saca europe

AGV & drones

AGVs are self-driving vehicles that transport materials or goods in manufacturing, warehousing, and logistics environments. They are programmed to follow a predetermined path and can operate 24/7 without human intervention. Drones can perform a variety of tasks, from surveillance and inspection to delivery and search and rescue operations. Both AGVs and drones are equipped with sensors, cameras, and other technologies that enable them to navigate and interact with their environment autonomously, making them invaluable tools in increasing efficiency, reducing costs, and improving safety in various industries.

manufacturers

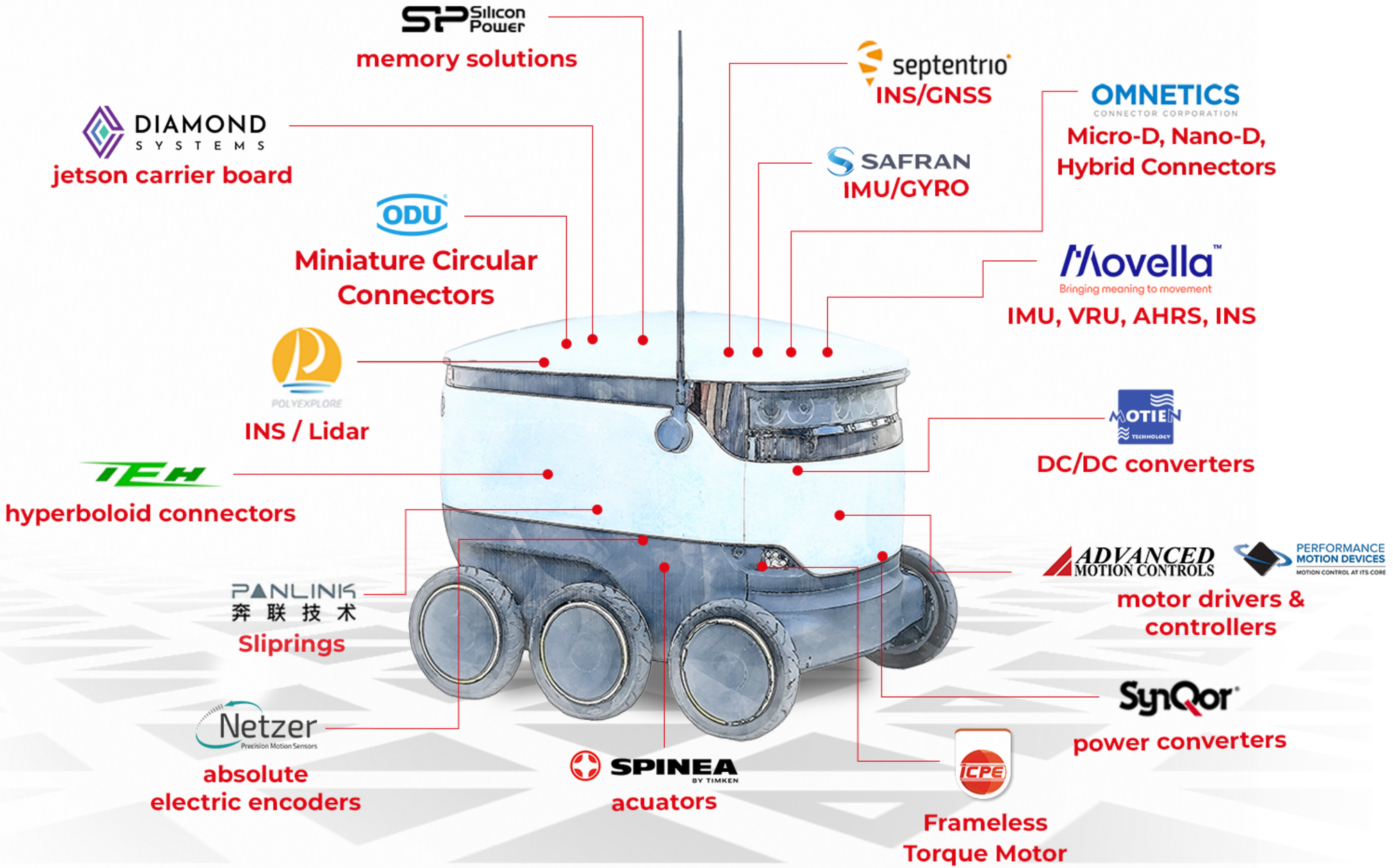
SynQor · MOTIEN TECHNOLOGY · P&P TECHNOLOGY · OMNETICS CONNECTOR CORPORATION · TEH · ODU

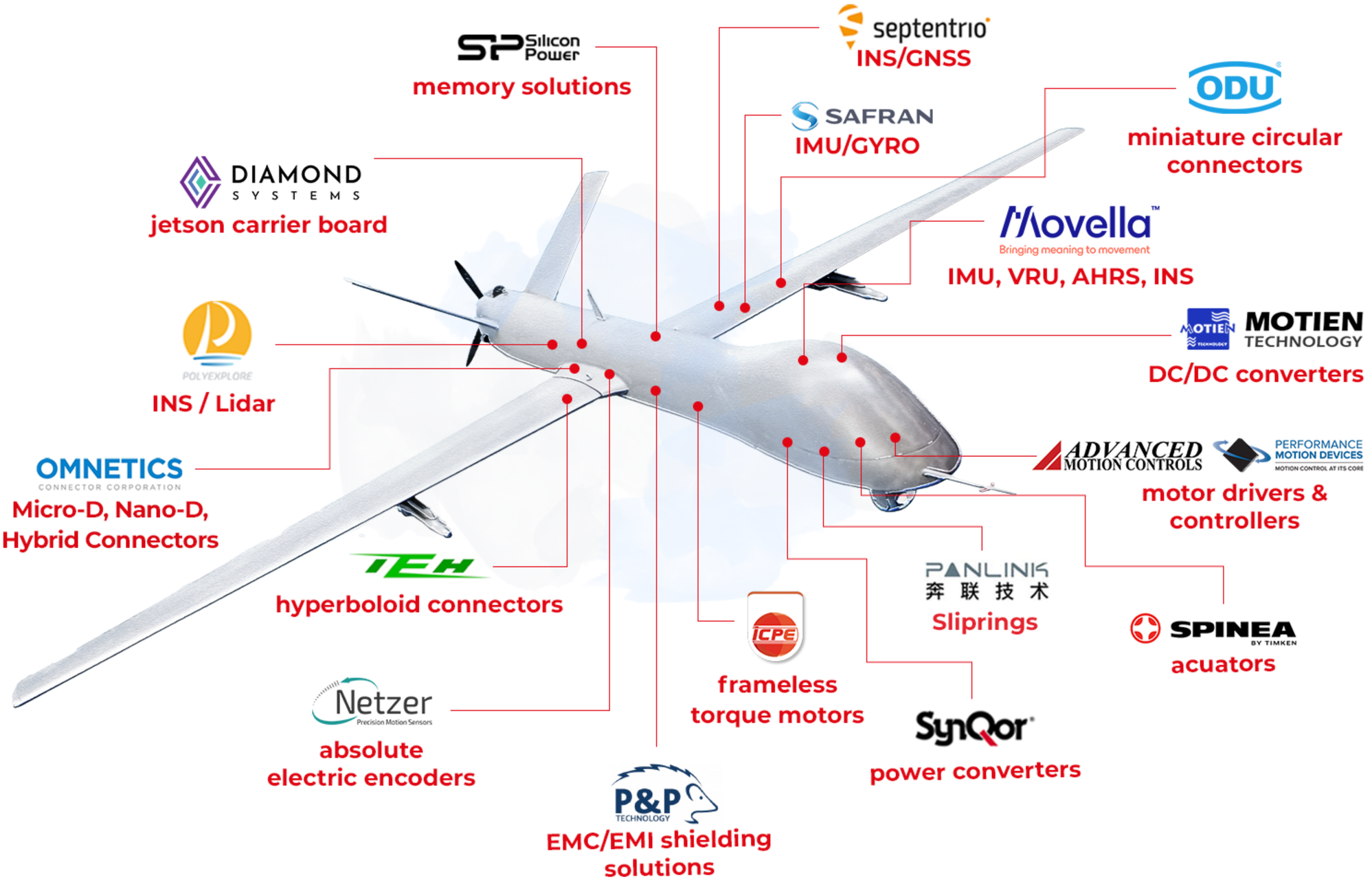
Movella Bringing meaning to movement · SAFRAN · POLYEXPLORE · septentrio · ADVANCED MOTION CONTROLS · ICPE

SPINEA BY TIMKEN · PANLINK 奔联技术 · Netzer Precision Motion Sensors Ltd · PERFORMANCE MOTION DEVICES MOTION CONTROL AT ITS CORE · DIAMOND SYSTEMS · SP Silicon Power

The Netherlands Steenowenweg 5, 5708HN, Helmond
+31 492 218 972

Poland Wspólna 70, Warsaw, Mazowieckie 00-687, PL
+48 221 822 534


Silicon Power
memory solutions
DIAMOND SYSTEMS
jetson carrier board
ODU
Miniature Circular Connectors
POLYEXPLORE
INS / Lidar
hyperboloid connectors
PANLINK 奔联技术
Sliprings
Netzer
Precision Motion Sensors
absolute electric encoders
SPINEA BY TIMKEN
acuators
septentrio
INS/GNSS
SAFRAN
IMU/GYRO
OMNETICS
CONNECTOR CORPORATION
Micro-D, Nano-D, Hybrid Connectors
Movella
Bringing meaning to movement
IMU, VRU, AHRS, INS
MOTIEN TECHNOLOGY
DC/DC converters
ADVANCED MOTION CONTROLS
PERFORMANCE MOTION DEVICES
MOTION CONTROL AT ITS CORE
motor drivers & controllers
SynQor
power converters
ICPE
Frameless Torque Motor


Silicon Power
memory solutions
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frameless torque motors
SPINEA
BY TIMKEN
acuators
Netzer
Precision Motion Sensors
absolute electric encoders
SynQor
power converters
P&P
TECHNOLOGY
EMC/EMI shielding solutions

SYNQOR

www.synqor.com

COMPANY OVERVIEW

SynQor® is a leading supplier of power conversion solutions to the military, industrial, transportation, telecom/ datacom and medical markets. SynQor's innovative products are designed to exceed the demanding performance, quality, and reliability requirements of today's power electronic engineers and system integrators who develop leading-edge infrastructure hardware.

NIQOR NON-ISOLATED DC-DC CONVERTER

BATTER CHARGING

- Provides the power conversion platform for battery charging
- Output current limit is externally controlled for constant-current charging
- Current can be set with an external resistor or an active circuit
- Current analog signal provided for instrumentation and control functions
- Ideal diode output stage with zero back-drive currents prevents discharge of battery when not charging
- discharge of battery when not charging
- Output voltage set-point is independently controlled through trim pin
- Unit will smoothly transition between current and voltage modes as charging cycle needs charge

KEY FEATURES

- Ultra-high efficiency up to 95%
- Wide input voltage ranges:
- 9-20 V (NQ20); 9-40 V (NQ40); 9-60 V (NQ60/MCOTS-N-28V);
- 9-90 V (NQ90/MCOTS-N-28VE)
- Non-isolated
- Buck or Buck/Boost topologies available
- Maximum input/output currents up to 55 A
- On-board input and output filtering
- No minimum load requirement
- Remote sense and wide output voltage trim
- Input under-voltage lockout (UVLO)
- Output current limit (OCP) and short circuit protection
- Output over-voltage protection (OVP)
- Thermal shutdown (OTP)
- Output voltage trim
- No maximum external output capacitance
- Active current sharing for higher power applications (half-brick only)

SYNQOR ADVANTAGES

- No maximum external output capacitance
- Higher power in smaller package sizes
- Current limit control and current monitoring
- Wide input and output voltage options
- Adjustable current limit
- Adjustable power limit

Input Voltage	9 - 20 V, 9 - 40 V, 9 - 60 V, 9 - 90 V
Output Voltage	0 - 20 V, 0 - 40 V, 0 - 60 V, 0 - 90 V
Output Power	120 W - 2000 W
Output Current	5 A - 55 A
Full Load Efficiency	Up to 96%
Industrial Operating Temperature	-40°C to +100°C
Military Operating Temperature	-55°C to +100°C

MOTIEN TECHNOLOGY

www.motien.com.tw

COMPANY OVERVIEW

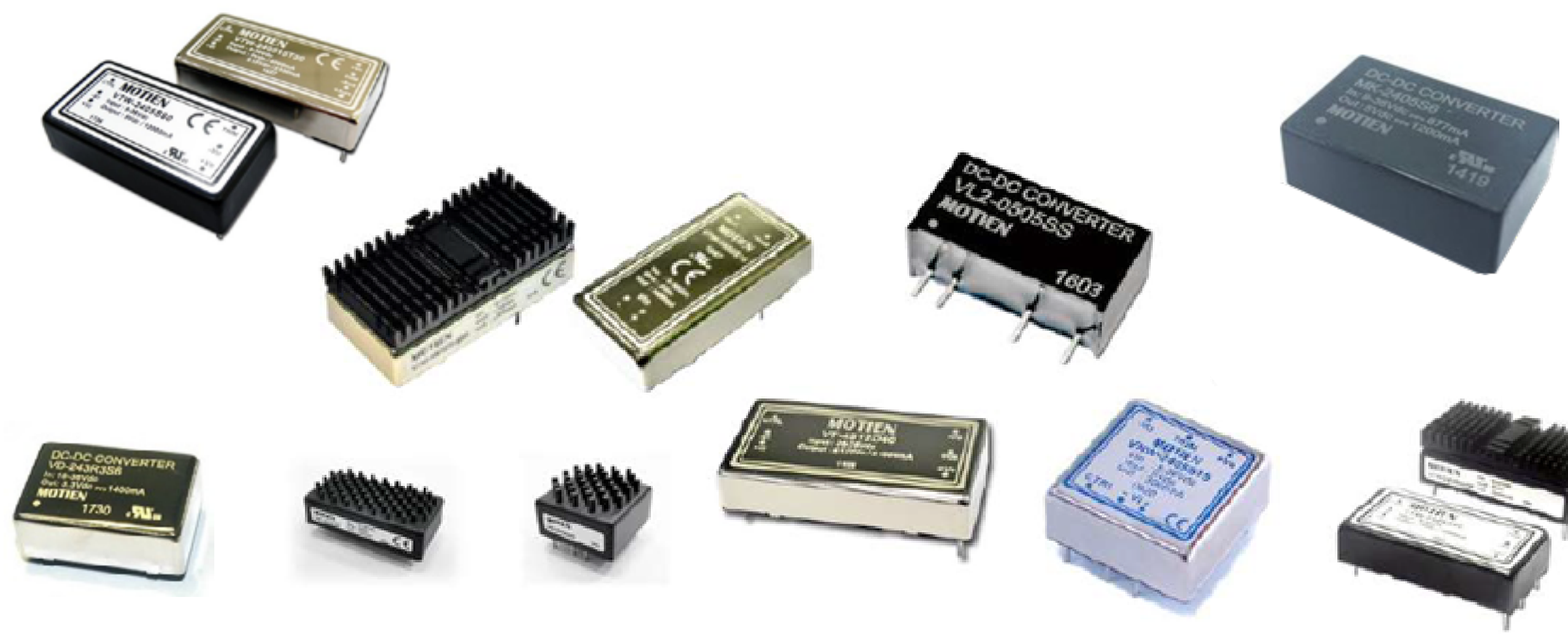
MOTIEN Technology is the professional and leading manufacturer of power solution since the establishment on 1998, with the great efforts and continually improvement for decades on power supplies, the brand MOTIEN has become well known and a symbol of quality and preferred & trusted DC power source.

