

# KRYPTON® RUGGED SYSTEMS

## KRYPTON® CPU

Compact, highly portable logger for data recording in harsh environments from -40 to +70 °C operating range.



## KRYPTON®

Ultra rugged and distributable data acquisition devices from -40 to +85 °C operating range.



## KRYPTON® 1 SERIES

Distribute your measurements down to a single channel.



## MADE TO BE EXTREME

IP67, dust proof, waterproof, 100 g shock and vibration resistant, wide temperature operating range.

Rugged DAQ system that can be distributed down to a single channel and placed close to sensors. All DAQ systems offer IP67 degree of protection and are thus waterproof, dustproof, shock resistant up to 100 g, and can withstand a temperature range up to -40 °C to 85 °C.

## SINGLE CABLE

With up to 100 m between devices for power, data and synchronization.

## DISTRIBUTABLE DEVICES

Locate your data acquisition hardware close to the sensors.

# KRYPTON® WATERPROOF



## UP TO 100 m BETWEEN UNITS

KRYPTON units can be distributed over the large area with distances of up to 100 meters (328 feet) between DAQ nodes.

## DISTRIBUTED DAQ

Distributed measurement hardware that can be located close to sensors. Compared to traditional DAQ systems, this has many advantages such as shorter cable runs and less potential for signal noise. KRYPTON systems can be distributed down to a single channel.

## EtherCAT® DAQ

Protocol with 100Mb/s bus speed is used for data transmission, data synchronization, and power supply. KRYPTONs are connected with a single cable for data, power, and sync.

## RUGGED IP67

These modules are built with tough-as-nails IP67 protection - they're ready to go to work in extreme weather and under the harshest conditions.

Rugged and distributable data acquisition modules. EtherCAT® interface for analog and digital I/O and IP67 degree of protection.

## UP TO 20 kS/s/CH SAMPLING RATE

Most KRYPTON channels in the EtherCAT® line can achieve sampling rates up to 20 kS/s.

## FROM 3 TO 16 CHANNEL UNITS

Modules are available from a 3 channel unit, ranging up to larger 8 and 16 channel modules.

