MOTIONCABLES

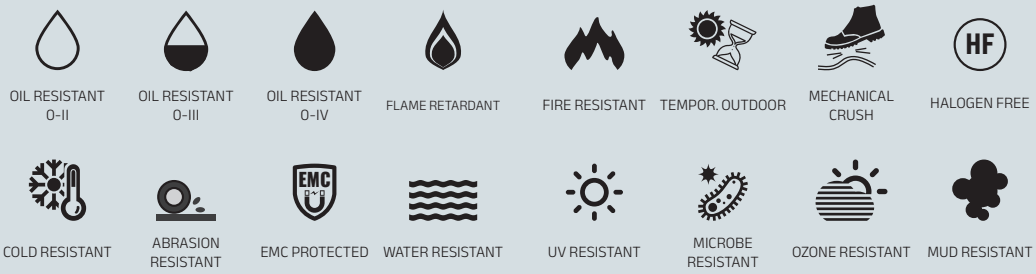
MOTION**SPECIAL**

SPECIAL APPLICATION CABLES FOR DIFFERENT ENVIRONMENTS

ICONS

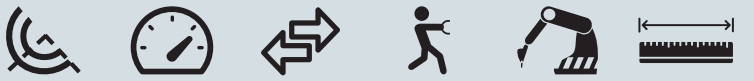
Summary of the icons you will find in the catalogue pages, grouped by relevant area

RESISTANCE TO ENVIRONMENTAL AND AGGRESSIVE CHEMICAL THREATS

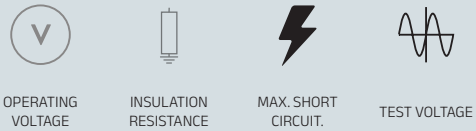


DURABILITY IN MECHANICAL & THERMAL CONDITIONS

BALANCED APPLICATION & VFD INTEGRATED COMPLIANCE



ELECTRICAL PROPERTIES



Use the icons for a fast summary and a general idea of the related product features. More details on product characteristics are available in the proper sections of each product page.

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Safety notice.
The cables and wires described in the catalogue are produced in accordance with national and international standards, as well as plant standards; application safety, as stipulated in the safety directives, standards, and statutory regulations, as amended, are provided. Following proper installation and usage guidelines, the possibility of product-specific dangers can be excluded. This catalogue describes general information for each product's use. Installation and processing must only be executed by qualified electricians.

CONTENTS

MDM.R

MOTIONDRUM-R

High-Dynamic Performance, durable cable ***designed for Heavy-Duty mobile applications****.*

HP

HIGH DYNAMIC PERFORMANCE

PUR FRHF | **600 V 1000 V** | **-50 °C +90 °C**

CE LABS Free ROHS REACH APPROVED UPON REQUEST

5 million	**5** x O.D.	**240** m / min	**20** m / s²	**≤ 50** N / mm²	**± 30** °/ m	**50** m
CYCLES	MIN. BENDING RADIUS	MAX. SPEED	ACCELERATION	PULLING FORCE	TORSION	MAX. HORIZ. TRAVEL

DURABILITY IN MECHANICAL & THERMAL CONDITIONS

	m.u.				
CYCLES	MIL	0,2	5	5	5
MIN. BENDING RADIUS	x O.D.	12	5	5	10
MAXIMUM SPEED	m/min	120	240	240	150
MAXIMUM ACCELLERATION	m/s²	2,0	20	20	15
PULLING FORCE	N/mm²	≤ 50	≤ 20	≤ 20	≤ 20
TORSION	°/m	-	± 30	± 30	± 30
MAX. HORIZONTAL TRAVEL	m	-	3	15	50
TEMPERATURE	°C	-50 / +90	-40 / +90	-40 / +90	-40 / +90

ELECTRICAL PROPERTIES

Test Voltage	4,0 kV x 5 min acc.to EN 50395 Cl. 10.3
Insulation Resistance	≥ 1.0 GΩ x km @ 20 °C acc.to EN 50395 Cl. 8.1
Max. Short Circuit Temperature	250 °C (≤ 1 s)
Operating Voltage	U0/U 0.6/1.0 kV (IEC)

RESISTANCE TO ENVIRONMENTAL AND AGGRESSIVE CHEMICAL THREATS

OIL RESISTANT · FLAME RETARDAN · COLD RESISTANT · ABRASION RESISTANT · EMC PROTECTED · WATER RESISTANT · UV RESISTANT · MICROBE RESISTANT · OZONE RESISTANT · MUD RESISTANT · HALOGEN FREE

MAIN ADVANTAGES

Reinforced Construction for High Mechanical Stress	Long service life even in applications with strong accelerations, tension, and torsion.
Excellent Dynamic Flexibility	Ideal for reeling systems, mobile trolleys, and systems with repeated movements.
Outer Jacket Resistant to Oils, Abrasion, and Weathering	Constant reliability in industrial and port environments, even under severe outdoor conditions.
Low Dielectric Constant Insulating Materials	Stable electrical performance and reduced losses even over long distances.
Balanced Structure with Flexible Strands	Increased resistance to mechanical fatigue and reduced stress on internal conductors.
Shielded and Unshielded Versions	Adaptability to power, signal, or control requirements, with high EMC compatibility.
Wide Operating Temperature Range	Guaranteed functionality even in conditions of intense cold or prolonged heat.
CE- UL AWM Industrial Certifications	International conformity for global applications in cranes, ports, machine tools, and automated logistics.

