# CTCS CONNECTION SYSTEM FAMILY OVERVIEW



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# The Challenge

Stringent emissions regulations Harsh operating environments

Alternative powertrains
Increased electrical architecture
complexity

More robust and reliable connection systems are needed

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#### **The Solution**

Introducing the CTCS connection system family.

A versatile solution with designed in reliability and superior performance, for the transportation market and heavy duty applications.



#### Robust features, meaningful benefits

# Versatile connection systems

- A complete portfolio of connectors, accessories, terminals, seals, and hand crimp tools
- Terminal flexibility: interchangeable with other industry terminals
- Mounting flexibility: panel, strap/clip, and bracket
- Application flexibility: perfect for cab, chassis, engine compartment, and onengine applications
- Offered in both non-V0 and V0 materials

# Unparalleled reliability and performance

#### Improved vibration resistance

- Up to 30G sine, 20Grms random 330 hrs./axis
- Robust back shells

#### High temperature ratings

Up to -40 to +140°C

#### Superior environmental protection

 Additional connector shielding for protection against debris ingress

# Designed for the transportation market

- Robust solution from an electrical component expert with over 100 years of experience
- Meets or exceeds a wide range of commercial vehicle validation standards

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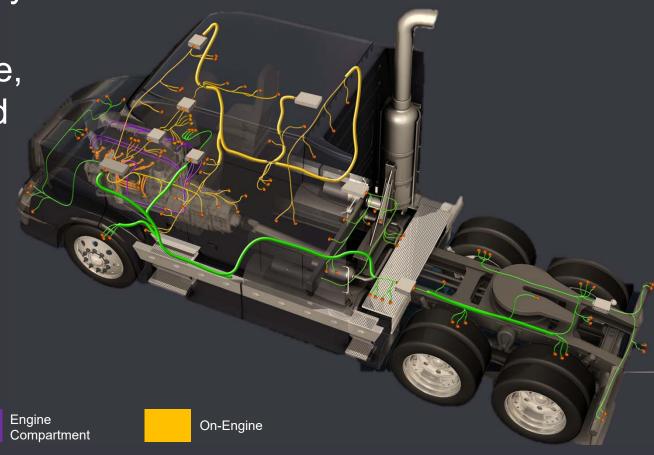
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Main Part Numbers The broad CTCS family covers virtually every application in a vehicle, ranging from unsealed in-cab to sealed on-engine.



Chassis

Cab

#### A wide family range



#### **Connectors**

- Inline and device applications
- 2 through 62 way configurations
- Sealed and unsealed applications
- Two different lock assist mechanisms for sealed connectors: Slider lock and Lever lock



#### **Terminals**

- 1.5, 2.8, and 6.3 mm blade sizes
- 0.08-6.0 mm<sup>2</sup> / 28-10 AWG cable sizes
- Tin, silver, and gold plating options



#### **Seals**

- · Cable seals and cavity plugs
- Cover all CTCS cavity sizes



#### **Accessories**

- 180° or 90° back shells
- 1.0-3.5 mm fixing slides
- Caps
- Clips and wire ties



#### **Hand Crimp Tool**

- · Covers female and male terminals
- No solder required





# The right connector for the right job













Performance	Unsealed Series	SP Series	XP Series
Max vibration: Sine(G) /Random(Grms)	n/a / 2.17	23.9 / 12.4	30.6 / 18
Max temperature (°C):	-40 to +85	-40 to +120	-40 to +140
Sealing IP (IEC / ISO):	5 / 5k	67. 69 / 6K7, 6K9K	67. 69 / 6K7, 6K9K
Flame resistance:	Non-V0	Non-V0 and V0	Non-V0 and V0
Available cavity configurations:	4, 18, 25, 36	15, 21, 26, 39, 62	2, 3, 4, 6, 7, 8, 10, 12, 15, 16, 18
Mounting options:	None	Panel and Bracket	Panel and Strap/Clip
Lock assist type:	Standard and Lever lock	Lever lock	Slider lock
Applications:	Cab	Chassis and engine compartment	Chassis, engine compartments and on-engine

