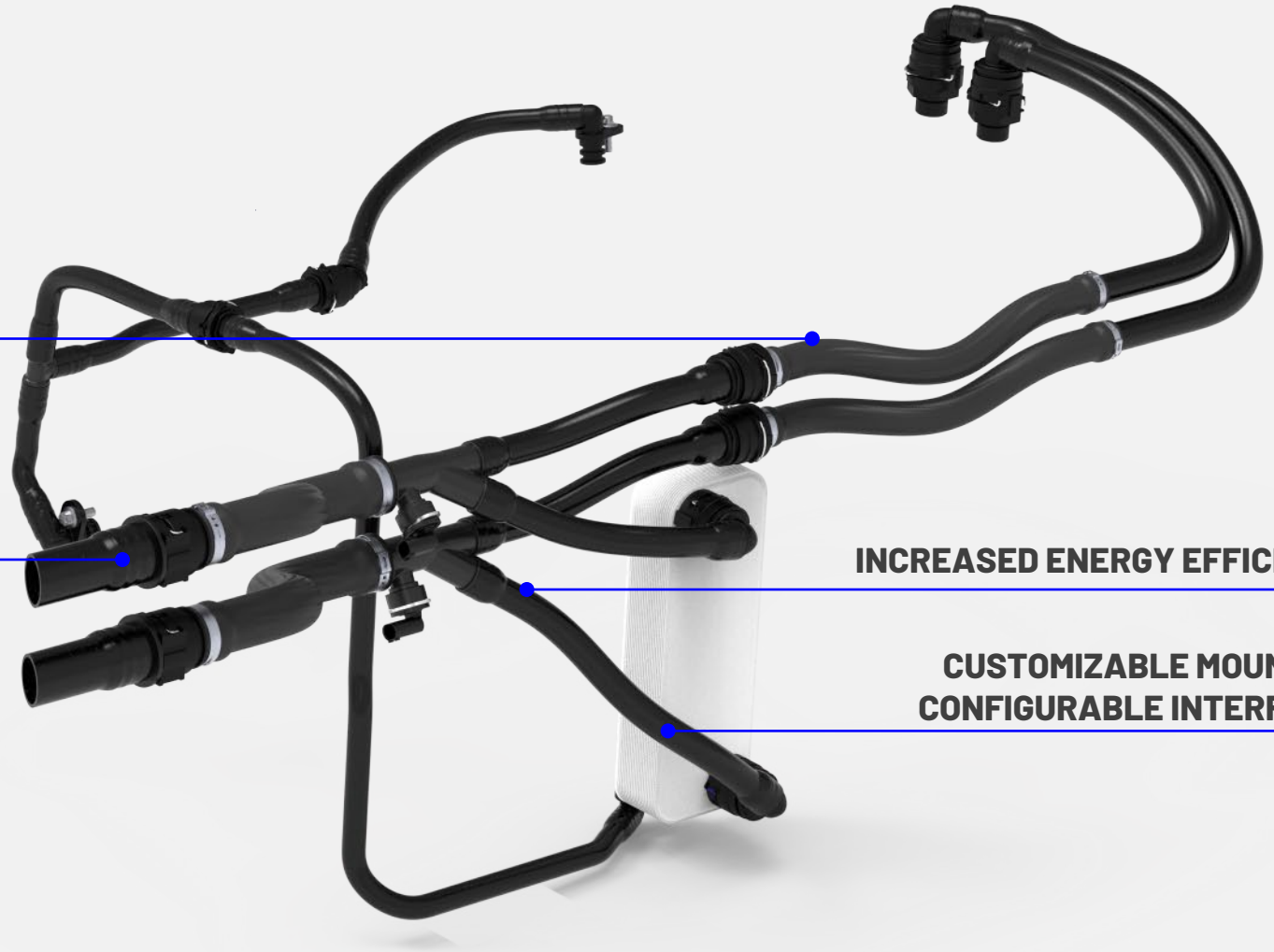
THERMAL MANAGEMENT SYSTEMS

COOLANT SYSTEMS	VALVE BLOCK SYSTEM

THERMAL MANAGEMENT SYSTEMS

CONTROL OF THERMAL DISTRIBUTION BETWEEN COMPONENTS IN ELETRIC VEHICLE
INCLUDING CHARGING OR IDLE BATTERY COMFORT

CAN, LIN OR PWM COMMUNICATION



INCREASED ENERGY EFFICIENCY

CUSTOMIZABLE MOUNTING, CONFIGURABLE INTERFACES

THERMAL MANAGEMENT SYSTEMS

SAFETY

DESIGNED TO AVOID UNWANTED OR UNPLANNED DISASSEMBLY VIA DOUBLE ACTION FOR QUICK CONNECTOR RELEASE

LONG-LIFE, LEAKAGE-FREE DESIGN DUE TO DOUBLE SEAL MECHANISM

QUICK CONNECTION WITH SIMPLIFIED ASSEMBLY AND DISASSEMBLY

ENVIRONMENTAL, THERMAL AGEING AND HYDROLYSIS RESISTANT MATERIALS

SUSTAINABILITY

LOWER CARBON FOOTPRINT MATERIALS

