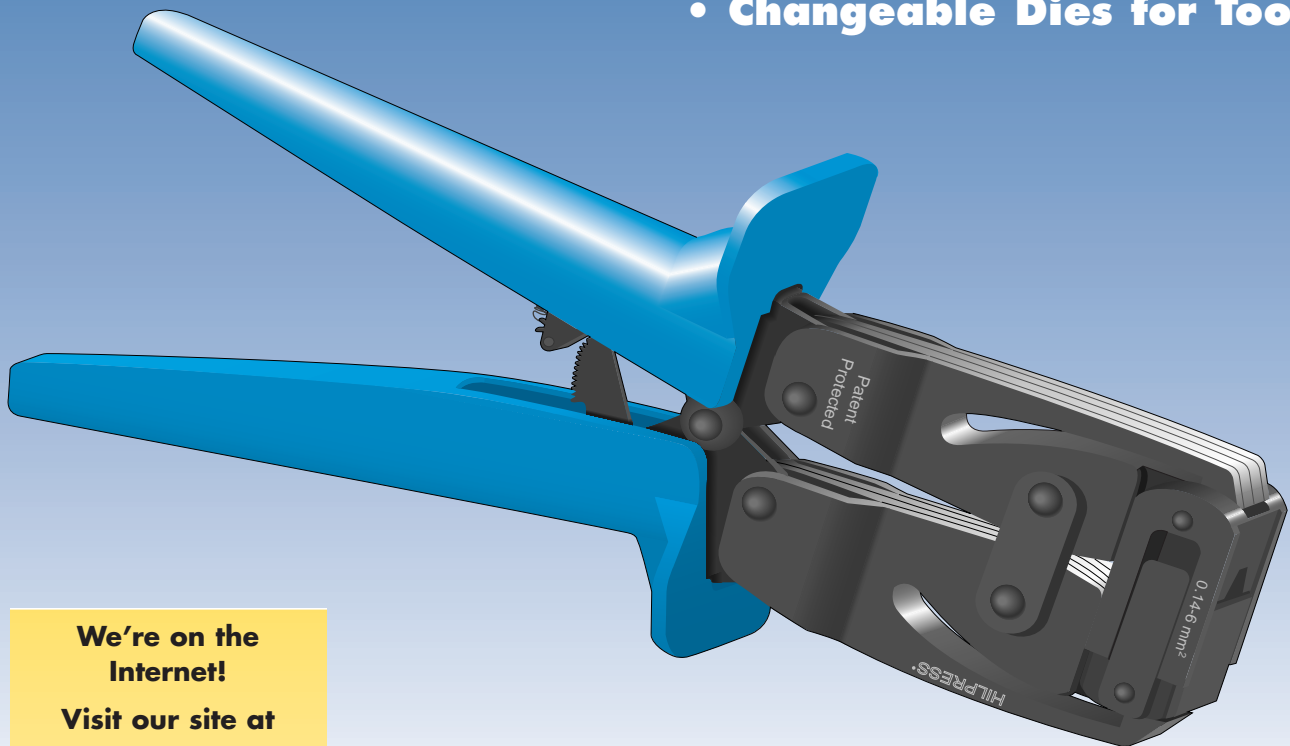


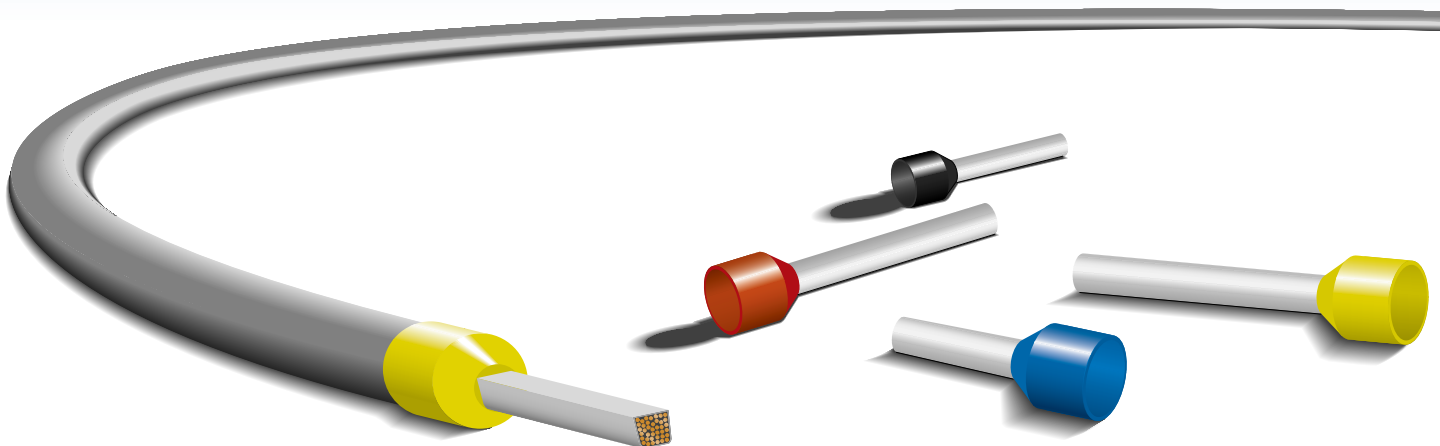
Interpower™ Wire Ferrules



- Insulated and Non-Insulated Wire Ferrules
- Crimping Tools
- Changeable Dies for Tools



We're on the
Internet!
Visit our site at
www.interpower.com



All items normally available from
stock for immediate shipment.
No minimum order requirement.

PRINTED IN THE U.S.A.



**interpower
components Ltd.**



An Introduction to Ferrules

Why use ferrules?

Screw Connections:

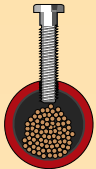


Figure 1

In contacts used in large industrial connectors as well as many terminal blocks, a screw is used to secure the connection between the wire and contact (figure 1).

Easier Insertion:

With ferrules, there is easier insertion of the wire into the female receptacle: individual wire strands won't fray backwards insuring better guarantee that all strands will be conducting current.

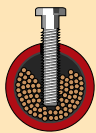


Figure 2

Unsecure Connections:

If the wire is stranded, the individual strands will tend to move out of the way of the screw as it is tightened (figure 2).

If the wire is just slightly smaller than the opening in the contact, the screw will usually clamp several of the strands securely while the others move up along-side the screw. If, however, the wire normally fills two-thirds or less of the opening in the contact, the screw may bottom out with none of the strands securely gripped. At this point, an electrically acceptable connection may exist, at least long enough for the device to be tested and shipped to the customer. However, the slightest vibration may allow the screw to back out enough that the impedance of the connection increases so that excess heat is generated. The connection could become intermittent.

Some contacts are designed to address this issue by including contact tang (figure 3). This type of contact will normally assure that all strands are captured and are in contact with the screw connection.

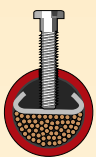


Figure 3

If the contact does not offer a contact tang, a crimp ferrule is the best way of assuring a solid contact (figures 4 and 5).

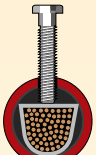


Figure 4

The ferrule should be sized properly so that it slides onto the wire easily. However, the wire should fill at least 80% of the ferrule.

The ferrule is then crimped and the ferrule terminated wire inserted into the contact and the screw tightened. An