# **Connector range**





# of ways	Performance series	Lock assist type	Gender	Male mounting type	Available terminal configurations	Applications		
	Sealed Connectors							
2	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5, 2.8, 6.3	Inline & Device		
3	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5	Inline & Device		
4	XP	Slider lock	Male & Female	Panel & Strap/Clip	2.8	Inline & Device		
6	XP	Slider lock	Female	Panel & Strap/Clip	1.5	Device		
7	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5/2.8	Inline & Device		
8	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5, 2.8	Inline & Device		
10	XP	Slider lock	Male & Female	Panel	1.5/2.8	Inline & Device		
12	XP	Slider lock	Male & Female	Panel	1.5	Inline & Device		
15	XP	Slider lock	Male & Female	Panel	1.5/2.8	Inline & Device		
16	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5/2.8	Inline & Device		
18	XP	Slider lock	Male & Female	Panel & Strap/Clip	1.5	Inline & Device		
15	SP	Lever lock	Female	-	2.8	Device		
21	SP	Lever lock	Male & Female	Panel	2.8	Inline & Device		
26	SP	Lever lock	Male & Female	Panel	1.5/2.8/6.3	Inline & Device		
39	SP	Lever lock	Male & Female	Panel & Strap/Clip	2.8	Inline & Device		
62	SP	Lever lock	Male & Female	Panel & Strap/Clip	1.5/2.8	Inline & Device		

# **Connector and accessory range**



# of ways	Performance series	Lock assist type	Gender	Male mounting type	Available terminal configurations	Applications
			Unsealed Con	nectors		
4	Unsealed	Standard	Female	-	6.3	Device
18	Unsealed	Standard	Female	-	2.8	Device
25	Unsealed	Lever lock	Female	-	1.5/2.8	Device
36	Unsealed	Lever lock	Female	-	1.5	Device



Accessory type	Conduit diameter (mm)	Wall thickness (mm)	Available angles
Back shell	7.5-17	-	90° & 180°
Fixing slide	-	1.0-3.5	-
Сар	-	-	-

#### Terminal, seal and hand crimp tool range



Blade size (mm)	Family name	Gender	Sealing	Base material	Plating options	Cable range (mm²)	SAE gage (awg)
1.5	CTS	F	Sealed & Unsealed	CuFe, CuNiSi	Sn, Au, Ag	0.08-1.5	28-16
1.5	CTS	M	Sealed & Unsealed	CuFe	Sn, Au, Ag	0.08-1.5	28-16
2.8	CTS	F	Sealed & Unsealed	CuNiSi	Sn, Ag	0.08-5.0	28-10
2.8	CTS	M	Sealed & Unsealed	CuFe	Sn, Ag	0.22-2.5	24-14
6.3	CTS	F	Sealed & Unsealed	CuFe	Sn, Ag	0.35-6.0	22-10



Seal type	Blade size (mm)	Outside diameter (mm)	Material	Available colors
Cable	1.5	1.2-2.1	LSR	Red, gray, yellow
Cable	2.8	1.2-3.0	LSR	Blue, white
Cable	6.3	1.2-5.3	LSR	Yellow, white, red-brown, green, gray
Plug	1.5	-	LSR	White
Plug	2.8	-	LSR	Red-brown, white, green
Plug	6.3	-	LSR	Green



Terminal	Cable range (mm²)	SAE gage (awg)	Insulation type
CTS 1.5	0.35-2.0	24-14	PVC or XLPE
CTS 2.8	0.50-3.0	22-12	PVC or XLPE
CTS 6.3	0.75-3.0	20-12	PVC or XLPE

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#### Connector design overview

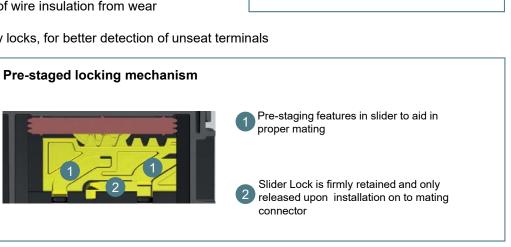
#### **Background**

- Seamless "drop-in" replacement
- Interchangeability cross mating capability

#### **Design features**

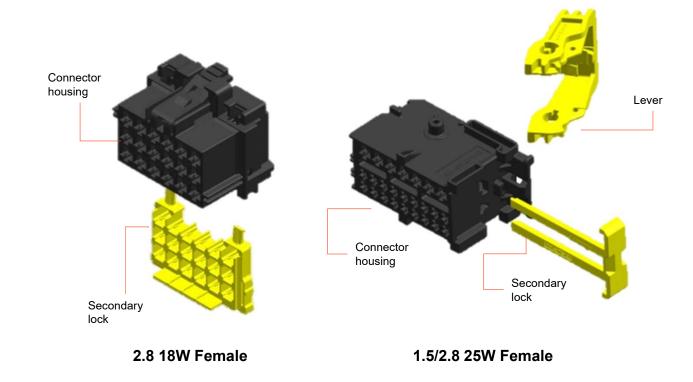
- Additional features for protection from ingression of dust
- Improved panel seal for maximum retention
- · Cover design optimized for maximum conduit retention and protection of wire insulation from wear
- Improved robustness of locking slides
- Increased distance between pre-position and end-position in secondary locks, for better detection of unseat terminals