ENERGY-SAVING

IMPROVED RECYCLABILITY WITH NEW TUBE CONSTRUCTIONS AND MATERIAL CHOICES

PRODUCTS ARE DESIGNED TO FULFILL A VEHICLE LIFE OF UP TO 1.5 MILLION KM

EFFICIENCY

ADVANCED AI/CNC MANUFACTURING PROCESSES FOR LARGE TUBE DIAMETERS (UP TO 65 MM ID) TO BEND PIPES TO SUIT TIGHT VEHICLE PACKAGING

ONE-PIECE CONNECTOR DESIGN WITH FEWER JOINTS TO ENABLE COMPACT PACKAGING AND LOWER RISK FOR LEAKAGE

QUICK CONNECTION AND TUBE ROUTINGS DESIGNED FOR OPTIMUM FLOW (LOWER PRESSURE DROP UP TO -40%)

LIGHTWEIGHT

SERVICE-FRIENDLY

SYSTEM OPTIMIZATION

QUICK CONNECTORS, MANIFOLDS AND STATIC DISTRIBUTORS WITH IMPROVED INTERNAL PROFILES

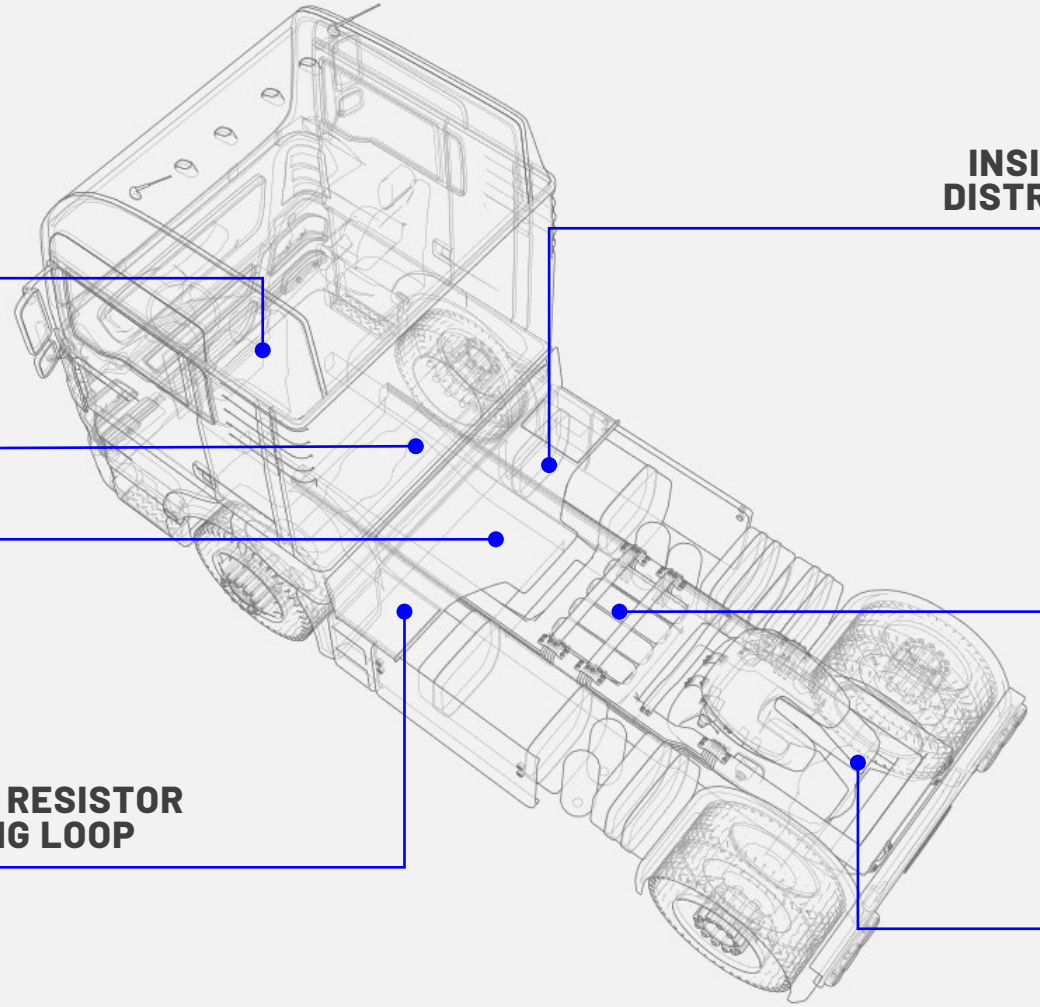
OPTIMIZED FLOW (UP TO 25%) AND FASTER REACTION TIME

