

HAWKE
International

CONTROLEX ENCLOSURES

For Harsh & Hazardous Environments



www.hubbell.com/hawke







Introducing Hawke's **ControlEx** range of Connectors

The 4th generation of ControlEx Connectors include many features and refinements as a result of consumer feedback, which makes them particularly suitable for control and low/medium power applications.

The robust stainless steel body can hold up to 60 contacts and will accept conductor sizes ranging between 0.5mm² and 35mm², operating up to 125A and 750V as standard (higher voltages may be available on request).

The ControlEx range of connectors is ideal for use in control and low/medium power applications. Front loaded design allows for easy assembly and installation of Exd compound barriers during termination.



International Approvals



Connector Plug - CP

Bulkhead Receptacle - BR

Connector Receptacle - CR

Technical Data

Material Options	Manufactured in 316L Stainless Steel
Ingress Protection	IP66 67
Deluge Protection	to DTS01
Operating Temperature	-40°C to +80°C
Applications	Suitable for use in Zone 1, Zone 21, Zone 2 and Zone 22

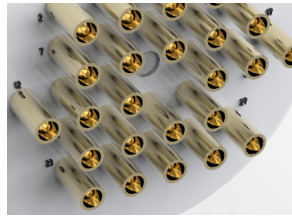
Global Approvals

Protection Class	Ex IM2 Ex db IIC T6/T5 Gb Ex II 2GD Ex db IIC T6/T5 Gb; Ex tb IIIC T80/95°C Db IP66/67
ATEX Certificate No	CML 23 ATEX 1064X
IECEx Certificate No	IECEx CML 23.0026X
UKEX Certificate No	CML 23 UKEX 1065X
Construction & Test Standards	IEC/EN 60079-0, 1, 31
Marine Approvals	ABS: 17-LD1653736-PDA BV: 43523/B0 DNV: TAE00003RX
Additional Certifications	EAC: EA3C KZ 7100841.01.01.03126 EQM: 20-11-27224/Q20-11-000979/NB0007 Inmetro: IEx 14.0216X PESO: P411510

NEC/CEC Approvals

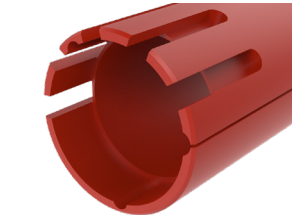
NEC Protection Class	Class I, Zone 1, AEx d IIC T6/T5 Gb, AEx tb IIIC T80/T95°C Db IP66/67
CEC Protection Class	Ex db IIC T6/T5 Gb, Ex tb IIIC T80/T95°C Db IP66/67
c CSA us Certificate	2633583
Construction & Test Standards	CSA C22.2 NO. 0-10, 0.4:04, 182.1-13, 182.3-M1987, CSA 22.2 60079-0, 1, UL 1977, UL/IEC 60079-0,1,31

CONTROLEX



1 Easy Fieldwireable

Pin and socket inserts are numbered front and back to assist wiring and avoid termination errors. Crimp and solder inserts available..



2 Internal Keyway Spacer

Allows quick hassle-free assembly as spacer is fitted after insert termination is complete. Spacers are specific to connector style to ensure foolproofed keyway engagement. Red for receptacle, Purple for plug.



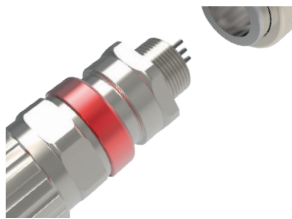
3 Locking Pin - optional

Provides the facility for mated connectors to be permanently locked, via the use of a padlock, ensuring they cannot be separated under load. (Padlock not supplied)



4 Keying Position

The unique visual 5 position insert keying system (3 on Ex16) with the integral machined keyways prevent contact damage ensuring safe use by eliminating the possibility of misconnection of adjacent circuits.



