03: 3NC

# IDEC

# **HS6B Series Subminiature Interlock Switch**

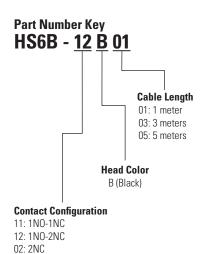
#### **HS6B** features:

- Only 78 x 30 x 15mm
- Allows highest level of safety by having 3 contacts: dual load contacts + monitoring contact (ISO13849-1, EN954-1)
- Two actuator entrances provide flexibility for installation options
- Integral molded cable reduces wiring time
- IP67 (IEC60529) watertight sealing (contact is sealed, housing allows drainage)
- Direct Opening Action: Opening the door forces the contacts to disconnect even if the contacts are welded (IEC/EN60947-5-1)
- Actuators comply with ISO14119 and EN1088



#### **Part Numbers**

Contact Configuration	Cable Length	Part Number (Standard Stock in bold)
1NC-1NO	1m	HS6B-11B01
11 <u></u> 12 ⊖	3m	HS6B-11B03
33 34	5m	HS6B-11B05
2NC	1m	HS6B-02B01
11 <u></u>	3m	HS6B-02B03
31 32 ⊖	5m	HS6B-02B05
2NC-1NO	1m	HS6B-12B01
$11 \xrightarrow{Zb} 12 \ominus$	3m	HS6B-12B03
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5m	HS6B-12B05
3NC	1m	HS6B-03B01
$11 \xrightarrow{Zb} 12 \ominus$	3m	HS6B-03B03
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5m	HS6B-03B05



#### **Contact Configuration & Operation Chart**

Туре	Con	tact Configuration		Con	tact Operation Cha	art
				0.8 (Actuator Mountin	ng Reference Positio	on)
HS6B-11	1NC-1NO	$11 \xrightarrow{Zb} 12 \Rightarrow 33 \xrightarrow{J} 34$	11-12 33-34	0 5.5 5.8	28.2 (Trave	el: mm) Contact ON (closed)
HS6B-02	2NC	$11 \xrightarrow{-1} 12 \xrightarrow{0} 31 \xrightarrow{-1} 32 \xrightarrow{0} 31$	11-12 31-32			: Contact OFF (open)
HS6B-12	2NC-1NO	$11 \xrightarrow{ L} 2b \xrightarrow{ 12} \bigcirc$ $21 \xrightarrow{ 12} 22 \bigcirc$ $33 \xrightarrow{ 34}$	11-12 21-22 33-34			
HS6B-03	3NC	$11 \xrightarrow{-1} 12 \xrightarrow{-1} 22 \xrightarrow{-1} 32 \xrightarrow{-1} 3$	11-12 21-22 31-32			
			Actuator inse	erted completely	Actuator removed	l completelv



# IDEC

# **HS6B Series**

# **Actuator Keys**

Appearance	Part Number	Shape	Appearance	Part Number	Shape
00	HS9Z-A61	Straight (Mainly for sliding doors)		HS9Z-A65	adjustable actuator 90° angle
00.1	HS9Z-A62	Right-angle (Mainly for hinged doors)		HS9Z-A66	adjustable actuator 180° angle

The actuators are not included, must be ordered separately.