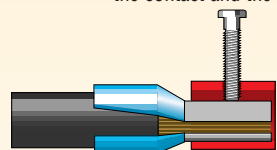


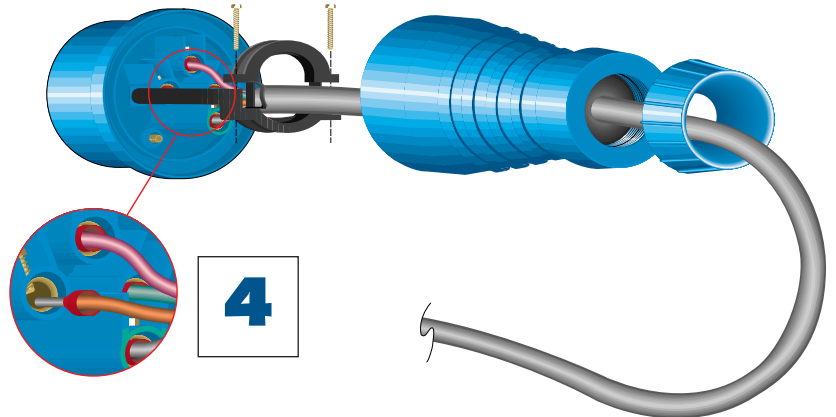
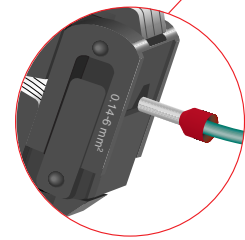
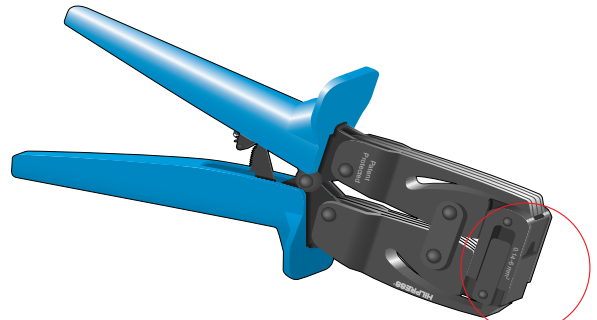
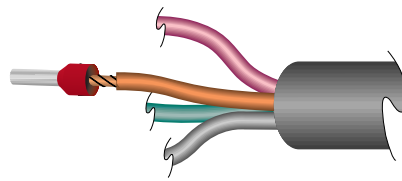
Figure 5

insulated ferrule minimises the chance that a loose strand can cause a short circuit.

As Simple as 1, 2, 3....

Assuring a good connection with a ferrule is simple.

1. Follow the suggestions at right for selecting a ferrule that is appropriate for both the wire and the application.
2. Select the appropriate crimp tool (see page 7).
3. Crimp the ferrule.
4. Make the connection.





An Introduction to Ferrules, continued

Suggestions for Selecting Ferrules

Selection of the correct ferrule for your application is a simple, five-step process.

The **first step** in selecting a ferrule is to select the style that is appropriate for your application and specifically whether the ferrule is to be insulated or uninsulated. Insulated ferrules are slightly more expensive; however, insulated ferrules “capture” strands that don’t get correctly inserted into the barrel, thereby reducing the possibility of a short between connections. Insulation also offers the opportunity to colour code the connection.

The **second step** in selecting a ferrule is to identify the conductor size. The chart below is designed for metric wire sizes. To simplify the conversion to A.W.G. sizes, the following data is provided:

A.W.G. to Metric Wire Sizes Conversion Chart

A.W.G.	Equivalent in mm ²
20 (7X28)*	0.562
18 (7X26)	0.902
16 (19X29)	1.327
14 (19X27)	1.954
12 (19X25)	3.105
10 (37X26)	4.770
8 (49X25)	8.007
6 (133X27)	13.675
4 (133X25)	21.733
2 (133X23)	34.648
1 (817X30)	41.667
0 (133X21)	55.098

* Number in parenthesis denotes stranding. Actual stranding may vary depending on primary conductor construction. Cross section in mm² will vary when stranding changes.

The number in parentheses denotes stranding.*This entry in the chart indicates that this 20 A.W.G. wire is composed of seven strands of 28 A.W.G.conductor. Different strandings will result in slightly different metric cross section equivalents.

The **third step** in selecting a ferrule is to determine how long the barrel should be. Three lengths are available: normal, medium and long barrels. The actual barrel length varies depending on the wire size capacity of the ferrule. Most applications require the normal length; however, ferrules with longer barrels are available in most sizes.

The **fourth step** in selecting a ferrule is to select the ferrule colour coding system you want to use. There are three different ferrule colour coding systems available. Our stock colour for the ferrule insulator is based on the DIN** system. (Note: uninsulated ferrules are not colour coded). Other colour schemes are available by special order with a minimum quantity of 1,000 pieces and a lead time of four to six weeks.