Scan the QRcode for a more detailed digital version on our website

MotionCables code	EPlan Code	Formation	∅	Cu	Pulling Force	Weight	DATA SHEET
		mm²	mm	kg / km	N	kg	
MDND15G04UP-N	MC3440415195	4 G 1.5	13.6	58	210	295	
MDND15G05UP-N	MC3440515195	5 G 1.5	14.0	72	263	330	
MDND15G07UP-N	MC3440715195	7 G 1.5	14.5	100	366	425	
MDND15G12UP-N	MC3441215195	12 G 1.5	19.5	173	630	595	
MDND15G18UP-N	MC3441815195	18 G 1.5	22.3	260	945	775	
MDND15G24UP-N	MC3442415195	24 G 1.5	23.6	345	1260	1050	
MDND15G30UP-N	MC3443015195	30 G 1.5	26.9	432	1575	1150	
MDND13G04UP-N	MC3440413195	4 G 2.5	15.0	96	350	365	
MDND13G05UP-N	MC3440513195	5 G 2.5	16.0	120	438	420	
MDND13G07UP-N	MC3440713195	7 G 2.5	21.0	168	613	580	
MDND13G12UP-N	MC3441213195	12 G 2.5	24.0	288	1050	770	
MDND13G18UP-N	MC3441813195	18 G 2.5	26.5	432	1575	1080	
MDND13G24UP-N	MC3442413195	24 G 2.5	30.5	576	2100	1460	
MDND13G30UP-N	MC3443013195	30 G 2.5	32.6	720	2625	1610	
MDND13G36UP-N	MC3443613195	36 G 2.5	34.8	864	3150	1350	
PDND11G04UP-N	MC3440411195	4 G 4	15.4	154	560	470	
PDND09G04UP-N	MC3440409195	4 G 6	16.4	230	840	625	
PDND07G04UP-N	MC3440407195	4 G 10	19.6	384	1400	930	
PDND05G04UP-N	MC3440405195	4 G 16	21.6	614	2240	1320	
PDND03G04UP-N	MC3440403195	4 G 25	27.9	960	3500	1870	
PDND02G04UP-N	MC3440402195	4 G 35	30.3	1344	4900	2500	
PDNDA1G06UP-N	MC34406A1195	3 X 50 + 3 G 25/3	32.4	1670	5400	2740	
PDNDA2G06UP-N	MC34406A2195	3 X 70 + 3 G 35/3	35.9	2304	6300	3750	

EPLAN
All the codes are available in the EPLAN PLAN8 System (use the EPLAN code in the relevant column).

SPAC CAVI
All the codes are available in the SPAC CAVI system (use MotionCables item code).

SPECIAL CABLES FOR AUTOMATION ROBOT INDUSTRY

MOTION**ROBOTLINE**

DYNAMIC RELIABILITY FOR ARTICULATED ROBOTICS

THE ROBOLINE CONCEPT: PHILOSOPHY AND APPLICATIONS

MOTION**ROBOTLINE** cables are engineered for dynamic robotic applications involving high torsion and thermal conditions from –40 °C to +90 °C.

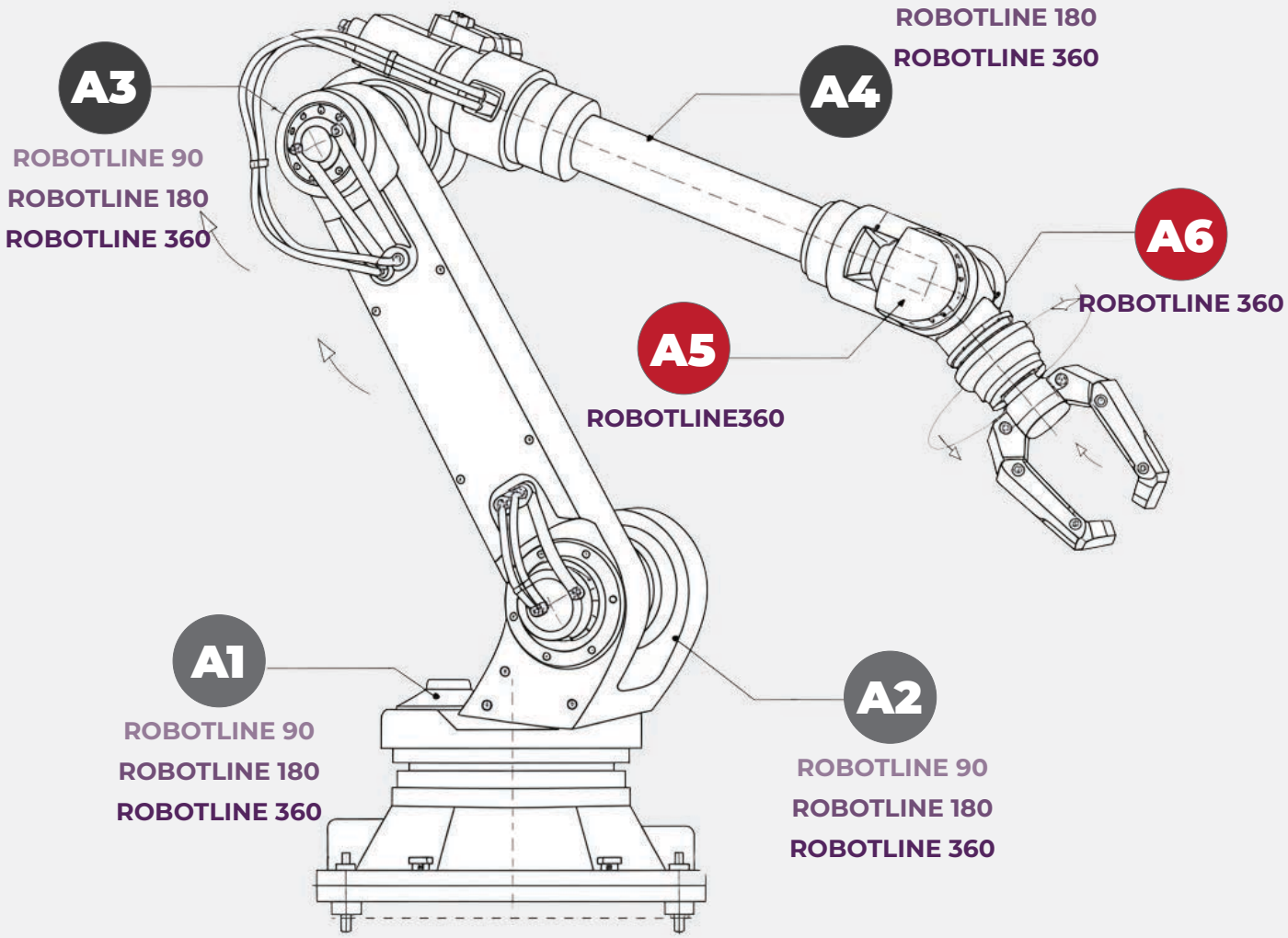
They are UL AWM Recognized compliant, available in shielded and unshielded versions, and customizable in hybrid configurations (power + signals + high-frequency data up to 100 MHz). The range is structured into three families based on the guaranteed torsion level.

