‰ Standard HGZ/MA1
2=10^{10}‰ Standard MH4, Optional HGW/HGD/HG/MA1
3=10^{11}‰ Optional HGZ
4=10^{12}‰ Optional MH4/MA1
5=10^{13}‰ Optional MH4/HGZ

Last digit for HG:
1=Delta range 30-45
2=Delta range 45-60

Last 2 digits for HGW/HGD:
1st digit: Min. dynamic transfer time
1=>25 s
2=>50 s
3=>100 s
2nd digit: Max. switching frequency
1=100Hz
2=200Hz

SWITCH OPERATING SPECIFICATIONS

HGW/HGD

Units	Delta Range	Insulation Resistance	Static Transfer Time	Dynamic Transfer Time	Switching Frequency
Part #	NI	Min Ω	Typ µs	Min µs	Max Hz
FORM-C					
HGW038055222	38-55	$5x10^{10}$	120-300	50	200
HGW038060212	38-60	$5x10^{10}$	60-300	25	200
HGW038485012	32-48	$5x10^{8}$	60-300	25	200
HGW045065011	45-65	$5x10^{8}$	60-300	25	100
HGW030038011	30-38	$5x10^{8}$	60-300	25	100
HGW030060011	30-60	$5x10^{8}$	60-350	25	100
Form-D					
HGD038055231	38-55	$5x10^{10}$	150-500	100	100
HGD030060011	30-60	$5x10^{8}$	75-500	25	100
HDG030060211	30-60	$5x10^{10}$	60-500	25	100

HGZ

	Operate Sensitivity	Release
Units	NI	NI
Part #	Range	Minimum
HGZ035050X	35-50	10
HGZ050055X	50-55	10
HGZ055060X	55-60	10
HGZ060065X	60-65	10

MYAD®

	Operate Sensitivity	Release
Units	NI	NI
Part #	Range	Minimum
MA1035050X	35-50	15
MA1035045X	35-45	15
MA1045055X	45-55	18
MA1055065X	55-65	22

"X" refers to insulation resistance option, see ordering information.

HG

Part #	Delta Range	Operate Range	Insulation Resistance
	NI	NI	Ω(1)
HG12014001	30-45	120-140	5×10^{7}
HG12014002	45-60	120-140	5×10^{7}
HG14016001	30-45	140-160	5×10^{7}
HG14016002	45-60	140-160	5×10^{7}
HG16018001	30-45	160-180	5×10^{7}
HG16018002	45-60	160-180	5×10^{7}

(1) 5×10^{10} Ω optional

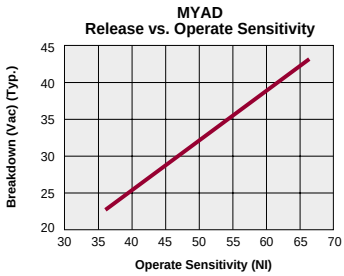
MH4

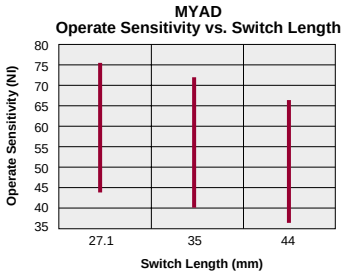
Part #	Operate Range (NI)	Release (NI) Min
MH4025035X	25-35	13
MH4020040X	20-40	13

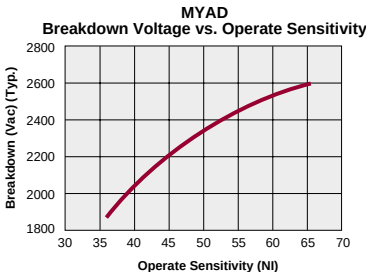
"X" refers to insulation resistance option, see ordering information.