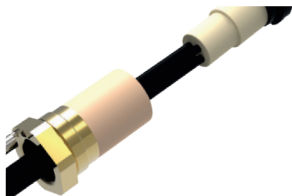
5 Running Coupler

Allows the connector to be installed onto a pre-assembled cable gland. Connector is front loaded and includes locking engaging nut.



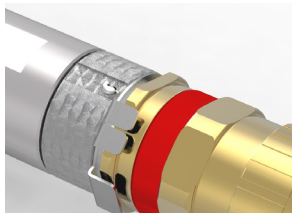
6 Acme Thread at Mating Interface

Unique ACME thread offers a smooth and quick fully mating action.



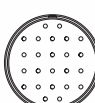
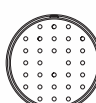
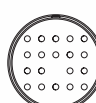
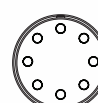
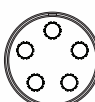
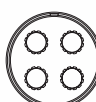
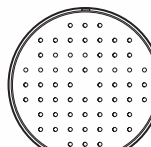
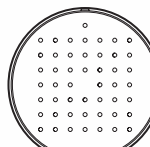
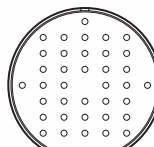
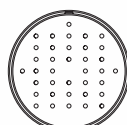
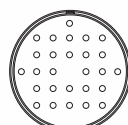
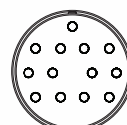
7 Fully Inspectable Flameproof Barrier

For direct inspection of the flameproof seal integral to the bulkhead receptacle for reassurance of safety. Supplied with express resin for faster installation.



8 Anti-Rotation Device

Connector plugs and receptacles come complete with anti-rotation ring. When fitted between the connector and gland, helps to eliminate the possibility of the gland loosening, locking in position.

																																				
Ex16 - 3 x 1.5	Ex16 - 4 x 1.5	Ex25 - 4 x 1.5	Ex25 - 9 x 1.5	Ex25 - 12 x 1.5	Ex25 - 4 x 2.5	Ex25 - 7 x 2.5	Ex25 - 4 x 6 Soldered Only																													
					<table><tr><th colspan="3">Pin Insert Connection Internal Diameters</th></tr><tr><th rowspan="2">Insert Size</th><th colspan="2">Nominal Internal Cup Diameter (mm)</th></tr><tr><th>Soldered</th><th>Crimped</th></tr><tr><td>1.5mm²</td><td>2.0</td><td>2.0</td></tr><tr><td>2.5mm²</td><td>3.0</td><td>3.0</td></tr><tr><td>6mm²</td><td>3.5</td><td>3.2</td></tr><tr><td>10mm²</td><td>7.0</td><td>4.0</td></tr><tr><td>16mm²</td><td>7.0</td><td>5.0</td></tr><tr><td>25mm²</td><td>8.0</td><td>6.5</td></tr><tr><td>35mm²</td><td>8.0</td><td>8.3</td></tr></table>			Pin Insert Connection Internal Diameters			Insert Size	Nominal Internal Cup Diameter (mm)		Soldered	Crimped	1.5mm ²	2.0	2.0	2.5mm ²	3.0	3.0	6mm ²	3.5	3.2	10mm ²	7.0	4.0	16mm ²	7.0	5.0	25mm ²	8.0	6.5	35mm ²	8.0	8.3
Pin Insert Connection Internal Diameters																																				
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6mm ²	3.5	3.2																																		
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16mm ²	7.0	5.0																																		
25mm ²	8.0	6.5																																		
35mm ²	8.0	8.3																																		
Ex32 - 12 x 1.5	Ex32 - 19 x 1.5	Ex32 - 10 x 2.5	Ex32 - 12 x 2.5	Ex32 - 4 x 6																																
																																				
Ex32 - 6 x 6	Ex132 - 3 x 10	Ex32 - 4 x 10	Ex32 - 3 x 16	Ex32 - 4 x 16																																
																																				
Ex40 - 24 x 1.5	Ex40 - 30 x 1.5	Ex40 - 19 x 2.5	Ex40 - 8 x 6	Ex40 - 5 x 10																																
			ControlEx Inserts 																																	
Ex40 - 5 x 16	Ex40 - 4 x 25	Ex40 - 4 x 35																																		
																																				
Ex50 - 37 x 1.5	Ex50 - 27 x 2.5	Ex50 - 13 x 6																																		
					Ex63 - 37 x 2.5	Ex63 - 49 x 1.5	Ex63 - 60 x 1.5																													

Working Voltage Information

Hawke ControlEx Connectors have a maximum working voltage of 750V AC/DC as standard. 3rd & 4th generation ControlEx Connectors can be connected together within certification. Other voltages available on special request.

