

HARNESSEFLEX

SPECIALIST CONDUIT SYSTEMS

Harnessflex conduit systems combine innovative design with precision manufacturing to offer customers a broad range of cable protection products and solutions.

Our range includes Conduits, Sealed Fittings and Hinged Fittings. The Harnessflex system performs in a wide variety of environments from high temperature to freezing subzero conditions.

Whether used individually or in combination, Harnessflex products provide protection against not only liquid and dust ingress, but also mechanical abrasion and corrosive salts.

Specifically designed to protect critical electrical and electronic wiring assemblies in heavy-duty commercial applications such as:

- ▶ Fuel Tankers
- ▶ Trucks & Buses
- ▶ Construction & Mining Vehicles
- ▶ Dangerous Goods Vehicle (ADR approved)
- ▶ Marine Vessels
- ▶ Critical Power
- ▶ Agricultural Vehicles



Harnessflex
SPECIALIST CONDUIT SYSTEMS

HARNESSFLEX SPECIALISED CONDUIT SYSTEMS



Harnessflex combines innovative design with precision manufacturing to offer customers a broad range of cable protection products and solutions.

- Performs in a wide variety of environments from high temperature to freezing subzero conditions
- Extensive range of engineered solutions are designed to withstand the rigours of the most technically demanding applications
- Harnessflex Specialist Conduit Systems can be used to protect critical power and data cabling. ADR approved.
- Tested and approved to ANZ and International Standards
- Harnessflex hinged systems are rated at IP40.
- Harnessflex sealed systems are rated at IP66, 67, 68 (2 BAR for 30 mins) and 69k, when using Harnessflex conduit.

Markets and Industries

Harnessflex Specialist Conduit Systems can be used to protect critical power and data cabling and is available throughout a wide range of markets including:

- **Dangerous Goods Vehicles**
- **Machinery**
- **Marine**
- **Mechanical**
- **Data Cabling**
- **Critical Power**

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SPECIALIST CONDUIT SYSTEMS

CARROLL.COM.AU/HARNESSFLEX

Many components are designed specifically for a market solution. These products uniquely meet an industry's needs - solving a specific application requirement, providing product innovation, saving installation and component costs, improving the quality and the integrity of the end product. Wherever you need mechanical and electrical protection for your cables you can be confident in specifying Harnessflex products.

Approvals

Harnessflex is tested and approved to International Standards, i.e. TUV & LCIE, for the widest variety of automotive applications including hazardous or aggressive fuel or chemical transportation environments. In Australia and New Zealand, Harnessflex is approved and meets the requirements specified in AS2809 for Dangerous Goods Vehicles, e.g. fuel tankers. It is also the system specified by the leading Australian heavy duty truck manufacturers. ADR Approved.

Copies of ADR approvals are available upon request.



HARNESSFLEX SPECIFICATIONS

Harnessflex premium nylon conduit is designed to withstand temperatures from -40°C to +120°C for long term static use and has many features including:

- Resistance to many oils, solvents and petrochemicals
- Flexible tough construction with high impact strength and a long fatigue life
- High UV resistance, halogen free and self extinguishing
- Stocked in a wide range of sizes

When used in conjunction with the extensive range of fittings and adaptors the Harnessflex System can achieve IP66, IP67, IP68 and IP69K and offers extreme versatility for both harness manufacturing and general purpose applications.

Harnessflex Chemical Compatibility

| CHEMICAL MINERAL | HARNESSFLEX CONDUIT | CHEMICAL/ MINERAL | HARNESSFLEX CONDUIT | CHEMICAL/ MINERAL | HARNESSFLEX CONDUIT |
|-------------------------|---------------------|------------------------------|---------------------|--------------------------|---------------------|
| Astm oil no. 1 | S | Astm oil no. 2 | S | Astm oil no. 3 | S |
| Acetic acid (10%) | L | Acetone | S | Aluminum chloride (10%) | L |
| Benzene | S | Chlorine water | U | Diesel oil | S |
| Ethyl alcohol | S | Ethylene glycol (antifreeze) | S | Freon 32 | S |
| Hydrochloric acid (10%) | U | Hydrochloric acid (36%) | U | Hydrogen peroxide (35%) | L |
| Lactic acid (90%) | L | Lubricating oil | S | Methyl alcohol | L |
| Methyl ethyl ketone | S | Nitric acid (10%) | U | Nitric acid (70%) | U |
| Oxalic acid | L | Ozone gas | U | Paraffin oil | S |
| Petrol | S | Silver nitrate | S | Sodium chloride | S |
| Sodium hydroxide (10%) | S | Sodium hydroxide (60%) | S | Sulphuric acid (10%) | U |
| Sulphuric acid (70%) | U | Toluene | S | Transformer oil | S |
| Trichlorethylene | L | Turpentine | S | Vegetable oils (general) | S |
| Vinyl acetate | L | Water (sea) | S | White spirit | S |
| Zinc chloride | U | | | | |