Family	Torsion Level	Axes Covered
ROBOTLINE 90	±90°/m	Axes 1–3
ROBOTLINE 180	±180°/m	Axes 1–4
ROBOTLINE 360	±360°/m	Axes 1–6

MOTION EM-TORSION MESH SHIELDING SYSTEM

For the shielded versions, MOTION**CABLES** has developed the patented **Motion EM-Torsion MESH Shield:**

- It is a braid optimized for torsion up to Axis 6, which maintains attenuation stability even after millions of cycles.
- Unlike spiral shields, which are affected by the Lenz Effect (electromagnetic induction generating eddy currents and increasing attenuation losses), the braided shield maintains shielding continuity without compromising high-frequency performance.
- Tested up to 100 MHz with controlled impedance for data signals.



MOTION**ROBOTLINE 360**

APPLICATIONS

AXES 1-6
EXTREME TORSION
Typical applications: foundry, metallurgy, high-speed handling, complex robots with simultaneous movements

MOTION**ROBOTLINE 180**

APPLICATIONS

AXES 1 – 4
MEDIUM-HIGH TORSION
Typical applications: welding, painting, automotive handling, packaging lines.

MOTION**ROBOTLINE 90**

APPLICATIONS

AXES 1 – 3
MODERATE TORSION
Typical applications: pick & place, light handling, primary packaging.

MOTION**ROBOTLINE** characteristics can be applied to the following cables' families:

MOTION**SERVO**

MOTION**HYBRID**

MOTION**FEEDBACK**

MOTION**BUS**

MOTION**STANDARD**

MOTIONROBOTLINE: MATERIAL AND CONSTRUCTION

- **Outer Jacket**:
  High-mechanical-strength polyurethane, optimized for torsion and abrasion.
- **Conductor Insulation**:
  XL-PE for thermal and electrical stability.
- **Optional Shielding System**:
  Motion Braiding Torsion Shield (for shielded versions).
- **Custom Options**:
  Hybrid configurations (power + signals + twisted data pairs with controlled impedance up to 100 MHz).

THE ROBOTLINE CONCEPT: PHILOSOPHY AND APPLICATIONS

- **Automotive Robotics**: Welding, handling, painting.
- **Foundry and Metallurgy Robotics**: Extreme torsion in hot and harsh environments.
- **Food and Pharmaceutical Robotics**: Handling, packaging, and high-speed pick & place.
- **Logistics Automation**: Articulated robots for palletizing and material handling.

MOTION**ROBOTLINE** cables offer not only environmental resistance but also excellent electrical and dynamic characteristics.

Feature	ROBOTLINE 90	ROBOTLINE 180	ROBOTLINE 360	Benefit
Torsion Level	±90°/m (Axes 1–3)	±180°/m (Axes 1–4)	±360°/m (Axes 1–6)	Complete coverage for articulated robots
Operating Temp.	–40 to +90 °C	–40 to +90 °C	–40 to +90 °C	Thermal reliability
Torsion Cycles	> 5 Million	> 7 Million	> 10 Million	High durability
Shielding	Opt. Motion Braiding	Opt. Motion Braiding	Opt. Motion Braiding	Data integrity up to 100 MHz
Compliance	UL AWM Recognized	UL AWM Recognized	UL AWM Recognized	International standard

ADVANTAGES OF THE MOTION EM-TORSION® MESH SHIELD SYSTEM

- **Resistance to Extreme Torsion:** Optimized braid that follows movement without gapping.
- **Maintenance of EMC Performance**: Constant shielding; no high-frequency degradation.
- **Reduction of Attenuation Losses**: Avoids the inductive effect typical of spirals (Lenz's Law).