Insert Selection Table		
Connector Shell Size	Conductor Size	Quantity of Contacts
Ex 16	1.5mm ²	3
		4
Ex25	1.5mm ²	4
		9
		12
	2.5mm ²	4
	6mm ²	7
Ex32	1.5mm ²	4
		10
		12
	2.5mm ²	4
		6
		10
	6mm ²	3
		4
Ex40	1.5mm ²	24
	2.5mm ²	30
	25mm ²	19
	35mm ²	4
Ex50	1.5mm ²	4
	2.5mm ²	37
	6mm ²	27
Ex63	1.5mm ²	13
	2.5mm ²	49
		60
		37

All configurations are provided with internal and external earthing points.

Connectors Order Codes

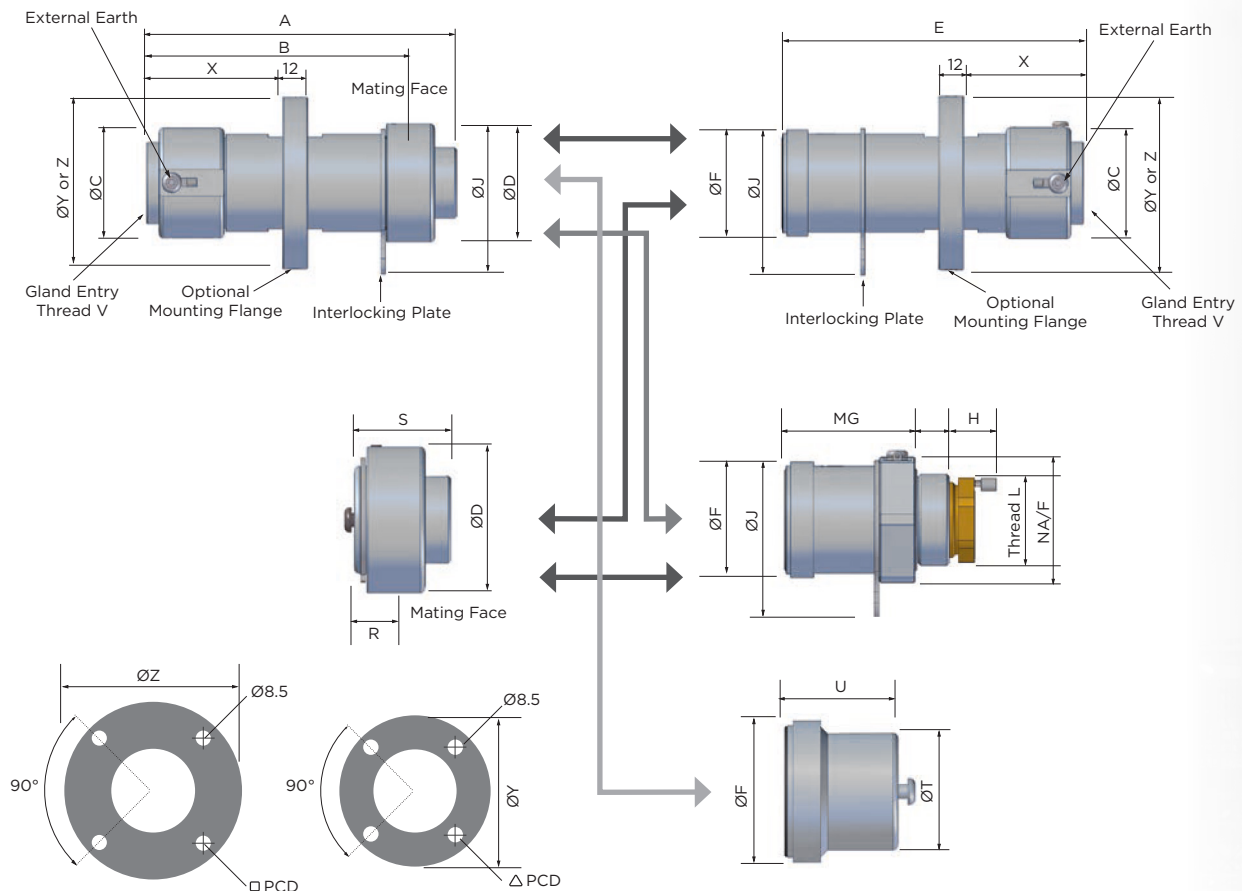
Hawke International does not recommend the use of their ControlEx Connectors in applications where rigid PVC/ SWA/PVC power cabling (typically to BS 6346 standards or equivalent) is used in portable/semi-portable applications.

