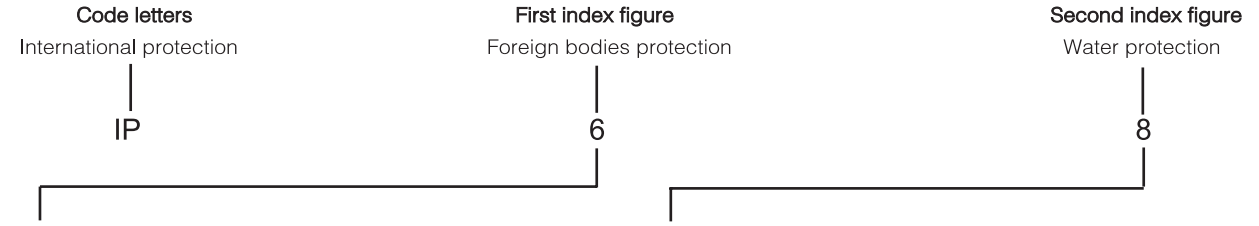
Hoods/housings connector insert protection

The connector ' s housing, sealing and locking mechanism protect the connection from external influences such as mechanical shocks, foreign bodies, humidity, dust, water or other fluids such as cleansing and cooling agents, oils, etc. The degree of protection the housing offers is explained in the IEC 60 529, DIN EN 60 529, standards that categorize enclosures according to foreign body and water protection.

The following table shows the different degrees of protection.



Index figure	Degree of protection
0	No protection: No protection against accidental contact, no protection against solid foreign bodies.
1	Protection against large foreign bodies: Protection against contact with any large area by hand and against large solid foreign bodies with Φ > 50mm.
2	Protection against medium sized foreign bodies: protection against contact with the fingers, protection against solid foreign bodies with Φ > 12mm.
3	Protection against small solid foreign bodies: Protection against tools, wires or similar objects Φ > 2.5mm, protection against small foreign solid bodies with Φ > 2.5mm.
4	Protection against grain–shaped foreign bodies: As 3 however, Φ > 1mm.
5	Protection against injurious deposits of dust: Full protection against contact, protection against interior injurious dust deposits.
6	Protection against ingress dust: Total protection against contact, protection against penetration dust.

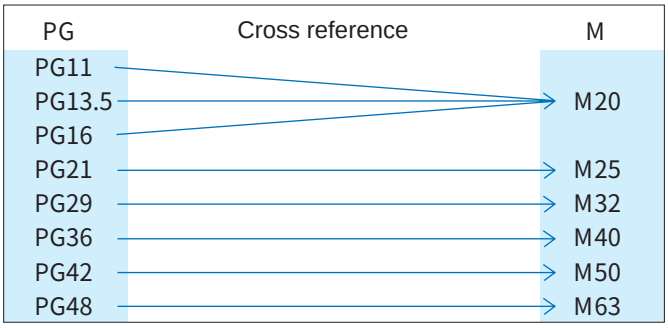
Index figure	Degree of protection
0	No protection against water.
1	Drip–proof: Protection against vertical water drips.
2	Drip–proof: Protection against water drips(Up to a 15° angle)
3	Spray–proof: Protection against diagonal water drips (Up to 60° angle)
4	Splash–proof: Protection against splashed water from all directions.
5	Hose–proof: Protection against water(out of a nozzle)from all directions.
6	Protection against flooding: Protection against temporary flooding.
7	Protection against immersion: Protection against temporary immersion.
8	Water–tight: Protection against temporary pressure.

