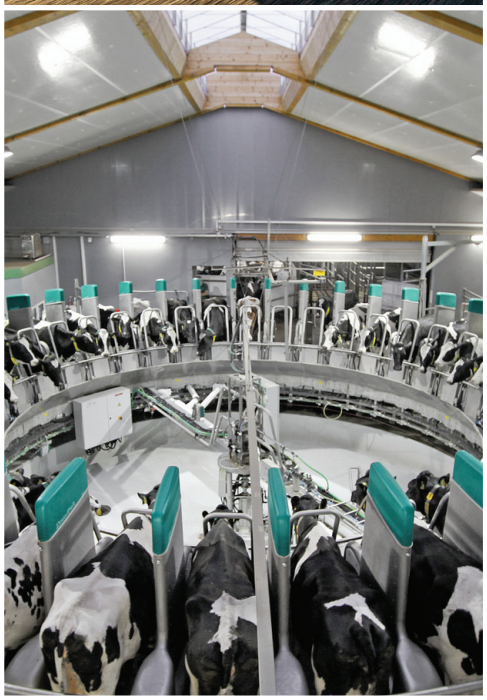
MOTIONCABLES

MOTIONAGRYLINK

SMART CABLES FOR CONNECTED AGRICULTURE.



MOTION **AGRYLINK®** SERIES

SMART CABLES FOR CONNECTED AGRICULTURE. FROM ISOBUS TO POWER, A SINGLE PLATFORM FOR THE TRACTOR, IMPLEMENT, AND FIELD.

Modern agriculture is digital: the tractor, seeder, sprayer, and field sensors work in a network, sharing data and power.

MOTION**AGRYLINK®** is the MotionCables platform designed for these environments:

- **ISOBUS** (ISO 11783) and **High-Speed ISOBUS** protocols.
- Power, control, sensors, and video on mobile machinery.
- Real-world conditions: mud, fertilizers, pesticides, stones, UV rays, vibrations, and continuous motion.

A single cable family for those who design, build, and use connected agricultural machinery.

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MOTION**AGRYLINK®**

A single cable platform for the tractor, implement, and field, from the ISOBUS connector up to the last sensor on the boom.

MOTION**AGRYLINK**®: WHY IT WAS CREATED

NEW AGRICULTURE IS ELECTRONIC... AND MOBILE

Agricultural machinery is no longer just mechanics, frame, and hydraulics. Today, every tractor and implement integrates:

- **ISOBUS** (ISO 11783) field buses at 250kbit/s on **CAN 2.0B**
- Variable rate dosing systems NIR and nutrient sensors
- Cameras, radar, GNSS receivers, and distributed electronic control units (ECUs)
- Towed equipment with its own logic and control, electrically powered by the tractor.

The result is a much more complex onboard ecosystem, which brings with it:

- Many more cables on mobile structures (arms, booms, spray bars, seeding units, elevators);
- Extreme and variable conditions: corrosive fertilizers, pesticides, livestock slurry, mud, dust, vibrations, UV rays, night frost;
- The need for different brands to communicate (Tractor X + Implement Y + Terminal Z) in compliance with the ISOBUS standard and AEF certifications

In this scenario, cabling is no longer a detail: it is the electrical and digital backbone of the machine.

THE ROLE OF THE CABLE

When the cable is not designed for agriculture:

- The **ISOBUS** network loses packets, generates "sporadic" errors, and random disconnections;
- Sensors and actuators stop communicating correctly, leading to incorrect dosing or failed activations;
- Repairs during the peak seeding or harvesting season result in costly machine downtime and lost working days.

MOTION**AGRYLINK**® was created precisely to avoid all this and to transform cabling from a potential weak spot into a reliable and durable infrastructure:

- A single cable platform for communication bus, power, control, and sensors on the tractor and implement;
- Dedicated design for the agricultural world, not a simple adaptation of industrial cables: materials, geometries, and shielding conceived for mud, fertilizers, UV, and continuous motion;
- Ready for evolution towards High-Speed ISOBUS and Single Pair Ethernet to support the next generations of high-data-contentù implements (cameras, advanced sensor technology, real-time analysis).