X Series E-Stops

Spe	cifi	cati	io	ns	
-				-	

Conforming be standardsEN1088, IEC80947-5-1, GN: GET-15, GEC: GER4-1, IEC80204-1, EN60204-1, ULS08Operating Terme erature-25 to 370° (no freezing)Storage Terme erature-40 to -80°C (no freezing)Operating Terme erature40 to 35% RH (no condensation)Storage Terme erature95% RH maximum (no condensation)Storage Funce3Rated Insulation3000	Specificatio	ns						
-40 to +80°C (no freezing)Operating Humidry45 to 85% RH (no condensation)Storage Humidry95% RH maximum (no condensation)Attitude2000 maximumAttitude2,000 maximumStorage Humidry3Rated Insulation Degree (III)3 00VImpulse With Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse With Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 10M/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 100/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 100/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 100/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 100/L maximumImpulse Voltage (Uiin)Between Ive & dead metal parts: 100/L maximum <td< th=""><th>Conforming to</th><th>o Standards</th><th colspan="3">EN1088, IEC60947-5-1, EN60947-5-1, GS-ET-15, IEC60664-1, IEC60204-1, EN60204-1, UL508</th><th>4-1, EN60204-1, UL508</th></td<>	Conforming to	o Standards	EN1088, IEC60947-5-1, EN60947-5-1, GS-ET-15, IEC60664-1, IEC60204-1, EN60204-1, UL508			4-1, EN60204-1, UL508		
Pierrain	Operating Ter	nperature	-25 to +70°C (no freezing)					
Storage Humidity99% RH maximum (no condensation)Altitude2,000m maximumPollution Degre3Rated Insulation Voltage (Uin)300VBetween lock to the & dead metal parts: 100MΩ maximumBetween lock to the & dead metal parts: 100MΩ maximumBetween lock to the & dead metal parts: 100MΩ maximumBetween lock to the & dead metal parts: 100MΩ maximumBetween lock to the & dead metal parts: 100MΩ maximumDegree of Protection ClassClass IIDegree of Protection ClassClass IIOperating Extremes300mΩ maximumStorage Limits300mΩ maximumClass IIStorage Limits300mΩ maximumClass IIStorage Limits300mΩ maximumClass IIStorage Limits300mΩ maximumStorage Limits300mΩ maximumStorage Limits300mΩ maximumStorage Limits300mΩ maximumDirect OpeniuStorage Limits300mΩ maximumClass II300mΩ maximumClass II300mΩ maximumClass II300mΩ maximumClass II300m maximum <th colspa<="" th=""><th>Storage Temp</th><th>erature</th><th>—40 to +</th><th>80°C (no freezing)</th><th></th><th></th><th></th></th>	<th>Storage Temp</th> <th>erature</th> <th>—40 to +</th> <th>80°C (no freezing)</th> <th></th> <th></th> <th></th>	Storage Temp	erature	—40 to +	80°C (no freezing)			
Altitude       2,000 maximum         Pollution Degre       3         Rated Insulation Degre(Uino)       300V         Insulation Residence       Between live & dead metal parts: 100MΩ maximum         Baseler Protection Class       Between live & dead metal parts: 100MΩ maximum         Degree of Protection Class       Class       Vertex         Operating Extreme       Stop Residence       More Residence         Messistance       Operating Extreme       Stop Residence       Stop Residence         Shock Resistance       Operating Extreme       Stop Residence       Stop Residence       Stop Residence         Direct Opening Travel       Bomminum       Stop Residence       Stop	Operating Hu	midity	45 to 85% RH (no condensation)					
Pollution Dejres         3           Rated Insulation Voltage (Ui)         3007           Impulse With+rard Voltage (Uin)         4kv           Batweer inverse         Betweer inverse           Betweer inverse         Betweer inverse           Betweer inverse         Betweer inverse           Betweer inverse         Class           Betweer inverse         Class           Degree of Protection Class         Class           Degree of Protection Class         Class           Omage Limits         30HZ, half amplitude 0.5 mm           Shock         Operating Extremes           Resistan         Operating Extremes           Shock         Operating Extremes           Brane Limits         300m/s² (JOC)           Direct Openity         Resistan           Damage Limits         1000m/s² (JOC)           Direct Openity         Resistan           Direct Openity         Resinve load (AC12)           Ferrer         Statise load (AC12)           Inducive load (AC12)         -           I	Storage Humi	dity	95% RH maximum (no condensation)					
Rated Issuities → Votage (Ui)     300/       Impulse With>Impulse With Quage (Uin)     4k/       Insulation Protection Class     Betwern inversion Quage (Vince Quage Qua	Altitude		2,000m maximum					
Impulse With Set of Voltage (Usion)     Impulse Voltage (Usion)       Insulation Residue (Voltage (Usion)       Impulse Voltage (Usion)       Impulse Voltage (Usion)       Impulse Voltage (Usion)       Impulse Voltage (Usion)       Operating Extremes     Solom Voltage (Usion)       Shock Resistanci     Operating Extremes     Solom Voltage (Usion)       Operating Extremes     Solom Voltage (Usion)       Shock Resistanci     Operating Extremes     Solom Voltage (Usion)       Direct Operium     Context Colspan="4">Solom Voltage (Usion)       Termed Current (It)     Operating Extremes       Reside Operating Extremes     Solom Voltage (Usion)       Reside Operating Extremes     Solom Voltage (Usion)       Market Operating Extremes     Operating Extremes       Operating Extremes     Solom Voltage (Usion)       Reside Operating Extremes     Operating Extremes       Operating Extremes     Operating Extremes       Operating Extremes     Operating Extremes	Pollution Deg	ree	3					