WHY BRAID SHIELDING IS BETTER THAN SPIRALS FOR TORSION CABLES

When a shielded cable must transmit high-frequency signals (e.g., data up to 100 MHz), shielding quality is critical for preventing electromagnetic interference (EMC). There are two main systems:

1. **SPIRAL SHIELDING** (Helical Winding of Metallic Wires):
2. **BRAID SHIELDING** (Motion Braiding Torsion Shield):

1. SPIRAL SHIELDING (HELICAL WINDING OF METALLIC WIRES):

The wires are helically wound around the cable. When the cable is subjected to torsion, **the winding tends to stretch or compress, creating less-shielded areas**. Furthermore, according to Lenz's Law, when a variable electromagnetic field passes through the spiral, induced currents are generated along the spiral, creating an opposing field. This effect increases impedance and increases attenuation losses, especially at high frequencies.

Result: Spiral shielding progressively reduces its effectiveness and degrades data transmission.

2. BRAID SHIELDING (MOTION BRADING TORSION SHIELD):

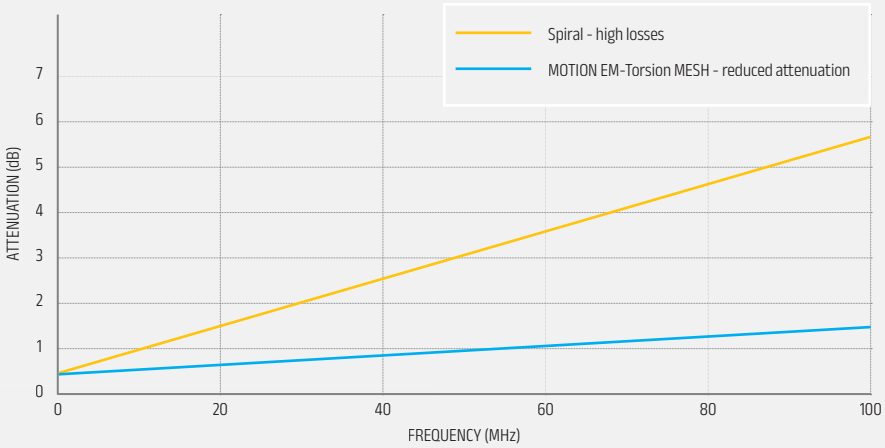
The wires are interwoven in a criss-cross pattern, forming a regular mesh. **The braid does not gap or tighten during torsion, maintaining a uniform 360° coverage of the cable**. The weave distributes induced currents into micro-closed loops and drastically reduces the inductive effects described by Lenz's Law.

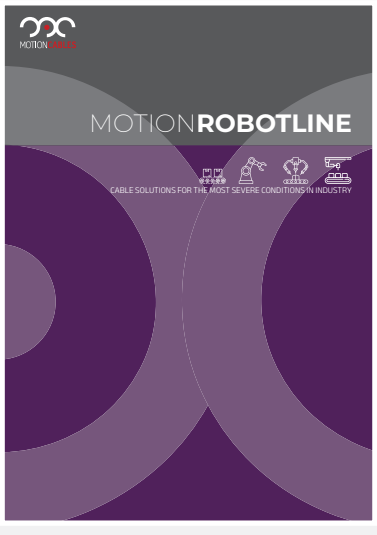
Result: The shield maintains its efficiency even after millions of cycles and guarantees constant attenuation at high frequencies.

IN SUMMARY:

- **Spirals**: Behave like a "spring" that deforms under torsion and, due to Lenz's Law, amplifies attenuation losses.
- **Motion EM-Torsion MESH Shield Braid**: Maintains stable coverage, does not suffer from the inductive effect, and therefore ensures stable EMC protection over time, even under extreme torsion.
- **Long-Term Reliability**: Tested on torsions up to Axis 6.

COMPARISON OF SHIELDING ATTENUATION





Further information about codes and applications could be found in our relevant brochure: MOTION**ROBOTLINE**. You can download the brochure in pdf format from our website at: https://www.motioncables.com/specialcables/downloads/en