MOTION**CABLES** & MOTION**LAB**

MOTIONLAB – THE TEST FIELD BEFORE THE REAL FIELD

For MOTION**CABLES**, in-house testing in the MOTION**LAB** is only the beginning. MOTION**AGRYLINK**® cables are tested as part of the real system, not as an isolated component:

TORSION AND FLEX SIMULATION

Typical movements of:

- Booms and spray bars.
- Loader arms and joints on towed implements.
- Cable segments that follow steering, lift, and chassis articulation.

EMC TESTS ON ISOBUS LINES AND POWER SUPPLIES

- Burst, Surge, RF tests on **ISOBUS** bus, power lines, and sensors.
- Tests before and after millions of mechanical cycles, to verify that the shielding continues to function even after intense work.

TESTS IN A "SIMULATED AGRICULTURAL" ENVIRONMENT

- Exposure to oils, liquid fertilizers, saline solutions, slurry, mud
- High-pressure washdowns and wet/dry cycles. Controlled thermal variations to reproduce cold nights and hot days in the field.

This approach allows us to:

- Verify the stability of the **ISOBUS** shielding over time.
- Issue technical reports usable by OEMs and manufacturers for certification dossiers (e.g., ISOBUS/AEF compliance, EMC tests).
- Minimize "intermittent" problems during the season that often emerge only after months of stress.

MOTION**CABLES** is among the very few cable manufacturers to **systematically test Burst**, **Surge**, **RF**, and **shielding behavior before and after** movement **on the complete system** (ECU – cable – sensors/ISOBUS actuators), not just on the cable in the lab.

FOCUS
ISOBUS

MOTIONAGRYLINK® BUS

The **ISOBUS** cable is the physical artery for 250kbit/s CAN communication. MOTION**AGRYLINK®** **BUS** is designed to prevent typical failure symptoms (random errors, lost messages, missed dosing).

STRUCTURE DESIGNED FOR ISOBUS

- Star quad 1x4x0.5 mm²
- Symmetrical geometry that optimizes CAN transmission, reduces crosstalk, and maintains constant impedance.
- Controlled Performance Inner Insulation
- Materials with excellent dielectric characteristics to reduce capacity and stabilize the CAN signal waveform.
- High-Coverage Braided Shielding

Designed to protect the bus from EMI (Electromagnetic Interference) generated by motors, inverters, and power relays, and to maintain low common-mode noise.

JACKETS FOR THE REAL AGRICULTURAL ENVIRONMENT

All MOTION**AGRYLINK®** **BUS** cables use specific jackets for:

- Liquid and solid fertilizers, slurry, pesticides.
- No swelling, cracking, or premature hardening.
- UV rays, ozone, frost, and day/night thermal fluctuations
- The cable remains flexible and intact throughout the season.
- Mud, gravel, impacts
- Thick and mechanically robust jacket with good abrasion resistance.

BENEFITS FOR THE ISOBUS SYSTEM STABLE COMMUNICATION:

- Between all ECUs and terminals, even over long lengths and with multiple nodes.
- Fewer "Mysterious" Errors in season.
- Ready for AEF / High-Speed ISOBUS Tests: Parameters are designed for accredited ISOBUS laboratories and future high-bandwidth evolution.

MOTION**AGRYLINK® BUS** is not a simple "green-coloured CAN cable." It is a cable designed around ISOBUS, to withstand fertilizers, mud, and movement without losing communication reliability, season after season.

FOCUS

ISOBUS HYBRID HYBRID

MOTIONAGRYLINK® HYBRID BUS + POWER IN A SINGLE CABLE

Modern equipment no longer has just "the ISOBUS cable": on bars, frames and rudders run together:

- Bus ISOBUS for data control and exchange;
- 12/24 V power supplies for electric actuators, metering devices, auxiliary motors;
- Additional lines for pressure, flow, level, inclination sensors, etc. Installing three or four parallel cables means:
- More weight on the boom,
- More fixing points and potential breakages,
- More connectors to assemble, check and replace.