Note: These results shown are based on exposure to individual chemicals at ambient temperature.
All inorganic salts are saturated aqueous solutions unless otherwise stated.
Key: S = Suitable L = Limited U = Unsuitable

Harnessflex Physical Properties

| CHEMICAL/MINERAL | HARNESSFLEX | CHEMICAL/ MINERAL | HARNESSFLEX CONDUIT |
|-----------------------------------|-------------|------------------------------------|---------------------|
| Specific gravity | 1.14 | Melting point | 220°C |
| Max. Operating temperature static | 120°C | Max. Operating temperature dynamic | 100°C |
| Min. Operating temperature static | -40°C | Min operating temperature dynamic | -30°C |
| Tensile strength * | 40MPa | Elongation at break * | 60% |
| Flexural modulus * | 1.0GPa | Impact strength – notched izod * | 0.25KJ/m |
| Dielectric strength * | 25MV/m | Volume resistivity * | 8 log ohm cm |
| Halogen free | Yes | | |

* The results are from test pieces of sheet material, conditioned at 23°C and 50% Relative Humidity, and not from finished products.

The International Protection (IP Rating) and published performance specifications of Harnessflex fittings is only guaranteed by Carroll Australasia when used in conjunction with Carroll supplied conduit.

Nylon Flexible Conduit

| PART NO. | NOMINAL SIZE | BORE | OD mm | LENGTH |
|----------|--------------|------|-------|--------|
| NC08 | 8 | 6.6 | 10 | 100m |
| NC10 | 10 | 8.4 | 11.5 | 100m |
| NC12 | 12 | 9.9 | 13 | 100m |
| NC16 | 16 | 12.7 | 16.1 | 50m |
| NC20 | 20 | 16.6 | 21.2 | 50m |
| NC25 | 25 | 21.3 | 25.6 | 50m |
| NC28 | 28 | 22.6 | 28.5 | 50m |
| NC32 | 32 | 28.8 | 34.5 | 50m |
| NC40 | 40 | 35.2 | 42.5 | 25m |
| NC50 | 50 | 46.5 | 54.5 | 25m |

Nylon Flexible Conduit - Dispenser Box (Retail)

| PART NO. | DESCRIPTION | LENGTH |
|----------|-------------------------------------|--------|
| NC08/DB | NC08 HFX CONDUIT WITH DISPENSER BOX | 100m |
| NC10/DB | NC10 HFX CONDUIT WITH DISPENSER BOX | 100m |
| NC12/DB | NC12 HFX CONDUIT WITH DISPENSER BOX | 100m |
| NC16/DB | NC16 HFX CONDUIT WITH DISPENSER BOX | 50m |
| NC20/DB | NC20 HFX CONDUIT WITH DISPENSER BOX | 50m |
| NC25/DB | NC25 HFX CONDUIT WITH DISPENSER BOX | 50m |

Complete Straight Sealed Adapters (IP 66, 67, 68, 69K)

Harnessflex straight adaptor bodies feature an anti vibration locking ring on the cap nut which ensures the fitting remains tightened during assembly and in service. An integral neoprene 'O' ring embedded in the mounting face seals the fitting against the junction box or enclosure.