The **fifth step** in selecting a ferrule is to determine if the application requires a double wire ferrule. Double wire ferrules are available only in insulated versions and are designed to accept only two wires. If you are using two A.W.G. wires of the same size in a ferrule, you can determine the correct ferrule size by increasing the total wire size by three steps. For example, two 20 A.W.G. wires are

equivalent to a single 17 A.W.G. Therefore, you would specify a 1.5mm² capacity ferrule. In theory, two 20 A.W.G. wires might fit into a 1.0mm² capacity ferrule, however they are likely to be a tight fit.

If you are using two metric wires, two 0.75mm² wires will fit comfortably into a 2x0.75mm² ferrule (See page 7).

The ferrules are made of tin plated copper, and the insulation is a polyamide nylon 6.6. The temperature rating is 110°C.

Although ferrules are commonly used in Europe, they are not well known in the U.S. Part of the reason is that much of the equipment production in Europe centers around machinery. Interconnections in machinery are usually based on terminal blocks and other connections that make screw connections desirable. In North America (where electronic equipment production focuses on computers, telecommunications, and medical equipment) interconnections are typically very small, and terminal blocks are inappropriate in many cases.

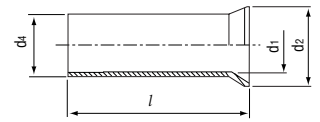
These devices are usually approved in Europe as part of the equipment. They do not have separate approvals. In the U.S., UL does not know how to treat these components, so for the time-being, they are also subject to evaluation at the time the equipment is evaluated for listing.

For more information about Interpower™ wire ferrules, or for assistance in selecting a ferrule that is appropriate for both the wire and the application you are using, please call our Customer Service Department at one of the numbers listed in the footnote below.

** DIN stands for Deutsches Institut für Normung: Colour coding arranged according to DIN 46228 Teil 4.



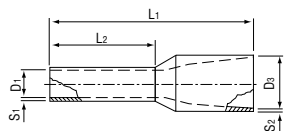
Interpower™ Uninsulated Wire Ferrules



Style	Part Number	Cable mm ²	Length mm	DIN Colour**	Insulated	d ₁	d ₂	d ₄	l
	82031010	0.5	—	none	no	1.0	2.1	1.3	8.0
	82031040	0.75	—	none	no	1.2	2.3	1.5	10.0
	82031070	1.0	—	none	no	1.4	2.5	1.7	8.0
	82031080	1.0	—	none	no	1.4	2.5	1.7	12.0
	82031110	1.5	—	none	no	1.7	2.8	2.0	10.0
	82031120	1.5	—	none	no	1.7	2.8	2.0	15.0
	82031150	2.5	—	none	no	2.2	3.4	2.5	8.0
	82031160	2.5	—	none	no	2.2	3.4	2.5	12.0
	82031190	4.0	—	none	no	2.8	4.0	3.2	12.0
	82031200	4.0	—	none	no	2.8	4.0	3.2	18.0
	82031230	6.0	—	none	no	3.5	4.7	3.9	12.0
	82031240	6.0	—	none	no	3.5	4.7	3.9	18.0
	82031270	10.0	—	none	no	4.5	5.8	4.9	16.0
	82031280	10.0	—	none	no	4.5	5.8	4.9	20.0
	82031310	16.0	—	none	no	5.8	7.5	6.2	18.0
	82031320	16.0	—	none	no	5.8	7.5	6.2	25.0
	82031350	25.0	—	none	no	7.3	9.5	7.7	18.0
	82031360	25.0	—	none	no	7.3	9.5	7.7	25.0
	82031390	35.0	—	none	no	8.3	11.0	8.7	18.0
	82031400	35.0	—	none	no	8.3	11.0	8.7	25.0