Gland technical information

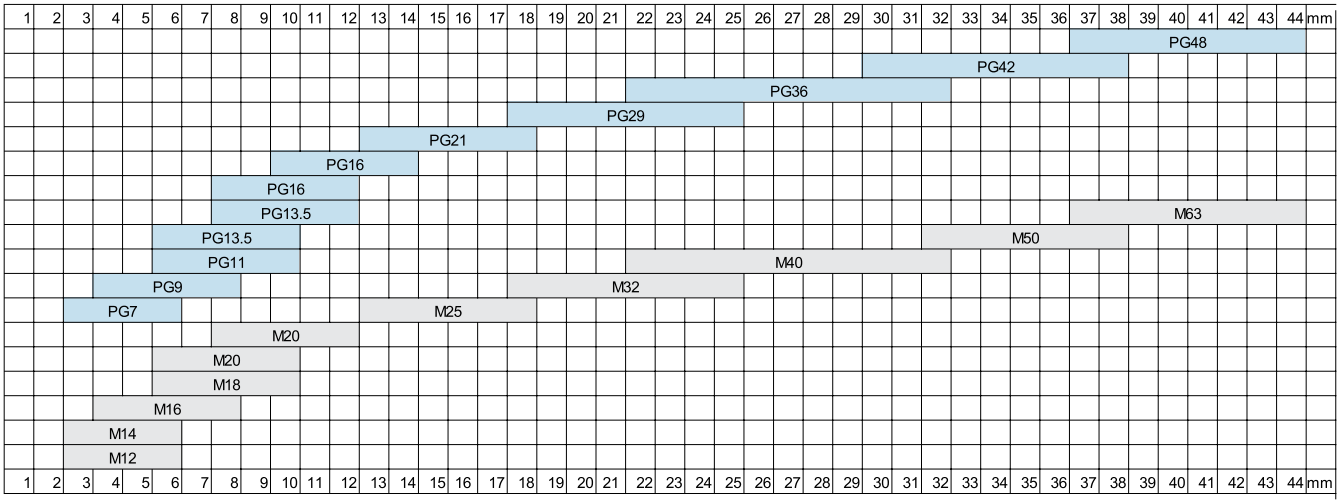
The adoption of metric threads considerably simplifies the understanding and specification of glands as the product type description contains the thread dimension.

The following Cross Reference table shows the correlation between the PG versions and the new metric types.

Please notice that the maximum cable diameter may be reduced by the new metric cable glands.

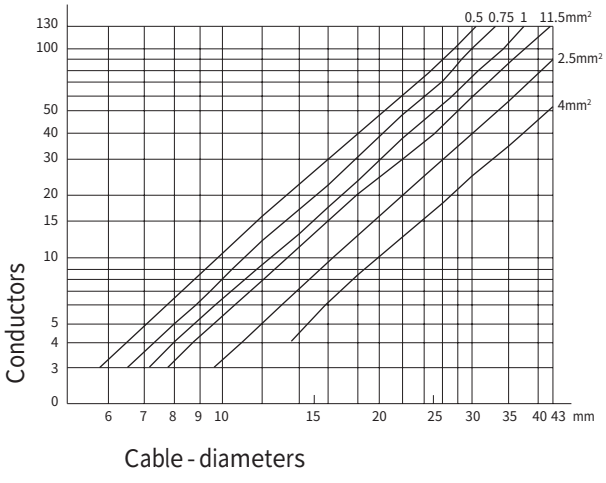


Below is shown the cable range of metric glands:



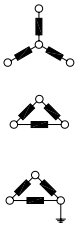
Cable

The diagram shows different cable - diameters,being dependent on wire gauges and number of conductors.
All data are averages for commercial cables.



Electrical engineering data

Rated impulse voltages (Table 5 of DIN EN 61984)

Nominal voltage of the supply system (= rated insulation voltage of equipment)					Preferred values for the rated impulse voltage kV (1.2/50 μs)			
					Overvoltage category			
					I	II	III	IV
Voltage line to earth derived from the nominal voltage of the supply system to the a. c. voltage (r. m. s. value) or d. c. voltage	AC voltage (r. m. s. value) 	AC voltage 	AC voltage (r. m. s. value d. c. voltage)	AC voltage (r. m. s. value d. c. voltage) 	Special protected levels	Level for electrical equipment (household and others)	Level for distribution supply systems	Input level
V	V	V	V	V				
100	66/115	66	60	—	0.5	0.8	1.5	2.5
150	120/208; 127/220	115; 120; 127	110; 120	220–110; 240–120	0.8	1.5	2.5	4
300	220/380; 230/400; 240/415; 260/440; 277/480	220; 230; 240; 260; 277	220	440–220	1.5	2.5	4	6
600	347/600; 380/660; 400/690; 415/720; 480/830	347; 380; 400; 415; 440; 480; 500; 577; 600	480	960–480	2.5	4	6	8
1000		660; 690; 720; 830; 1000	1000	—	4	6	8	12

Over-voltage category

The following categories in line with the standard IEC 60664–1

The overvoltage category is dependent on the mains voltage and the location at which the equipment is installed. It describes the maximum overvoltage resistance of a device in the event of a power supply system fault, e. g. in the event of a lightening strike. According to the relevant standards, there are 4 overvoltage categories.

Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriately low level.

Note: Examples are protected electronic circuits.

Equipment of overvoltage category II is energy–consuming equipment to be supplied from the fixed installation.

Note: Examples of such equipment are appliances, portable tools and other household equipment with similar loads.

Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availabil–ity of the equipment is subject to special requirements.

Note: Examples of such equipment are switches in the fixed installation and equipment for industrial use with permanent connection to the fixed installation. WAIN industrial connectors belong to the over–voltage type

Equipment of overvoltage category IV is for use at the origin of the installation.

Note: Examples of such equipment are electricity meters and primary overcurrent protection equipment.

Electrical engineering data

Pollution degree

The following categories in line with the standard IEC 60664–1

The dimensioning of operating equipment is dependent on environmental conditions. Any pollution or contamination may give rise to conductivity that, in combination with moisture, may affect the insulating properties of the surface on which it is deposited. The pollution degree influences the design of components in terms of the creepage distance. The pollution degree is defined for exposed, unpro–tected insulation on the basis of environmental conditions.

Pollution degree 1

No pollution or only dry, non–conductive pollution occurs. The pollution has no influence. such as computer and measuring instrument rooms, for example.

Pollution degree Ⅱ

Only non–conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be excepted. such as residential，sales，laboratories，precision engineering workshops, for example.

Pollution degree Ⅲ

Conductive pollution occurs or dry nonconductive pollution occurs which becomes conductive due to condensation which is to be excepted. such as unheated storage premises, workshops or boiler rooms, also for the electrical components of assembly or mounting equipment and machine tools, for example. WAIN heavy duty connectors are designed as standard for the Pollution Degree .

Pollution degree Ⅳ

The pollution generates persistent conductivity caused by conductive dust or by rain or snow. such as in outdoor or exterior areas such as equipment mounted on the roofs of locomotives or tramcars.

Special ruling for connectors

Subject to compliance with certain preconditions, the standard for connectors permits a lower pollution degree than that which applies to the installation as a whole. This means that in a pollution degree 3 environment, connectors may be used which are electrically rated for pollution degree 2.

Extract from DIN EN 61 984, Para. 6.19.2.2.

For a connector with a degree of protection IP 54 or higher according to IEC 60529, the insulating parts inside the enclosure may be dimensioned for a lower pollution degree, This also applies to mated connectors where enclosure is ensured by the connector housing and which may only be disengaged for test and maintenance purposes.

The conditions fulfills：

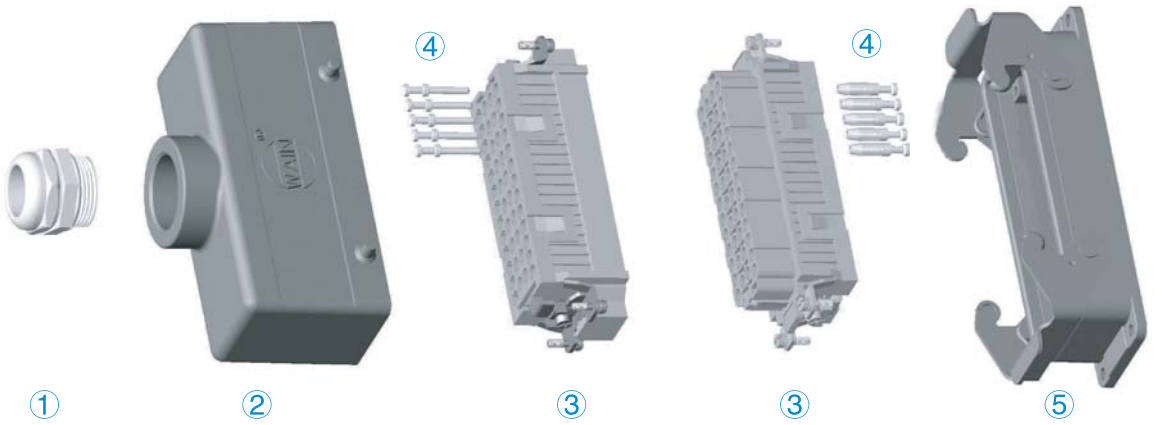
- a connector which is protected to at least IP 54 as per IEC 60 529.
- a connector which is installed in a housing and which as described in the standard is disconnected for testing and maintenance purposes only.
- a connector which is installed in a housing and which when disconnected is protected by a cap or cover to at least IP 54,
- a connector located inside a switching cabinet to at least IP 54.