ENGINEERING EXPERTISE OF COMPLETE SYSTEM FLOW SIMULATION (CFD/1D) TO SUPPORT CUSTOMER DEVELOPMENT

FREEDOM IN DESIGN AND ROUTING DUE TO MULTIPLE TUBE ORIENTATION

MONOWALL AND MULTI-LAYER TUBES WITH PROPERTIES TO SUIT ALL COOLANTS AND ALL APPLICATIONS

THERMAL MANAGEMENT SYSTEMS



FUEL CELL SYSTEMS
DIRECTLY LINKED TO HYDROGEN CELL

FUEL CELL SYSTEMS
SUPPORTING COOLING INTEGRATIONS

BATTERY COOLANT
CHASSIS DISTRIBUTION MODULES

BRAKE RESISTOR COOLING LOOP

INSIDE BATTERY PACK DISTRIBUTION MODULES

POWERTRAIN CIRCUIT

E-AXLE SYSTEM
FOR WATER GLYCOL, OIL AND PNEUMATIC APPLICATIONS

THERMAL MANAGEMENT SYSTEMS

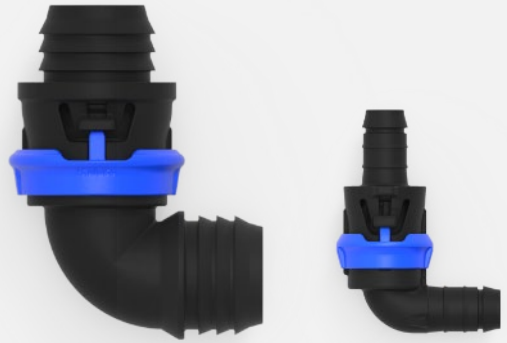
THE LIQUID FLOW IS IMPROVED WITH KA QUICK CONNECTORS TO MINIMIZE PRESSURE DROPS

The TMS controls working temperature range to ensure optimal performance.

E-valve: controlling the flow direction of the fluid and ensuring optimal temperature levels on key components

