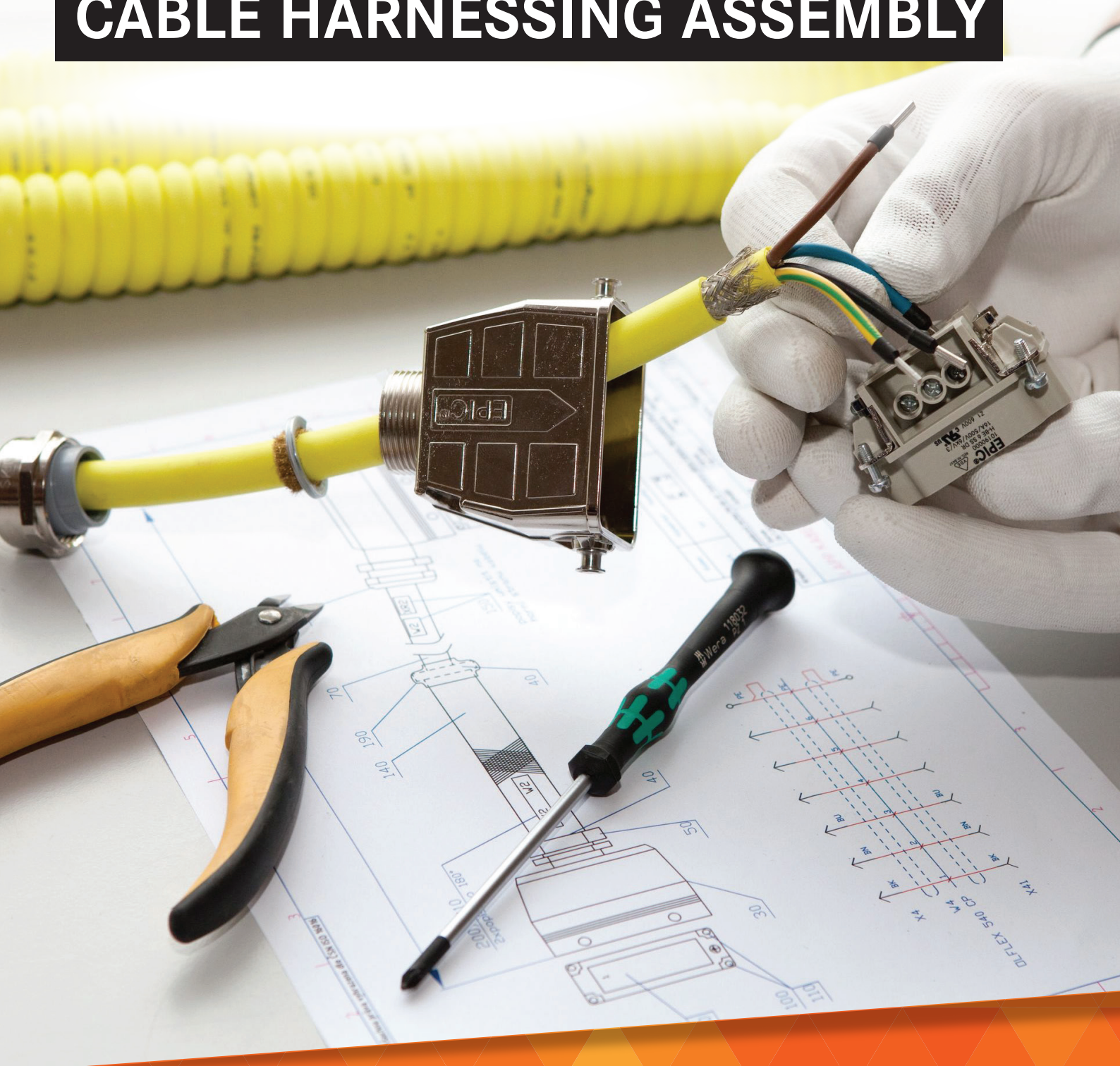
The Ultimate Guide for
CABLE HARNESSING ASSEMBLY



Choosing the right cables and connectors goes miles in ensuring operational stability for production facilities and assembly lines. This e-book sheds some light on what to take note of when selecting connectors and how to assemble them.

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1.0 GLOSSARY OF COMMONLY-USED TERMS

These basic definitions will help you understand some of the concepts mentioned in this e-book.

Breakout
The separation of a conductor from the main body of wires in a harness

Cable
A shielded single conductor or combination of conductors in a twisted or parallel configuration

Cable Assembly
A group of cables arranged in a single unit, usually protected by a covered sleeve

Contact
The conducting part of a connector that acts with another such part to control the flow

Crimping
A method of mechanically compressing or securing a terminal, splice or contact to a conductor

Harness
An arrangement of wires and cables, usually with many breakouts, which have been tied together or pulled into a rubber or plastic health used to interconnect an electric circuit

Insulation
Material providing electrical resistance for covering components, terminals and wires which helps prevent future contact of adjacent conductors and short circuits

Strain Relief
A technique or connector device that prevents the disturbance of the contact and cable terminations

Strip
To remove insulation from a conductor

Stress Relief
A portion of the conductor that provides sufficient length to minimise stress between terminations

Wire Diameter
The overall conductor plus insulation thickness

2.0 WHEN ELECTRICAL CONNECTIONS **BREAK DOWN**

Choosing the right cables and connectors goes miles in ensuring operational stability for production facilities and assembly lines. Read on to find out what are some important points to take note of when selecting connectors and assembling cables.