MOTION**AGRYLINK®** **HYBRID/BUS** It was born precisely to simplify all of this: in a single integral sheath:

- 1-star quad ISOBUS with parameters aligned with ISO 11783;
- 1 or more power pairs/conductors for 12/24 V§ or low voltage services;
- Any pairs dedicated to extra signals (sensors, local controls, OEM proprietary functions).

PRACTICAL ADVANTAGES

- A single cable along the rudder or tiller less weight, less bulk, fewer breaking points.
- Fewer connectors and joints fewer critical issues in the field, faster assembly, easier maintenance.
- Simplified warehouse A single reference covers functions that previously required 2–3 different codes.
- Cleaner layout Tidy wiring, easier to inspect and wash.

READY FOR HIGH-SPEED ISOBUS

Next-generation agriculture won't stop at 250 kbit/s. Cameras, NIR sensors, radars, vision systems and advanced diagnostics require much higher bandwidths. For this reason, the sector is introducing High-Speed ISOBUS (HSI), based on:

- Single Pair Ethernet (SPE)– for example, IEEE1000BASE-T1,
- Gigabit transmission on a single twisted pair, compatibility with the next-generation AEF ecosystem.

The MOTION**AGRYLINK®** platform is already designed for this evolution:

- Dedicated SPE cables for on-board HSI connections (ECU camera, ECU high-bandwidth sensors).
- Variants HYBRID "ISOBUS + SPE + Power"
- A single cable can carry classic ISOBUS, single-pair Ethernet and power for smart devices.
- Project aligned with AEF/HSI electrical and mechanical requirements
- EMC margin, controlled geometry, materials for agricultural environments.

In practice, those who design with today MOTION**AGRYLINK®** **HYBRID/BUS** have:

- a solution optimised for the current ISOBUS,
- already prepared for future HSI integration without disrupting the wiring.

POWER & CONTROL

MOTIONAGRYLINK® POWER – POWER SAFELY

In addition to the data bus, each agricultural machine has a network of 12/24 V power supplies which reaches:

- Electric actuators and auxiliary motors,
- Lighting and signalling systems,
- Pumps, valves, fans, auxiliary control units.
- These cables must coexist with:
- Shocks, vibrations, and traction on frames,
- Mud, gravel, oils, diesel, urea (AdBlue),
- High-pressure washing.

MOTION**AGRYLINK® POWER**. It is designed specifically for this context.

MAIN FEATURES

- Multi-conductor cables in various sections, for auxiliary power supplies and small motors.

- Reinforced mechanical structures against traction and abrasion: support cords, anti-crush fillers, thick sheaths.

- Sheath materials resistant to:
  - Oils and fats;
  - Diesel fuel and urea,
  - Liquid and waste fertilisers,
  - Water, mud and UV rays.

- Versions for fixed and mobile installation:
  - Ideal for both protected backbones and sections on oscillating frames and moving components.

WHERE IT FINDS A PLACE

- Power wiring on complex tools (fertiliser spreaders, sprayers, precision seed drills).
- Power supplies for local control units, electric actuators, fans, pumps.
- 12/24 V distribution on trailers, mixer wagons, tankers, and towed systems.

MOTIONAGRYLINK® CONTROL – SIGNALS AND I/O

Every agricultural ECU is surrounded by a universe of sensors and actuators:

- Sensors of level, pressure, flow, temperature, humidity;encoders and sensors speed on wheels, shafts, discs;
- Proportional valves and on/off actuators;
- Digital and analog inputs and outputs.

MOTION**AGRYLINK®** **CONTROL** is the family dedicated to these "fine" connections.

MAIN FEATURES

- Screened and unscreened variants
  - Shield sensitive signals (analog, low voltage sensors, local communications) in the presence of drives, relays or power lines;
  - Unshielded for less critical I/O, with an excellent cost/performance ratio.