Motien has more than 30 series of DC/DC converters, LED drivers and AC/DC converter modules. Products are widely built in modern electronic equipments: Industries Automation equipments, Telecommunication equipments, instruments, transportation system, medical equipments etc.

GENERAL SPECIFICATION

- **Power rating: 0.25W~60W**
- **DC / DC converters, LED drivers**
- **Customized products**
- **Minor change of standard product**
- **New product development**

PRODUCT GROUPS



RAILWAY SERIES

SMD SERIES

LED DRIVERS

ISOLATED DC/DC CONVERTERS

- SIP-Packages
- DIP-Packages

NON - ISOLATED DC/DC CONVERTERS

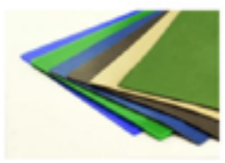
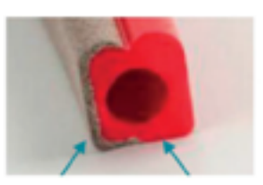
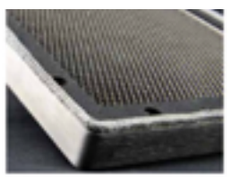
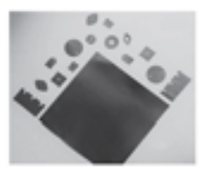
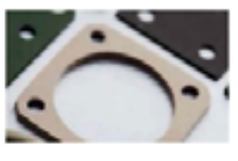
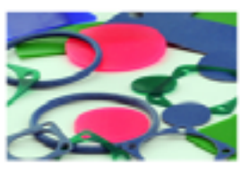
- SIP-Packages
- SMD-Packages

P&P TECHNOLOGY

www.p-p-t.co.uk

COMPANY OVERVIEW

About EMC EMI shielding solutions EMCEMI Staff have between them, over 50 years' experience in the manufacturing processes involved in making high quality & reliable EMC & RFI components, while specialising in the manufacture and supply of a wide range of products which are manufactured at our brand new factory in Essex in the United Kingdom. We manufacture components to MIL83528C specification.

			
Conductive Elastomers	Conductive Elastomers	Conductive Elastomers Moulded 'O' Rings	Co-extrusion Conductive Gasket
			
Aluminium Honeycomb Vents	Round Aluminium Honeycomb Vents	Steel Honeycomb Vents	Oriented Wires in Silicone
			
Knitted Wire Mesh	Knitted Wire Mesh over Elastomer Core	Knitted Wire Mesh with Enviromental IP Carrier	Knitted Wire Mesh Moulded to Silicon-Fluorosilicone
			 
Fabric Over Foam	Neoprene Sponge	Copper & Aluminium Conductive Foil Tape	S /s
			
Compressed Mesh 'O' Rings	Conductive Sponge Material	Thermal Graphite	Composite Wire Mesh
			
Expanded Wire Gasket	Co-extrusion Conductive	Thermal Gap Pad	Connector Gaskets
			
Silicone	Copper Fingerstock	Shielded Windows	Thermal Pad

OMNETICS
CONNECTOR CORPORATION

OMNETICS

www.omnetics.com

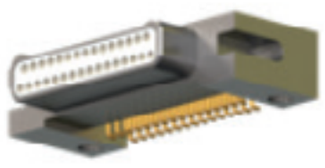
COMPANY OVERVIEW

Omnetics is a world-class miniature connector design and manufacturing company with over 30 years of experience, focused on Micro-miniature and Nano-miniature highly reliable electronic connectors and interconnection systems. Our miniature connectors are designed and assembled in a single location at our plant in Minneapolis, Minnesota.

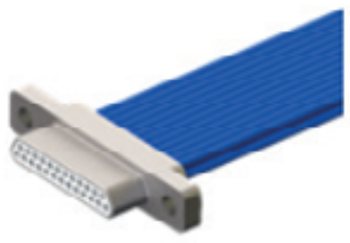
SINGLE ROW NANO-D

							
Horizontal SMT (AA)	Vertical SMT (VV)	Straight Tails (DD)	Thru-Hole Horizontal (H2)	Thru-Hole Vertical (V2)	Pre-Wired (W2)	Jumpers (JU)	MILDTL-32139 QPL

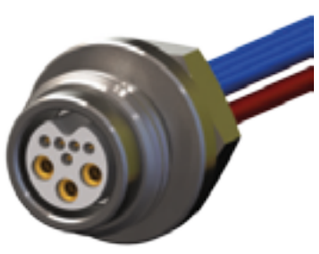
LATCHING NANO-D

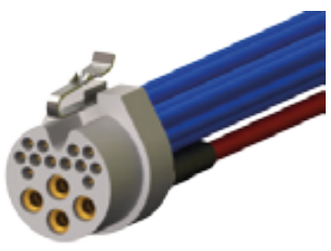
			
Surface Mount (AA)	Flex Mount (FF)	Straight Thru-Hole (DD)	Pre-Wired (WD)

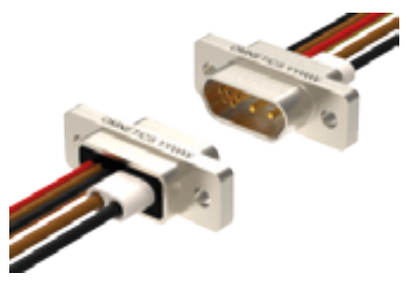
LOW PROFILE MICRO-D

				
Discrete Wired (WD)	Right Angle Thru-Hole (H1)	Right Angle Thru-Hole (R2)	Solder Cup (SS)	Straight Thru-Hole (S2)

Power and Signal Micro Hybrids: 10A, 5A, 3A

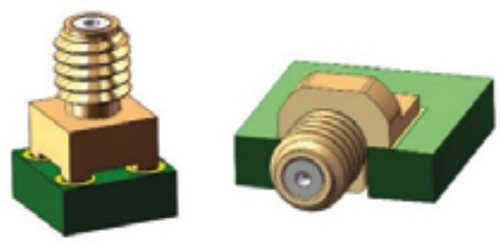






Nano Coax Connectors

Omnetics Nano Coax contacts are available either in a Hybrid Micro-D or as a standalone contact... The standalone version provides optimal performance in one of the lowest form factors on the market. The Nano Coax contacts are designed to be terminated to a low-loss 29 AWG (.047”) 50 coax cable. Cable-Cable: 20GHz / Edge Launch: 20GHz / Thru Hole: 10GHz



Micro 360® Circular Connectors

Omnetics' Micro Circular Connector Series utilizes Omnetics' rugged and reliable Flex-Pin contact system, is spaced on 50 mil (1.27mm) centerlines, features a mated length of less than 12.4 mm, and is specified to MIL-DTL-83513.

Discrete Wired (WD)

Right Angle Thru-Hole (H1)

Right Angle Thru-Hole (R2)

Solder Cup (SS)

Straight Thru-Hole (S2)

IP68 Nano Circulars

Omnetics' Micro Circular Connector Series utilizes Omnetics' rugged and reliable Flex-Pin contact system, is spaced on 50 mil (1.27mm) centerlines, features a mated length of less than 12.4 mm, and is specified to MIL-DTL-83513.

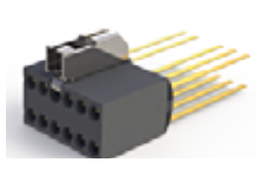
Full Keyed Breakaway (M)

Full Keyed Breakaway (F)

Ratcheting - RMCP

Ratcheting - RMCS

Micro Strip Connectors



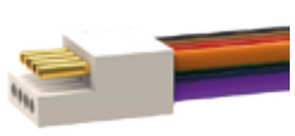
Single row: pin count changes up to 48
Dual row: pin count changes up to 97 available with latch

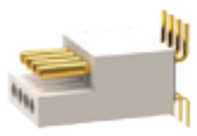
Nano Strip Connectors

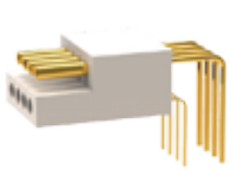
2-60 positions for single row
2-48 for dual row

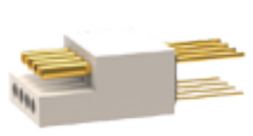
Polarized Nano Connector (PZN)

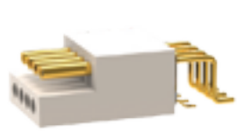
This configuration effectively polarizes the connector without the additional space required for guide pins. Termination options include: Pre-Wiring, Straight tail, Horizontal SMT, and Vertical SMT. Up to 24 positions.











Capabilities

LATCHING NANO-D	EMI SHIELDING	CUSTOM HARNESSING	CUSTOM METAL SHELL
			

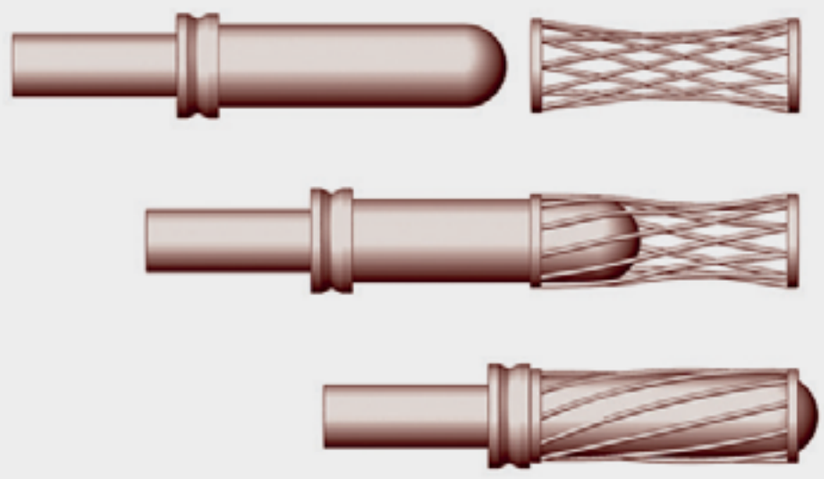
IEH

www.iehcorp.com

COMPANY OVERVIEW

Since 1941, IEH has been manufacturing superior products for demanding applications. Whether it's printed circuit board connectors, signal or power contacts, or custom interconnects, focus is delivering the right connector solution.

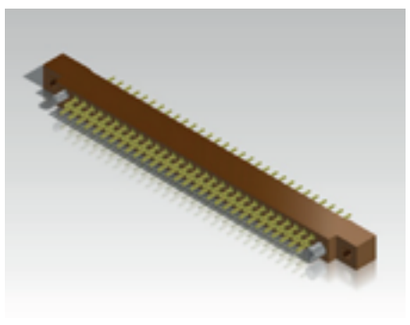
Hyperboloid Technology



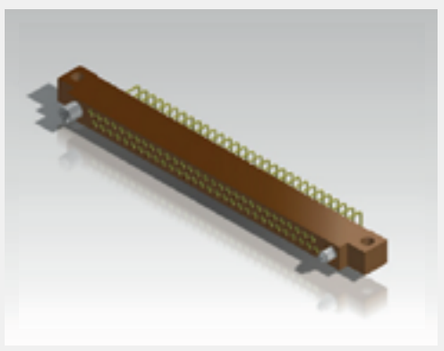
Utilized in all of our receptacle connectors, this unique design offers superior capability in every critical parameter of connector performance:

- Very low insertion force
- All but impervious to shock & vibration(Test exceed 300 g's without discontinuity.)
- 100,000 minimum duty cycles
- Extremely low contact resistance
- Improved current carrying capacity (The low contact resistance gives a lower °C rise from ambient under load. This feature often allows the user to operate the same size contact under higher load.)
- High reliability

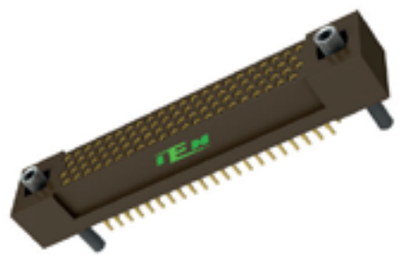
PCB CONNECTORS



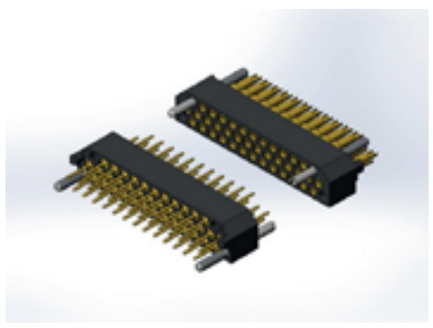
Type N Circulator from
300MHz to 10 GHz



HRM Series - .075" centers
2 & 3 row 10-206pos
M55302 /190 /193

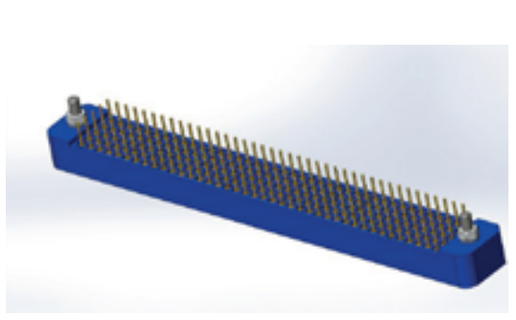


HMM Series - .075" centers
4, 6 & 8 row 58-604pos



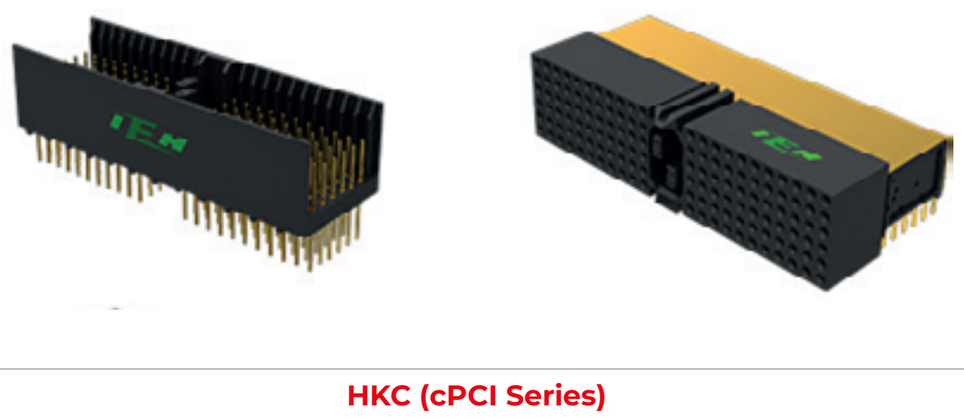
HGC/HGS Series
Low-Profile for parallel boards
22-90pos

HVM Series - .050" centers
2-row
10-100pos



HMK Series - .100" centers,
2, 3, 4 & 5 row
17-490pos

HYPERKINETIC® CONNECTORS - HIGH SPEED, HIGH DENSITY MODULAR



HKC (cPCI Series)

- Interchangeable with COTS board layout but with Hyperboloid Contact System
- 2mm Footprint of cPCI PICMG 2.0
- LCP Insulator Meets Outgassing Requirements
- Press-fit or Solder tail Terminations

HKX (VPX-Compatible Series)

- VITA-46 Platform
- Data Rates up to 10 Gbps
- 3U, 6U and Custom Configurations
- Custom Wafer Design for Mixing
- Differential and Single-ended Circuits
- Press-fit or Solder tail Terminations

ODU

www.odu.de

COMPANY OVERVIEW

ODU, founded in 1942, is one of the leading international suppliers of connection systems. Our company employs 1,650 people around the world. The group of companies has its headquarters in Mühldorf am Inn, Germany. ODU also has production sites in Romania, USA and China.