MOTION**THERMLINE**

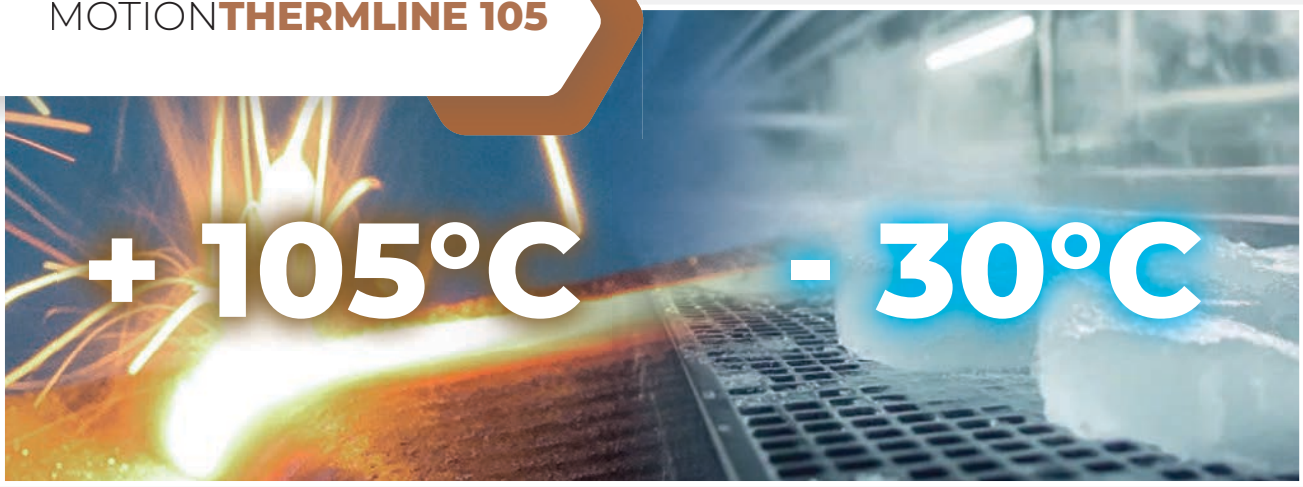
THERMAL SAFETY, DYNAMIC PERFORMANCE, AND RELIABILITY FOR INDUSTRY

THE THERMLINE CONCEPT: PHILOSOPHY AND APPLICATIONS

In the modern industrial sector, managing temperature extremes is crucial: deep-freeze cells, pasteurization tunnels, industrial furnaces, turbines, and foundry lines. MOTION**THERMLINE** cables are designed for dynamic applications—in cable carriers, robotics, and continuous motion—and resist repeated thermal cycles, steam, hot water, and chemical agents, without compromising flexibility or service life MOTION**THERMLINE** cables are engineered for dynamic applications **where thermal variability is a critical factor**.
They ensure operational continuity, resistance to thermal aging, and optimal dynamic behaviour (suitable for use in cable carriers and robotics). The product line is structured into **three families, differentiated by temperature range and jacket/insulation compound**, covering requirements from cryogenic processes and extreme cold to industrial furnaces and aggressive thermal cycles.

MOTION**THERMLINE 125**

MOTION**THERMLINE 105**



MOTION**THERMLINE 90**

MOTION**THERMLINE 125**

APPLICATIONS

Cold Extremes:
Deep-freezing, cryogenic transport, –40 °C food logistics.

Hot Extremes:
Hot-fill, sterilization, pasteurization tunnels.

Industrial:
Turbines, foundries, thermal testing lines.

Pharmaceutical/Biotech:
Autoclaves, Lyophilization.

MOTION**THERMLINE 105**

APPLICATIONS

Food & Beverage:
Bakery, drying, packaging machinery.

Robotics:
Axes near heat sources.

Industrial:
Presses, machine tools, moderate heat treatment.

MOTION**THERMLINE 90**

APPLICATIONS

Packaging:
Conveyors, sensors, motors not in extreme zones.

Intermediate Refrigeration:
Cells and machinery with hot water washdowns.

General Automation:
Moderate temperature cable carrier applications.

MOTION**THERMLINE** characteristics can be applied to the following cables' families:

MOTION**SERVO**

MOTION**HYBRID**

MOTION**FEEDBACK**

MOTION**BUS**

MOTION**STANDARD**

MOTIONTHERMLINE: DESIGN AND INSTALLATION

- **Smooth**:
  non-porous surface, easy to clean.
- **Custom colours**:
  for identifying thermal lines.
- **Compatible with**:
  cable carriers and robotics.
- **Recommendations**:
  - Minimum bending radius 7.5×Ø;
  - Protection from surfaces >150 °C;
  - Periodic inspections.

THE THERMLINE CONCEPT: PHILOSOPHY AND APPLICATIONS

Typical Applications:

- **Food & Beverage**: hot-fill, pasteurization, sterilization, ovens, steam cleaning.
- **Heavy Industry**: turbines, foundries, heat treatment, hot presses.
- **Extreme Temperature Logistics**: cold storage rooms, deep-freezing, cryogenic transport.
- **Robotics and Automation:** dynamic axes near heat sources or in sub-zero environments.

MOTION**THERMLINE** cables offer not only environmental resistance but also excellent electrical and dynamic characteristics.

Characteristic	THERMLINE 125	THERMLINE 105	THERMLINE 90	Benefit
Nominal Voltage	600 / 1000 V	600 / 1000 V	600 / 1000 V	Industrial Compatibility
Insulation	MotionGum	XL-PE	XL-PE	Dielectric Stability
Temp. Range	–50 to +125 °C (peaks +150 °C)	–30 to +105 °C (peaks +125 °C)	–5 to +90 °C (peaks +105 °C)	Full Coverage
Dynamic Cycles	>5 million	>5 million	>10 million	Robotics & Cable Carriers
Bending Radius	10 × Ø	10 × Ø	7.5 × Ø	Compact Installations
Mechanical Strength	>15 N/mm²	>15 N/mm²	>15 N/mm²	Vibration Resistance
Chemical Resistance	Excellent	Very Good	Good	Sanitation and Detergents

PERFORMANCE COMPARISON TABLES

Family	Temp. Range	Jacket	Insulation	Key Applications
THERMLINE 125	–50 to +125 °C (peaks +150 °C)	MotionGum	MotionGum	Cryogenic, Hot-fill, Sterilization, Ovens, Foundries
THERMLINE 105	–30 to +105 °C (peaks +125 °C)	MotionTherm PU-105	XL-PE	Bakery, Robotics, Presses, Thermal Automation
THERMLINE 90	–5 to +90 °C (peaks +105 °C)	MotionTherm PN-90	XL-PE	Packaging, Conveyors, Intermediate Refrigeration

RESISTANCE TO THERMAL PROCESSES AND SANITATION

- **THERMLINE 125:**
  >1000 hot/cold shock cycles without insulation loss.
- **THERMLINE 105:**
  Resistant to steam and alkaline detergents without degradation.
- **THERMLINE 90:**
  Stable against hot wash-downs up to 90 °C with common detergents.