Betwen live & dead metal parts: 100ΛΩ maximum           Degree of Provide of Norman line         Soft ST4, laft amplitude 0.5 mm           Operating Extremes         300/ soft ST4, laft amplitude 0.5 mm           Contact Resistance         Operating Extremes         300/ soft ST4, laft amplitude 0.5 mm           Direct Open         Operating Extremes         300/ soft ST4, laft amplitude 0.5 mm           Tavel         Soft Staft amplitude 0.5 mm           Tavel         Soft Staft amplitude 0.5 mm           Torrect Prove         Soft Staft amplitude 0.5 mm           T	Rated Insulat	ion Voltage (Ui)	300V					
Insulation R∈s     Betweer positive & negative live pris::::00MΩ minimum       Electric Sho::     Class I       Degree of P⊂toto Class     097 (II ⊂ 0529)       Vibration Resistance     Operating Extremes     50 55 H₂ kalf amplitude 0.5 mm       Damage Limits     30H₂ half amplitude 0.5 mm       Contact Resistance     00m / s² (II 0G)       Shock Resistance     Operating Extremes     300m/s² (II 0G)       Direct Openitre     80m minum     80m/s² (II 0G)       Direct Openitre     80m minum     80m minum       Thermal Current (Ie)     80m minum     30V / 125V     250V       Rated Operatify Extremes     Perating Extremes     8esistance (IC 2)     -     1.5A       Rated Operatify Extremes     0     Resistre (IC 2)     -     1.5A     0.75A       Rated Operatify Extremes     0     Resistre (IC 2)     -     1.5A     0.75A       Rated Operatify Extremes     0     -     1.5A     0.75A       Rated Operatify Extremes     0     -     1.5A     0.75A       Rated Operatify Extremes     0     -     1.5A     0.75A       Rate Operatify Extremes     0     -     1.5A     0.75A       Rate Operatify Extremes     0     -     1.5A     0.75A       Rate Operatify Extremes     0 </th <th>Impulse With</th> <th>stand Voltage (Uimp)</th> <th>4kv</th> <th></th> <th></th> <th></th> <th></th>	Impulse With	stand Voltage (Uimp)	4kv					
Between-positive & negative live parts: 100MQ minimumElectric Short IClass IPortation ClassPortation ClassOperating ExtremesState StatemesSobe I ange LimitsSobe I ange LimitsOperating ExtremesSobe I ange LimitsOperating Extremes <th colspan<="" th=""><th>Inculation Ro</th><th>sistanco</th><th>Betweer</th><th>n live &amp; dead metal parts: 1</th><th>00MΩ maximum</th><th></th><th></th></th>	<th>Inculation Ro</th> <th>sistanco</th> <th>Betweer</th> <th>n live &amp; dead metal parts: 1</th> <th>00MΩ maximum</th> <th></th> <th></th>	Inculation Ro	sistanco	Betweer	n live & dead metal parts: 1	00MΩ maximum		
Degree of Pre-term         IP67 (IE Costal I amplitude 0.5 mm           Vibration Resistance         Operating Extremes Jamage Limits         Sto 55 + , half amplitude 0.5 mm           Contact Resistance         Operating Extremes Jamage Limits         Obust 300m/s² (100G)         Store S           Shock Resistance         Operating Extremes Jamage Limits         Obust 300m/s² (100G)         Store S         Store S           Direct Openity Teret Openit		sistance	Betweer	n positive & negative live p	arts: 100MΩ mini	mum		
Yibration ResistanceS to 55 H₂ half amplitude 0.5 mmJonage Limits30H₂ / arplitude 1.5 mmContact ResistanceOperating ExtremesShock ResistanceOperating ExtremesJonage Limits300m/s² (100G)Direct OpenityB mmDirect OpenityB mmThermal Current (Ith)C.5ASheck ResistanceOperating ExtremesOperating ExtremesContact ResistanceDirect OpenityB mmThermal Current (Ith)C.5ASheck ResistanceOperating ExtremesOperating ExtremesSite load (AC12)Inductive load (AC12)-Current (Ith)C.5ACurrent (Ith)ACResistive load (AC12)-Inductive load (AC15)-Inductive load (AC16)-Inductive load (AC12)-Inductive load (AC12)-Inductive load (AC12)-Inductive load (AC13)-Inductive load (AC13)-Inductive load (AC13)-Inductive load (DC13)2.5AInductive load (DC13)(2.4)Inductive load (DC13)(2.3A)Inductive load (DC13)(1.4)Inductive load (DC13)(1.4)	Electric Shoc	k Protection Class	Class II					
Answin     Answin     Auge Limits     30Hz, half amplitude 1.5mm       Contact Resistance     300m / s² (30G)       Shock Resistance     Operating Extremes Damage Limits     300m/s² (100G)       Direct Openim     Resistance     Rem       Direct Openim     Rem     60N minum       Thermal Current (lth)     2.5A       Identify I	Degree of Pro	tection	IP67 (IEC60529)					
Contact Resistance     Operating Extremes Damage Limits     Solid, Hair anginitude F.Shiffi 300m/s <sup>-2</sup> (100G)       Direct Openir Direct Openir Direct Openir Thermal Current (Ith)     8 mm minum       Solid     Solid     Solid       Accent Intermal Current (Ith)     8 operating Extremes Solid     300m/s <sup>-2</sup> (100G)       Bread Operating Extremes     8 mm minum       Accent Intermal Current (Ith)     0 perating Extremes Solid     300m/s <sup>-2</sup> (100G)       Based Operating Extremes     0 perating Extremes     Solid       Accent Intermal Current (Ith)     0 perating Extremes     300V     125V       Based Operating Extremes     Solid     Resistive load (AC12)      2.5A       Based Operating Extremes     Name     Resistive load (AC12)      2.5A     1.5A       Based Operating Extremes     Resistive load (AC12)      2.5A     1.5A       Based Operating Extremes     Actuation Speed     Resistive load (DC12)     2.5A     1.1A     0.55A       Based Operating Extremes     1000U =verations (at full rated UPC1)     2.3A     0.55A     0.27A       Based Operating Extremes     2.3D     0.55A     0.27A       Based Operating Extremes     0.5U     VERAting Extremes       Mechanical Life     0.5D     VERAting Extremes       Wire Tensile Extrengith     0.5D </th <th></th> <th><b>Operating Extremes</b></th> <th colspan="3">5 to 55 Hz, half amplitude 0.5 mm</th> <th></th>		<b>Operating Extremes</b>	5 to 55 Hz, half amplitude 0.5 mm					
Shock ResistanceOperating Extremes Damage Limits300m/s² JUCGDirect Openime8 mm ××Direct Openime8 mm ××Direct Openime8 mm ××Direct Openime60N ××Thermal CurveSoloperation (and provide transmission (and provide transm	Resistance	Damage Limits	30Hz, half amplitude 1.5mm					