| PART NO. | DESCRIPTION | PACK QTY |
|--------------|-----------------------------------|----------|
| CAB10M16-CA | KIT ADAPTOR BODY NC10/M16 X 10PC | 10 |
| CAB12M16-CA | KIT ADAPTOR BODY NC12/M16 X 10PC | 10 |
| CAB12M20-CA | KIT ADAPTOR BODY NC12/M20 X 10PC | 10 |
| CAB16M16-CA | KIT ADAPTOR BODY NC16/M16 X 10PC | 10 |
| CAB16M20-CA | KIT ADAPTOR BODY NC16/M20 X 10PC | 10 |
| CAB16PG13-CA | KIT ADAPTOR BODY NC16/PG13 X 10PC | 10 |
| CAB20M20-CA | KIT ADAPTOR BODY NC20/M20 X 10PC | 10 |
| CAB25M25-CA | KIT ADAPTOR BODY NC25/M25 X 10PC | 10 |
| CAB32M32-CA | KIT ADAPTOR BODY NC32/M32 X 10PC | 10 |
| CAB28M25-CA | KIT ADAPTOR BODY NC28/M25 X 10PC | 10 |
| CAB40M40-CA | KIT ADAPTOR BODY NC40/M40 X 1 | 1 |



HARNESSFLEX CONDUIT



HARNESSFLEX CONDUIT WITH DISPENSER BOX



STRAIGHT ADAPTER BODIES

Complete Flanged 90° Adapter Bodies (IP 66, 67, 68, 69K)

Used in place of an electrical connector where cables need to be passed through a bulkhead.

| PART NO. | CONDUIT SIZE | PACK QTY |
|----------|--------------|----------|
| CAB40F90 | 40 | 1 |



**COMPLETE FLANGED 90°
ADAPTER BODIES**

Complete 90° Adapter Bodies (IP 66, 67, 68, 69K)

Harnessflex 90° adaptor bodies are similar to the straight adaptors, in that they feature anti vibration locking ring on the cap nut. The seal between the adaptor body and enclosure is achieved by the neoprene sealing face washer supplied in the kit.

| PART NO. | DESCRIPTION | PACK QTY |
|---------------|--|----------|
| CAB10M1690-CA | KIT 90 DEGREE A/BODY NC10/M16MM X 10PC | 10 |
| CAB12M1690-CA | KIT 90 DEGREE A/BODY NC12/M16MM X 10PC | 10 |
| CAB16M1690-CA | KIT 90 DEGREE A/BODY NC16/M16MM X 10PC | 10 |
| CAB16M2090-CA | KIT 90 DEGREE A/BODY NC16/M20MM X 10PC | 10 |
| CAB20M2090-CA | KIT 90 DEGREE A/BODY NC20/M20MM X 10PC | 10 |
| CAB25M2590-CA | KIT 90 DEGREE A/BODY NC25/M25MM X 10PC | 10 |
| CAB28M2590-CA | KIT 90 DEGREE A/BODY NC28/M25MM X 10PC | 10 |
| CAB32M3290-CA | KIT 90 DEGREE A/BODY NC32/M32MM X 1 | 1 |
| CAB40M4090 | KIT 90 DEGREE A/BODY NC40/M40MM X 1 | 1 |



90° ADAPTER BODIES

'T' Piece Connector (IP 66, 67, 68, 69K)

| PART NO. | JOINS T PIECES | PACK QTY |
|----------|----------------|----------|
| TPC16 | CTP16 | 5 |
| TPC20 | CTPB20 | 5 |
| TPC28 | CTPB28 | 5 |



'T' PIECE CONNECTOR

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PROTECTORS

Complete 'T' Pieces (IP 66, 67, 68, 69K)

Harnessflex "T" pieces save time and space in the construction of wiring looms. Also featuring the unique anti vibration rings, the "T" pieces make branches from main harnesses simple and also in many instances can replace expensive junction boxes. Through the use of the simple reducing kits, any outlet can be reduced down to any smaller conduit size. The inspection hatch can be removed in order to ease routing cables through the "T" piece but this must be refitted after assembly to maintain the IP67 rating.

| PART NO. | CONDUIT SIZE | PACK QTY |
|----------|--------------|----------|
| CTP10 | 10 x 3 | 1 |
| CTP12 | 12 x 3 | 1 |
| CTP16 | 16 x 3 | 1 |
| CTPB20 | 20 x 3 | 1 |
| CTPB25 | 25 x 3 | 1 |
| CTPB28 | 25 x 3 | 1 |
| CTPB32 | 32 x 3 | 1 |



'T' PIECE

Reducing Kits (IP 66, 67, 68, 69K)

Special cap nut and sealing bush kit, designed to reduce outlets from "T" pieces, manifolds and connectors.