LONG-TERM ADVANTAGES

- **Thermal reliability**
  across the entire –50/+125 °C spectrum.
- **Longer service life**
  and reduced machine downtime.
- **High dynamic performance** (>10 million cycles).
- **Modular range to cover all requirements.**
- **Lower operating costs.**

Further information about codes and applications could be found in our relevant brochure: MOTION**THERMLINE**. You can download the brochure in pdf format from our website at: https://www.motioncables.com/specialcables/downloads/en

MOTION**CLEANLINE**

SPECIFIC AND TECHNOLOGICALLY ADVANCED SOLUTION FOR THE FOOD INDUSTRY

THE CLEANLINE CONCEPT: PHILOSOPHY AND APPLICATIONS

MOTION**CLEANLINE** encapsulates in its name the product's philosophy: cables that are clean, safe, and designed for longevity.

They are utilized in demanding applications such as:

- Bottling and packaging lines;
- Machinery for processing meat, dairy, and bakery products;
- Fruit and vegetable processing plants;
- Freezing and refrigeration equipment.

Every MOTION**CLEANLINE** cable is designed to prevent dirt accumulation, minimize contamination risks, and ensure electrical reliability even after years of use.

HYGIENIC ZONE 1

MOTION**CLEANULTRA**

Food is in direct contact with equipment and electrical components

SPLASH ZONE 2

MOTION**CLEANPRO**

Drips or splashes of food could return to the food manufacturing process, causing contamination.

NO-PRODUCT ZONE 3

MOTIONCLEANMAX

MOTIONCLEANULTRA
HYGIENIC ZONE

MOTIONCLEANPRO
SPLASH ZONE

MOTIONCLEANMAX
NO-PRODUCT ZONE

APPLICATIONS

Electrical equipment or components that need to be washed as part of regular maintenance

APPLICATIONS

Areas that need to be washed down

APPLICATIONS

Conveyor belt for packaged products

MOTIONCLEANLINE characteristics can be applied to the following cables' families:

MOTIONSERVO

MOTIONHYBRID

MOTIONFEEDBACK

MOTIONBUS

MOTIONSTANDARD

MOTIONGUM JACKET MATERIAL: TECHNICAL PROPERTIES

The MOTION**GUM** jacket represents the technological core of MOTION**CLEANLINE** cables. Key properties include:

- **Smooth, non-porous surface**: Prevents the build-up of organic residues.
- **High chemical resistance**: Withstands alkaline detergents, organic acids, animal fats, and industrial oils.
- **Controlled elasticity**: Maintains flexibility even at low temperatures (–40 °C).
- **Thermal stability**: Resists up to +80 °C continuously, with peaks up to +105 °C.
- **Food compatibility**: Complies with FDA regulations and EHEDG recommendations.

RESISTANCE TO INDUSTRIAL SANITATION PROCESSES

Food processing plants require wash-downs several times a day using:

- High-pressure jets (IP69K);
- Alkaline and acidic detergents;
- Steam sanitization;
- Dry ice cleaning (–78 °C).

MOTION**CLEANLINE** cables maintain their:

- Jacket integrity;
- Electrical insulation;
- Mechanical robustness.

Internal tests show over 1.000 simulated wash cycles with no performance degradation.

MOTION**CLEANLINE** cables offer not only environmental resistance but also excellent electrical and dynamic characteristics.

FEATURE	TYPICAL CLEANLINE VALUE	PRATICAL BENEFIT
Nominal Voltage	600/1000V	Compatibility with most food machinery
Conductor Insulation	XLPE	Dielectric stability and low capacitance
Operating Temperature	–40 ° C to +105°C (peaks +125°C)	Resistance to extreme thermal cycles
Flexing Cycles	>10 million	Ideal for drag chain applications
Minimum Bending Radius	7.5 × Cable ∅	Compact and flexible installations
Mechanical Tensile Strength	>15 N/mm²	Durability in high-vibration and stress environments

HYGIENIC DESIGN PRINCIPLES APPLIED TO CABLES

MOTION**CLEANLINE** cables adhere to EHEDG principles:

ABSENCE OF MICRO-FISSURES
The MotionGum jacket is uniform and continuous.

COMPATIBILITY WITH OPEN INSTALLATIONS
Reduces the need for closed, condensation-prone conduits.

DEEP BLUE COLORATION
Easily detectable in case of breakage or accidental drop

WASHABLE SURFACE
Prevents the accumulation of biofilm or residues.