Resistance Direct Opening Travel       8 mm ⊨ mm         Direct Opening Force       60N mi⊨mm         Bower       2.5A         Thermal Current (Ith)       2.5A         AC       Resistive load (AC12)       -       2.5A         Rated Operating Current (Ie)       AC       Resistive load (AC15)       -       1.5A       0.75A         Idductive load (AC15)       -       1.5A       0.75A       0.75A         Inductive load (AC15)       -       1.5A       0.75A         Inductive load (AC15)       -       1.5A       0.75A         Inductive load (DC12)       (CA)       (0.4)A       (0.2A)         Inductive load (DC13)       (CA)       (D.4)A       (0.2A)         Inductive load (DC13)       (IA)       (D.2A)       (D.1A)         Maximum Actuation Frequency       1200 - U=rations (at full rated - U=)       (IA)       (IA)         Kire Tensile Strength       50N = U=rations (at full rated - U=)       U       U       U         Wire Tensile Strength       50N = U=rations (at full rated - U=)       U       U       U         Gunditional Shr-tericui Current       50A = U=rations (at full rated - U=)       U       U       U	<b>Contact Resis</b>	tance	300mΩ maximum					
Diract Opening Travel8 mm mimumDirect Opening Force60N mimumThermal Current (Ith)2.5APolyage (Ue)30V125V250VPasitive load (AC12)-2.5A1.5ARated Operating Current (Ie)Resistive load (AC15)-1.5A0.75ARated Operating Current (Ie)PaceResistive load (AC12)-1.5A0.75ARated Operating Current (Ie)PaceResistive load (AC15)-1.5A0.75ARated Operating Current (Ie)PaceResistive load (DC12)2.5A1.1A0.55ARated Operating Current (Ie)PaceResistive load (DC13)2.3A0.55A0.27AMaximum Actuation Frequency1000.0U=verations (at full rated local dot (DC13)2.3A0.55A0.27AMechanical Life0.50 to 1.m/sRecommended Actuation Speed0.5t v=v=rations (at full rated local dot (DC13)0.5t v=v=t=v=v=v=v=v=v=v=v=v=v=v=v=v=v=v=v=		<b>Operating Extremes</b>	300m/s² (30G)					
Direct Opening Force60N mirrier Version Section S	Resistance	Damage Limits	1000m/s <sup>2</sup> (100G)					
Thermal Current (ith)2.5APersonal Current (ith)2.5AOperating Current (ite)30V125V250VACResistive load (AC12)-2.5A1.5AInductive load (AC15)-1.5A0.75AInductive load (AC15)-1.5A0.75AInductive load (AC15)-1.5A0.75AInductive load (DC13)(2.5A1.1A0.55AInductive load (DC13)(2.3A0.55A0.27AInductive load (DC13)1(A)(0.2A)(0.1A)Maximum Actuation Frequency1200-1.4A0.55AInductive load (DC13)1(A)(0.2A)(0.1A)Mechanical Life1.000Mire Tensile Strength50N50NVire Tensile Strength50N50NElectrical Life100,000Gonditional Short-Circuit Current50A50A-	Direct Openin	ıg Travel	8 mm minimum					
Pate of the problem	Direct Openin	ıg Force	60N minimum					
AccResistive load (AC12)-2.5A1.5AInductive load (AC15)-1.5A0.75AInductive load (AC15)-1.5A0.75AInductive load (DC12)2.5A1.1A0.55AInductive load (DC12)(2A)(0.4)A(0.2A)Inductive load (DC13)2.3A0.55A0.27AInductive load (DC13)2.3A0.55A0.27AInductive load (DC13)(1A)(0.2A)(0.1A)Maximum Actuation Frequency1200 -perations (at full rated I-ad)(0.1A)Mechanical Life1.000.000 -perations (at full rated I-ad)0.05 to 1.000 - to 1.000 - to 1.0000 - to 1.0	Thermal Curre	ent (Ith)	2.5A					
ACInductive load (AC15)–1.5A0.75ARated Operating Current (le) $AC$ $Bestive load (DC12)$ 2.5A1.1A0.55A $AC$ $AC$ $(CA)$ $(CA)$ $(CA)$ $(CA)$ $AC$ $AC$ $AC$ $AC$ $(CA)$ $(CA)$ $AC$ $AC$ $AC$ $(CA)$ $(CA)$ $(CA)$ $AC$ $AC$ $AC$ $AC$ $AC$ $(CA)$ $AC$ $AC$ $AC$ $AC$ $AC$ $(CA)$ $AC$ $AC$ $AC$ $AC$ $AC$			Operatin	ig Voltage (Ue)	30V	125V	250V	
Rated Operating Current (le)Inductive load (AC15)–1.5A0.75A $A = A = A = A = A = A = A = A = A = A =$			AC	Resistive load (AC12)	-	2.5A	1.5A	
Resistive load (DC12)(2A)(0.4)A(0.2A)DC $\partial_{1}$ $\partial_{2}$			710	Inductive load (AC15)	-	1.5A	0.75A	
DC(2A)(0.4)A(0.2A)Inductive load (DC13)2.3A0.55A0.27AMaximum Actuation Frequency1200	Rated Operati	ng Current (le)		Basistiva load (DC12)	2.5A	1.1A	0.55A	
Inductive load (DC13)2.3A0.55A0.27AInductive load (DC13)(1A)(0.22A)(0.1A)Maximum Actuation Frequency1200 operations/hour(0.1A)Mechanical Life1,000,000 operations (at full rated load)(0.1A)Recommended Actuation Speed0.05 to 1.0m/s(0.1A)Wire Tensile Strength50N minimumElectrical Life100,000 operations (at full rated load)Gonditional Short-Circuit Current50A 250V (IEC60947-5-1, IEC60269-1, -2)			DC	1001011010101010127	(2A)	(0.4)A	(0.2A)	
Maximum Actuation Frequency1200 operations/hour(1.A)(0.22A)(0.1A)Mechanical Life1,000,000 operations (at full rated load)Image: Comparison of the comparison o			20	Inductive load (DC13)	2.3A	0.55A	0.27A	
Mechanical Life1,000,000 operations (at full rated load)Recommended Actuation Speed0.05 to 1.0m/sWire Tensile Strength50N minimumElectrical Life100,000 operations (at full rated load)Conditional Short-Circuit Current50A 250V (IEC60947-5-1, IEC60269-1, -2)					(1A)	(0.22A)	(0.1A)	
Recommended Actuation Speed       0.05 to 1.0m/s         Wire Tensile Strength       50N minimum         Electrical Life       100,000 operations (at full rated load)         Conditional Short-Circuit Current       50A 250V (IEC60947-5-1, IEC60269-1, -2)	Maximum Ac	tuation Frequency	1200 op	erations/hour				
Wire Tensile Strength     50N minimum       Electrical Life     100,000 operations (at full rated load)       Conditional Short-Circuit Current     50A 250V (IEC60947-5-1, IEC60269-1, -2)	Mechanical L	ife	1,000,000 operations (at full rated load)					
Electrical Life       100,000 operations (at full rated load)         Conditional Short-Circuit Current       50A 250V (IEC60947-5-1, IEC60269-1, -2)	Recommende	Actuation Speed 0.05 to 1.0m/s						
Conditional Short-Circuit Current         50A 250V (IEC60947-5-1, IEC60269-1, -2)	Wire Tensile	Strength	50N minimum					
	Electrical Life	•	100,000	operations (at full rated loa	ad)			
Weight 120g	Conditional S	hort-Circuit Current	50A 250	V (IEC60947-5-1, IEC60269	-1, -2)			
izug	Weight							