Dimensions in mm

** DIN stands for Deutsches Institut für Normung: Colour coding arranged according to DIN 46228 Teil 4.



Interpower™ Insulated Wire Ferrules

Style	Part Number	Cable mm ²	Length* mm	DIN** Colour	Insulated	L ₁	L ₂	D ₁	S ₁	D ₃	S ₂
	82031020	0.5	N	white	yes	14.0	8.0	1.0	0.15	2.6	0.25
	82031030	0.5	M	white	yes	16.0	10.0	1.0	0.15	2.6	0.25
	82031050	0.75	N	grey	yes	14.0	8.0	1.2	0.15	2.8	0.25
	82031060	0.75	M	grey	yes	16.0	10.0	1.2	0.15	2.8	0.25
	82031090	1.0	N	red	yes	14.0	8.0	1.4	0.15	3.0	0.30
	82031100	1.0	M	red	yes	16.0	10.0	1.4	0.15	3.0	0.30
	82031130	1.5	N	black	yes	14.0	8.0	1.7	0.15	3.5	0.30
	82031140	1.5	M	black	yes	16.0	10.0	1.7	0.15	3.5	0.30
	82031170	2.5	N	blue	yes	15.0	8.0	2.2	0.15	4.2	0.30
	82031180	2.5	M	blue	yes	19.0	12.0	2.2	0.15	4.2	0.30
	82031210	4.0	N	grey	yes	17.0	10.0	2.8	0.20	4.8	0.30
	82031220	4.0	M	grey	yes	20.0	12.0	2.8	0.20	4.8	0.30
	82031250	6.0	N	yellow	yes	20.0	12.0	3.5	0.20	6.3	0.30
	82031260	6.0	L	yellow	yes	26.0	18.0	3.5	0.20	6.3	0.30
	82031290	10.0	N	red	yes	21.0	12.0	4.5	0.20	7.6	0.40
	82031300	10.0	L	red	yes	27.0	18.0	4.5	0.20	7.6	0.40
	82031330	16.0	N	blue	yes	23.0	12.0	5.8	0.20	8.8	0.40
	82031340	16.0	L	blue	yes	29.0	18.0	5.8	0.20	8.8	0.40

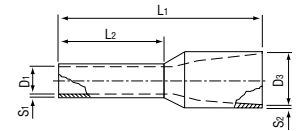
Dimensions in mm

* N=Normal, M=Medium, L=Long

** DIN stands for Deutsches Institut für Normung: Colour coding arranged according to DIN 46228 Teil 4.



Interpower™ Insulated Wire Ferrules

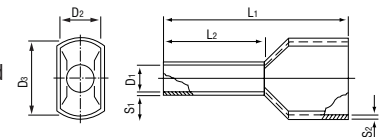


Style	Part Number	Cable mm ²	Length* mm	DIN** Colour	Insulated	L ₁	L ₂	D ₁	S ₁	D ₃	S ₂
	82031370	25.0	N	yellow	yes	29.0	16.0	7.3	0.20	11.2	0.40
	82031380	25.0	L	yellow	yes	35.0	22.0	7.3	0.20	11.2	0.50
	82031410	35.0	N	red	yes	30.0	16.0	8.3	0.20	12.7	0.55
	82031420	35.0	L	red	yes	39.0	25.0	8.3	0.20	12.7	0.55
	82031430	50.0	N	blue	yes	36.0	20.0	10.3	0.35	15.0	0.50

Interpower™ Double-Wire Ferrules

Note: The ferrules below are considered “double-wire” ferrules. They are sized to easily accommodate two

conductors in one end sleeve, which enables quick and easy potential loops.



Style	Part Number	Cable mm ²	Length* mm	DIN** Colour	Insulated	L ₁	L ₂	D ₁	S ₁	D ₃	D ₂	S ₂
	82031440	2x0.5	N	white	yes	14.6	8.2	1.4	0.15	5.0	3.0	0.25
	82031450	2x0.75	N	grey	yes	14.6	8.2	1.7	0.15	5.3	2.8	0.25
	82031460	2x1.0	N	red	yes	15.8	8.2	2.05	0.15	6.3	3.4	0.25
	82031470	2x1.5	N	black	yes	15.8	8.2	2.3	0.15	6.3	3.4	0.25
	82031480	2x2.5	N	blue	yes	18.5	10.0	2.9	0.15	7.8	4.3	0.30
	82031490	2x4.0	N	grey	yes	22.0	12.0	3.6	0.20	8.8	5.0	0.30
	82031500	2x6.0	N	yellow	yes	23.0	12.0	4.6	0.20	11.2	6.2	0.50
	82031510	2x10.0	N	red	yes	24.0	12.0	5.8	0.20	13.2	7.4	0.50
	820315230	2x16.0	N	blue	yes	29.0	16.0	8.3	0.30	17.0	9.5	0.50