Note:These conditions do not extend to connectors which when disconnected remain exposed to the industrial atmosphere for an indefinite period.

Typical applications in which to choose pollution degree 2 connectors:

- A connector serving a drive motor which is disconnected only for the purpose of replacing a defective motor, even when the plant or system otherwise calls for pollution degree 3.
- Connectors located inside a switching cabinet to IP 54. In such cases, it is even possible to dispense with the IP 54 housings of the connectors themselves.
- Connectors serving a machine of modular design which are disconnected for transport purposes only and enable rapid erection and reliable commissioning. In transit, protective covers or adequate packing must be provided to ensure that the connectors are not affected by pollution/contamination.

Parts of the heavy duty connector



1. Cable gland

Nylon or brass nickel plated
Universal cable glands
Cable gland with normal or multiple seal
Other Cable gland

2. Hoods

Low or high construction
Top or side cable entry
2blots or 4blots or 2 locking levers

3. Male insert or Female insert

Screw terminal
Crimp terminal
Cage-clamp terminal

4. Crimp contacts(only for crimp connection insert)

Golden plated or silver plated
Rated current: 5A, 10A, 16A, 40A ,70A,100A ,200A, 350A , 650A

5. Housings

Bulkhead mounting or surface mounting or cable to cable
Low or high construction
1 or 2 locking levers or 4bolts
With or without thermoplastic / metal covers

Except standard enclosure, special enclosures with high protection level (IP68) and EMC screening are also available for clients.

*For customize requirement,please contact us.

Contents

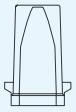
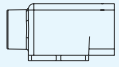
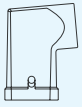
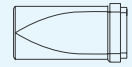
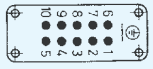
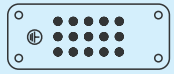
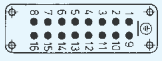
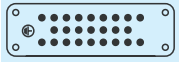
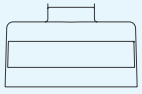
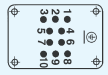
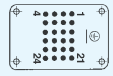
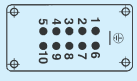
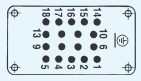
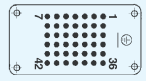
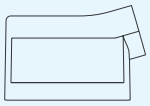
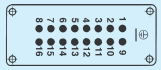
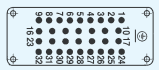
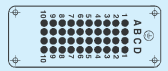
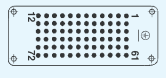
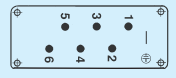
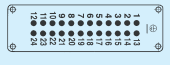
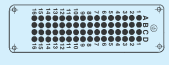
Inserts

Contents

Hoods/Housings

Crimp contacts

Accessories

HOOD \ INSERT		HA Series Screw terminal Crimp terminal	HE Series Screw terminal Spring terminal Crimp terminal	*HEE Series Crimp terminal	*HD Series Crimp terminal	*HDD Series Crimp terminal	HSB Series Screw terminal	HK Series Screw terminal	HOUSING 下壳
3A		 230/400V10A3p+⏚			 250V10A7p+⏚				
		 230/400V10A 4p+⏚			 250V10A 8p				
10A		 250V16A 10p+⏚			 250V10A 15p+⏚				
16A		 250V16A 16p+⏚			 250V10A 25p+⏚				
32A		Suitable for 2 inserts of size 16A							
6B			 500V16A 6p+⏚	 500V16A 10p+⏚		 250V10A 24p+⏚			
10B			 500V16A 10p+⏚	 500V16A 18p+⏚		 250V10A 42p+⏚		HK–008/24	
16B			 500V16A 16p+⏚	 500V16A 32p+⏚	 250V10A 40p+⏚	 250V10A 72p+⏚	 400V/690V35A6p+⏚	HK–004/0 HK–004/2 HK–006/12 HK–006/36 HK–012/2	
24B			 500V16A 24p+⏚	 500V16A 46p+⏚	 250V10A 64p+⏚	 250V10A 108p+⏚		HK–004/8 HK–006/6 HK–008/0	
32B		Suitable for 2 inserts of size 16B							
48B		Suitable for 2 inserts of size 24B							