#### Installation Notes

#### **Recommended Screw Torque**

- Safety switch body installation (M4 screw): 1.0~1.5N-m
- Actuator installation (M4 screw): 1.0~1.5N-m

## Wiring Designations

HS6B

#### **Part Number** Color Contact blue-blue/white NC HS6B-12B01 brown-brown/white NC (2NC-1NO) orange-orange/white NO blue-blue/white NC HS6B-03B01 brown-brown/white NC (3NC) orange-orange/white NC

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27.6

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Part Number	Color	Contact
HS6B-11B01 (1NC-1NO)	blue-blue/white	NC
	orange-orange/white	NO
HS6B-02B01	blue-blue/white	NC
(2NC)	orange-orange/white	NC

· Minimum bend radius of installed cable: 40mm

· Do not tighten or loosen the fastened cable conduit of the safety switch



(58)

(9)

(ø7.6)

**Handling Cables** 

# Installation



The interlock switch can be mounted in two directions.

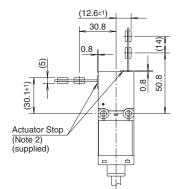
Slot Plug (Note 1) (supplied) Note 1: Plug the unused actuator entry slot using the slot plug supplied with the interlock switch.

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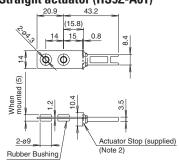
10.4

10.1

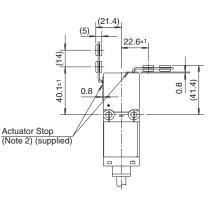
#### Using straight actuator (HS9Z-A61)



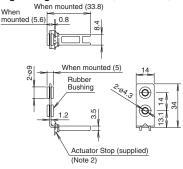
Straight actuator (HS9Z-A61)



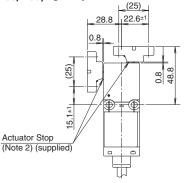
Using Right-angle actuator (HS9Z-A62)



Right-angle actuator (HS9Z-A62)



#### Using Angle Adjustable Actuator (HS9Z-A65/A66)



Actuator Installation Straight/Right-angle

Actuator

(ø4.3 or M4 tapped) Angle Adjustable Actuator



2-M4 Screws

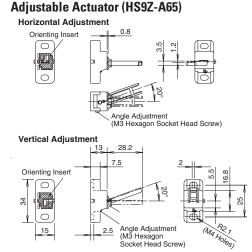
Overview

Overview

X Series E-Stops

Interlock Switches

Door



#### The orientation of actuator adjustment (horizontal/vertical) can be changed using the orienting insert (white plastic) installed on the back of the actuator.

Angle adjustment screws are stainless steel. When using adhesive

Note 2: After mounting the actuator, remove the actuator stop from the interlock switch.

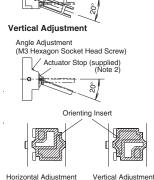
The base is made of glass-reinforced PA66 (66 nylon).

on screws, take material compatibility into consideration

Adjustable Actuator (HS9Z-A66) The HS9Z-A65 and HS9Z-A66 have the metal key inserted in opposite directions

#### Horizontal Adjustment

Angle Adjustment (M3 Hexagon Socket Head Screw)

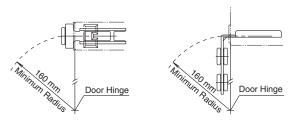


# Minimum Radius of Hinged Door

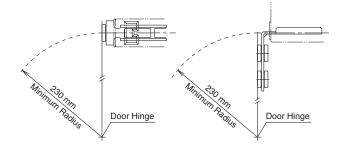
- · When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For doors with small minimum radius, use angle adjustable actuators (HS9Z-A65 or HS9Z-A66).
  - Note: Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

#### HS9Z-A62 Actuator

• When the door hinge is on the extension line of the interlock switch surface:

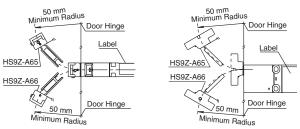


· When the door hinge is on the extension line of the actuator mounting surface:

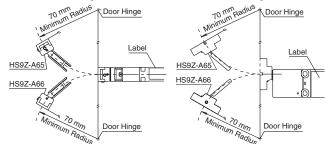


#### When using the HS9Z-A65/HS9Z-A66 Angle Adjustable (vertical) Actuator

• When the door hinge is on the extension line of the interlock switch surface: **Horizontal Swing** Vertical Swing



When the door hinge is on extension line of the actuator mounting surface: **Horizontal Swing** Vertical Swing



#### Actuator Angle Adjustment for the HS9Z-A65/HS9Z-A66

- Using the angle adjustment screw, the actuator angle can be adjusted (see figures on page 370).
- Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can enter properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not become loose.

# Safety Precautions

- In order to avoid electric shock or fire, turn power off before installation, removal, wiring, maintenance, or inspection of the interlock switch.
- If relays are used in the circuit between the interlock switch and the load, use only safety relays, since welded or sticking contacts of standard relays may invalidate the functions of the interlock switch. Perform a risk assessment and make a safety circuit which satisfies the requirements of the safety category.
- Regardless of door types, do not use the interlock switch as a door stop. Install a mechanical door stop at the end of the door to protect the interlock switch against excessive force.
- Do not apply excessive shock to the interlock switch when opening or closing the door. A shock to the interlock switch exceeding 1,000 m/s<sup>2</sup> may cause damage to the interlock switch.
- If the operating atmosphere is contaminated, use a protective cover to prevent the entry of foreign objects into the interlock switch through the actuator entry slots.

#### Mounting

Mount the interlock switch on the machine. Mount the actuator key on the hinged door.

Note: When mounting an actuator key, make sure that the actuator enters into the slot in the correct direction, as shown on the right.

#### **Recommended Screw Tightening Torque**

- Interlock switch (M4 screw): 1.0 to 1.5 N·m
- Actuator key (M4 screw): 1.0 to 1.5 N·m
- Mounting bolts are not supplied, and must be purchased separately by the user.

Note: The above recommended tightening torque of the mounting screw is the value with hex socket head bolts. When other screws are used and tightened to a smaller torque, make sure that the screws do not become loose after mounting.

#### Cable

- Do not fasten or loosen the gland at the bottom of the interlock switch.
- When bending cable during wiring, make sure that the cable radius is kept at 40 mm minimum.
- When wiring, make sure that water or oil does not enter from the end of cable.

DEC

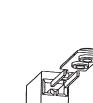
# Terminal Number Identification

• Wires can be identified by color and/or a white line printed on the wire.

- When wiring, the terminal number on each contact can be identified by wire color.
- The following diagrams show a safety (main) contact and one or two auxiliary contacts for two-contact and three-contact types.



• When wiring, cut any dummy insulation (black) and any unused wires at the end of the jacket to avoid incorrect wiring.



Gland

- Do not place a PLC in the circuit between the interlock switch and the load. Safety security can be endangered in the event of a malfunction of the PLC.
- Do not disassemble or modify the interlock switch, otherwise a malfunction or an accident may occur.
- Do not install the actuator in the location where a human body may come into contact. Otherwise injury may occur.

#### Instructions

- Entry of a considerable amount of foreign objects into the interlock switch may affect the mechanism of the interlock switch and cause a malfunction.
- Do not store the interlock switches in a dusty, humid, or organic-gas atmosphere.
- Use proprietary actuators only. When other actuators are used, the interlock switch may be damaged.
- Cover the unused actuator entry slot using the slot plug supplied with the interlock switch.

## Wire Identification

No.	Insulation Color	No.	Insulation Color
1	Orange/White	4	Brown
2	Blue/White	5	Blue
3	Brown/White	6	Orange

# **Safety Precautions**

**Operation Precautions - for all series** 

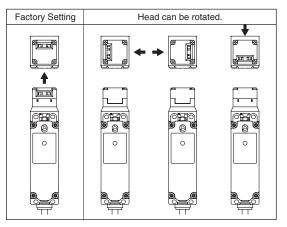
- In order to avoid electric shock or a fire, turn the power off before installation, removal, wire connection, maintenance, or inspection of the switch.
- If relays are used in the circuit between the safety switch and the load, consider degrees of the danger and use safety relays, since welded or sticking contacts of standard relays may invalidate the functions of the safety switch.
- Regardless of door types, do not use the safety switch as a door stop. Install a mechanical door stop at the end of the door to protect the safety switch against excessive force.
- Do not apply excessive shock to the switch when opening or closing the door.
- A shock to the door exceeding 1,000 m/sec<sup>2</sup> (approx. 100G) may cause the contacts of the switch to chatter, and a malfunction of the switch may occur.
- For connection of wires, unscrew the cover. Unnecessary loosening of other screws may cause a malfunction of the switch.

- Do not place a PLC in the circuit between the safety switch and the load. The safety security can be endangered in the event of a malfunction of the PLC.
- Do not disassemble or modify the switch. It may cause a breakdown or an accident.
- Prevent foreign objects such as dust and liquids from entering the switch while connecting conduit or wiring.
- If the operating atmosphere is contaminated, use a protective cover to prevent the entry of foreign objects into the switch through the actuator entry slots.
- Entry of a considerable amount of foreign objects into the switch may affect the mechanism of the switch and cause a breakdown.
- Do not store the switches in a dusty, humid, or organic-gas atmosphere.