* N=Normal, M=Medium, L=Long

** DIN stands for Deutsches Institut für Normung: Colour coding arranged according to DIN 46228 Teil 4.

Dimensions in mm



Interpower™ Ferrule Crimping Tools

Selecting the Proper Crimping Tools

Four standard crimp tools cover the wire ranges from 0.5 to 16mm². Crimp tools for larger wire are available upon request. Please contact our Customer Service Department at one of the numbers listed in the footline for price and delivery information.

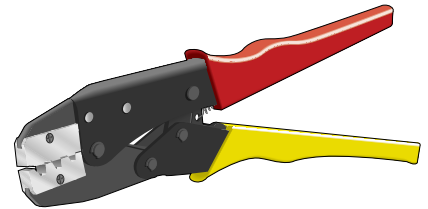
Two ratcheting tools are best choices for small to moderate production applications in which moderate hand pressure is required to close the tool. In both cases, the tools ratchet so that the crimp cycle must be completed before the ferrule can be released. This prevents partially crimped contacts from being released from the tool. Part number **82030050** (see pg. 8) crimps wire in the 0.5 to 2.5mm² range, and part number **82030060** (see pg. 8) crimps wire in the 4.0 to 16.0mm² range.

The **82030080** (see pg. 7) tool combines the ability to cut, strip, and crimp wire ranging from 0.5 to 6.0mm². It does not ratchet and does not provide as much mechanical

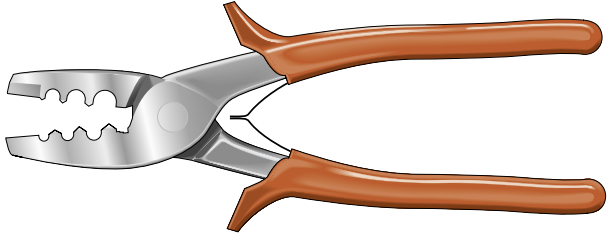
advantage as do the tools noted in the text above. It is best specified for use in lab or field applications where the convenience of cutting, stripping, and crimping with one tool is desirable and where the volume of terminations is small.

The **82030070** (see pg. 7) is basically a pair of pliers with crimping dies for jaws. There is limited mechanical advantage. This tool crimps wire sizes ranging from 0.75 to 10.0mm². This is the least expensive crimp tool. It is not recommended for production.

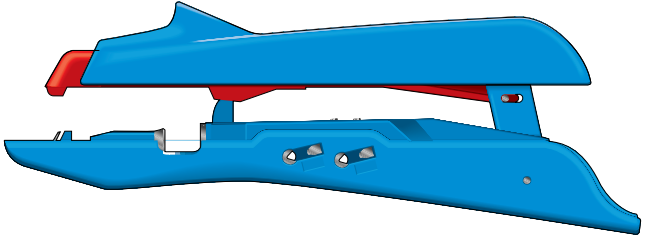
Please note: tool and die shown at right not available in this brochure. Call our Customer Service Dept. for more information about this and other crimping tools.



Crimping Tool for Cable 0.75–10.0mm²

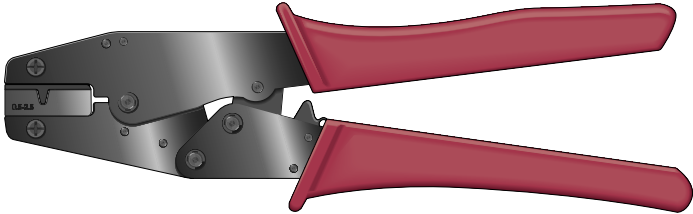
Part Number	Cable Sizes (mm ²)	Tool Length	Tool Weight	Illustration
82030070	0.75–10.0	180mm	0.240kg	