| PART NO. | DESCRIPTION | PACK QTY |
|------------|-----------------------------------|----------|
| RK12-08-CA | REDUCING BUSH NC12 TO NC08 X 10PC | 10 |
| RK16-08-CA | REDUCING BUSH NC16 TO NC08 X 10PC | 10 |
| RK16-12-CA | REDUCING BUSH NC16 TO NC12 X 10PC | 10 |
| RK20-08-CA | REDUCING BUSH NC20 TO NC08 X 10PC | 10 |
| RK20-12-CA | REDUCING BUSH NC20 TO NC12 X 10PC | 10 |
| RK20-16-CA | REDUCING BUSH NC20 TO NC16 X 10PC | 10 |
| RK25-12-CA | REDUCING BUSH NC25 TO NC12 X 10PC | 10 |
| RK25-16-CA | REDUCING BUSH NC25 TO NC16 X 10PC | 10 |
| RK25-20-CA | REDUCING BUSH NC25 TO NC20 X 10PC | 10 |
| RK28-12-CA | REDUCING BUSH NC28 TO NC12 X 10PC | 10 |
| RK28-16-CA | REDUCING BUSH NC28 TO NC16 X 10PC | 10 |
| RK28-20-CA | REDUCING BUSH NC28 TO NC20 X 10PC | 10 |
| RK32-20-CA | REDUCING BUSH NC32 TO NC20 X 10PC | 10 |
| RK32-25-CA | REDUCING BUSH NC32 TO NC25 X 10PC | 10 |
| RK32-28-CA | REDUCING BUSH NC32 TO NC28 X 10PC | 10 |



HFX REDUCING KIT

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Complete 'X' Piece (IP 66, 67, 68, 69K)

The Harnessflex "X" Piece exhibits all the sealing and anti-vibration features of the T Piece, and accepts the reducing kits allowing utilisation of 20, 16, 12 and 8mm conduit sizes from any of the 4 outlets. A perfect, space saving, economical replacement for junction boxes.

| PART NO. | CONDUIT SIZE | PACK QTY |
|----------|--------------|----------|
| CXP20 | 20 x 4 | 1 |

'Y' Piece Hinged Fittings (IP 40)

"Y" pieces provide branch outlets along a conduit run. Standard applications include insertion in vehicle engine or chassis harness where complete sealing is not required. Splash proof to IP40. Sizes are available for use with conduit diameters from 8mm up to 25mm. The "Y" piece is supplied as one part and hinged along its length. They are simply applied as the final assembly item by locating onto the conduit corrugations and snapped together. The fitting offers no restriction of the conduit bore.

| PART NO. | CONDUIT SIZE | PACK QTY |
|----------------|--------------|----------|
| YPS080808 - HX | 08-08-08 | 10 |
| YPS120808 - HX | 12-08-08 | 10 |
| YPS121212 - HX | 12-12-12 | 10 |
| YPS161208 - HX | 16-12-08 | 10 |
| YPS161212 - HX | 16-12-12 | 10 |
| YPS161608 - HX | 16-16-08 | 10 |
| YPS161612 - HX | 16-12-12 | 10 |
| YPS201208 - HX | 20-12-08 | 10 |
| YPS201212 - HX | 20-12-12 | 10 |
| YPS201612 - HX | 20-16-12 | 10 |
| YPS201616 - HX | 20-16-16 | 10 |
| YPS202012 - HX | 20-20-12 | 10 |
| YPS202016 - HX | 20-20-16 | 10 |
| YPS252016 - HX | 25-20-16 | 10 |
| YPS252512 - HX | 25-25-12 | 10 |
| YPS252516 - HX | 25-25-16 | 10 |
| YPS252520 - HX | 25-25-20 | 10 |
| YPS252525 - HX | 25-25-20 | 10 |

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COMPLETE 'X' PIECE



HINGED 'Y' PIECE



PROTECTORS

Complete Manifold (IP 66, 67, 68, 69K)

Similar to a "T" piece. This product can be used where two outlets are required close together from a main conduit run. Used principally on vehicle chassis harnesses where connections are required to gearbox, differentials and air drier switches etc.

| PART NO. | CONDUIT SIZE | PACK QTY |
|----------|----------------|----------|
| CMF25X12 | 2 x 12, 2 x 25 | 1 |

Complete Solenoid/Switch Connectors

To provide a straight or 90° electrical connection between conduit and solenoid or switch connector with either M24 or M27 thread connection.

| PART NO. | TYPE | SUIT CONDUIT | NO. OF PINS | PACK QTY |
|-----------|--------|--------------|-------------|----------|
| CSCM24902 | 90 DEG | 12 | 2 | 5 |
| CSCM27902 | 90 DEG | 12 | 2 | 5 |

*Includes solenoid-switch connector/connector housing/socket terminals/sealing ring and cap nut.