#### **HS5E/HS5B** Precautions

For Rotating Head Directions

 The heads of the HS5E/HS5B can be rotated in 90° increments after removing the 4 screws on the corners of the head. Prevent entry of foreign objects into the switch during removal of the head. Tighten these screws with torque designated in the instruction sheet. Improper torque may cause errors.



#### **Minimum Radius of Hinged Doors**

• When using the interlock switch on hinged doors, refer to the minimum radius of doors shown below. When using on doors with small minimum radius, use the angle adjustable actuator (HS9Z-A55).

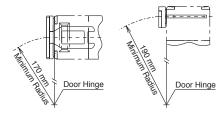
#### **Wire Connection**

- The HS2B has 3 conduit ports, which are closed as a part of the molded switch housing.
- Make an opening for wire connection by breaking one of the conduit-port knockouts on the switch housing using a screwdriver.
- When breaking the conduit port, take care not to damage the contact block or other parts inside the switch.

Note: Because deviation or dislocation of hinged doors may occur in actual applications, make sure of the correct operation before installation.

When using the HS9Z-A52 Actuator

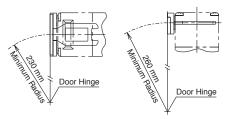
• When the door hinge is on the extension line of the interlock switch surface:



• When door hinge is on the extension line of the actuator mounting surface:

Cracks or burrs on the conduit entry may deteriorate the housing protection

· When changing to another conduit port, close the unused opening with an



**HS2B** Precautions

against water.

optional plug (Part No. HS9Z-P1).

X Series E-Stops

Door Interlock Switches

Enabling Switches

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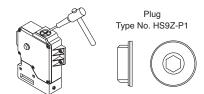
# IDEC

# Precautions

## **HS1E Precautions**

#### **Wire Connection**

- Make an opening for wire connection by breaking one of the conduit-port knockouts on the switch housing using a screwdriver.
- Before breaking the knockout, temporarily remove the connector-fixing lock nut from the switch.
- When breaking the knockout, take care not to damage the contact block or other parts inside the switch.
- Cracks or burrs on the conduit entry may deteriorate the housing protection.
- When changing to the other conduit port, close the unused opening with an optional plug (accessory).



#### Manual Unlocking

- Remove the screw located on the unlocking entry at the side of the switch using the key wrench included with the switch. Then insert a small screwdriver into the switch to push the lever inside of the switch toward the indicator until the actuator is unlocked (refer to the diagram on the right).
- Insert a small screwdriver into the elliptical hole on the back of the switch, then push the lever inside of the switch toward the indicator until the actuator is unlocked (refer to the diagram on the right).
- Regardless of door type, do not use the safety switch as a locking device. Install a locking device independently, for example, using a metal latch (also applicable to HS1E).
- The safety switch cover can be only removed with the special key wrench supplied with the switch or with the optional screwdriver (also applicable to HS1B and HS1E).
- Remove the screw located on the unlocking entry at the side of the switch using the key wrench included with the switch. Then insert a small screwdriver into the switch to push the lever inside of the switch toward the indicator until the actuator is unlocked (refer to the diagram on the right).

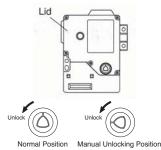


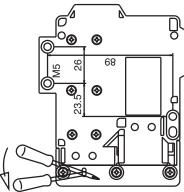
Caution: After the unlocking operation, put the screw back into the unlocking entry for safety.

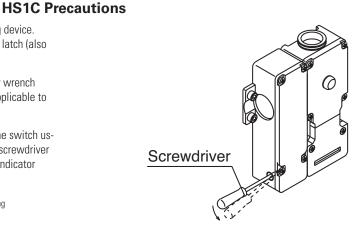


- This unlocking method is intended for an escape from a machine when a person is locked in. For access to the unlocking entry, an access hole should be opened on the mounting panel. When opening the hole, apply proper protection against water or other foreign objects.
- Caution: After the unlocking operation, put the screw back into the unlocking entry for safety.









X Series E-Stops

**Overview** 

Door

# **Operation Precautions**

#### **Applicable Crimping Terminals**

- (Refer to the Crimping Terminal 1 or 2 shown in the drawing below.)
- HS1C Terminals No. 1 to 6: Use solid or stranded wires only (crimping terminals not applicable). Terminals No. 7 and 8: Crimping Terminal 1 Ground Terminal: Crimping Terminal 2
- HS1B

Ground Terminal: Crimping Terminal 2 Other Terminals: Crimping Terminal 1 HS2B, HS5B, and HS1E Crimping Terminal 1

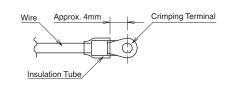


Use an insulation tube on the crimping terminal.