Order Code Builder			
ControlEx Connector			
Parameter	Select Code	Description	Example Code
Protection Concept	Exd	Flameproof	Exd
Shell Size	16	Ex16 Shell Size	32
	25	Ex25 Shell Size	
	32	Ex32 Shell Size	
	40	Ex40 Shell Size	
	50	Ex50 Shell Size	
	63	Ex63 Shell Size	
Material	S	Stainless Steel	S
Connector Style	CP	Connector Plug	CP
	CR	Connector Receptacle	
	BR	Bulkhead Receptacle	
Keying System	V	Variable Keyway	V
Quantity of Contacts	See Insert Selection Table		19
	X	No Insert	
Contact Size (mm ²)	See Insert Selection Table		1.5
	X	No Insert	
Insert Type	P	Pin	S
	S	Socket	
	X	No Insert	
Termination Style BR is always solder for 6mm ² contacts and above	S	Solder	C
	C	Crimp	
	X	No Insert	
Flange Type*	FL	Mounting Flange	FL
	SF	Split Flange	
Cap Type	FRC	Flameproof Receptacle Cap	FPC
	FPC	Flameproof Plug Cap	
Locking Pin*	P	Locking Pin	P
Cable Gland Reduced Entry*	R20	Reduced Cable Gland Entry M20 (Ex 25 and Ex 32 only)	R25
	R25	Reduced Cable Gland Entry M25 (Ex 40 & Ex 32 only)	
	R32	Reduced Cable Gland Entry M32 (Ex 50 & Ex 40 only)	
	R40	Reduced Cable Gland Entry M40 (Ex 63 & Ex 50 only)	
	R50	Reduced Cable Gland Entry M50 (Ex 63 only)	
Certification Type	A	Group II : ATEX / IECEx / UKEx / InMetro / EAC	A
	B	Group I: ATEX/ IECEx/ UKEx	
	N	Group II: ATEX / IECEx / UKEx / InMetro / cCSAus (Voltage reduced to 600V)	
Ambient Rating & T Class	7	T5/T6 Tamb -40°C to +60°C (see P9 table)	7

*If not required, omit this parameter from the order code



Dimensions & Technical Specifications



ControlEx Series Dimensions (mm)

Dimension	Ex16	Ex25	Ex32	Ex40	Ex50	Ex63
A	127	152	152	152	152	148
B	105	128	129	129	129	126
Ø C	36	46	53	60	66	83
Ø D	37	49	57	65	76	90
E	128	152	152	152	152	152
Ø F	32	45	51	59	70	83
G	15	15	15	15	15	15
H (nominal)	20	20	20	20	20	20
J (Aperture Clearance Hole)	55	65	75	85	95	115
*Thread L (1.5mm Pitch)	M25	M32	M40	M50	M63	M75
M	54	54	56	56	56	56
N A/F	36	46	55	65	80	95
R	15	15	15	16	16	17
S	38	38	38	39	39	40
Ø T	28	34	42	51	60	73
U	40	40	40	40	40	40
Thread V (1.5mm Pitch)	M20	M25	M32	M40	M50	M63
X (nominal)	54	70	70	70	70	67
Ø Y	66	76	83	91	102	117
Δ	49	59	66	74	85	100
Ø Z	87	99	105	117	129	147
□	70	82	88	100	112	130