# Robust Design Designed for maximum strength and protection from mud and dust. 1 Heavy ribbing 2 Strapping points fully integrated with cover for maximum retention of harness 3 Four shrouded locks



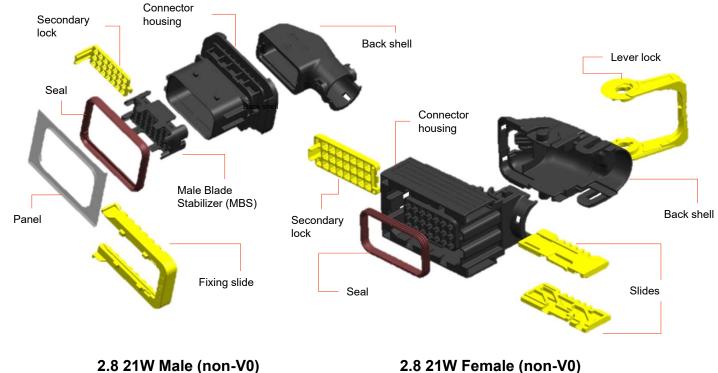
# **CTCS Unsealed exploded view**





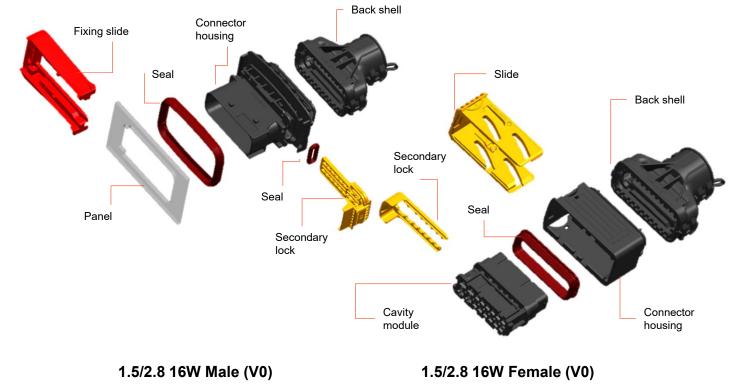
#### **CTCS SP exploded view**





#### **CTCS XP exploded view**





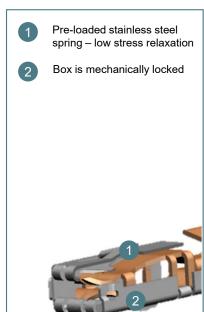
#### **CTS Terminal design overview**

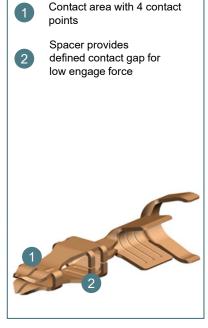
#### **Design features**

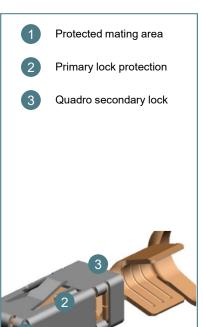
- Protected mating area
- Spring loaded contact area for low relaxation
- · Primary lock protection
- High performance base material
- Safety sleeve locking system, no laser welding necessary
- 100% vision-controlled manufacturing
- · 2-piece tanged terminal system
- No misalignment of mating parts
- · Defined contact gap and forces
- Industry standard mechanical features

#### **Crimp tooling**

Available for both hand crimping and applicator dies







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# **CTCS Unsealed Series main part numbers**

<b>Unsealed</b> Series	Cavity Count	CTS Blade Size (mm)	Gender	Index	Part Number
	4	6.3	F	Α	33136690
4	18	2.8	F	Α	35129604
	25	1.5 / 2.8	F	Α	33219796
	36	1.5	F	Α	33252408