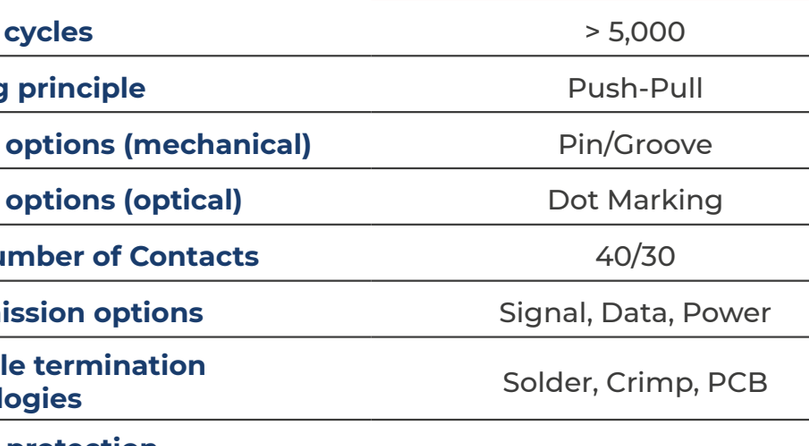
ODU AMC®

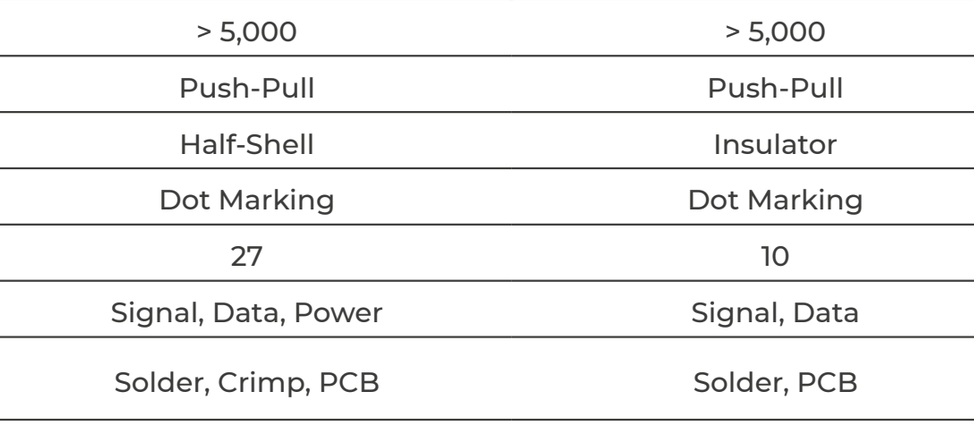
	ODU AMC® BREAK-AWAY	ODU AMC® PUSH-PULL	ODU AMC® EASY-CLEAN	ODU AMC® HIGH-DENSITY	ODU THREADED CONNECTOR
Mating cycles	Up To 5,000	Up To 5,000	Up To 5,000	Up To 5,000	Up To 2,000
Locking principle	Break-Away	Push-Pull	Break-Away	Break-Away	Screw Locking
Coding options (mechanical)	Pin/Groove	Pin/Groove	Pin/Groove	Pin/Groove	Pin/Groove
Coding options (optical)	Dot Marking, Color Coding	Dot Marking, Color Coding	Dot Marking, Color Coding	Dot Marking, Color Coding	Color Coding
Max. number of contacts	37	55	19	27	26
Transmission options	Signal, Data, Power	Signal,Data, Power	Signal	Signal, Data	Signal, Data, Power
Available termination technologies	Solder, PCB	Solder, PCB	Solder, PCB	Solder, PCB	Solder, PCB
Max. IP protection in mated condition	IP6K9K	IP6K9K	IP6K8 and IP6K9K	IP6K8	IP6K8

ODU MINI-SNAP®

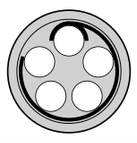
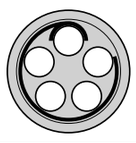
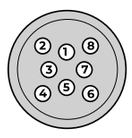
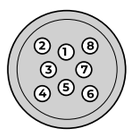
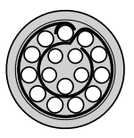
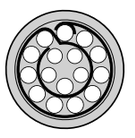
	ODU MINI-SNAP® PIN AND GROOVE CODING	ODU MINI-SNAP® HALF-SHELL CODING	ODU MINI-SNAP® CODING USING SPLIT INSULATORS
Mating cycles	> 5,000	> 5,000	> 5,000
Locking principle	Push-Pull	Push-Pull	Push-Pull
Coding options (mechanical)	Pin/Groove	Half-Shell	Insulator
Coding options (optical)	Dot Marking	Dot Marking	Dot Marking
Max. number of Contacts	40/30	27	10
Transmission options	Signal, Data, Power	Signal, Data, Power	Signal, Data
Available termination technologies	Solder, Crimp, PCB	Solder, Crimp, PCB	Solder, PCB
Max. IP protection in unmated condition	IP68	IP68	IP68
Max. IP protection in mated condition	IP50/IP68	IP68	IP68

Hermetic Sealing





ODU MINI-SNAP Hermetic Sealing Receptacles

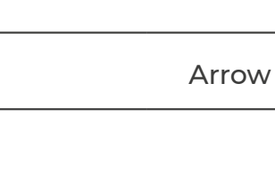
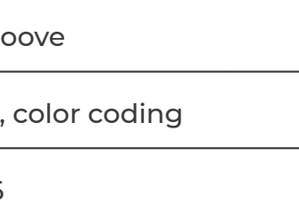
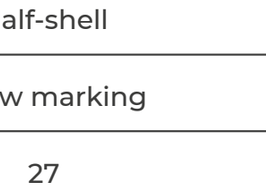
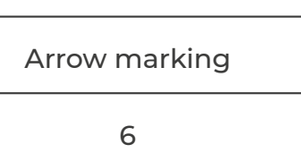
	G80L0Q–PU5RF00–00V0	G80L0Q–PU5QF00–00V0	G81L0Q–PD8RC00–00V0	G81L0Q–PD8QC00–00V0	G82L0Q–P16RC00–00V0	G82L0Q–P16QC00–00V0
⌀ Panel cut-out	9.1 mm + 0.1	9.1 mm + 0.1	12.1 mm + 0.1	12.1 mm + 0.1	15.1 mm + 0.1	15.1 mm + 0.1
Number of contacts	5	5	8	8	16	16
						
Contact style	Pin	Socket	Pin	Socket	Pin	Socket
He leakage rate acc. to DIN EN 60512-14-2:2006	Tested at < 10^{-9} mbar l/s					
Insulator material	Glass + PEEK					
Data transfer protocol	USB® 2.0[1]		Ethernet (CAT 5)		HDMI® [1]	
Data transfer rate	480 Mbit/s		1 Gbit/s		14.4 Gbit/s	
Single contact nominal current	4 A		3.8 A		4.2 A	
Nominal current insert	3 A		2.4 A		2.1 A	
Nominal voltage acc. to IEC 60664	10 V AC	7.5 V AC	32 V AC		32 V AC	

ODU Circular Plastic Connectors



	ODU MEDI-SNAP® PUSH-PULL	ODU MINI-SNAP® PC	ODU MINI-MED®
Mating Cycles	2,000/5,000	> 5,000	> 1,000
Locking Principle	Push-Pull / Break-Away	Push-Pull	Break-Away
Coding Options (Mechanical)	Pin/groove	Half-shell	Pin/groove
Coding Options (Optical)	Arrow marking, color coding	Arrow marking	Arrow marking
Max. Number Of Contacts	26	27	6
Transmission Options	Signal, power, fluids (liquids and gases)	Signal	Signal
Available Termination Technologies	Solder, crimp, PCB	Solder, crimp, PCB	Solder
Max. IP Protection In Unmated Condition	IP68	IP50	IP50
Max. IP Protection In Mated Condition	IP64/ IP67	IP67	IP67

Electrical Contacts

	ODU SPRINGTAC®	ODU LAMTAC®	ODU TURNTAC®	ODU SPRINGTAC® FLATSOCKET
Primary Attribute	High mating cycles	High temperature & current	Rugged	High mating cycles
Contact Technology	Springwire technology	Lamella technology	Turned, slotted contacts	Springwire technology
Reliability (Contact Points)	44 wire springs (size Ø 6 mm)	19 double contacting lamella louvres (size ⌀ 6mm)	4 contact fingers (size Ø 6 mm)	30 wire springs (size ▫ 6.3 x 0.8 mm)
Nominal Current	100 A (size Ø 6 mm)	115 A (size Ø 6 mm)	100 A (size Ø 6 mm)	27 A (size ▫ 6.3 x 0.8 mm)
Angular Misalignment	+/- 1°	+/- 1°	+/- 5° *	
Mating Cycles	> 100,000	> 10,000	> 10,000	> 50,000
Temperature Range Standard Version	-40 °C to 125 °C	-40 °C to 150 °C	-40 °C to 125 °C	-40 °C to 125 °C
Temperature Range High-Temp. Version		on request		
Contact Size	from Ø 0.76 mm	from Ø 1.5 mm	from Ø 1.5 mm	from ▫ 0.64 x 0.64 mm
Standard Plating	Ag / Au	Ag / Au	Ag / Au	Ag / Au
Crimp Termination	●	●	●	●
Screw Termination	●	●	●	●
For Busbars (Through-Hole Design)	●	●		

*max. 5° misalignment in mounting position with corresponding design of the contact chamber.

Movella
Bringing meaning to movement

MOVELLA

www.movella.com

COMPANY OVERVIEW

Movella is the leading innovator in 3D motion tracking technology and products. Our sensor fusion technologies enable a seamless interaction between the physical and the digital world in consumer electronics devices and professional applications such as Motion Capture, Motion Analysis, healthcare, sports and industrial applications.

MTI-600 SERIES

- Fully supported by the MT Software Suite (free use), enabling our customers a faster time to market
- Small footprint, flexible mounting options
- Industrial grade accuracy & reliability at affordable pricing, 100% calibrated and tested
- Rich interface platform, incl. CAN bus support
- External and internal GNSS-RTK receiver support
- Advanced proprietary XKF3 core sensor fusion algorithms
- State-Of-The-Art hardware components
- Extensive technical support
- RTK Solution
- ITAR-free

MTI 100 SERIES

- Highest performance with resistance to magnetic distortions
- Vibration-rejecting gyroscopes and accelerometers
- Configurable output settings, synchronizes with any 3rd party device

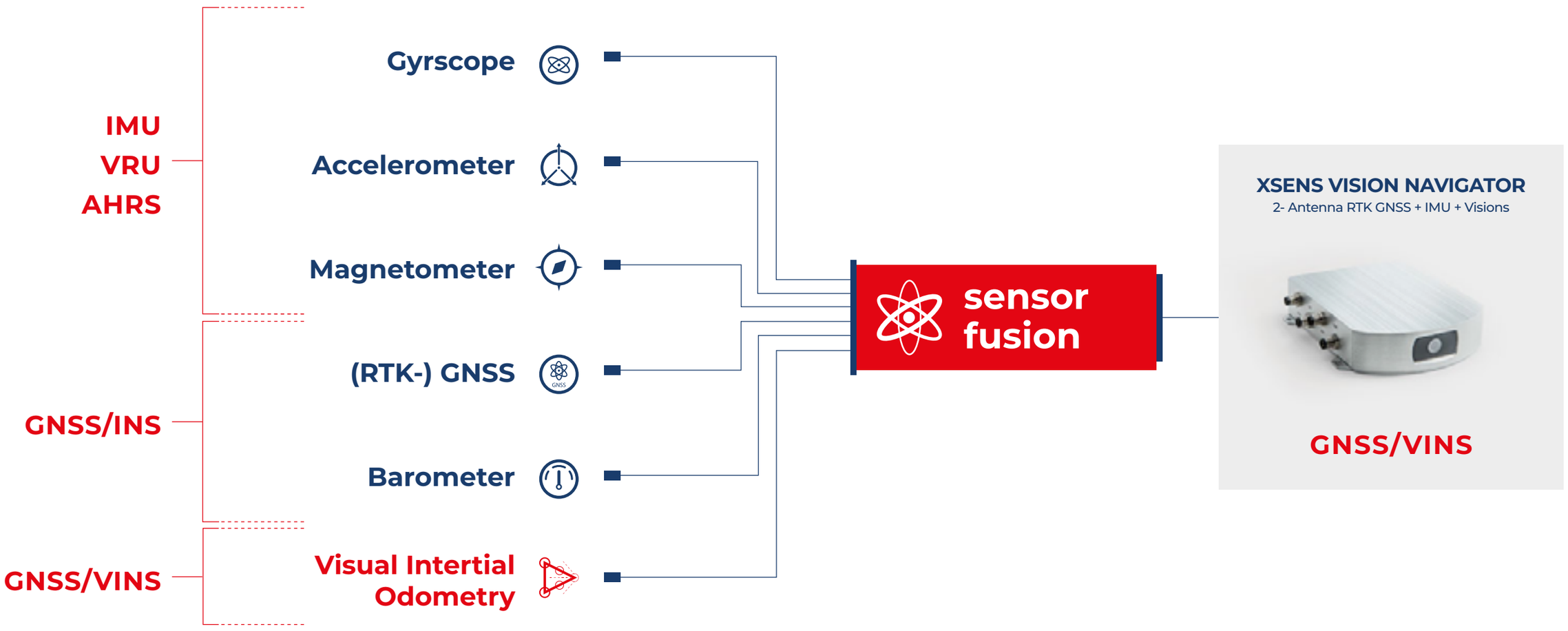
MTI-G-710

- All-in-one sensor system with high-frequency position and orientation output
- Excellent heading tracking without requiring a magnetic field
- Configurable output settings, synchronizes with any 3rd party device

	ROLL/PITCH STATIC	ROLL/PITCH DYNAMIC	YAW	SENSOR FUSION CORE	POSITION & VELOCITY
MTi 1-series					
MTi-1 IMU	-	-	-	-	-
MTi-2 VRU	0.5°	0.8°	AHS	XKF	-
MTi-3 AHRS	0.5°	0.8°	2.0°	XKF	-
MTi-7 GNSS/INS	0.5°	0.5°	1.5°	XKF	1 m | 0.05 m/s
MTi 600-series					
MTi-610 IMU	-	-	-	-	-
MTi-620 VRU	0.2°	0.5°	AHS	XKF	-
MTi-630 AHRS	0.2°	0.5°	1.0°	XKF	-
MTi-670 GNSS/INS	0.2°	0.5°	1.0°	XKF	1m | 0.05m/s
MTi-680G RTK-GNSS/INS	0.2°	0.5°	1.0°	XKF	0.05m / 0.05m/s
MTi 10-series					
MTi-30 AHRS	0.2°	0.5°	1.0°	XKF	-
MTi 100-series					
MTi-100 IMU	-	-	-	-	-
MTi-200 VRU	0.2°	0.3°	AHS	XEE	-
MTi-300 AHRS	0.2°	0.3°	1.0°	XEE	-
MTi-G-710 GNSS/INS	0.2°	0.3°	0.8°	XEE	1 m | 0.05 m/s

REAL-TIME SENSOR FUSED DATA

	IMU (1)	VRU (2)	AHRS (3)	GNSS/INS (7)	RTK-enabled GNSS / INS (8)	RTK-enabled VINS
	Intertial Measurement Unit	Vertical Reference Unit	Attitude and Heading Reference System	GNSS / GPS enabled Intertial Navigation System	Real Time Kinematics	Attitude and Heading Reference System
Gyroscope	Roll	Roll	Roll	Roll	Roll	Roll
Accelerometer	Pitch	Pitch	Pitch	Pitch	Pitch	Pitch
Magnetometer	Unref. Yaw	Unref. Yaw	Unref. Yaw	Unref. Yaw	Unref. Yaw	Unref. Yaw
Barometer				3D Position	cm-level 3D Position	3D Position
GNSS Receiver				3D Velocity	3D Velocity	3D Velocity
				GNSS Time	GNSS Time	GNSS Time
RTK Corrections						
Camera (B&W) & Wheel Odometry (External Source)					Long term dead-reckoning	



- **Accuracies, real-time operation, speed from 0 km/h up yo 80 km/h:**
  - Position: 1 cm + 1 ppm (RTK fix)
    Position error during GNSS outages:
    2% of travelled distance
    Reduced further to 0.75%, using wheel odometry input
  - Orientation: 0.4* (Roll/Pitch and Yaw/Heading)
  - Velocity: 0.1 m/s
- **Output Rate up to 200 Hz**
- **“ lean & mean ” : No SLAM needed (optional available soon)**
- **Features:**
  - SyncIn, SyncOut (GNSS 1 PPS), NTP time server
  - ASCII (NMEA) messages
  - ROS1/RPS2 driver
  - Available soon (2023)
    Post-processing
    PointPerfect - advanced GNSS augmentation data service

SAFRAN SENSING TECHNOLOGIES NORWAY

www.safran.com

COMPANY OVERVIEW

Safran operates its own wafer fabrication facility for production of the key sensor components in its products. Assembly, test and calibration are all in-house processes to secure the product performance. The tight integration between sensor fabrication, testing and assembly is what puts the company in a position to offer the highest performing sensors in the market.