Sensors: to inform about the temperature level of the liquid

FIRTREE



QUICK CONNECTORS

FIRTREE T-CONNECTOR

E - VALVES

SENSORS

THERMAL MANAGEMENT SYSTEMS

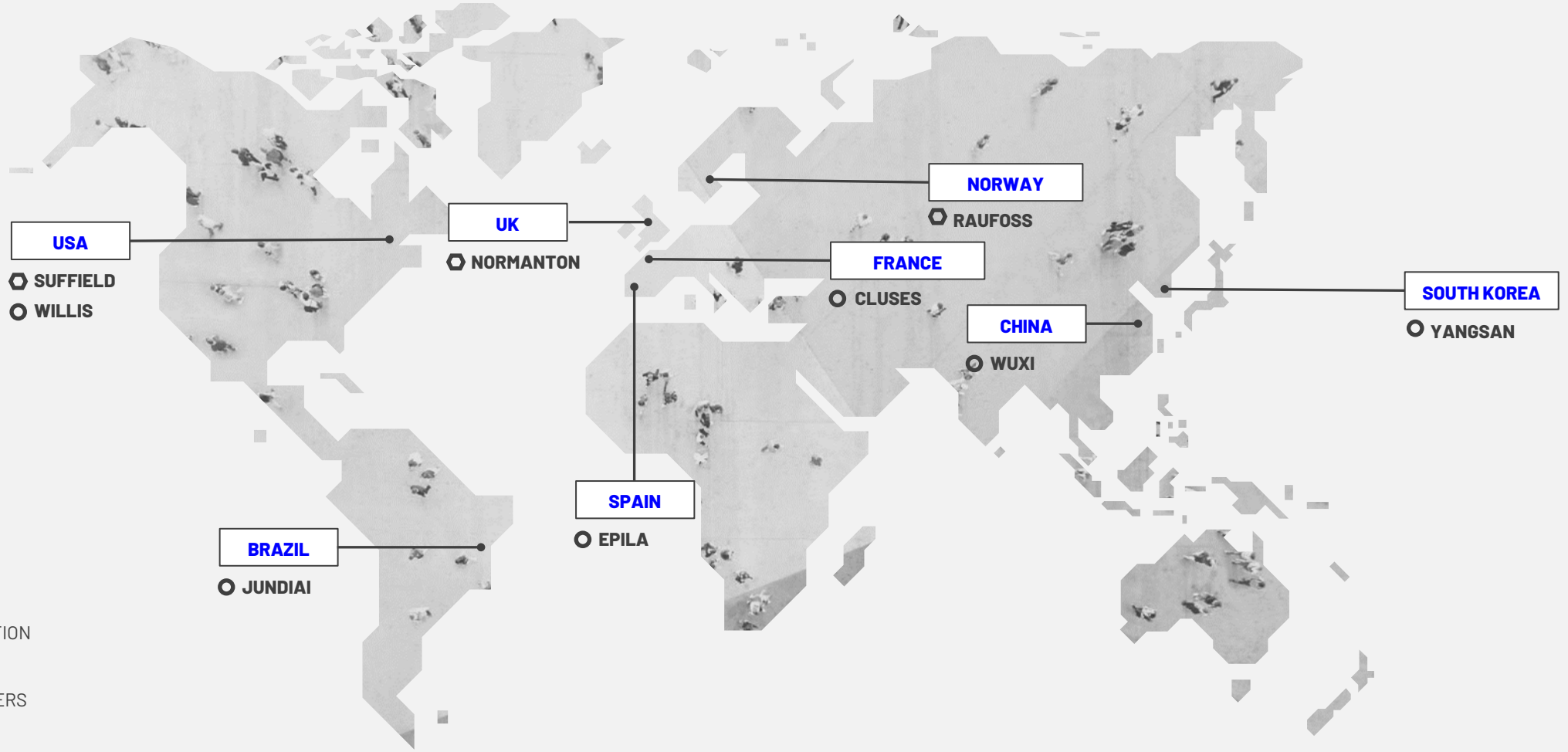
QUICK CONNECTORS
BASED ON VDA, SAE AND KA STANDARDS
FIRTREE OR WELDED CONNECTION TO TUBE
WORKING PRESSURE 8 BAR (VALIDATED)
SPEC UPGRADE MAINLY DEPENDING ON TUBE
DESIGN ALLOWS THE SAME PART TO BE USED ON ALL PORTS

KA TUBES	
DESIGN	VDA, SAE and KA
WORKING TEMPERATURE	-40°C to + 100°C
MATERIALS	PA, and more
PLANNED DIMENSIONS (LDMM)	6, 12, 16, 20, 32, 45, 50, 55
MAX. WORKING PRESSURE	8 bar

DRY BREAK VALVE - COMMERCIAL VEHICLES	
DESIGN ALLOWS THE SAME PART TO BE USED ON ALL PORTS	
WORKING TEMPERATURE	-40°C to + 100°C
SPECIFIC UPGRADE MAINLY DEPENDING ON TUBE	
IMPACT STRENGTH	6 J
WORKING PRESSURE	12,5 bar (validated)