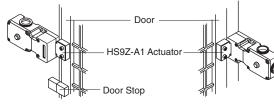


Crimping Terminal 2

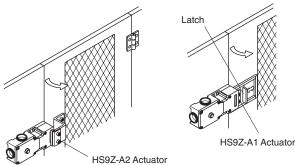


## Installation Examples (see the diagrams below)

#### Mounting on Sliding Doors

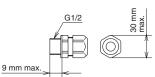


Mounting on Hinged Doors



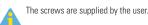
#### Applicable Connectors (As shown below)

- Use connectors which maintain the IP67 protection.
- Applicable Connector Dimensions
- Flex Conduit: VF03 (Japan Flex) www.nipolex.co.jp
- Steel Connector (G1/2): ALC-103 (PF13.5): RBC-103PG13.5



#### **Recommended Screw Tightening Torque**

- HS1C: 5.0±0.5 N-m (approx. 50±5 kgf-cm) (4 or 6 pcs of M5 hex socket head cap screws)
- HS1B: 5.0±0.5 N-m (approx. 50±5 kgf-cm) (2 or 4 pcs. of M5 hex socket head cap screws)
- HS2B: 5.0±0.5 N-m (approx. 50±5 kgf-cm) (2 pcs of M5 hex socket head cap screws)
- HS5B: 4.0±0.4 N-m (approx. 40±4 kgf-cm) (2 pcs of M4 hex socket head cap screws)
- HS1E: 5.0±0.5 N-m (approx. 50±5 kgf-cm) (4 or 6 pcs of M5 hex socket head cap screws)
- Actuator (HS9Z-A1/A2)
   5.0±0.5 N-m (approx. 50±5 kgf·cm)
- (2 pcs. of M6 hex socket head cap screws) Actuator (HS9Z-A51/A52)
- 2.0±0.2 N-m (approx. 20±2 kgf·cm) (2 pcs of M4 hex socket head cap screws)
- 1.0±0.2 N-m (approx. 10±2 kgf·cm) (2 pcs of M4 Phillips screws)



#### **Applicable Wire Size**

- HS1C: 0.5 to 0.75 mm<sup>2</sup> (Terminals No.1, 2, 5 to 8) 1.0 to 1.25 mm<sup>2</sup> (Terminals No.3, 4, and grounding terminal)
- HS5B: 0.5 to 1.25 mm<sup>2</sup>
- HS1E: 0.5 to 1.25 mm<sup>2</sup>

IDEC

# **Door Interlock Switches**

#### Actuator Angle Adjustment

- Using the screw (M3 hex socket head screw), the actuator angle can be adjusted (refer to the dimensional drawing). Adjustable angle: (0°) to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.

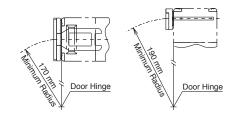
#### Minimum Radius of Hinged Door

 When using the interlock switch on hinged doors, refer to the minimum radius of doors shown below. When using on doors with small minimum radius, use the angle adjustable actuator (HS9Z-A55).

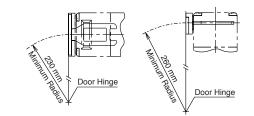
Note: Because deviation or dislocation of hinged doors may occur in actual applications, make sure of the correct operation before installation.

#### When using the HS9Z-A52 Actuator

• When the door hinge is on the extension line of the interlock switch surface:

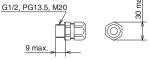


• When door hinge is on the extension line of the actuator mounting surface:



#### When using the HS9Z-A55 Angle Adjustable Actuator

- When door hinge is on the extension line of the interlock switch surface: 50 mm
- When door hinge is on the extension line of the actuator mounting surface: 70 mm
- Use a cable gland with a degree of protection IP67



#### When Using Flexible Conduits (Example) Flexible conduit example: VF-03 (Nihon Flex)

Conduit Port Size	Plastic Cable Gland	Metal Cable Gland		
G1/2	—	RLC-103 (Nihon Flex)		
PG13.5		RBC-103PG13.5 (Nihon Flex)		
M20	—	RLC-103EC20 (Nihon Flex)		

#### **Applicable Cable Glands**

all dimensions in mm

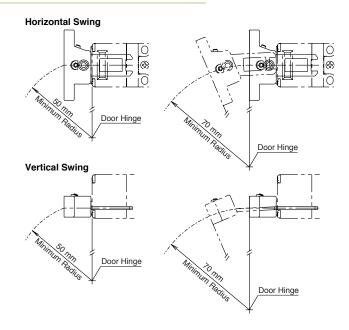
#### When Using Multi-core Cables (Example)

•		
Conduit Port Size	Plastic Cable Gland	Metal Cable Gland
G1/2	SCS-10* (Seiwa Electric)	ALS-16** (Nihon Flex)
PG13.5	ST13.5 (K-MECS)	ABS-**PG13.5 (Nihon Flex)
M20	ST-M20X1.5 (K-MECS)	ALS-**EC20 (Nihon Flex)

Different cable glands are used depending on the cable sheath outside diameter. When
purchasing a cable gland, confirm that the cable gland is applicable to the cable sheath
outside diameter.

 When using a 1/2-14NPT cable gland, use the HS5B interlock switch with M20 conduit port (Part No.: HS5B-\*\*\*BM) together with an adapter (Part No.: MA-M/NPT 20X1.5 5402-0110, K-MECS) and a gasket (Part No.: GP M20, K-MECS). Install a gasket between the interlock switch and the adapter. Apply sealing tape between the cable gland and the adapter to make sure of IP67 protection for the enclosure.

- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the entry slot of the safety switch.
- Recommended tightening torque: 0.8 N-m (approx. 8.0 kgf-cm)
- After adjusting the actuator angle, apply loctite or the like to the adjustment screw so as to prevent its loosening.



#### Actuator Angle Adjustment for the HS9Z-A55

- Using the angle adjustment screw, the actuator angle can be adjusted (see figures on page 370. Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not loosen.

Barriers

# X Series E-Stops

Interlock Switches

Door

**Enabling Switches** 

**Overview**