Safran is a global leader in MEMS technology and has more than 30 years of experience developing and manufacturing reliable sensor solutions for demanding applications involving high vibration, high shock and harsh environments.

STIM210

STIM210 is a small, tactical grade, affordable, robust and reliable, ultra high performance (Bias Stability 0.3°/h, ARW 0.15°/√h) MEMS gyro module with up to 3 axes. An integrated 32-bit microcontroller enables flexible user configuration. Electronic axis alignment is standard.

- Miniature package
- ITAR free
- Excellent performance in vibration and shock
- Excellent environmental robustness
- 1, 2 or 3 axes offered in same package
- Electronically calibrated axis alignment
- RS422 interface
- 24 bits resolution
- Single-crystal silicon technology
- Low bias drift
- Low noise
- 5 different sampling rates available
- 5 different bandwidths available
- LP filter -3dB frequency can be set individually for each axis
- RS422 protocol, bit rate and line termination
- Selectable output unit: angular rate [deg/s] or incremental angle [deg]
- Continuous self-diagnostics.

STIM300

STIM300 is a small, tactical grade, low weight, high performance non-GPS aided Inertial Measurement Unit (IMU). It contains 3 highly accurate MEMS gyros, 3 high stability accelerometers and 3 inclinometers. The IMU is factory calibrated and compensated over its entire operating temperature range.

STIM300 is a cost-effective ITAR free solution for systems that only had FOGs as an alternative when reaching for the performance level of that STIM300 can offer.

- Weight: <0,12 lbs (<55g)
- Volume: <2,2 cu. in. (35cm3)
- ITAR free
- Insensitive to magnetic fields
- Solid state - high reliability
- Low gyro bias instability (0.3°/h)
- Continuous self-diagnostics
- Low gyro noise (0.15°/√h)
- ±10g acceleration input range
- Low accelerometer bias instability (0.05mg)
- 3 inclinometers for accurate leveling
- Compensated digital output, RS422
- Customer configurable output format, sampling rate and filter settings.

STIM318

STIM318 is a small, tactical grade, low weight, high performance non-GPS aided Inertial Measurement Unit (IMU) with greatly improved accelerometer performance. It contains 3 highly accurate MEMS gyros and 3 ultra-high stability accelerometers. The IMU is factory calibrated and compensated for temperature effects over its entire operating temperature range.

STIM318 is a cost-effective ITAR free solution for systems that only had FOGs as an alternative when reaching for the performance level of that STIM318 can offer.

- ITAR free
- Low gyro bias instability (0.3°/h)
- Low gyro noise (0.15°/√h)
- Low accelerometer bias instability (0.003mg)
- Low accelerometer noise (0.015 m/s/√h)
- ±10g acceleration input range
- User programmable bias trim offset
- Customer configurable output format, sampling rate and filter settings
- Compensated digital output, RS422
- Continuous self-diagnostics
- Solid state - high reliability
- Insensitive to magnetic fields
- Weight: <0,13 lbs (<57g)
- Volume: <2,2 cu. in. (35cm3)

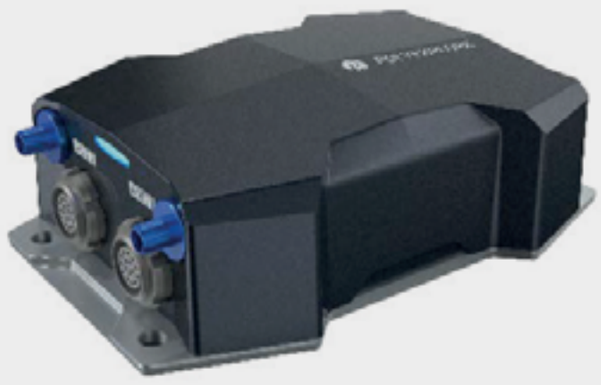
POLYEXPLORE

www.polyexplore.com

COMPANY OVERVIEW

About EMC/EMI shielding solutions EMCEMI Staff have between them, over 50 years' experience in the manufacturing processes involved in making high quality & reliable EMC & RFI components, while specialising in the manufacture and supply of a wide range of products which are manufactured at our brand new factory in Essex in the United Kingdom. We manufacture components to MIL83528C specification.

MEMS RTK GNSS/INS POLYNAV 2000H/P



High accuracy position, velocity, acceleration, attitude, heading, angular rate and heave

- GPS, GLONASS, Beidou, Galileo and SBAS
- Dual frequency (L1 & L2) RTK
- Dual antenna for accurate heading
- Best in class price-performance ratio
- 100 Hz navigation solution and the raw measurement output
- Accurate attitude/heading whether the platform is static or moving
- Tactical grade IMU sensors
- Multiple sensor fusion
- ROS driver ready
- Heave message

FOG INERTIAL NAVIGATION SYSTEM POLYNAV 2000F

High accuracy position, velocity, acceleration, attitude, heading, angular rate and heave

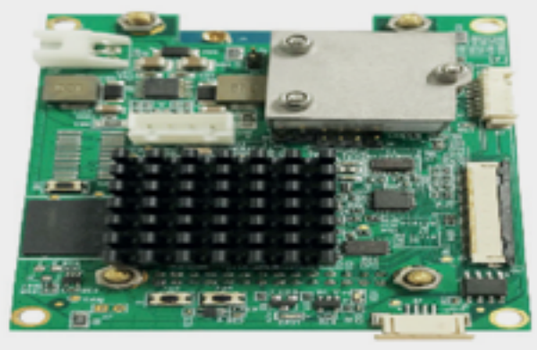
- GPS, GLONASS, Beidou, Galileo and SBAS
- Dual frequency (L1 & L2) RTK
- Dual Antenna for accurate heading
- Best in class price-performance ratio
- 100 Hz navigation solution and the raw measurement output
- Accurate attitude/heading whether the platform is static or moving
- Fiber Optic Gyroscope (FOG)
- Multiple sensor fusion
- ROS driver ready
- Heave message

"ULTRA" GNSS/INS POLYNAV 2000S

Centimeter level positioning with precise attitude and heading whether the platform is static or moving

- Precision velocity, acceleration, attitude (Roll, pitch, heading), and angular rate
- GPS, GLONASS, Beidou, Galileo*, and SBAS, QZSS; 240 Tracking Channels
- Dual frequency (L1 & L2) RTK
- Global PPP
- Dual antenna for accurate heading
- Best in class price-performance ratio
- 100 Hz navigation solution and the raw measurement output
- Tactical grade, near FOG performing solid-state IMU sensor
- Multiple sensor fusion
- ROS driver ready
- Heave message
- IP67 environmental rating

RTK GNSS/INS POLYNAV 2000P OEM



High accuracy position, velocity, acceleration, attitude (Roll, pitch, heading), angular rate

- GPS, GLONASS, Beidou, Galileo and SBAS
- Dual frequency (L1 & L2) RTK
- Dual antenna for accurate heading
- Best in class in size and price-performance ratio
- 100 Hz navigation solution and the raw measurement output
- Accurate attitude/heading whether the platform is static or moving
- Tactical grade IMU sensors
- Multiple sensor fusion
- ROS driver ready
- Heave message

	POLYNAV 2000S	POLYNAV 2000P OEM	POLYNAV 2000P	POLYNAV 2000H	POLYNAV 2000F	POLYNAV 2000F1
GNSS						
Constellation	GPS/GLONASS/ BeiDou/Galileo/ SBASS/QZSS	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo
Satellite signals	L1 & L2C/L2P (GPS), E1&E5b (Galileo)	L1 & L2	L1 & L2	L1 & L2	L1 & L2	L1 & L2
Position accuracy (RTK)	1.6 m CEP SPS	1.6 m CEP SPS	1.6 m CEP SPS,	1.6 m CEP SPS	1.6 m CEP SPS	1.6 m CEP SPS
	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK
Velocity Accuracy (RTK)	1 cm/s	1 cm/s	1 cm/s	1 cm/s	1 cm/s	1 cm/s
Roll/Pitch	0.015°	0.05°	0.005° (H), 0.01°(P)	0.005° (H), 0.01°(P)	0.05°	0.05°
Heading	0.08° (1 m base)	0.1°	0.1° (1 m base)	0.1° (1 m base)	0.01° (5 m base) 0.08° per 1 meter of baseline length	0.01° (5 m base) 0.08° per 1 meter of baseline length
Measurement rate	100 Hz	100 Hz (up to 400Hz)	100 Hz	100 Hz	100 Hz	100 Hz
Sensitivity	-160 dBm	-160dBm	-160 dBm	-160 dBm	-160 dBm	-160 dBm
Number of antennas	2	2	2	2	2	2
Inputs/comm	Ethernet, UART, RS232, CAN, DMI, PPS, Event Input		Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer
TIME TO FIRST FIX (TTFF)						
Cold start	< 60 s	< 60 s	< 60 s	< 60 s	< 60 s	< 60 s
Warm Start	< 45 s	< 45 s	< 45 s	< 45 s	< 45 s	< 45 s
Hot Start	< 11 s	< 11 s	< 11 s	< 11 s	< 11 s	< 11 s
Re-acquisition	< 2 s	< 2 s	< 2 s	< 2 s	< 2 s	< 2 s
INERTIAL SENSORS						
Gyro Dynamic Range	400°/s	±125°/s	±125°/s	125 °/s	490°/s	490°/s
Gyro Bias Instability	0.3 °/h	2°/h	2°/h	0.8 °/hr	0.1 °/h	0.05 °/h
Gyro Random Walk	0.015°/√h	0.15°/√h	0.15°/√h	0.09°/√hr	0.017°/√h	0.012°/√h
Accelerometer Dynamic Range	10g	±8g	±8g	8 g	10g	10g
Accelerometer Bias Instability	0.03 ug	3.6ug	3.6ug	3.2 ug	0.1mg	0.01mg
Accelerometer Random Walk	0.015 m/s/√h	0.012m/s/√h	0.012m/s/√h	0.008 m/s/√hr	0.07m/s/√h	0.014m/s/√h
MECHANICAL						
Dimension	166 x 134 x 70 mm	80 x 60 x 22 mm	147 x 99 x 48 mm	147 x 99 x 48 mm	177 x 115 x 109 mm	177 x 115 x 109 mm
Weight	approx. 800 g.	13 g	500 g	500 g	1455 g (without antennas)	1455 g (without antennas)
ENVIRONMENTAL						
Operating temperature	-40° to 85° C	-40° to 85° C	-40° to 85° C	-40° to 85° C	-40° to 65° C	-40° to 65° C
Shock					Operating, 9 g, 11 msec, sawtooth	Operating, 9 g, 11 msec, sawtooth
Vibration					Operating 8 g rms, 20-2000 Hz random	Operating 8 g rms, 20-2000 Hz random
ELECTRICAL						
Input voltage	12–24 V DC	12–24 V DC	12–24 V DC	12–24 V DC	12–28 V DC	12–28 V DC
Power	10W	5W	5W	5W	10 W	10 W

	POLYNAV 2000S	POLYNAV 2000P OEM	POLYNAV 2000P	POLYNAV 2000H	POLYNAV 2000F	POLYNAV 2000F1
GNSS						
Constellation	GPS/GLONASS/ BeiDou/Galileo/ SBASS/QZSS	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo	GPS/GLONASS/ Beidou/Galileo
Satellite signals	L1 & L2C/L2P (GPS), E1&E5b (Galileo)	L1 & L2	L1 & L2	L1 & L2	L1 & L2	L1 & L2
Position accuracy (RTK)	1.6 m CEP SPS	1.6 m CEP SPS	1.6 m CEP SPS,	1.6 m CEP SPS	1.6 m CEP SPS	1.6 m CEP SPS
	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK	0.02 m RTK
Velocity Accuracy (RTK)	1 cm/s	1 cm/s	1 cm/s	1 cm/s	1 cm/s	1 cm/s
Roll/Pitch	0.015°	0.05°	0.005° (H), 0.01°(P)	0.005° (H), 0.01°(P)	0.05°	0.05°
Heading	0.08° (1 m base)	0.1°	0.1° (1 m base)	0.1° (1 m base)	0.01° (5 m base) 0.08° per 1 meter of baseline length	0.01° (5 m base) 0.08° per 1 meter of baseline length
Measurement rate	100 Hz	100 Hz (up to 400Hz)	100 Hz	100 Hz	100 Hz	100 Hz
Sensitivity	-160 dBm	-160dBm	-160 dBm	-160 dBm	-160 dBm	-160 dBm
Number of antennas	2	2	2	2	2	2
Inputs/comm	Ethernet, UART, RS232, CAN, DMI, PPS, Event Input		Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer	Ethernet, CAN, 2 Serial Ports, Odometer
TIME TO FIRST FIX (TTFF)						
Cold start	< 60 s	< 60 s	< 60 s	< 60 s	< 60 s	< 60 s
Warm Start	< 45 s	< 45 s	< 45 s	< 45 s	< 45 s	< 45 s
Hot Start	< 11 s	< 11 s	< 11 s	< 11 s	< 11 s	< 11 s
Re-acquisition	< 2 s	< 2 s	< 2 s	< 2 s	< 2 s	< 2 s
INERTIAL SENSORS						
Gyro Dynamic Range	400°/s	±125°/s	±125°/s	125 °/s	490°/s	490°/s
Gyro Bias Instability	0.3 °/h	2°/h	2°/h	0.8 °/hr	0.1 °/h	0.05 °/h
Gyro Random Walk	0.015°/√h	0.15°/√h	0.15°/√h	0.09°/√hr	0.017°/√h	0.012°/√h
Accelerometer Dynamic Range	10g	±8g	±8g	8 g	10g	10g
Accelerometer Bias Instability	0.03 ug	3.6ug	3.6ug	3.2 ug	0.1mg	0.01mg
Accelerometer Random Walk	0.015 m/s/√h	0.012m/s/√h	0.012m/s/√h	0.008 m/s/√hr	0.07m/s/√h	0.014m/s/√h
MECHANICAL						
Dimension	166 x 134 x 70 mm	80 x 60 x 22 mm	147 x 99 x 48 mm	147 x 99 x 48 mm	177 x 115 x 109 mm	177 x 115 x 109 mm
Weight	approx. 800 g.	13 g	500 g	500 g	1455 g (without antennas)	1455 g (without antennas)
ENVIRONMENTAL						
Operating temperature	-40° to 85° C	-40° to 85° C	-40° to 85° C	-40° to 85° C	-40° to 65° C	-40° to 65° C
Shock					Operating, 9 g, 11 msec, sawtooth	Operating, 9 g, 11 msec, sawtooth
Vibration					Operating 8 g rms, 20-2000 Hz random	Operating 8 g rms, 20-2000 Hz random
ELECTRICAL						
Input voltage	12–24 V DC	12–24 V DC	12–24 V DC	12–24 V DC	12–28 V DC	12–28 V DC
Power	10W	5W	5W	5W	10 W	10 W