*Modified contact loading arrangement permits use up to 500V, 690V 1000V at insulation group C.

Product overview

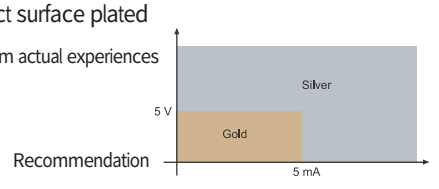
Terminations technology

Overview inserts with axial screw terminal

Insert	Wire gauge	Stripping length	Tightening torque	Max. cable insulation diameter	Size hexagon recess	Insert dimension for cable indication (ISK)
	(mm²)	(mm)	(Nm)	(mm)	(SW)	(mm)
HK-004/4 finger proofed	6 - 16	6 mm²: 11+1 10 mm²: 11+1 16 mm²: 11+1	6 mm²: 2 10 mm²: 3 16 mm²: 4	8.9	2.5	7.4 PE:1.5
	10 - 22	10 mm²: 11+1 16 mm²: 11+1 22 mm²: 11+1	10 mm²: 3 16 mm²: 4 22 mm² 5	8.9 8.9 11	2.5	7.4 7.4 5.4 PE: 1.5
HK-004/4	6 - 16	6 mm²: 11+1 10 mm²: 11+1 16 mm²: 11+1	6 mm²: 2 10 mm²: 3 16 mm²: 4	8.9	2.5	7.4 PE: 1.5
	10 - 22	10 mm²: 11+1 16 mm²: 11+1 22 mm²: 11+1	10 mm²: 3 16 mm²: 4 22 mm² 5	8.9 8.9 11	2.5	7.4 7.4 5.4 PE: 1.5
HK-006/12	2.5 - 8	2.5 mm²: 8+1 4 mm²: 8+1 6 mm²: 8+1 8 mm²: 8+1	2.5 mm² 1.5 4 mm²: 1.5 6 mm²: 2 8 mm²: 2	6.2	2	4.7
	6 - 10	6 mm²: 8+1 8 mm²: 8+1 10 mm²: 8+1	6 mm²: 2 8 mm²: 2 10 mm²: 2	6.2	2	4.7
HK-006/6	10 - 25	13+/-1	10 mm²: 6 16 mm²: 6 25 mm²: 7	11.4	4	4.9
	16 - 35	13+/-1	16 mm²: 6 25 mm²: 7 35 mm²: 8	11.4	4	4.9
HK-008/0	10 - 25	13+/-1	10 mm²: 6 16 mm²: 6 25 mm²: 7	11.4	4	4.75
HQ-002 HQV-002 High Voltage	2.5 - 10 2.5 - 10	8+1 PE: 2 mm longer	1.8	7.3	2	5.6
200 A module without PE 200 A module with PE	25 - 40	25 mm²: 16 40 mm²: 16	25 mm²: 8 40 mm²: 8	12 16	5	3
200 A module without PE 200 A module with PE	40 - 70	40 mm²: 16 70 mm²: 16	40 mm²: 9 70 mm²: 10	12 16	5	3
100 A module	10 - 25	13+/-1	10 mm²: 6 16 mm²: 6 25 mm²: 7	11.4	4	4.9
	16 - 35	13+/-1	16 mm²: 6 25 mm²: 7 35 mm²: 8	11.4	4	4.9
	38	13+/-1	8	11.4	4	4.9
70 A module	6 - 16	6 mm²: 11+1 10 mm²: 11+1 16 mm²: 11+1	6 mm²: 2 10 mm²: 3 16 mm²: 4	8.9	2.5	7.4
	14 - 22	12.5+1	14 mm²: 4 16 mm²: 4 22 mm²: 5	10	2.5	5.9
40 A module	2.5 - 8	2.5 mm²: 5+1 4 mm²: 5+1 6 mm²: 8+1 8 mm²: 11+1	2.5 mm²: 1.5 4 mm²: 1.5 6 mm²: 2 10 mm²: 2	4 4 6 10.5	2	4.7
	6 - 10	6 mm²: 8+1 10 mm²: 11+1	6 mm²: 2 10 mm²: 2	6 10.5	2	4.7