PERFORMANCE COMPARISON TABLES

CHEMICAL SUBSTANCE	MOTIONGUM RESISTANCE
Caustic Soda (2-5%)	Resistant
Nitric Acid (≤10%)	Resistant
Hydrogen Peroxide	Resistant
Animal Fats	Resistant
Vegetable Oils	Resistant

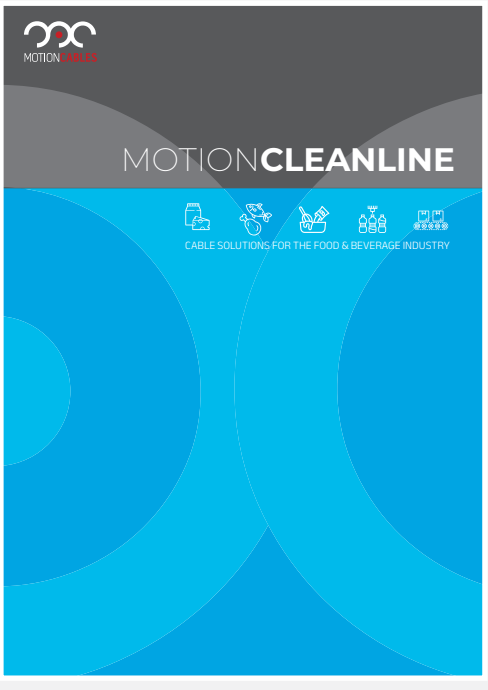
USAGE ZONE	CLEANLINE	RATIONALE
Hygienic Design Zone	☑	Smooth jacket, EHEDG compliant
Splash Zone	☑	Resistance to intense sprays and wash-downs
Non-Product Zone	☑	Versatility and mechanical robustness

INSTALLATION & MAINTENANCE GUIDELINES

- **Avoid tight cable routing**: Leave space for cleaning.
- **Minimize cable slack**: Reduces accumulation points.
- **Use hybrid configurations when possible**: Fewer connections equals better hygiene.
- **Install in hygienic zones with sufficient slope**: Prevents water pooling.
- **Periodically check the jacket surface**: Ensures hygiene and integrity.

LONG-TERM ADVANTAGES

- **Superior lifespan**: Resists extreme cleaning cycles without degradation.
- **Reduced downtime**: Fewer failures, greater production continuity.
- **Certified hygiene**: Compliant with industry standards.
- **Operational savings**: Faster cleaning times, less detergent usage.
- **Product safety**: Contamination risk minimized



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EXTREME PERFORMANCE CABLES

MOTION**XP**

SINGLE-CORE, MULTI-CORE, AND QUAD-CORE CABLES FOR DYNAMIC APPLICATIONS AND HARSH ENVIRONMENTS

The MOTION**XP** line is engineered to confront the most severe conditions in modern industry: continuous motion, high mechanical stress, chemically aggressive environments, and temperature extremes.

Each cable is the result of advanced engineering design, featuring selected materials and optimized geometries to ensure dynamic flexibility, robustness, and long-term electrical stability.

Tested at the MOTION**CABLES** Research & Test Center, MOTION**XP** cables are the ideal solution for offshore installations, oil & gas, mining, steel production, heavy-duty robotics, and industrial automation.

MOTION**XP** product families:

Family	Type	Available Cross-Sections	Configurations	Shielding	Primary Applications
MOTIONWIRE XP®	Single-core Power Cables	4 ÷ 400 mm²	Single conductor	Shielded / Unshielded	Power connections, energy distribution, motor and inverter supply lines
MOTIONMULTIWIRE XP®	Multi-core and Control Bundles	0,50 ÷ 2,50 mm²	2 ÷ 48 Insulated conductors	Shielded / Unshielded	Control wiring, signals, sensors, and actuators in dynamic environments
MOTIONPOWER XP®	Four-core Power Cables with Ground	4 ÷ 240 mm²	4G symmetrical	Shielded / Unshielded	Motor power supply, inverters, mobile systems, and heavy dynamic installations

ELECTRICAL & MATERIAL SPECIFICATIONS

CHARACTERISTIC	**TECHNICAL SPECIFICATION**
Conductor	Flexible Copper Class 6 – Extra-flexible (IEC 60228)
Insulation	XLPE – Low capacitance and high thermal stability
Outer Jacket	PUR FRHF or TPE-U Heavy Duty – High mechanical and chemical resistance
Nominal Voltage	0.6 / 1 kV
Operating Temperature	–50 °C to +90 °C (peaks +105 °C)
Dynamic Acceleration	Up to 6 G
Linear Speed	Up to 600 m/min
Static Bending Radius	4 × Outer Diameter
Dynamic Bending Radius	5 × Outer Diameter
Mechanical Resistance	High resistance to Flexing, Tensile Stress, Impact, and Abrasion
Chemical Resistance	Industrial Oils, Hydrolysis, Coolants, MUD (Drilling Fluid), Light Acids
Environmental Resistance	UV, Ozone, Fungi, Bacteria, Marine Agents, and Salt
Flame Properties	IEC 60332-1-2 / UL VW-1 / LSZH optional

DEMANDING OPERATING ENVIRONMENTS

MOTION**XP** cables are designed for operation in harsh environments where electrical and mechanical reliability is critical for safety and operational continuity. Primary applications:

OIL & GAS, OFFSHORE, SUBSEA

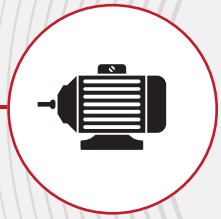
Platforms, FPSOs (Floating Production Storage and Offloading), drilling systems, and submersible pumps (MUD & NEK 606 compliant)

IRON AND STEEL, METALLURGY

Furnaces, roller tables, cranes, and high-temperature manipulators.

OFFSHORE RENEWABLE ENERGY

Offshore wind turbines, floating systems, hybrid parks.



EXTREME OUTDOOR ENVIRONMENTS

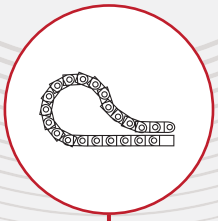
Exposure to UV, ozone, thermal variations, humidity, frost/ice

SHIPBUILDING AND PORT FACILITIES

Mobile cranes, quays/docks, lifting systems

MINING & TUNNELLING

Excavators, drag-lines, drilling rigs, conveyors, and extraction machinery.