GNSS receivers

GNSS&INS-RTK

SEPTENTRIO

www.septentrio.com

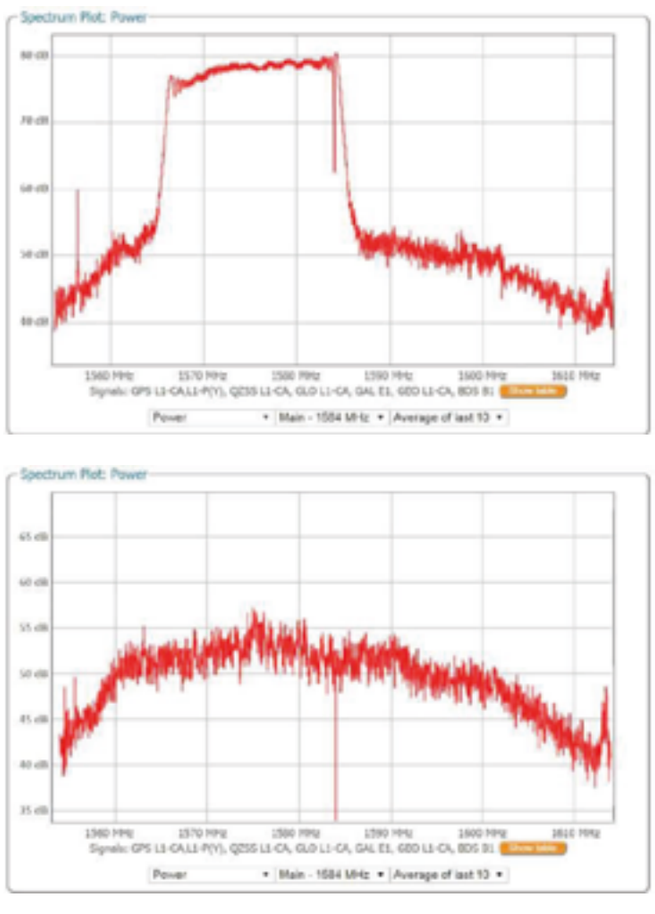
COMPANY OVERVIEW

Septentrio designs and manufactures multi-frequency multi-constellation GPS/GNSS positioning technology for demanding applications. At the core of our receivers is the latest GNSS technology delivering reliable centimeter-level positioning.

Our receivers are known for their outstanding performance, high level of security and resilience in challenging environments. That is why our products serve in safety-critical applications and are part of critical infrastructure around the world.

Septentrio GNSS+ Algorithms Technology

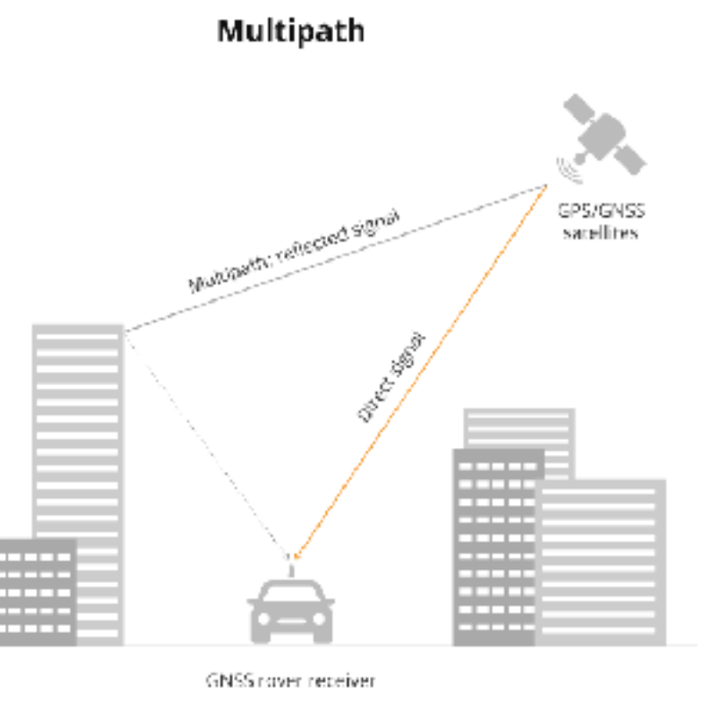
1- AIM+ : Advanced Interference Monitoring & Mitigation



RF interference caused by the chirp jammer

AIM+ in action.

2-APME+ : Multipath Mitigation Technology



3-IONO+ : Ionospheric Scintillation Monitoring
4-RAIM+ : Receiver Autonomous Integrity Monitoring
5-LOCK+: Robust tracking under rapid signal changes

mosaic-X5

- Small in size, big in performance
- All-in-view satellite tracking: multi-constellation, multi-frequency
- Best-in-class reliable and scalable position accuracy
- Future proof: supporting current and future satellite signals
- AIM+ unique interference monitoring and mitigation system + advanced GNSS+ algorithms
- Advanced anti-jamming, anti-spoofing solutions with update rate at 100 Hz
- Industry-leading ultra-low power consumption
- Easy-to-integrate, optimized for automated assembly

PARAMETER	MOSAIC X5	MOSAIC H
Satellite	◆ GPS(L1C/A, L1C, L1PY, L2C, L2P, L5) ◆ GLO(L1CA, L2CA, L2P, L3 CDMA) ◆ BEI(B1I, B1C, B2a, B2I, B3) ◆ Galileo(E1, E5a, E5b, E5 AltBoc, E6) ◆ QZSS(L1C/A, L1C, L2C, L5, L6) ◆ Navic(L5) ◆ SBAS(Egnos, WAAS, GAGAN, MSAS, SDCM (L1, L5)) ◆ On module L-band	◆ GPS(L1, L2) ◆ GLO(L1, L2) ◆ BEI(B1, B2) ◆ Galileo(E1, E5b) ◆ QZSS(L1, L2) ◆ SBAS(Egnos, WAAS, SDCM, GAGAN, MSAS, SDCM (L1))
Raw data	+	+
Events	+	+
Low latency	+	+
Heading, 2 antennas	-	+
Roll&Heading or Pitch&Heading	-	+
Measurement rate	up to 100 hz	up to 100 hz
Advanced Logging	+	+
Moving base RTK	+	-

AsteRx-m3 Pro+

- All-in-view satellite tracking on 3 frequencies
- Best-in-class reliable RTK position accuracy (cm-level)
- Best SWaP on the market (Size, Weight and Power)
- AIM+ advanced anti-jamming, anti-spoofing technology as part of the GNSS+ Technology Suite
- Easy-to-integrate rover receiver
- GNSS heading available directly from initialization, removes reliance on vehicle dynamics or magnetic sensors

PARAMETER	ASTERX-M3 PRO	ASTERX-M3 PRO+
Satellite	◆ GPS(L1 C/A, L2C, L2P, L5) ◆ GLO(L1 C/A, L2C/A, L2P, L3) ◆ BEI(B1I, B1C, B2a, B2I, B3I) ◆ Galileo(E1, E5a, E5b) ◆ QZSS(L1 C/A, L2C, L5) ◆ NAVIC(L5) ◆ SBAS(Egnos, WAAS, SDCM, GAGAN, MSAS)	◆ GPS(L1 C/A, L1C, L2C, L2P, L5) ◆ GLO(L1 C/A, L2C/A, L2P, L3) ◆ BEI(B1I, B1C, B2a, B2I, B3I) ◆ Galileo(E1, E5a, E5b) ◆ QZSS(L1 C/A, L1C, L2C, L5) ◆ NAVIC(L5) ◆ SBAS(Egnos, WAAS, SDCM, GAGAN, MSAS)
Raw data	+	+
Events	+	+
Low latency	+	+
Heading, 2 antennas	optional	+
measurement rate	up to 10 hz	up to 100 hz
Logging	-	+
DGPS/RTK Correction output	-	+

AsteRx-i3 D pro+

Reliable and accurate IMU-enhanced GNSS positioning down to the centimeter level

Full access to raw GNSS and IMU data

Single or dual GNSS antenna with heading, pitch and roll

Lightweight, low power and compact

AIM+ unique interference monitoring and mitigation system + advanced other GNSS+ algorithms

Quad-constellation, multi-frequency, all-in-view RTK positioning

PARAMETER	ASTERX-I3 D PRO	ASTERX-I3 D PRO+
Satellite	◆ GPS(L1 C/A, L1C, L2C, L2 P, L5) ◆ GLONASS(L1 C/A, L2C/A) ◆ BeiDou(B1I, B2I, B3I) ◆ Galileo(E1, E5a, E5b,) ◆ SBAS(EGNOS, WAAS, GAGAN, MSAS)	◆ GPS(L1 C/A, L1C, L2C, L2 P, L5) ◆ GLONASS(L1 C/A, L2C/A) ◆ BeiDou(B1I, B2I, B3I) ◆ Galileo(E1, E5a, E5b, E5 AltBOC) ◆ SBAS(EGNOS, WAAS, GAGAN, MSAS)
IMU	+	+
Events	+	+
Low latency	+	+
Velocity input fusion	+	+
Raw data	-	+
Heading, 2 antennas	-	+
Measurement rate	up to 10 hz	up to 200 hz
Logging	-	+
DGPS/RTK PVT mode	-	+

AsteRx-SBi3 pro+

Robust and compact IP68 weatherproof housing

reliable and accurate IMU-enhanced GNSS positioning down to the cm level

Full attitude - heading, pitch and roll

Lightweight, low-power and compact

AIM+ unique and advanced interference monitoring and mitigation system + advanced GNSS+ algorithms

High update rate, low-latency positioning and attitude

Robust calibration for wide temperature ranges

Ready to use

PARAMETER	ASTERX-SBI3 PRO	ASTERX-SBI3 PRO+
Satellite	◆ GPS(L1 C/A, L1C, L2C, L2P, L5) ◆ GLO(L1 C/A, L2C/A) ◆ BEI(B1I, B2I, B3I) ◆ Galileo(E1, E5a, E5b)	◆ GPS(L1 C/A, L1C, L2C, L2P, L5) ◆ GLO(L1 C/A, L2C/A) ◆ BEI(B1I,B2I, B3I) ◆ Galileo(E1, E5a, E5b, AltBOC)
IMU	+	+
Events	+	+
Low latency	+	+
Velocity input fusion	+	+
Raw data	-	+
Heading, 2 antennas	-	+
Measurement Rate	up to 10 hz	up to 200 hz
Logging	-	+
DGPS/RTK PVT mode	-	+

ADVANCED MOTION CONTROLS

AMC

www.a-m-c.com

COMPANY OVERVIEW

ADVANCED Motion Controls has earned a reputation for being the most flexible and affordable manufacturer of quality high performance and high power density servo drives. By selecting ADVANCED Motion Controls as your servo drive and controls supplier, you will be adding an integral member to your design engineering team with multi-industry expertise. 30+ years of servo drive manufacturing, with nearly 3 million servo axes built and shipped worldwide!

ANY NETWORK

CANopen EtherCAT ETHERNET POWERLINK Ethernet RS-485/232 SERIAL Modbus

We also have the ability to quickly produce custom DigiFlex® Performance™ drives utilizing many other common types of network communication.

ANY MOTOR

Three Phase (Brushless)	Single Phase
▸ Servo – BLDC, PMAC ▸ AC Induction (Closed loop vector) ▸ Closed loop stepper	▸ Brushed ▸ Voice coil ▸ Inductive load

ANY FEEDBACK

ABSOLUTE ENCODER	Tachometer
▸ EnDAT® ▸ Hiperface® ▸ BiSS®C – Mode	▸ ±10 Vdc ▸ ±60 Vdc
1 VP – P SIN/COS ENCODER	**Aux. Incremental Encoder**
INCREMENTAL ENCODER	**Resolver**
±10 Vdc position	**Hall Sensors**

ANY CONTROLLER

Digital or analog controllers	Digital or analog controllers
▸ ±10 Vdc ▸ PWM and Direction ▸ Step and Direction	▸ 0 – 5 V (Standard, Inverted or Wigwag) ▸ 0 – 5 kW (Standard, Inverted or Wigwag)

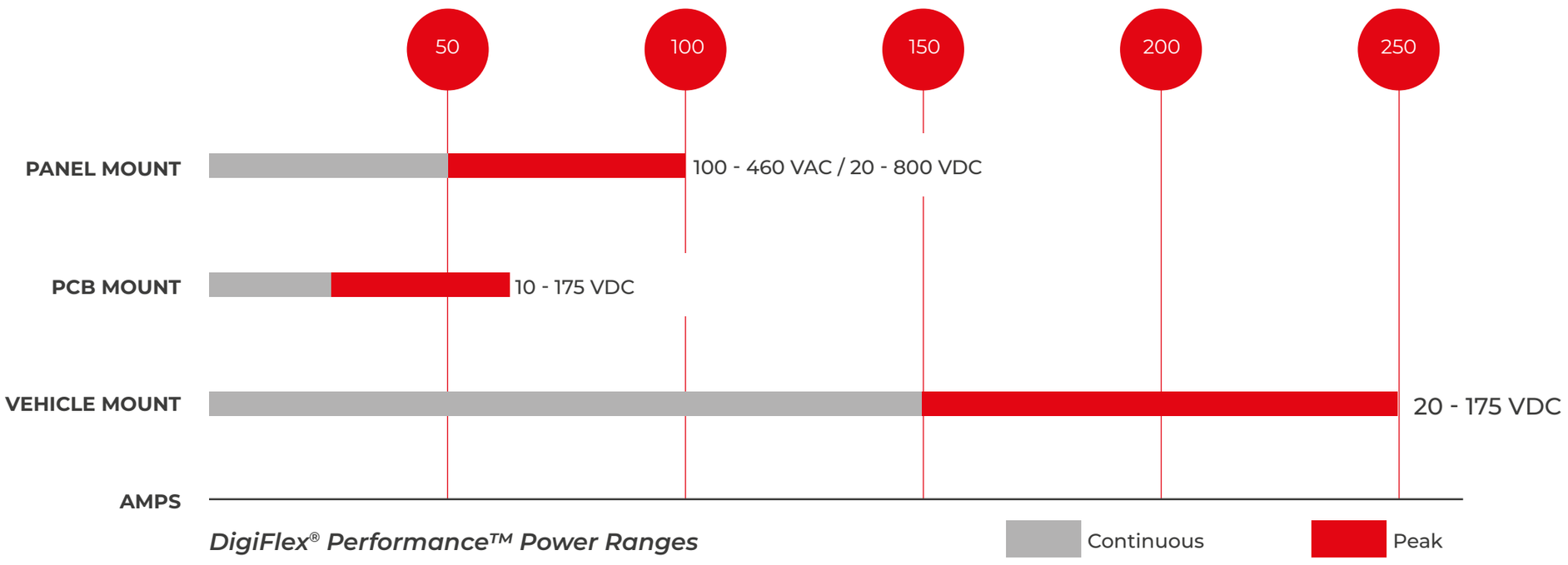
ANY ENVIRONMENT

Extreme Ambient Temperatures	Component Temperature Protection
▸ Standard products range from -40°C to +85°C ▸ Custom products operate down to -50°C and ▸ lower, and +100°C and higher!	▸ Ø PCB operating temperatures up to 105°C