The selection of contact surface plated

Below is a table derived from actual experiences



Terminations technology

Module with axial screw terminal	2.5 - 8 6 - 10	2.5 mm²: 5+1 4 mm²: 5+1 6 mm²: 8+1 10 mm²: 11+1	2.5 mm²: 1.5 4 mm²: 1.5 6 mm²: 2 10 mm²: 2	4 4 6 8.2	2	5.2
HK-003/0 straight	35 - 70	22	35 mm²: 8 50 mm²: 9 70 mm²: 10	15	5	8.2
HK-003/0 angled	35 - 70	22	35 mm²: 8 50 mm²: 9 70 mm²: 10	15	5	9
HK-003/2 straight	35 - 70	22	35 mm²: 8 50 mm²: 9 70 mm²: 10	15 PE: 10	5	8.2 PE: 7.2
HK-003/2 angled	35 - 70	22	35 mm²: 8 50 mm²: 9 70 mm²: 10	15 PE: 10	5	9.0
HC Modular 350	35 - 70	19+1	35 mm²: 8 50 mm²: 10 70 mm²: 12	19.5	5	13
	95 - 120	19+1	95 mm² 14 120 mm² 16	19.5	5	13
Ground contact for HC Modular 350	35 - 70	19+1	35 mm²: 8 50 mm²: 10 70 mm²: 12	-	5	-
HC Modular 650	70 - 120	23+2	70 mm²: 12 95 mm²: 14 120 mm²: 16	26.5	8	28
	150 - 185	23+2	150 mm²: 17 185 mm²: 18	26.5	8	28

Overview inserts with crimp terminal

Wire gauge		Internal diameter	Stripping length l (mm)		
(mm²)	AWG	Ø (mm)	HDD HD R15 Modular (10 A)	HE HA Hv E (16 A)	HC (40 A)
0.14 ... 0.37	26 ... 22	0.9	8	-	-
0.5	20	1.15	8	7.5	-
0.75	18	1.3	8	7.5	-
1	18	1.45	8	7.5	-
1.5	16	1.75	8	7.5	9
2.5	14	2.25	6	7.5	9
4	12	2.85	-	7.5	9.6
6	10	3.5	-	-	9.6
10	8	4.6	-	-	15

	Conductor cross-section	ø	Stripping length
100 A Modul	10 mm²	4.3 mm	19.0 mm
	16 mm²	5.5 mm	19.0 mm
	25 mm²	7.0 mm	19.0 mm
	35 mm²	8.2 mm	16.0 mm
HC Modular 350	35 mm²	8.2 mm	26.0 mm
	50 mm²	10.0 mm	28.0 mm
	70 mm²	11.5 mm	28.0 mm
	95 mm²	13.5 mm	30.0 mm
	120 mm²	15.5 mm	24.0 mm
HC Modular 650	240 mm²	22.5 mm	50.0 mm
for fine stranded wires according to IEC 60 228 class 5			

Others

Recommended tightening torque and size of screw driver.

Size of screw	Connector type	Tightening torque (N.m)	Tightening torque (lbft)	Recommended size of screw driver
M3	Screw terminal HA - 003/HA - 004	0.25	0.20	0.4x2.5
M3	Screw terminal HA - 010/HA - 016	0.50	0.40	0.5x3.5 or+size 1
M3	Screw terminal HE, fixing serews of all kinds, guiding pins and bushes	0.50	0.40	0.5x3.5
M4	Ground terminal HA,HE,HD,HDD	1.20	0.90	0.5x3.5 or+size 1+2
M4	Terminal blocks HSB	1.20	0.90	0.80x4.5
M5	Ground terminal HSB	2.00	1.40	0.8x4.5 or 1.2x8