Electrical Specification

Table 1: Maximum Allowable Dissipated Wattage

Connector Shell Size	Ambient Temperature (Tamb)	Maximum Dissipated Wattage by T-Rating	
		T6	T5
Ex16	-40°C to +40°C	5W	7W
	-40°C to +50°C	4W	6W
	-40°C to +60°C	2.6W	4.6W
Ex25	-40°C to +40°C	8W	11W
	-40°C to +50°C	6W	10W
	-40°C to +60°C	4W	7W
Ex32	-40°C to +40°C	10.5W	14.5W
	-40°C to +50°C	8W	12W
	-40°C to +60°C	5.4W	9W
Ex40	-40°C to +40°C	12W	17W
	-40°C to +50°C	9W	14W
	-40°C to +60°C	5.5W	10.5W
Ex50	-40°C to +40°C	13W	20W
	-40°C to +50°C	10W	17W
	-40°C to +60°C	6.5W	12.5W
Ex63	-40°C to +40°C	17W	29W
	-40°C to +50°C	13W	24W
	-40°C to +60°C	8.5W	17W

Table 2: Combined Cable and Contact Resistance (Ohms)

Contact Size	Soldered	Crimped	Contact Current Rating*
1.5mm ²	0.0166Ω	0.0173Ω	10 amps
2.5mm ²	0.0102Ω	0.0109Ω	17 amps
6mm ²	0.0047Ω	0.0054Ω	30 amps
10mm ²	0.0027Ω	0.0033Ω	78 amps
16mm ²	0.0018Ω	0.0024Ω	78 amps
25mm ²	0.0012Ω	0.0018Ω	125 amps
35mm ²	0.0009Ω	0.0015Ω	125 amps

*Alternative values for cCSA, see cCSA Max Ampacity Table

cCSA Max Ampacity

Connector Shell Size	Conductor Size		Max Current
	mm ²	AWG	Amps (A)
Ex 16	1.5	16	10
	2.5	14	17
Ex 25	1.5	16	10
	2.5	14	17
	6	10	30
Ex 32	1.5	16	10
	2.5	14	17
	6	10	30
	10	8	78
	16	6	78
Ex 40	1.5	16	10
	2.5	14	17
	25	4	125
	35	2	125
Ex 50	1.5	16	10
	2.5	14	17
	6	10	30
Ex 63	1.5	16	10
	2.5	14	17

Cable Types Permitted for Canada (CEC) Applications					
Cable Types		Cable Classification			
		Class I Div 1	Class I Div 2	Class II Div 1	Class II Div 2
Armoured	AC90HL, ACG90HL, AC90	✓	✓	✓	✓
	TECK 90 -HL,	✓		✓	✓
	RA-90-HL, RA90	✓		✓	✓
	TECK 90		✓		✓
	RC90		✓		✓
	ACIC		✓		✓
Unarmoured	TC, TC-ER		✓		✓
	RW90		✓		✓
	CIC		✓		✓

The above table denotes suitable cable selections dependent on hazardous area classification, in line with the requirements of the CEC. For NEC applications the cable type is not limited by the ControlEx Connector. The end user shall specify the correct cable type and gland for their applications. The appropriate gland shall be selected by the end user for the type of cable used in the application.

Bulkhead Connector Express Resin Quantities		
Shell Size	Express Resin Cartridge Size	Quantity Required
Ex16	14ml	1
Ex25	14ml	1
Ex32	24ml	1
Ex40	24ml	2
Ex50	24ml	3
Ex63	24ml	4

When ordering end items from Hubbell, the hand dispense cartridges above are provided as standard as part of the BR kit. If ordering from distribution partners, alternatively 50ml cartridges can be ordered which are dispensed with a gun and can be used across multiple bulkhead connectors.