ADVANCED Motion Controls Advantages:

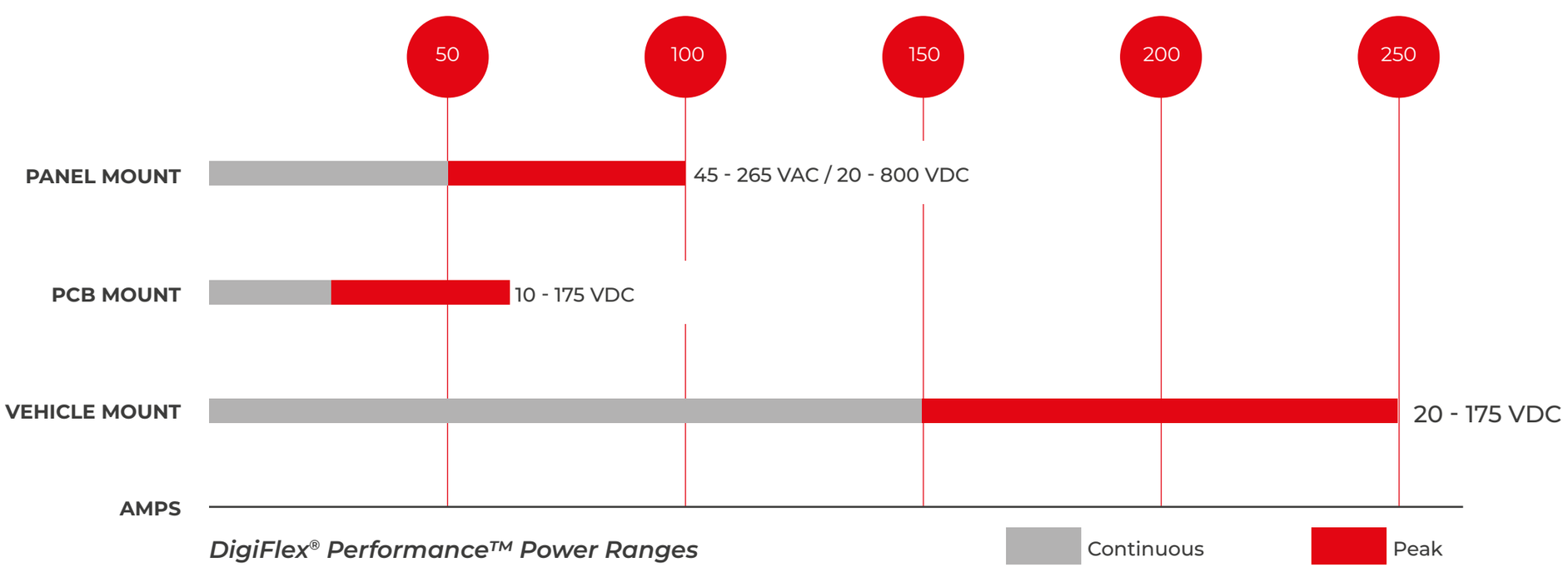
- Battery supplied, mobile operation needing 8+ hours duty / 7-day standby capability
- • ≥98% efficiency to extend overall battery life
- • Multiple power demands
- • Common control system dictated same servo drive interface but with models having different power levels
- • Minimal maintenance
- • Operation typically in remote locations
- • Long service life expected

DigiFlex® Performance™ Servo Drives



- Peak power output up to 27.4kW
- Three phase brushless (servo, closed loop vector, closed loop stepper)
- Single phase (brushed, voice coil, inductive load) motors
- Variety of feedback options - Absolute Encoder (EnDat®, Hiperface®, BiSS® C-Mode), Incremental Encoder, Hall Sensors, Resolver, 1Vp-p Sin/Cos Encoder, Tachometer
- Compatible with DriveLibrary™ - ADVANCED Motion Controls' API for C++ motion programming

AxCent™ Servo Drives



- Unparalleled benefits in both simplicity and performance,
- NOT require computer hardware or software,
- Higher bandwidth and faster response times at a lower cost,
- Including ±10V analog, PWM and Direction, and specialized electric vehicle commands,
- Optical isolation between high and low power signals standard on certain models
- Current, Velocity, and Fault Monitor analog output signals

Extended Environment products (AZX – DZX Series)

ADVANCED Motion Controls' Extended Environment products are designed to operate under harsh thermal and mechanical extremes.

- Ambient operating temperatures from -40°C to 85°C
- Over Temperature up to 105°C
- Thermal rise cycling in about 2 minutes
- Shock up to 15g's at 11ms
- Vibration up to 30grms on all 3 axes
- Designed to assist system compliance toward: MIL-STD-810F: temperature, thermal shock, humidity, altitude, shock & vibration

ICPE

www.icpe.ro

COMPANY OVERVIEW

ICPE or Institutul de Cercetări Electrotehnice® was established over 65 years ago. The modern research infrastructure, obtained successfully following the performance of local and international projects, is a solid basis for further research in electrical engineering, and related fields.

DC BRUSHED TORQUE MOTORS

DC Torque Motors operate on the same principles as the conventional DC motors but the magnetic circuit design and consequent mechanical configuration are designed for maximum torque output rather than the usual low torque / high speed characteristic. Arrange of unhoused units which are supplied as three separate components, a permanent magnet field assembly, a wound armature with precision bore for mounting and a brush ring assembly or brush segments.

Fixed element – the stator, is equipped with rare earth permanent magnets and the rotor is equipped with a dc specific winding which is connected to an extra flat commutator – brushed system. Low speed Torque Motors are beneficial for direct-drive applications. Position and velocity feedback can be achieved via additions of DC Tachos, Resolvers or Optical Encoders. The unhoused motors described below can be offered in custom designed housings for specific applications.

PRODUCT CODE	PEAK TORQUE [mNm]	TORQUE SENSITIVITY [mNm/A]	MOTOR CONSTANT [mNm/W]	OUTSIDE DIAMETER [mm]	HEIGHT [mm]
TQRB-15-0.39	77.7	25,1	10,3	38,10	9,78
TQRB-15-0.51	127	36,3	13,9	38,10	12,95
TQRB-15-0.51-B	141	32,4	16	38,10	12,95
TQRB-15-1.03	333	83,2	39,2	38,10	26,00
TQRB-15-1.1	353	50,4	28,3	38,10	27,94
TQRB-20-1.14	1200	150	86,6	51,00	29,00
TQRB-24-1-C	600	195	68,2	60,32	25,40
TQRB-30-0.78	777	256	87,4	76,20	19,80
TQRB-34-0.51	883	160	74,1	85,725	12,95
TQRB-34-0.95-A	2048	438	195	85,725	24,40
TQRB-34-1.46	3140	551	271	85,725	36,90
TQRB-37-0.54	1060	210	85,4	92,075	13,72
TQRB-37-0.54-B	1060	158	85,4	92,075	13,72
TQRB-37-0.84	2120	358	156	92,075	21,33
TQRB-37-1.46	4000	681	341	92,456	37,008
TQRB-45-0.56	2300	340	146	114,3	14,22
TQRB-45-0.69-B	3250	542	238	114,3	17,45
TQRB-45-0.69-C	3250	963	238	114,3	17,45
TQRB-45-0.86	4590	715	277	114,3	21,84
TQRB-45-1.08	6510	838	401	114,3	27,28
TQRB-51-0.58	2825	251	180	130,175	14,73
TQRB-51-0.93	2800	1400	422	130,175	23,9
TQRB-51-1.0	4800	1200	490	130,175	25,5
TQRB-51-2.1	10000	1515	716	130,175	53,34

D.C. LIMITED ANGLE BRUSHLESS TORQUE MOTORS

Limited Angle Torque Motors are ideal for compact, limited angular excursion, rotary, closed loop servo applications. Operating in the system, these units endure a long storage life and a harsh thermal and mechanical environment. All motors consist of a housed stator with a high density
winding around a steel core, molded in a special resin. The rotor is build from high-grade samarium cobalt magnets or neodymium, on a stainless steel core.

Advantages

- No Torque Ripple
- High Angular Acceleration
- No Commutation
- Brushless
- Low Profile

AC SERVO MOTORS – BSM SERIES

BSM Series motors are available with high energy Nd-Fe-B magnets - 6 (six) magnetic poles - F Class Insulation - standard feedback system with resolver - winding protection with PTC - Standard protective structure is IP55 class - torque range from 0.1 to 20 Nm - high torque to weight ratios - superior low speed performance - very low inertia.

In this motor range below options are also available:

- **Shaft with keyway according to DIN 6885**
- **Fail safe brake 24 VDC,**
- **Shaft seal ring,**
- **Additional feedback systems (encoder),**
- **Protection class IP65,**
- **Custom windings,**
- **Special dimensions and configurations.**

SINUSOIDAL OUTPUT TRANSDUCERS – RESOLVERS

Resolvers which are directly supplied on the rotor winding, used on either limited angle, case in which they are supplied by means of flexible cables or on 360 degrees and, in this case, they are supplied through some collecting rings, as well as resolvers supplied by means of rotary transformer with a constant transformation ratio and the input and output winding terminals on the stator.

Advantages

- **Used as an absolute angle transducer,**
- **Resistance to mechanical stresses,**
- **Operation within a wide temperature range.**

OUTER ROTOR BRUSHLESS MOTOR

PARAMETER	SYMBOL	UNITS	VALUE
Nominal Torque	M_n	Nm	9
Peak Torque	M_{max}	Nm	27
Motor Constant	K_M	N/W	1,4
Voltage	V_{DC}	V	600
Nominal Current	I_n	A	8,3
Torque Constant	K_T	Nm/A_{ms}	1,08
Back EMF Constant	K_E	V_{ms}/krpm	67
No-Load Speed		rpm	7000
Number of Poles	N_P		10
Phase Connection			Y
Line-to-Line Resistance	R_L	Ω	0,4
Line-to-Line Inductance	L_L	mH	5,3
Electric Time Constant	T_E	ms	13,2
Insulation Class			H
Thermal Resistance	T_R	°C/W	1,7
External Diameter	OD	mm	170
Stator/Rotor Length	L	mm	28
Motor Length	TL	mm	55
Inertia	J	$kg\ cm^2$	105
Weight	Wt	kg	4,2

The stator is a laminated steel core with a three phase windings. The high energy permanent magnets outer rotor configuration provides a more rigid structure for the permanent magnets and has higher inertia.

Advantages

- **High torque due to large air gap radius,**
- **Stable low speed performance without feedback,**
- **Lower audible noise with reduced cogging.**

Other Product Groups

As the company is established to customize different electrical machines there are many different products that ICPE can offer as following:

- **Flat brushless servo motors,**
- **Precision small brushless motors,**
- **AC servo motors,**
- **Linear motors,**
- **Electric generators,**
- **2-D robot tables.**

SPINEA

www.spinea.com

COMPANY OVERVIEW

The products of the company are suitable for applications, which require high reduction gear ratio, high kinematic precision, zero backlash motion, high torque capacity, high rigidity, compact design in a limited installation space, as well as low weight. They are widely used in automation and industrial robotics, in the field of machine tools manufacturing, in navigation and camera equipment, medical systems and many other fields.

Through intensive development and sales activities, in the course of several years, SPINEA, s.r.o. started to succeed among other manufacturers of high-precision reduction gears.

SPINEA enjoys the membership of international robotics associations, such as the International Federation of Robotics, EU Robotics as well as the German Engineering Federation - VDMA.

Reduction Gears - Twinspin

The notion “high precision reduction gear” designates the full integration of high precision reduction gear and high precision radial-axial bearing in a single unit. TwinSpin® high precision reduction gears are designed for applications requiring a high reduction ratio, high kinematic accuracy, low lost motion, high moment capacity and high stiffness of a compact design with a limited installation zone, and low mass.

Actuators

The actuators of the DriveSpin® series combine optimized servomotors and TwinSpin gears, resulting in a dynamic, high performance, and very compact servo actuator with high tilting torque capacity with integrated bearing.
The main characteristics of the DriveSpin® actuators include compact design, zero backlash, high dynamic performance, high torsional and tillting stiffness, small size, low mass, simple installation, high load capacity of radial-axial output bearing and easy maintenance.

PANLINK
奔 联 技 术

PANLINK

www.pan-link.cn

COMPANY OVERVIEW

Panlink focuses on high end slip rings' R&D and manufacturing for 16 years with nearly 100 employees and 3000 square meters production area. The company has powerful R&D and management team providing cutting edge design and process technology.

Product range is very diverse such as military, wind turbine, heavy machinery, large CT, hybrid slip rings etc. to worldwide clients.

CUSTOMIZATION | EMI IMMUNITY | TEMP RANGE | HIGH IP | SERVO SYSTEM

Typical Applications

A slip ring can be used in any electromechanical system that requires unrestrained, intermittent or continuous rotation while transferring power and / or data.

- Defense
- Medical equipment
- Wind power
- Oil exploration
- Environment treatments
- Antenna systems
- Aviation & Navigation
- Robotics
- Port equipment
- Cable reel
- Offshore platform

Slip Ring Solutions

- Support all kinds of signals and communication protocols.
- Electrical, FORJ, RF and media channels can be flexibly combinedEnvironment treatments.
- Experienced in slip ring solutions for used in SIEMENS and other brand servo-drive systems.
- Can provide suitable slip ring solutions for use in various harsh environments.

Communication Protocol

CANopen, Modbus, PROFIBUS, PROFINET, DeviceNet, AS-Interface, SUPERSPEED USB, OPC UA, CC-Link V2, EtherNet/IP, CAN FD, CAN, CAMERA Link, HART COMMUNICATION PROTOCOL

Practical Applications

Multi-channel air hybrid slip ring

Multi-channel FORJ

Servo system slip ring

Non-contacting slip ring

Pancake slip ring

Ultra Miniature Slip Rings for Airborne Fields

Recommended model: PSR-TM10S

PSR-TM10S is the first ultra-miniature slip ring in China market. With 5.9mm dia x 7.62mm flange, it can provide 1~10 circuits power and signal transfer. Stainless steel housing, hard gold contact materials, V-shape groove design, low torque, low wear, ensure sensor and thermocouples etc. weak signals' reliable transmission.

Typical Applications

- **Aircraft electro-optical pod**
- **Missile guidance system**

Multi-circuits Military Slip Rings

Recommended model PSR-Ms

PSR-Ms series SR are specially designed for space technology experiments. 60-200 circuits optional, can provide power, analog and high speed digital signals transfer. Compliant with EMC and 3D vibration proof, ensure power and signal's stable transmission without interference

Typical Applications

- **Aerospace 3D simulation motion turntable**

Hybrid Fiber-electrical Slip Rings

SPEC
▸ Contactless, no friction, long lifetime up to 50M revolutions ▸ Combine various signals - video, series data, network data ▸ No signal leakage, EMI immunity ▸ Support multi-channels high speed data transmission ▸ Small size, light weight, stainless steel, suitable for airborne or marine ▸ environments ▸ With pressure compensation, good sealing, can work in undersea ▸ 7000m or space environments

PARAMETERS
Fiber: SM a or MM **Wavelength:** 650 - 1650 nm **Insertion loss: <2 dB (typical: <0.5 dB)** **Return loss:** >40 dB (typical:45 dB, 2323 C), >50 dB (MJXA)

NETZER

www.netzerprecision.com

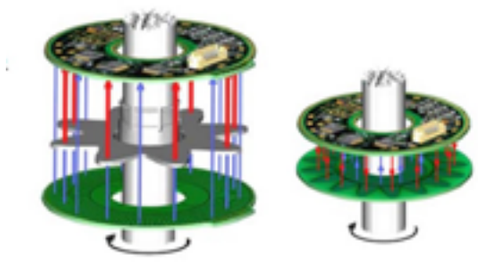
COMPANY OVERVIEW

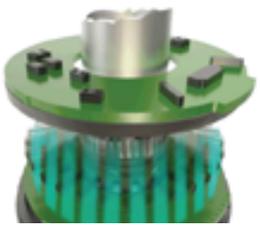
Electric Encoder™ Netzer's world-wide patented, rugged high performance Electric Encoder™ technology, suits a wide variety of applications ranging from space and avionics, through military and defense, to instrumentation and automotive. The product portfolio includes Rotary & Linear absolute or incremental position encoders, with analog or digital outputs.