Crimping Tool for Cable 0.5–6.0mm²

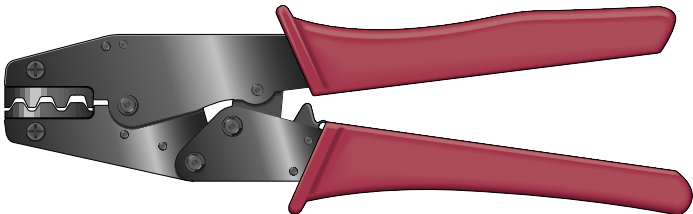
Part Number	Cable Sizes (mm ²)	Tool Length	Tool Weight	Illustration
82030080	0.5–6.0	160mm	0.120kg	



Crimping Tool for Cable 0.5-2.5mm²

Part Number	Cable Sizes (mm ²)	Tool Length	Tool Weight	Illustration
82030050	0.5-2.5	225mm	0.63kg	

Crimping Tool for Cable 0.75-10.0mm²

Part Number	Cable Sizes (mm ²)	Tool Length	Tool Weight	Illustration
82030060	4.0-16.0	225mm	0.63kg	

Ordering Information: Policies and Procedures

General Conditions: Orders are accepted by Interpower Components Ltd. on these conditions: In the event that customer's purchase conditions are in variance with our own, the order will only be accepted if these are waived by the customer or specially agreed in writing.

Prices: All prices quoted are net and F.O.B. Bognor Regis, West Sussex. Prices quoted more than 30 days before date of ordering may be subject to price change due to exchange rate variation if applicable.

V.A.T.: Prices quoted are not inclusive of V.A.T. Invoices will include tax rated at the time the goods are despatched.

Minimum Orders and Despatch Costs. We do not impose a minimum order cost and we include free delivery for orders over £100 net value (free delivery U.K. mainland only).

Quality Assurance: All the goods listed in this catalogue are available with a Certificate of Conformity and this will automatically be incorporated in the invoice/delivery note.

Payment Terms: Strict 30 days from date of invoice.

Retention of Title: The purchaser will only claim ownership when the seller is in receipt of the full price of the goods.

New Accounts: Customers wishing to open an account will be requested to supply 2 trade and 1 bank reference.

Telephone Orders: Orders placed by telephone will be accepted on the basis that a confirmation will be received either by FAX or post.

Scheduled Orders: Orders will be accepted with up to 12 deliveries over 12 months. Interpower Components Ltd. reserves the right to withhold a delivery if payment terms are not met by the purchaser.

Urgent Orders: Orders can be despatched out the day of ordering providing instructions are received before 1 PM.

Special Orders: Orders for products made to customer's own instructions are not subject to cancellation.

Return Material Authorisation: Materials will only be accepted by our receiving department if they carry an RMA number. Please contact our office to obtain an RMA number.

Customer's Inspections: Goods that have been despatched by Interpower Components Ltd. and subsequently rejected by the customer for not meeting specification will not be accepted back if notification is not received within 12 days of despatch.

Refused Shipments: On occasions that goods are returned and then a request is made by the customer to redeliver goods, all transport costs will be charged to the customer.

Catalogue Specifications: All specifications listed in our catalogue or in other data sheets issued by Interpower Components Ltd. are based on our knowledge and understanding of the products as of the printing date. We reserve the right to change technical specifications without notice. All product recommendations are based on our knowledge and experience but do not eliminate the customer's responsibility to ensure that the correct product is selected for a particular application. Free samples can be provided for evaluation.

Copyright: The contents of this catalogue are copyrighted in their entirety and cannot be duplicated in any manner without written authorisation of Interpower Components Ltd.

The next edition of our full-line *Export Designer's Reference & Catalogue* is now in production. Call or FAX to request your **FREE** copy of the sixteen page Shortform Catalogue, or to be added to the mailing list for the next edition of our full-line *Export Designer's Reference & Catalogue*:

U.K. Free Phone0800 212066
Ireland Free Phone1800 626506
Outside U.K. Telephone+44 1243 842323
Internet E-mailinfo@interpower.com

Free FAX0800 212693
 Free FAX1800 409505
 FAX+44 1243 842066
 Web Address.....www.interpower.com

Printed in the U.S.