- Reduced bending radii
  -Flexible conductors and compact construction for passages in narrow spaces, frame channels, joints and hinges

- Colour coding is designed for complex cabins and panels
  - Simplifies wiring, diagnostics, and retrofitting; reduces connection errors in production and maintenance.

- Agricultural platform resistance
  - Same "agricultural" sheath as POWER/BUS: fertilisers, oils, UV, mud, high-pressure washing.

WHERE IT FINDS A PLACE

- Wiring of sensors and actuators on spray booms.
- Connections between the ECU and hydraulic distributors.
- Sensors on seed drills, tankers, fertiliser spreaders, harvesting systems.
- Small signal bundles integrated into complex harnesses together with BUS and POWER.

DYNAMIC CAVES & DRUM

MOTIONAGRYLINK® FLEX CONTINUOUS MOVEMENT ON BOOMS AND ARMS

In modern agricultural machinery, most wiring failures do not occur "in the switchboard", but where the cable moves:

- cable chains on spray arms, and booms
- joints between the frame and the moving parts
- points subject tocontinuous vibrations(headers, shredders, distribution organs)

Here, a standard cable, designed for almost fixed installation, tends to:

- to stiffen in the cold
- create microfractures on insulation and sheathing
- break after a limited number of cycles

MOTION**AGRYLINK**®® FLEX. It was created precisely for these critical areas.

MAIN FEATURES

➲ Structures for millions of bending cycles
Conductor stranding, insulating materials, and overall geometry are designed to work in cable drag chains and on mobile arms without prematurely reaching the end of the cable's life.

➲ Insulation and anti-microcrack sheathing in cold climates.
They maintain elasticity even at low temperatures (morning start-up, winter work), reducing the risk of sudden breakages.

➲ Smooth and compact outer coat
Does not retain mud, dust, or product residues
It cleans easily when washing the car.
Reduces the accumulation of dirt and therefore the risk of localised abrasion.

➲ Bus, power and signal compatibility.
Available in BUS, CONTROL, and HYBRID versions, with dynamic execution, to align the "data" part with the "mechanical" part

WHERE IT FINDS A PLACE

- cable chains on spray booms and distribution booms;
- wiring between the main frame and folding sections of seed drills and combined implements;
- points subject to intense vibrations (such as harvest heads, cutting tools, belts, and elevators).

MOTIONAGRYLINK® DRUM – WINDING CABLES

In many agricultural applications, the cable not only flexes: it wraps and unwinds continuously:

- drums on irrigation machines(reels, pivots, water waste distribution systems).
- systems of wrapping on towed tools and special trailers
- small drums and festoons on gru agricole, front loaders or mobile equipment

Under these conditions, the cable is subjected to:

- longitudinal traction (stretching)
- Crushing on the drum, pulleys, and guides
- Twist due to imperfect windings

MAIN FEATURES

➲ Tensile reinforcement core
Load-bearing elements are integrated into the construction to withstand traction without placing the stress only on the electrical conductors

➲ Anti-torsion design
Balanced internal geometry to reduce the risk of the cable “catching a helix” or twisting uncontrollably during repeated windings

➲ Resistance to crushing and passages on pulleys/guides
Robust external sheaths and internal structures that maintain shape and functionality even with:
roller passages, guided tight curves
very compact windings on the drum

➲ Same chemical resistance as the MOTIONAGRYLINK® platform.
Oils, fertilisers, mud, high-pressure water: the drum cable is in line with others in terms of resistance to the agricultural environment.

WHERE IT FINDS A PLACE

- drum irrigation machines, wastewater distribution systems;
- towed equipment with feed/power/ISOBUS drums;
- small winches or lifting systems in the agricultural sector

AGRICULTURAL ENVIRONMENT

REAL ENVIRONMENT: CHEMISTRY, CLIMATE, MECHANICS

An agricultural cable does not work in a clean shed. It works outdoors, all year round, under conditions that combine:

- aggressive chemistry
- mineral and organic fertilizers
- ammonia, zootechnical waste
- pesticides, herbicides, sprayed fungicides
- harsh physical environment
- mud, earth, stones, dust
- shocks, vibrations, scrapes on the frame and metal parts
- variable climate
- direct solar radiation
- very pronounced day/night temperature variations
- night frost and cold seasons

The families MOTION**AGRYLINK**®® they are designed starting from this real scenario, not from the "ideal" one.