Dissipated Wattage Calculation

Equation Definitions

W = Dissipated wattage factor of the connector

N = The number of conductors to be terminated/number of contacts required.
(Note: A contact comprises of a pin and socket).

I = The current requirement per contact.

(Note: This must be equal to or less than the maximum current rating of the contact, as shown in table 2).

R = The combined cable and contact resistance (see table 2)

Values pertinent to these definitions must then be input into the following equation to calculate the dissipated wattage (w) of your chosen arrangement:

W = N x I² x R (Note: The results must be lower than the maximum figure shown in table 1 for the appropriate temperature class and ambient temperature).

e.g. T6 40°C ambient application with 9 x 1.5mm² conductors, running at 7 amps.

N = 9 contacts I = 7 amps R = 0.0166Ω (1.5mm² soldered combined cable and contact resistance)

Therefore W = 9 x 49 x 0.0166Ω = 7.32 watts.

Therefore, an Ex25 Connector should be specified for this application as the shell size can accommodate the required 9 x 1.5mm² pin/socket inserts (See Insert Selection Table) and the resultant dissipated wattage (7.32 watts) is below the maximum permitted 8 watts (See Table 1)

This equation can also be transposed to facilitate the calculation of the maximum number of conductors permitted in your selected connector (1) and the maximum allowable current within the upper ambient temperature of our location (2).

$$① \quad N = \sqrt{\frac{W}{N \times R}}$$

$$② \quad I = \sqrt{\frac{W}{N \times R}}$$

The result of equation (2) must not exceed the maximum current rating of contacts (see table 2).

Note: Unless otherwise requested, connectors will be marked as T5 with an upper ambient temperature of +40°C.

Hawke Connectors Range

Utilising the most advanced technology, Hawke connectors are designed for quick and easy termination. Boasting market-leading features like the complete elimination of cross-mating, high reliability contacts and much more, the Hawke Connector range guarantees innovation, safety and reliability.

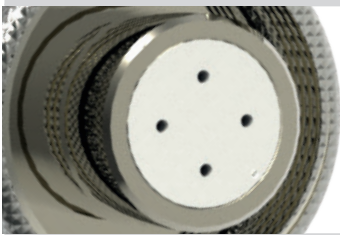
The range is ideal for use in dust and gas hazardous areas commonly found in Oil and Gas exploration and production and chemical process plants. Hawke connectors may also be used in explosive dust environments and hostile non-explosive environments.

The Hawke Connector range has been designed for four electrical application areas: Instrumentation, Control, Power and Fibre. Take a closer look at our range, below.



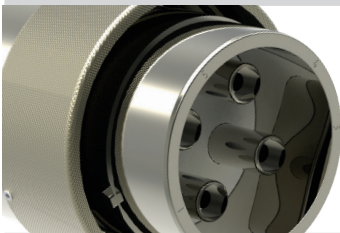
InstrumEx

The revolutionary InstrumEx allows for the live mate and de-mating of signal and low power in hazardous areas safely and quickly.



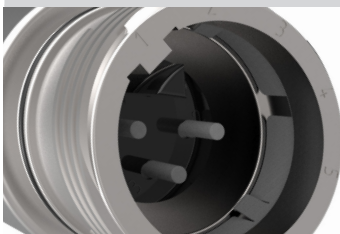
ControlEx

ControlEx is ideal for use in control and low/medium power applications. Front loaded design allows for easy assembly and installation of Exd compound barriers during termination.



PowerEx

The PowerEx range has been designed specifically for the extremely demanding requirements of higher power applications up to 780A and 750V as standard. Other voltages are available on special request.



FibreEx

The Fibre Ex from Hawke and Acal BFi combines the strength of Hawke's market-leading connection range with the latest in Ex Fibre-Optic specifications.

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