Other indexes (B-D) are also available

<b>SP</b> Series	Cavity Count CTS Blade Size (mm)		Gender	Index	<b>V0</b> Part Number	<b>Non-V0</b> Part Number
	15	2.8	F	А	33188785	33276642
	21	2.8	F	Α	33101162	33276630
- >	21	2.8	M	Α	33237993	33276634
	26	1.5 / 2.8 / 6.3	F	Α	33207220	33283998
	26	1.5 / 2.8 / 6.3	M	Α	33207134	33284519
	39	2.8	F	Α	33111401	33273782
	39	2.8	M	Α	33198862	33276705
	62	1.5 / 2.8	F	Α	33337577	33337581
	62	1.5 / 2.8	М	Α	33213199	33276719

Other indexes (B-D) are also available.

<b>XP</b> Series	Cavity	CTS Blade Size	Gender	Index	Mount	V0	Non-V0
AP Selles	Count	(mm)	Gender	IIIuex	Mount	Part Number	Part Number
	2	1.5	F	Α	Universal	33253266	33344638
	2	2.8	F	Α	Universal	33253554	33344639
	2	2.8	M	Α	Panel	33254221	33344850
	2	6.3	F	Α	Universal	33285119	33346221
	2	6.3	M	Α	Panel	33285118	33346220
	2	6.3	M	Α	Strap	33341148	33347784
	3	1.5	F	Α	Universal	33253275	33344674
	3	1.5	M	Α	Panel	33254285	33344669
	3	1.5	М	Α	Strap	33254098	33344861
	4	2.8	F	Α	Universal	33308974	33346865
	4	2.8	М	Α	Panel	33308731	33346867
	4	2.8	М	Α	Strap	33308978	33346866

Other indexes (B-D) are also available



<b>XP</b> Series	Cavity	CTS Blade Size	Gender	Index	Mount	V0	Non-V0
211 331133	Count	(mm)				Part Number	Part Number
	6	1.5	F	Α	Universal	33308961	33346852
	6	1.5	M	Α	Panel	33308982	33347865
	6	1.5	M	Α	Strap	33308912	33347886
	7	1.5 / 2.8	F	Α	Universal	33285164	33346265
as Reday	7	1.5 / 2.8	М	Α	Panel	33285120	33346256
	7	1.5 / 2.8	М	Α	Strap	33341403	33346260
	8	1.5	F	Α	Universal	33341417	33346281
	8	1.5	М	Α	Panel	33341408	33346266
	8	1.5	M	Α	Strap	33341413	33347532
	8	2.8	F	Α	Universal	33343499	33350336
	8	2.8	М	Α	Strap	TBD	TBD

Other indexes (B-D) are also available

VD Carias	Cavity	CTS Blade Size	Gender	Index	Mount	V0	Non-V0
XP Series	Count	(mm)		index	Mount	Part Number	Part Number
	10	1.5 / 2.8	F	Α	Universal	33344008	33350438
	10	1.5 / 2.8	М	Α	Panel	33343722	33350430
	10	1.5 / 2.8	М	Α	Strap	TBD	TBD
	12	1.5	F	Α	Universal	33340130	33350122
	12	1.5	М	Α	Panel	33340243	33350115
	12	1.5	М	Α	Strap	TBD	TBD
	15	1.5 / 2.8	F	Α	Universal	33344005	33347873
	15	1.5 / 2.8	M	Α	Panel	33343701	33349151
	15	1.5 / 2.8	М	Α	Strap	TBD	TBD
	16	1.5 / 2.8	F	Α	Universal	33285172	33347875
	16	1.5 / 2.8	M	Α	Panel	33285171	33347859
	16	1.5 / 2.8	М	Α	Strap	33342243	33347860

Other indexes (B-D) are also available.



<b>XP</b> Series	Cavity Count	CTS Blade Size (mm)	Gender	Index	Mount	Non-V0	Non-V0
						Part Number	Part Number
	18	1.5	F	A	Universal	33342277	33347876
	18	1.5	M	Α	Panel	33342293	33347872
	18	1.5	М	Α	Strap	33342234	33347874
					Other indexes (R-D) are also available		

Other indexes (B-D) are also available

#### Why CTCS?

**Application versatility** 

Unparalleled reliability & performance

Designed for the transportation market







Our solution to the market's most stringent regulations and demanding operating environment.

# Thank you.