*Connectors with NC12 outlets as standard can be reduced to NC08 with reducing kit.

End Caps and End Sleeves

Where conduit is not terminated with an adaptor or fitting, end caps are used to seal the end of a conduit run when using up to five separate wires. Suitable for NC10 and NC12 conduit, the end caps are supplied with either a 3 or 5 cable outlets, which are simply slit open when required. End sleeves are used to seal the end of the conduit when either single or multiple wires are used, with the addition of two nylon cable ties.

| PART NO. | TYPE | SUIT CONDUIT | PACK QTY |
|----------|------------|--------------|----------|
| EK03-10 | END CAP | 10 & 12 | 10 |
| EK05-10 | END CAP | 12 | 10 |
| ESN12-CA | END SLEEVE | 12 | 10 |
| ESN16-CA | END SLEEVE | 16 | 10 |
| ESN20-CA | END SLEEVE | 20 | 10 |
| ESN25-CA | END SLEEVE | 25 | 10 |
| ESN32-CA | END SLEEVE | 32 | 10 |

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MANIFOLD



SOLENOID SWITCH CONNECTORS



END CAPS



END SLEEVES

Conduit Clip - Hinged

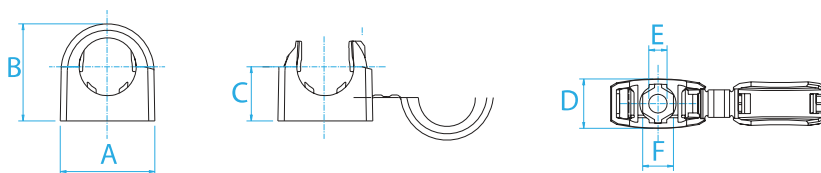
Carroll's new hinged conduit mounting clip is designed to save time and improve Harnessflex conduit serviceability. The low profile design is space saving and results in a more aesthetically pleasing finish.

| PART NO. | CONDUIT SIZE | | DIMENSIONS mm | | | | FIXING HOLE | A/F COUNTER SIZE | PACK QTY |
|----------|--------------|-----|---------------|----|----|----|-------------|------------------|----------|
| | NC | NW | A | B | C | D | E | F | |
| HCB08/HX | 8 | 7.5 | 23 | 23 | 13 | 12 | 4 | 8 | 10 |
| HCB12/HX | 12 | 10 | 23 | 23 | 13 | 12 | 4 | 8 | 10 |
| HCB16/HX | 16 | 13 | 27 | 27 | 15 | 14 | 5 | 9 | 10 |
| HCB20/HX | 20 | 17 | 34 | 35 | 20 | 18 | 6 | 10 | 10 |
| HCB28/HX | 28 | 23 | 44 | 44 | 23 | 21 | 6 | 10 | 10 |
| HCB32/HX | 32 | 29 | 53 | 52 | 27 | 23 | 6 | 10 | 10 |
| HCB40/HX | 40 | 36 | 65 | 63 | 32 | 27 | 6 | 10 | 5 |
| HCB50/HX | 50 | 48 | 81 | 77 | 39 | 32 | 6 | 10 | 5 |



**HARNESSFLEX
CONDUIT CLIP**

Harnessflex Conduit Clip



Conduit P Clip

A one screw fixing P shaped clip for secure conduit mounting. Available in either heavy duty Nylon 6/6 or steel with PVC insert (steel/stainless steel PVC in the Bundling section of the catalogue).

| PART NO. | SUIT CONDUIT | PACK QTY |
|----------|--------------|----------|
| RP12 | 10 | 10 |
| RP13 | 12 | 10 |
| RP16 | 16 | 10 |
| RP22 | 20 | 10 |
| RP25 | 25 | 10 |



CONDUIT P CLIP

**Check out our other range of Nylon P Clips in the
CABLE MANAGEMENT section on page 66!**

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PROTECTORS