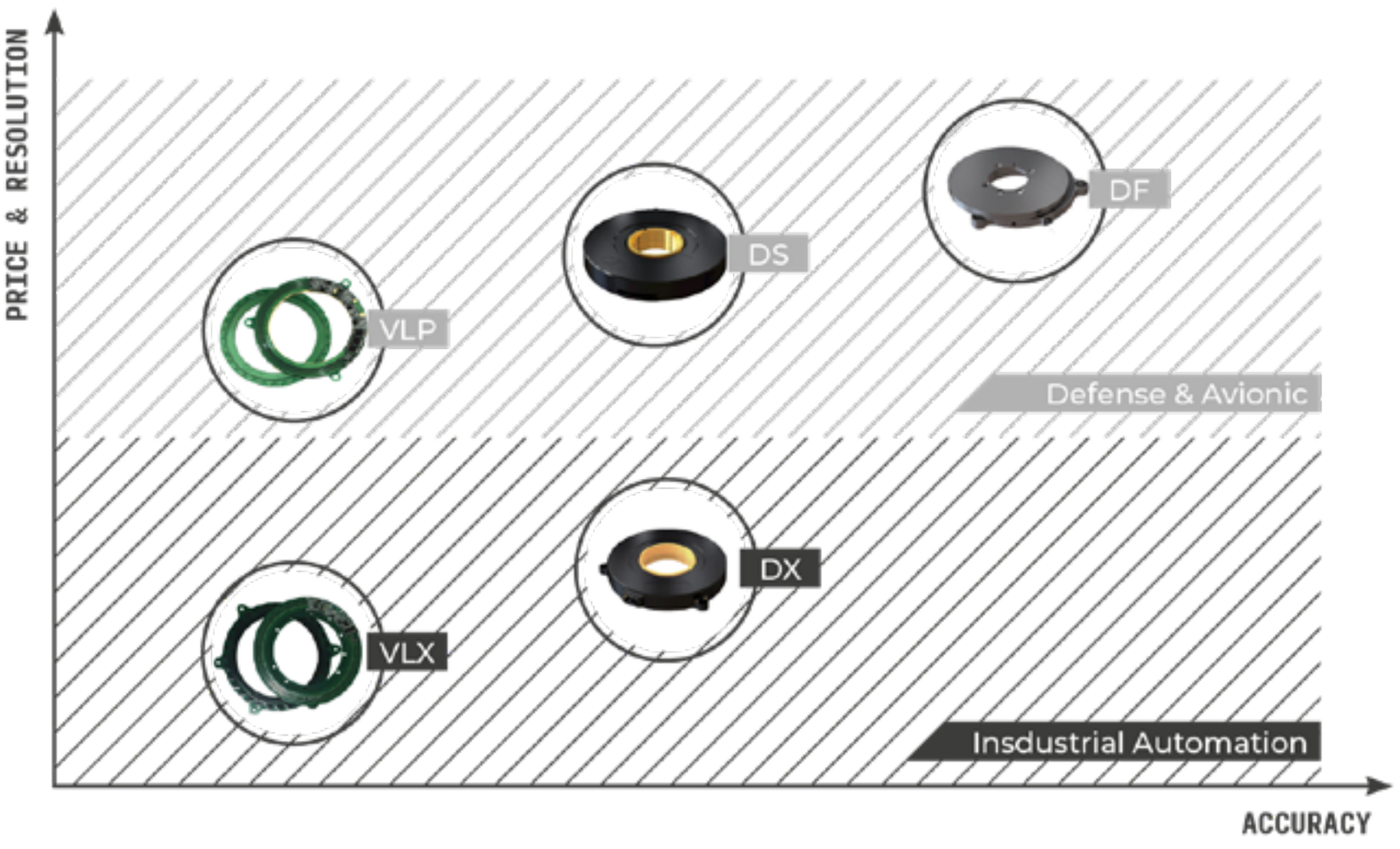
The Non-contact, absolute-position relies on interaction between the measured displacement and an internally shielded, space/time modulated, electric field and offers features unsurpassed by traditional optical and magnetic encoders.

Advantages of Electrical Encoders

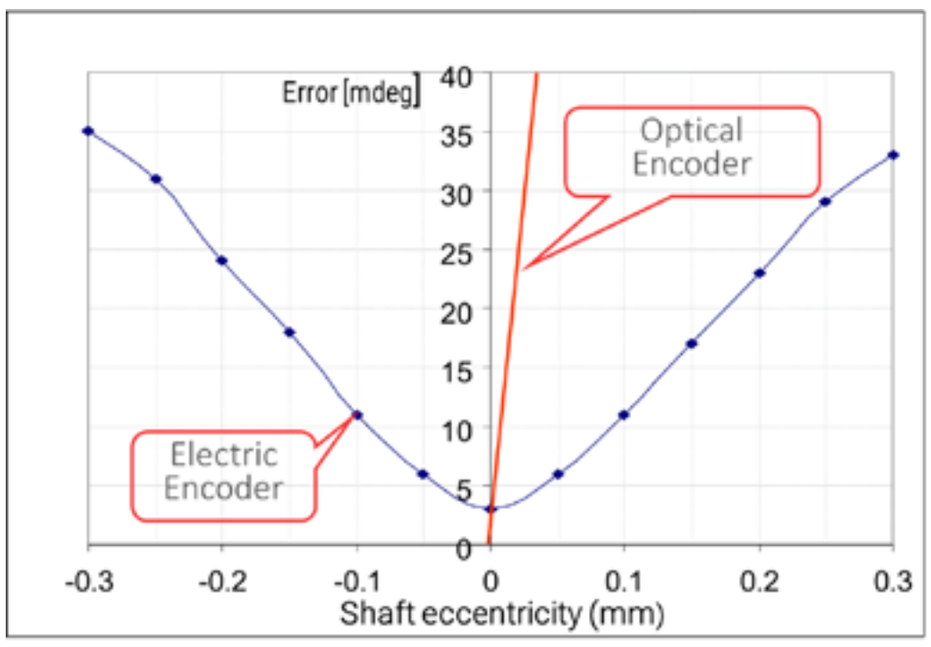
- **Simple, robust structure with a virtually no-failure-mechanism,**
- **Very low weight, inertia, and profile (=<10mm),**
- **Ring shaped, hollow shaft with a wide range of diameters,**
- **Precision to 0.001° in selected models,**
- **Default operation range from -55°C to +125°C,**
- **Insensitivity to EMI/RFI and magnetic fields,**
- **Ultra-high-speed options,**
- **Wide variety of position feedback protocols.**
- **The company has structured its product range based**







The company has structured its product range based on price performance criteria for different types of applications. For industrial applications DX and VLX products; for defense and avionic applications VLP, DS and DF products are available.



Netzer products are also verified with their high MTBF as shown in below diagram.

T (°C)	MTBF (HOURS)		
	GF (ground fixed)	GM (ground mo-bile)	SF (space flight)
25°	4,300,000	2,000,000	1,500,000
85°	450,000	300,000	750,000

PERFORMANCE MOTION DEVICES
MOTION CONTROL AT ITS CORE

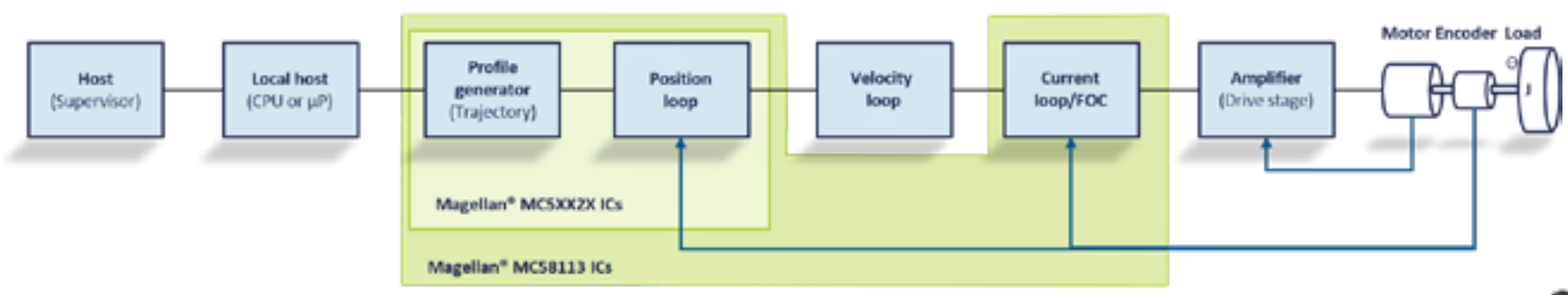
PMD

www.pmdcorp.com

COMPANY OVERVIEW

ADVANCED Motion Controls has earned a reputation for being the most flexible and affordable manufacturer of quality high performance and high power density servo drives. By selecting ADVANCED Motion Controls as your servo drive and controls supplier, you will be adding an integral member to your design engineering team with multi-industry expertise. 30+ years of servo drive manufacturing, with nearly 3 million servo axes built and shipped worldwide!

MAGELLAN POSITIONING IC FAMILY



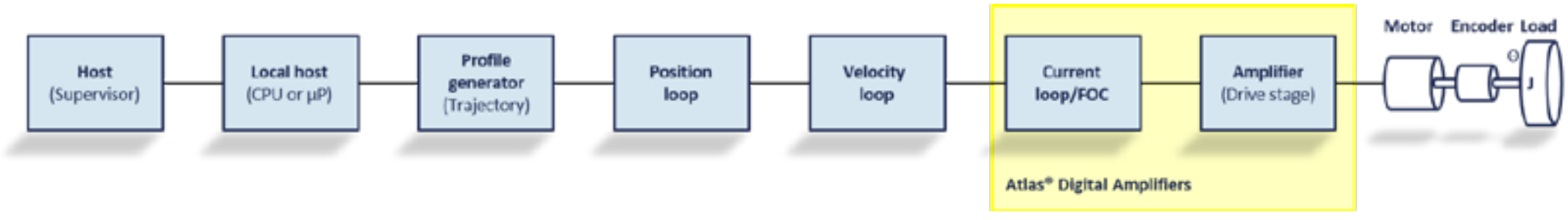
Magellan® MC58113 Ics

- Intelligent, single-axis
- Multi-motor
- Easy, preconfigured motion commands
- Digital current loop
- Onboard memory

Magellan® MC5XX2X ICs

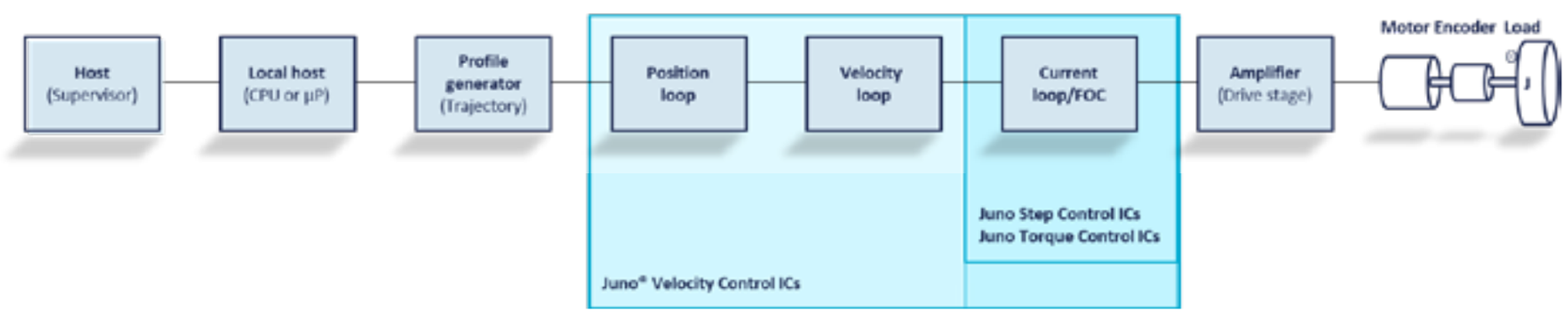
- Intelligent, multi-axis
- Multi-motor
- Easy, preconfigured motion commands
- Digital current loop
- Onboard memory

ATLAS® DIGITAL AMPLIFIERS



- Intelligent, single-axis
- Multi-motor
- Easy, preconfigured motion commands
- Digital current loop
- Onboard memory

JUNO® VELOCITY & TORQUE IC FAMILY



- Ultra-efficient performance
- Four-quadrant control
- Safety features built in

Velocity Control ICs: Sophisticated velocity and torque control of 3-phase
brushless DC, DC brush, step motors or multi-motor.
Step Motor Control ICs: State of the art step motor control with pulse and
direction or SPI command input.
Torque Control ICs: Ultra precise torque control for 3-phase brushless DC
and DC brush motors with direct analog or SPI command input.

DIAMOND SYSTEMS

www.diamondsystems.com

NVDIA Carrier Boards

Expansion Modules

Ethernet Switches

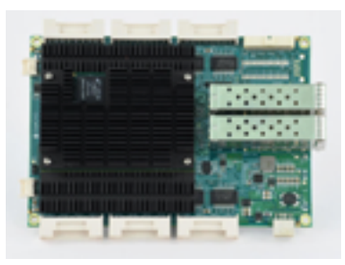
COMPANY OVERVIEW

This guide presents a sample of our current standard product offerings. We welcome the opportunity to serve you with one of these products or a custom solution based on our vast library of technologies and our worldwide design and manufacturing resources.