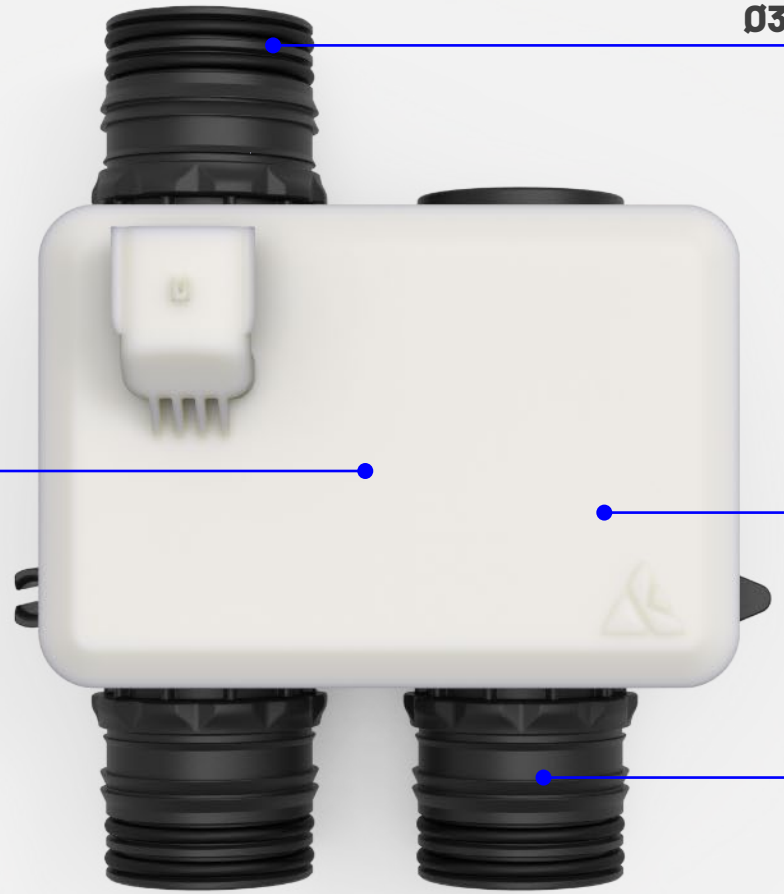
THERMOPLASTIC TUBES AND HOSES MODULES	
STANDARDS	DIN 73378, ISO 7628, FMVSS106, J844, J517, J2260, J20454 and more.
MATERIALS	PA11, PA12, PA1010, PA6.12, PA6.10, PPA, PPS, TPV's, TEEP's
TUBE DIMENSIONS	OD= 4 till 60 mm ; Wall thickness = 0,75 – 4 mm;
MONO AND MULTILAYER TUBES	min layers thickness 0,1 mm
PREFORMED MIN. BEND RADIUS	1,5 to 3 x OD
CONNECTIONS	composite SAE, VDA , Raufoss ABC, steel banjo's,

THERMAL MANAGEMENT SYSTEMS



- PLANTS/PRODUCTION
- DEVELOPMENT
- TECHNICAL CENTERS
- WAREHOUSES

VALVE BLOCK SYSTEM



Ø32MM NOMINAL DIAMETER

INTEGRATED ACTUATOR
DURABLE DESIGN, FEWER COMPONENTS, AND NO EXPOSED MOVING SEALS

SMART CONTROL
EFFICIENT CAN COMMUNICATION WITH WAKE-UP FEATURE AND EASY MASTER/SLAVE CONFIGURATION

50 MBAR @ 135 L/MIN PRESSURE DROP

VALVE BLOCK SYSTEM

COMPACT SIZING FOR EASY PACKAGING

LOW PRESSURE DROP (OR HIGH FLOW EFFICIENCY)