With all the mission-critical electrical connections in a modern plant, downtime from damaged electrical connections is a matter of “when”, not “if”.

2.1 Minimise impact of operational disruptions

Today’s evolving manufacturing industries places emphasis on speed, efficiency and ease of installation.

A typical manufacturing plant has thousands or even many thousands of electrical connections on both fixed equipment and moving machines. The sometimes inevitable power and signal disruptions therefore present a risk in the form of **operational disruptions and losses**.

Triggers of such disruptions include **mechanical and electrical causes**. Besides the wear and tear of machines from daily use, other factors like forklift accidents or over-current conditions may also trigger such damaged electrical connections, bringing production machines to a dead stop.

2.2 Introducing Connectors

One way to minimise such costly downtime is to “connectorise” power and signal cables. **Multi-conductor cables can be replaced in just minutes** if they have connectors at both ends, compared to hours if the same cable was hard-wired.

Though connectors add a small premium to the initial cost of cabling, they will pay for themselves many times over if they eliminate even a few minutes of downtime on a busy production line. Conversely, **hardwiring presents other hidden costs** which rise with the number of connection points on the machine.

To add on to the benefits of connectorisation, connectors also give engineers a **plug-and-play assembly solution** that is faster than hardwiring, besides ensuring wiring integrity. Without the need to rewire machines, site electricians can also simply unplug cables from the panel’s connectors.

3.0 **INSTALLATION ENVIRONMENT** OF YOUR CONNECTOR CABLE

In order to select a cable connector that will perform as expected, it is important to understand the environment in which they will operate, and how they will be used.

The ideal connector should be able to withstand mechanical stresses and unique characteristics in their environment they shall be installed in.

3.1 Environmental factors

If extreme temperatures or exposure to moisture and debris are part of the installation environment, sealed connector systems should be considered to ensure its functionality.

3.2 Application and available space

Where a very small space exists for such connections, such as in vehicles, terminals or mobile equipment, smaller connectors need to be considered, just as special products need to be considered where unusual electrical requirements are likely.

The myriad number of connector varieties and individual connector models presents a problem for even experienced engineers.

No more "CONNECTOR CONFUSION"!

Choosing the right connector product not only ensures safety on the job, but also automatically reduce significant time, labour and money that would be expended on fixing potential issues.

SPECIFICATIONS TO HELP YOU SELECT **THE RIGHT CONNECTOR**

The most important criterion in the selection of electrical connectors is current rating and operating voltage. Others include outer diameter (the diameter of the sleeve on the outside of the plug), wire size (measured in standard American Wire Gauge (AWG) sizes) and number of contacts.

As a starting point, take a look at four key technical factors to help narrow down the huge range of connector products.

Four factors to consider are:

WIRE GAUGE (AWG)

Cable's wire gauge should be within allowed range of the connector contacts (screw contacts usually accommodate a broader range of wire gauges than crimped contacts).

NUMBER OF CONTACTS

The number of contacts in the connector should match or exceed the number in the cable.

MAXIMUM VOLTAGE & CURRENT

Safety is a paramount concern at all times - so check to make sure the application's voltage and current are within the connector's rated capacity.

CABLE OUTSIDE DIAMETER (OD)

Often overlooked, dimensional information helps prevent performance and installation issues. Cables with too small an OD relative to the housing will lead to poor performance, whereas those with too big an OD will cause potentially costly installation issues.

It is important to ensure that all four factors are taken into consideration! Where only one or a few of these factors are looked at, a connector may fulfill the number of contacts, wire gauge and outside diameter, but not the application's current or voltage requirements.

4.0 CABLE AND CONNECTOR ASSEMBLY

For operators looking to leverage on the time-saving simplicity of connectorisation, we recommend the cost-effective ÖLFLEX® connectivity solution.

The ÖLFLEX® portfolio offers three distinct harnessing services to cover all your connectivity needs, including cable systems, servo systems and chain systems. Our time-tested ÖLFLEX® cables also include a pressure-extruded jacket for precision connectorisation.

Paired with our plug-and-play EPIC® connectors or SKINTOP® which ensures minimal Outside Diameter (OD) variance, installation is made easier too.

Our cable assembly solutions, which include the following, can be used across diverse industries and applications.

- Cable cutting to specifications
- Stripping
- Crimping
- Heat shrinking
- Markings (labels, sleeves, marking rings, packing, stainless steel marking)
- Cable printing
- Push-pull test
- Resistance test

Harnessing Solutions with ÖLFLEX®

LAPP has been recognised as the world's leading supplier of specialised cabling solutions. Its ÖLFLEX® brand of cables has been used in diverse industries and is the reliable choice for virtually any industrial application.

ÖLFLEX®
Flexible Control Cable

ÖLFLEX®
Tray Rated Cable

ÖLFLEX®
Flexible Cable for Motors, Drives & Assemblies

SCAN TO EXPLORE ÖLFLEX® CONNECT

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Secure Connections In a Matter of Seconds

For single-entry as well as multi-cable entry systems, SKINTOP® provides solutions for both assembled and non-assembled cables and wires, which meet EHEDG standards.

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