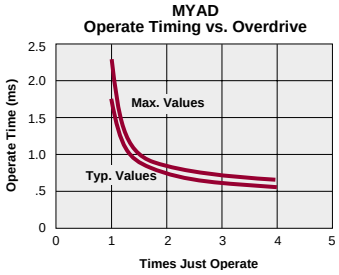
PERFORMANCE GRAPHS

MYAD®

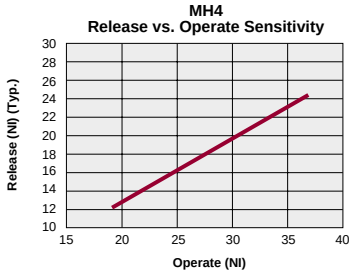


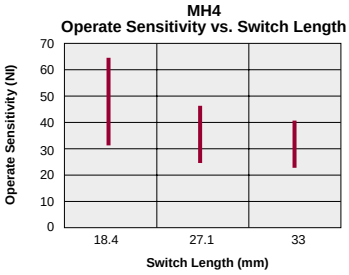


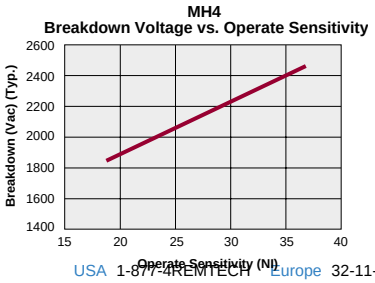


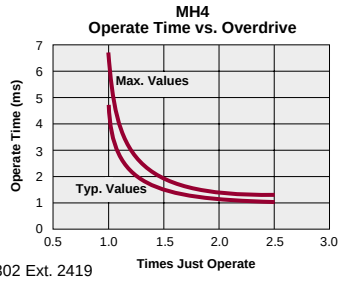


MH4





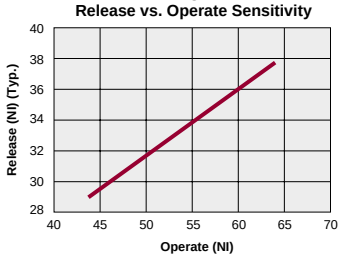




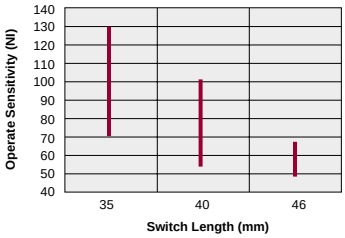
PERFORMANCE GRAPHS

HGZ

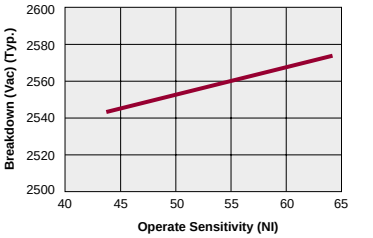
HGZ
Release vs. Operate Sensitivity



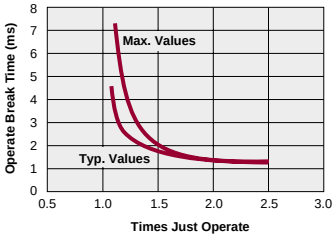
HGZ
Operate Sensitivity vs. Switch Length



HGZ
Breakdown Voltage vs. Operate Sensitivity



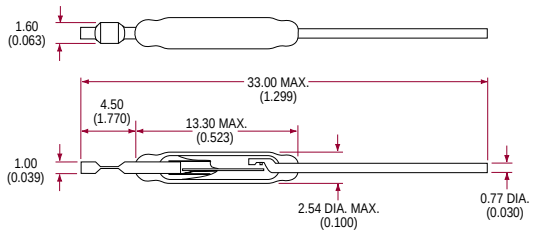
HGZ
Operate Time vs. Overdrive



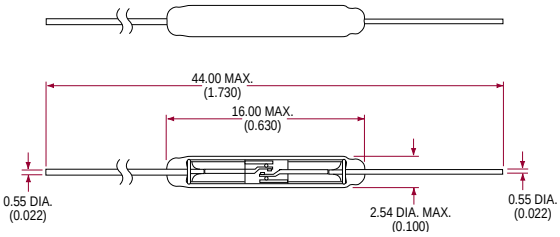
MECHANICAL DIMENSIONS

DIMENSIONS
mm
(inches)

MH4



MYAD¤ - MA1



HG