LOW POWER SLEEP FOR MINIMAL BATTERY USAGE

RELIABLE WITH NO EXPOSED SEALING

MULTI-VALVE MODULARITY
COMPLEX SYSTEMS CAN BE MADE WITH LOW OR NO TOOLING

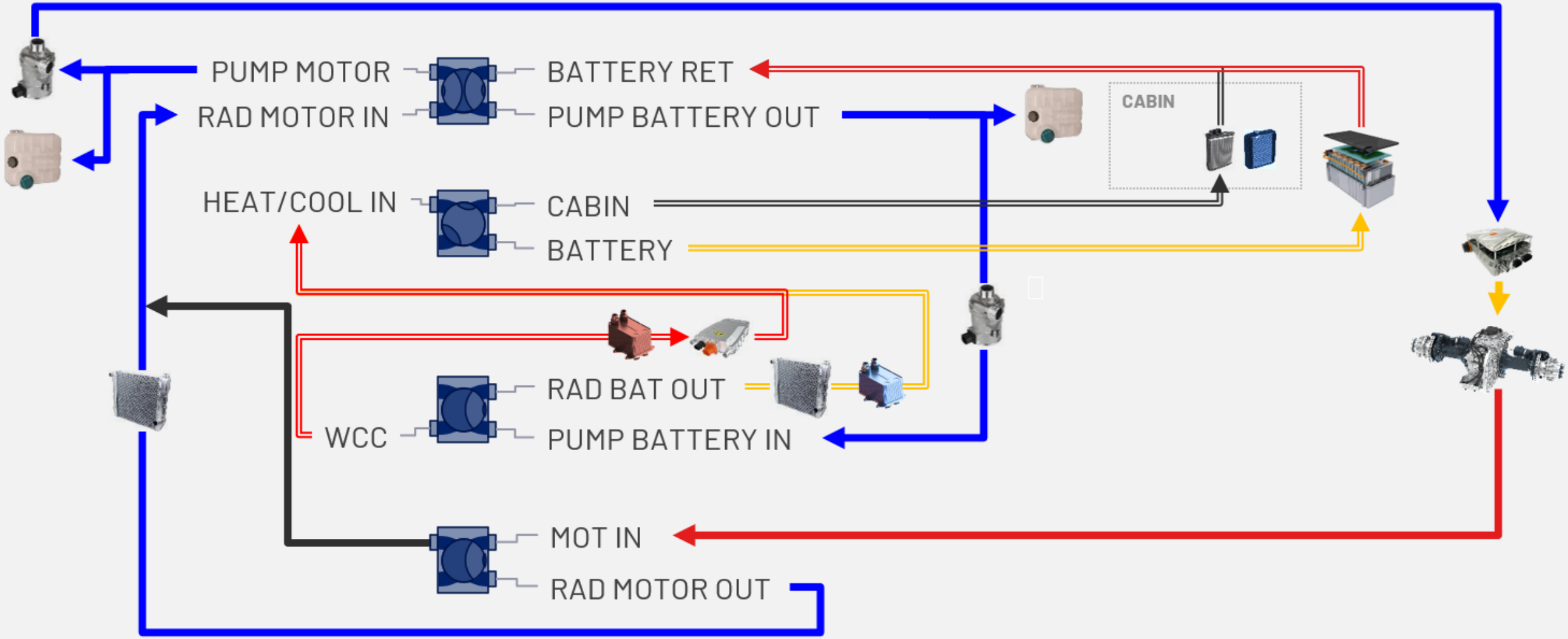
SIZED FOR COMMERCIAL EV APPLICATIONS

HIGH CONFIGURABILITY

SMART CONTROL WITH AUTO-DIAGNOSTIC

SUPPORTS 12V & 24V SYSTEMS ON A SINGLE SKU

VALVE BLOCK SYSTEM



VALVE BLOCK SYSTEM

CONTROLS COOLANT FLOW IN DIVERTING, MIXING OR SPLITTING MODES

PROGRAMMED POSITIONS OR PROPORTIONAL CONTROL

CONTROL OVER CAN. SUPPORTS CAN-FD COMMUNICATION

AUTO-SLEEP WITH WAKE-UP OVER CAN

ABSOLUTE POSITION FEEDBACK

BLOCK BASED SOFTWARE DEVELOPMENT

MODULAR CONCEPT: Integration with other KA products