Nvidia Solutions

	FLOYD	ZIGGY	JETHRO	STEVIE	ELTON
					
Jetson Module	Nano&Xavier NX	TX2/TX2i	TX2/TX2i	AGX Xavier	AGX Xavier
Camera	3x CSI-2 4-lane ports	N/A	2x CSI 4-lane	8x CSI 2-lane	8x CSI 2-lane
Display	2x HDMI	1x HDMI	1x HDMI	2x HDMI	1x HDMI, 1x LVDS
Mass Storage	mPCIe M.2 NVME 2280 Micro SD	Micro SD	M.2 SATA 2242 Micro SD	M.2 PCIe x4 NVMe 2280	M.2 PCIe x4 NVMe 2242
Serial Ports	2x RS-232/422/485	2x RS-232	2x RS-232	2x RS-232	2x RS-232
USB	1x USB 3.0 2x USB 2.0	1x USB 3.0 1x USB 2.0	N/A	1x USB 3.0 2x USB 2.0	2x USB 3.0 2x USB 2.0
Ethernet	2x GbE with PoE	1x GbE	1x GbE	2x GbE	2x GbE
CAN	1	N/A	N/A	2	2
Integrated GPIO	8	13	13	13	13
Integrated DAQ	N/A	6x 12-16-bit A/D 2x 12-bit D/A	6x 12-16-bit A/D 2x 12-bit D/A	6x 12-16-bit A/D 2x 12-bit D/A	6x 12-16-bit A/D 2x 12-bit D/A
Expansion	1x PCIe/USB MiniCard	N/A	1x PCIe/USB MiniCard SkyWire Modem Socket	1x PCIe/USB MiniCard	1x PCIe/USB MiniCard SkyWire Modem Socket 1x PCIex8 4x PCIex1 PCI Bus Links
Size	143x76 mm	63x67x96 mm	76x107 mm	100x87 mm	102x152 mm

EPSM-10GX4



EPS-24G4X

EPS-12G2

EPS-12000-CM

EPS-8100

PRODUCT	DESCRIPTION	COPPER PORTS	FIBER PORTS	FORM FACTOR	DIMENSIONS	NOTES
EPS-8100	Layer 2+ managed 8-Port Gigabit Ethernet switch	8	x	PC/104	90mm x 96mm	Industry-leading rugged compact switch for vehicle applications
EPS-12G2	Layer 2+ managed 12-Port Gigabit Ethernet Switch	12	2x1G/2.5G	COM Express	95mm x 125mm	Economical 12 port rugged switch with dual fiber backbone capability
EPS-12G1	Layer 2+ managed 12-Port Gigabit Ethernet Switch	12	1x1G/2.5G	COM Express	95mm x 125mm	Economical 12 port rugged switch with fiber uplink
EPS-12G0	Layer 2+ managed 12-Port Gigabit Ethernet Switch	12	x	COM Express	95mm x 125mm	Economical 12-port rugged switch

EPS-12G0	Layer 2+ managed 12-Port Gigabit Ethernet Switch	12	x	COM Express	95mm x 125mm	Economical 12-port rugged switch
EPS-12000-CM	Layer 2+ / Layer 3 managed 12-Port Gigabit Ethernet Switch	12	x	COM Express Mini	84mm x 55mm	Ultra-compact, rugged, IEEE-1588 capable
EPS-24016-104	Layer 2+ managed 16-Port Gigabit Ethernet switch	16	x	PC/104	90mm x 96mm	High port density, rugged design
EPS-24026-104	Layer 2+ managed 26-Port Gigabit Ethernet switch	24	2x1G/2.5G	PC/104	90mm x 96mm	High port density, rugged design
EPSM-10GX4	Layer 2+ / Layer 3 managed 28-Port Gigabit Ethernet switch module	24	4 10G	COM Express Mini	84mm x 55mm	Switch module for custom solutions; Layer 3 and IEEE-1588 capability
EPS-24G4X	Layer 2+ / Layer 3 managed 28-Port Gigabit Ethernet Switch	24	4 10G	--	146mm x 102mm	Full featured switch, 10G Layer 3 and IEEE-1588 capability

Rugged Systems

The SABRE family offers rugged mission computers and Ethernet switches for use in the most challenging vehicle environments. MIL-STD-461, 704, and 1275 compliance is available. Systems have been tested to MIL-STD-810G specifications up to 75G shock.

ETHERNET SWITCHES	SABRENET 12000	SABRENET 24000	SABRENET 24G2X
Copper ports	12x 1G	24x 1G	24x 1G
Fiber ports	N/A	N/A	2x 10G
Input voltage	6-34VDC	5-34VDC	5-34VDC
PTP option	Yes	Yes	Yes
Dimensions mm	162Wx137Dx66H	198Wx175Dx66H	198Wx175Dx66H

COMPUTERS	SABRECOM VNS	SABRECOM ARS	SABRECOM ZTA
Processor	Skylake 6th Gen Core i7 i7-6600U 2C 2.6GHz	Bay Trail E3845 2C 1.91GHz	Bay Trail E3845 Apollo Lake E3940/N4200
RAM	4-20GB	4GB	4-8GB
Mass storage	32-256GB SSD	32-256GB SSD	32-256GB SSD
Serial ports	4x RS-232/422/485	4x RS-232/422/485	4x RS-232/422/485
USB ports	4x USB 2.0, 2x USB 3.0	2x USB 2.0	4x USB 2.0, 1x USB 3.0
Ethernet	2x 10/100/1000	2x 10/100/1000	2x 10/100/1000
Integrated GPIO	16	16-24	16-24
Integrated data acquisition	N/A	16x 16-bit A/D 4x 16-bit D/A	16x 16-bit A/D 4x 16-bit D/A
Expansion	PCIe/104, PCI-104, and MiniCard sockets	PC/104-Plus: ISA & PCI 1x MiniCard	1x PCIe/USB MiniCard 1x M.2 SATA socket
Standard enclosure size	198W x 175D x 66H mm	198W x 175D x 66H mm	162W x 137D x 66H mm
Operating system support	Windows 10 IOT LTSC; Linux Ubuntu 16.04 LTS; 64-bit support	Windows 7/10; Linux Ubuntu 16.04 LTS; 32/64-bit support	Windows 7/10; Linux Ubuntu 16.04 LTS; 32/64-bit support

I/O Expansion Modules

Diamond Systems offers a wide range of I/O modules in PC/104 and PCIe MiniCard form factors. Our analog and digital I/O modules are supported by our industry-leading Universal Driver software, consisting of a C language programming library along with example programs and GUI demos that provide instant verification of system operation. All products meet -40°C to +85°C operating temperature.

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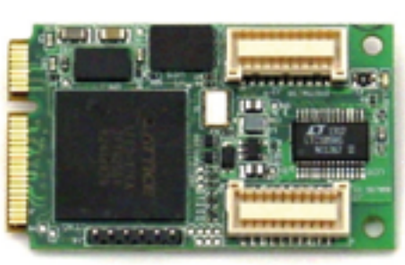
ANALOG I/O														
Product	**Form Factor**	**#A/D**	**Res**	**Max**	**Min**	**Gain**	**Max**	**Autocal**	**FIFO**	**#D/A**	**Res**	**Max**	**Min**	**GPIO**
DMM-32DX-AT	PC/104	32 SE, 16 DI	16	±10V	0-.625V	Program	250K	Auto	1024	4	16	±10V	0-5V	24 I/O
DMM-32X-AT	PC/104	32 SE, 16 DI	16	±10V	0-.625V	Program	250K	Yes	1024	4	12	±10V	0-5V	24 I/O
DMM-16R-AT	PC/104	16SE, 8 DI	16	±10V	0-1.25V	Program	100K	Yes	512	4	12	±10V	0-5V	8 In, 8 Out
DMM-16RP-AT	PC/104-Plus	16SE, 8 DI	16	±10V	0-1.25V	Program	100K	Yes	512	4	12	±10V	0-5V	8 In, 8 Out
DMM-AT	PC/104	16SE, 8 DI	12	±10V	0-1.25V	Program	100K	Yes	512	2	12	±10V	0-5V	8 In, 8 Out
DMM-XT	PC/104	16SE, 8 DI	12	±10V	0-1.25V	Jumper	100K			2	12	0-5V	0-5V	8 In, 8 Out
DS-MPE-DAQ0804	MiniCard	8SE, 4 DI	16	±10V	0-5V	Program	100K		2048	4	16	0-5V	0-2.5V	14 I/O
RMM-1616A-XT	PC/104									16	16	**Voltage ranges:** ±10V, ±5V, 0-10V, 0-5V		48 I/O
RMM-816A-XT	PC/104									8	16			48 I/O
RMM-416A-XT	PC/104									4	16			48 I/O
RMM-1616AP-XT	PC/104-Plus									16	16	**Current ranges:** 0-20mA, 0-24mA, 4-20mA		48 I/O
RMM-816AP-XT	PC/104-Plus									8	16			48 I/O
RMM-416AP-XT	PC/104-Plus									4	16			48 I/O

DMM-32DX-AT

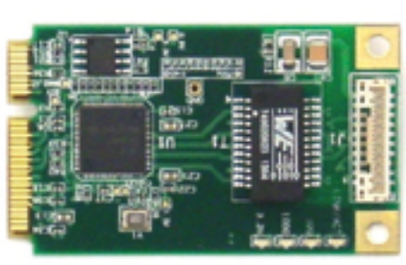
DMM-16RP-AT

RMM-1616AP-XT

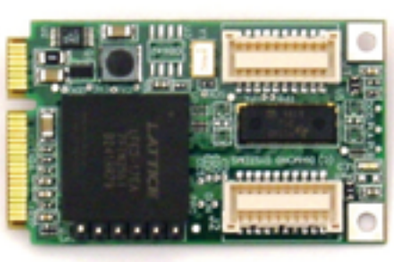
GPIO-MM-XT



DS-MPE-DAQ0804



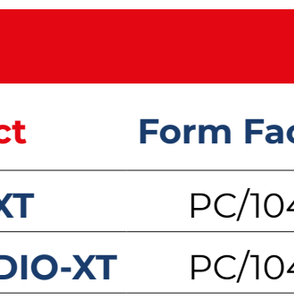
DS-MPE-GE210 Ethernet Minicard



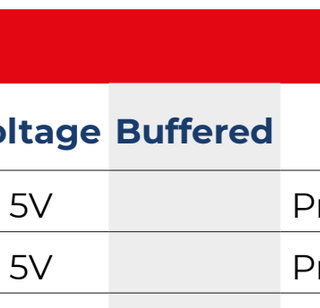
DS-MPE-GPIO

DS-MPE-CAN2L Ethernet Minicard

DIGITAL I/O											
Product	**Form Factor**	**#GPIO**	**Voltage**	**Buffered**	**Direction**	**Opto**	**Relays**	**Load**	**Counters**	**Ctr Bits**	**Max Rate**
OMM-XT	PC/104	48	5V		Programmable				3	16	10MHz
OMM-DIO-XT	PC/104	48	5V		Programmable						
GPIO-MM-XT	PC/104	100	5V	Yes	Programmable				10	16	10MHz
DS-MPE-GPIO	MiniCard	36	5V/3.3V	Yes	Programmable				8	32	50MHz
PMM-P	PC/104						16 SPDT	30VDC/2A			
OPMM-1616-XT	PC/104					16 In 3-30VDC	16 SPDT	30VDC/2A			
IR104-PBF	PC/104					20 In 3-24V	20 SPST	30VDC/5A			

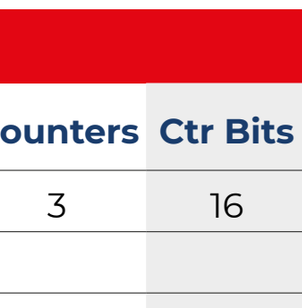


EMM-8EL-XT

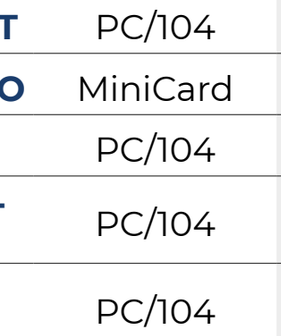


EMM-8P-XT

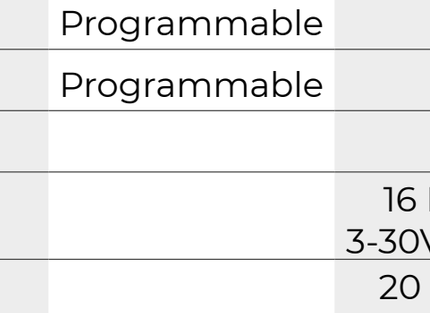
EMM-8PLUS-XT



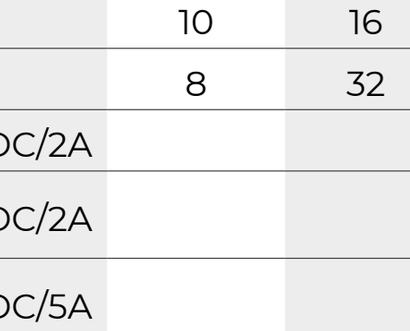
EMM-4M-XT



EMM-OPT4-XT



DS-MPE-SER4M



DS-MPE-OPT4232

Flash Memory Solutions

DRAMs

SILICON POWER

www.silicon-power.com

COMPANY OVERVIEW

With over 16 years of experience, Silicon Power has become a trusted service-driven provider of professional NAND flash storage and DRAM modules for industrial and enterprise applications.

DDR4 DRAM MODULES					
Model	SODIMM	UDIMM	ECC SODIMM	ECC UDIMM	ECC RDIMM
DRAM Type	DDR4	DDR4	DDR4	DDR4	DDR4
Capacity	2GB, 4GB, 8GB, 16GB, 32GB	4GB, 8GB, 16GB, 32GB	4GB, 8GB, 16GB, 32GB	4GB, 8GB, 16GB, 32GB	4GB, 8GB, 16GB
Data Rate	2400 / 2600 MHz	2400 / 2600 MHz	2400 / 2600 MHz	2400 / 2600 MHz	2400 / 2600 MHz
CAS Latency	CL17 / CL19	CL17 / CL19	CL17 / CL19	CL17 / CL19	CL17 / CL19
Voltage	1.2V	1.2V	1.2V	1.2V	1.2V
Pin Count	260 Pin	288 Pin	260 Pin	288 Pin	288 Pin
Data Width	64Bits	64Bits	72Bits	72Bits	72Bits
PCB Heigth	30.13 mm	31.40 mm	30.13 mm	31.40 mm	31.40 mm
Standard 0~85°C	Supported	Supported	Supported	Supported	Supported
Industrial -40~85°C	Supported	Supported	Supported	Supported	Supported
Storage -55~95C	Supported	Supported	Supported	Supported	Supported

DDR3 DRAM MODULES					
Model	SODIMM	UDIMM	ECC SODIMM	ECC UDIMM	ECC RDIMM
DRAM Type	DDR3L	DDR3L	DDR3L	DDR3L	DDR3L
Capacity	2GB, 4GB, 8GB	2GB, 4GB, 8GB	4GB, 8GB	4GB, 8GB	8GB
Data Rate	1600 MHz	1600 MHz	1600 MHz	1600 MHz	1600 MHz
CAS Latency	CL 11	CL 11	CL 11	CL 11	CL 11
Voltage	1.35V	1.35V	1.35V	1.35V	1.35V
Pin Count	204 Pin	240 Pin	204 Pin	240 Pin	240 Pin
Data Width	64Bits	64Bits	72Bits	72Bits	72Bits
PCB Heigth	30.50 mm	30.50 mm	30.50 mm	30.50 mm	30.50 mm
Standard 0~85°C	Supported	Supported	Supported	Supported	Supported
Industrial -40~85°C	Supported	Supported	Supported	Supported	Supported
Storage -55~95°C	Supported	Supported	Supported	Supported	Supported

SSDS					
Form Factor	M.2	M.2	2.5''	2.5''	mSATA
Interface	PCIe Gen3, NVMe	SATA III	SATA III	IDE / PATA	SATA III
Capacity	64 GB - 2 TB	8 GB - 1 TB	8 GB - 4 TB	128 MB - 128 GB	8 GB - 1 TB
Supported Flash Types	3D TLC	SLC, MLC, 3D TLC	SLC, MLC, 3D TLC	SLC, MLC	SLC, MLC, 3D TLC
Industrial -40~85°C	Supported	Supported	Supported	Supported	Supported

FLASH CARDS				
Form Factor	CFExpress	Compact Flash	SD	micro SD
Interface	Cfast 2.0	CF 6.0	SD 3.0	SD 3.0
Capacity	4 GB - 512 GB	128 MB - 256 GB	256 MB - 256 GB	256 MB - 256 GB
Supported Flash Types	SLC, MLC, 3D TLC	SLC, MLC	SLC, MLC, 3D TLC	SLC, MLC, 3D TLC
Industrial -40~85°C	Supported	Supported	Supported	Supported

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