COMMON PLATFORM FEATURES

HIGH CHEMICAL RESISTANCE SHEATHS

Formulations selected to resist:

- acidic and alkaline solutions (fertigation, detergents)
- oils and fats
- diesel, urea (AdBlue)
- liquid fertilizers and wastewater

EXCELLENT UV AND OZONE RESISTANCE

Cables can stay for a long time:

- on frames exposed to the sun
- on booms folded outwards
- on cars parked outdoors between one season and another
- without hardening or cracking prematurely.

ELASTIC BEHAVIOR AT LOW TEMPERATURES

The structures maintain flexibility even in intense cold:

- less risk of breakage during morning start-ups
- Greater safety for cables laid on arms and booms in winter

MECHANICAL RESISTANCEAIMED AT AGRICULTURE

- they withstand long-term vibrations;
- tolerate occasional impacts and contact with metal parts;
- They are designed to be washed frequently (even at high pressure).

BENEFIT FOR THE ENTIRE LIFE CYCLE OF THE MACHINE:

➲ Fewer sudden substitutions in the middle of the season less downtime at times when working time is more precious than the cost of spare parts.

➲ Wiring life aligned with the useful life of the vehicle the cable becomes a “silent” element, which does not require constant attention

➲ Greater reliability of electronic systems fewer false alarms, fewer communication problems, fewer emergency interventions.

INSTALLATION GUIDELINES

Install well to last longer. A cable designed for agriculture gives its best only if it is installed correctly. The following guidelines will help you get the most out of the performance of the MOTION**AGRYLINK**® families.

TRACTOR-IMPLEMENT PATH

This is the most sensitive feature for ISOBUS: here they coexist **movement, traction and contaminants**.

- **Use** MOTION**AGRYLINK**® **BUS / HYBRID**
  - On the path between the rear ISOBUS socket of the tractor and the implement.
  - ⇨ Ensures correct electrical parameters for the bus + adequate mechanical and chemical resistance.
- **Prevent the cable from acting as a "tow rope"**
  - Design the route so that the **traction is discharged** on supports, springs, movable arms and not directly on the cable.
  - ⇨ The cable follows the movement; it does not pull the trailer.
- Foresee **controlled play courses**.
  - Neither too tight (risk of tearing), nor too loose (risk of getting caught or crushed).

ON BOARD THE TOOL/BOOM

On complex tools, the cable follows the movement of arms, bars and folding sections.

- **Respect the minimum bending radi**
  - suitable for families **FLEX** and **BUS**
  - Too narrow spokes will bring the cable to its end of life, especially in the presence of continuous movement.
- **Avoid pinch points**
  - Design routes so that the cable cannot:
    - > be closed between two moving metal parts;
    - > work "edge-wise" on corners or edges.
- **In the external passages, prefer inspectable and easily washable route**
  - The cable remains visible, can be checked at a glance and cleaned without dismantling half the machines.

EMC & ISOBUS – GOOD INSTALLATION PRACTICES

- To maintain the stability of ISOBUS communication and sensor signals:
  - Terminate the BUS cable shielding at 360°
  - in connectors and ECUs, minimising the "tails" of exposed braid:
  ⇨ The effectiveness of the shielding against bursts, surges and EMI disturbances is fully exploited.
- **Separate power and bus/sensor where possible**
  - Keep a certain distance between:
    > power cables (pumps, motors, high-current actuators
    > cables MOTION**AGRYLINK®** **BUS / CONTROL** for **ISOBUS** and sensors
  ⇨ reduces coupling noise and "sporadic" communication problems.

Right cable + correct installation =maximum service life and maximum ISOBUS reliability.
MOTION**AGRYLINK®** is designed for agriculture, but it is the union between product and installation that makes the real difference in the field.

MOTIONCABLES

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