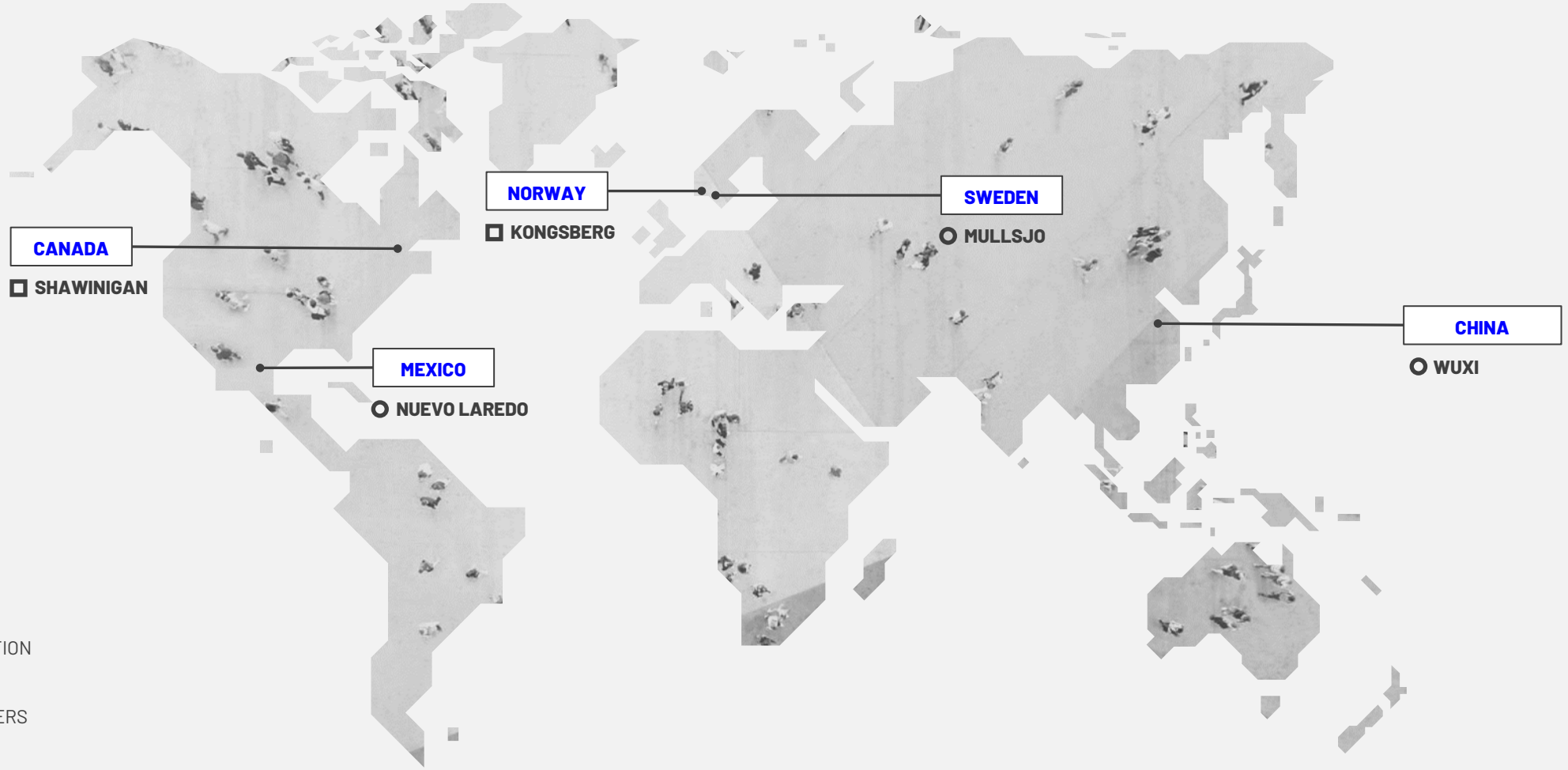
CONFIGURABLE PORTS:
KA RAUFOSS
SAE VDA
BARBED
DIRECT TUBE CONNECTION
PUMP ADAPTER
CUSTOM

CONFIGURABLE CORE:
2-WAY
3-WAY SPLITTER
3-WAY MIXING
3-WAY HYBRID
4-WAY

VALVE BLOCK SYSTEM

COOLANT TEMPERATURE	-40°C to 125°C
MASTER / SLAVE MULTI-MODULE SUPPORT	CAN-FD Communication
CUSTOM CONNECTOR UPON REQUEST	MX-150 Standard Connector
LOW-POWER SLEEP MODE	Wake-up over CAN
COMPLEX SYSTEM WITHOUT TOOLING	Multi-Module Standard Design
RELIABILITY BY ELIMINATING FAILURE POINTS	Integrated Actuator
SINGLE SKU FOR ALL PLATFORMS	12 & 24V Systems Supported

VALVE BLOCK SYSTEM



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