HEAVY AUTOMATION

Cable carriers, mobile systems.

CHEMICAL AND PHARMACEUTICAL INDUSTRY

Zones with aggressive chemical agents or high-pressure wash-downs.

VALIDATION & TESTING SUMMARY – MOTIONCABLES RESEARCH & TEST CENTER

Test Parameter	MOTIONCABLES Test Method	Typical MOTIONXP® Result
Dynamic Cycles in Cable Carrier	Continuous Flex Test at 5×Ø	≥ 10 million cycles (no visible cracking)
Torsion Tests	±90°/m at 60 cycles/min	Passed – mechanical and electrical integrity confirmed
MUD Resistance	IEC 60092-360 / NEK 606	Compliant – "Severe" level
Oil and Hydrolysis Resistance	IEC 60811-2-1 / ISO 1817	Excellent
UV Resistance	ISO 4892-2 (720 h)	No surface degradation
Cold Bend / Cold Impact	IEC 60811-504 / –40°C	Passed
Tensile and Impact Tests	IEC 60811-506	Passed
Flame Test	IEC 60332-1-2 / UL VW-1 / FT1	Passed
100% Electrical Tests	Automatic Continuity Test and Insulation Resistance	Compliant with IEC 60245 / UL 758
HALT (Highly Accelerated Life Test)	Multi-stress: Torsion, Heat, etc.	Passed – L50 life margin >2× standard

VALIDATION & TESTING SUMMARY – MOTIONCABLES RESEARCH & TEST CENTER

All cables in the MOTION**XP** series are validated in the MOTION**CABLES** Research & Test Centre, which integrates state-of-the-art electrical, mechanical, and environmental testing systems.

Testing Methodologies and Tools:

- Dynamic Flex and Torsion Tests with in-line electrical monitoring.
- HALT (Highly Accelerated Life Test) to determine thermal and mechanical endurance limits.
- Multiple Chemical Resistance Tests (Oil, MUD,Hydrolysis, Ozone, UV, Fungus).
- Cyclic Thermal and Climatic Tests from –50 C to +180°C.
- 100% Automated Electrical Tests: continuity, insulation, conductor resistance.
- Flame Tests (UL VW-1, IEC 60332).
- Dimensional and Metallographic Checks on conductors, insulation, and jackets.

Laboratory Output:

- Certified MOTION**CABLES** Test Report with results and degradation curves.
- Dynamic Life Certificate (MC-DLT) with estimated service life (L50).
- Regulatory and Process Conformity Certificate (CE, UL, Lloyd's, NEK).

Every MOTION**XP** cable is thus not only tested, but validated to ensure measurable and repeatable performance over time.

CONFORMITY UPON NORMS AND CERTIFICATIONS

Standard / Body	Reference	Scope of Application
CE	Directives 2014/35/EU – 2011/65/EU	European low voltage and RoHS conformity
IEC 60228 / 60332 / 60811	IEC International Standards	Conductors, mechanical tests, flame test
NEK 606 / IEC 60092-360	Oil & Gas / Offshore	MUD resistance, synthetic oils, and drilling fluids
UL 758 / UL 1277 / UL 1063	North America	AWM / TC-ER / Power & Control cables
CSA C22.2 N°210 / N°239	Canada	AWM / Industrial Power
Lloyd's Register	Marine & Offshore	Marine and dynamic certification
ISO 4892 / ISO 1817 / ISO 846	Outdoor Environments	UV, hydrolysis, biological resistance

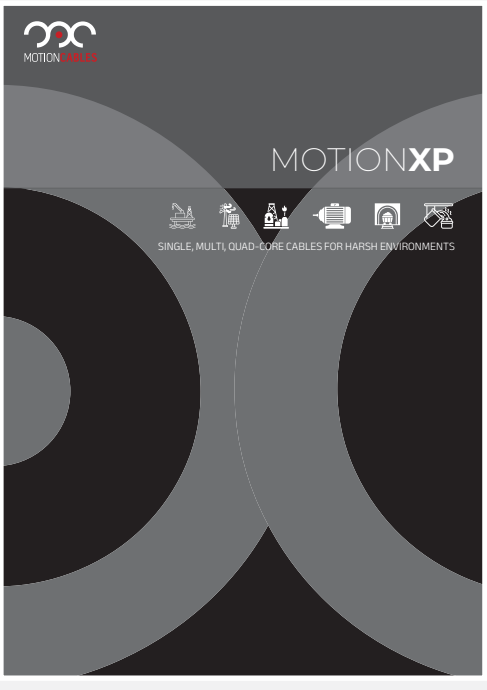
VALIDATION & TESTING SUMMARY – MOTIONCABLES RESEARCH & TEST CENTER

MOTION**XP** is the synthesis of power, endurance, and reliability.

Engineered to tackle the most difficult industrial environments, MOTION**XP** cables offer electrical stability, long dynamic life, and maximum protection against mechanical, thermal, and chemical agents.

From the offshore sector to advanced robotics, they represent the ultimate choice for those who demand extreme performance and total safety.

MOTIONXP – Engineered for Extreme Motion and Harsh Environments. Tested. Certified.



Further information about codes and applications could be found in our relevant brochure: MOTION**XP**. You can download the brochure in pdf format from our website at: https://www.motioncables.com/specialcables/downloads/en

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