# KRYPTON® WATERPROOF SPECS

|                              | STG                                                                         | TH                                       | TH-HS                                    | RTD                         | ACC                        | LV                               | LA                                   | DIO                                            | CNT                                   |
|------------------------------|-----------------------------------------------------------------------------|------------------------------------------|------------------------------------------|-----------------------------|----------------------------|----------------------------------|--------------------------------------|------------------------------------------------|---------------------------------------|
| Connectors                   | DB9, L2B10f                                                                 | Thermocouple                             | Thermocouple                             | L0B6f                       | BNC                        | BNC                              | BNC                                  | DB25                                           | L1T7f                                 |
| #ch per module               | 3x, 6x                                                                      | 8x, 16x                                  | 8x, 16x                                  | 8x                          | 4x, 8x                     | 4x, 8x                           | 8x                                   | 16xDI, 16xDO 8xDI, 8xDO                        | 4xCNT                                 |
| Data rate / channel          | 20 kS/s                                                                     | 100 S/s                                  | 100 S/s, upgradable to 10 kS/s           | 100 S/s                     | 20 kS/s                    | 20 kS/s                          | 20 kS/s                              | 40 kS/s                                        | 20 kS/s                               |
| Resolution                   | 24-bit                                                                      | 24-bit                                   | 24-bit                                   | 24-bit                      | 24-bit                     | 24-bit                           | 24-bit                               | digital                                        | 100 MHz timebase<br>5 ppm, 20 ppm max |
| Bandwidth                    | 0.49*fs                                                                     | X                                        | 0.49*fs (max. 1 kHz)                     | X                           | 0.49*fs                    | 0.49*fs                          | 0.49*fs                              | X                                              | 10 MHz                                |
| Voltage ranges               | ±10 V, ±1 V, ±100 mV, ±10 mV                                                | ±1 V, ±100 mV                            | ±1 V, ±100 mV                            | ±1 V, ±100 mV               | ±10 V, ±5 V, ±1 V, ±200 mV | ±50 V                            | ±20 mA                               | CMOS compatible                                | TTL (Low: <0.8 V, High > 2 V)         |
| Input coupling               | DC                                                                          | DC                                       | DC                                       | DC                          | DC, AC 0.1 Hz, 1 Hz        | DC                               | DC                                   | DC                                             |                                       |
| Sensor excitation            | 0...15 V max. 0.4 W/ch (45 mA limit)                                        | X                                        | X                                        | X                           | IEPE 4 mA, 8 mA            | -                                | -                                    | 5 V / 300 mA, 12 V / 120 mA, Vsupply / 200 mA* | 5 V / 100 mA<br>12 V / 50 mA          |
| Bridge connection            | Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire                                            | X                                        | X                                        | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| Programmable shunt           | 100 kΩ                                                                      | X                                        | X                                        | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| IEPE input                   | DSI-ACC                                                                     | X                                        | X                                        | X                           | ✓                          | X                                | X                                    | X                                              | X                                     |
| Resistance                   | X                                                                           | X                                        | X                                        | 10 kΩ                       | X                          | X                                | X                                    | X                                              | X                                     |
| Temperature (PTx)            | DSI-RTD                                                                     | X                                        | X                                        | PT100, 200, 500, 1000, 2000 | X                          | X                                | X                                    | X                                              | X                                     |
| Thermocouple                 | DSI-TH                                                                      | K, J, T, R, S, N, E, C, B                | K, J, T, R, S, N, E, C, B                | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| Current                      | ext. shunt DSI-20mA, DSI-5A                                                 | X                                        | X                                        | X                           | ext. shunt                 | X                                | X                                    | X                                              | X                                     |
| Potentiometer                | ✓                                                                           | X                                        | X                                        | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| LVDT                         | DSI-LVDT                                                                    | X                                        | X                                        | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| Charge                       | DSI-CHG                                                                     | X                                        | X                                        | X                           | X                          | X                                | X                                    | X                                              | X                                     |
| TEDS                         | ✓                                                                           | X                                        | X                                        | X                           | ✓                          | X                                | X                                    | X                                              | X                                     |
| Isolation voltage            | Differential                                                                | 1000 V                                   | 1000 V                                   | 1000 V                      | Differential               | 1000 V                           | 1000 V                               | 250 V                                          | X                                     |
| Isolation arrangement        | None                                                                        | Ch-Ch & Ch-GND                           | Ch-Ch & Ch-GND                           | Ch-Ch & Ch-GND              | None                       | Ch-Ch & Ch-GND                   | Ch-Ch & Ch-GND                       | Isolated common GND                            | Isolated common GND                   |
| Power consumption per module | 2.4 W (4 W 120 Ω @ 5 V load) 3xSTG;<br>5.9 W (8.9 W 120 Ω @ 5 V load) 6xSTG | 2.5 W (8xTH)<br>4 W (16xTH)              | 2.6 W (8xTH-HS)<br>4.3 W (16xTH-HS)      | 2.5 W                       | 4.6 W                      | 3.5 W (4xLV)<br>6.7 W (8xLV)     | 6.8 W                                | 2 W                                            | 2.3W                                  |
| Advanced functions           | Supports all strain types, TEDS support                                     | High isolation, support of main TC types | High isolation, support of main TC types | X                           | TEDS support               | High isolation, high input range | High isolation, 4-20 mA current loop | X                                              | SuperCounter®                         |

## AMPLIFIER SPECS

|                                |                                                                        |
|--------------------------------|------------------------------------------------------------------------|
| 3xSTG, 6xSTG                   | Differential universal and strain module                               |
| 8xTH, 16xTH, 8xTH-HS, 16xTH-HS | Isolated universal thermocouples module                                |
| 8xRTD                          | Isolated module for measurements with resistance temperature detectors |
| 4xACC, 8xACC                   | IEPE accelerometer amplifier                                           |
| 4xLV, 8xLV                     | Isolated voltage input module                                          |

|                         |                                                                                                               |
|-------------------------|---------------------------------------------------------------------------------------------------------------|
| 8xLA                    | Isolated low current amplifier                                                                                |
| 16xDI, 16xDO, 8xDI-8xDO | Isolated digital input/output module                                                                          |
| GPS JUNCTION            | Module for synchronization between SIRIUS or KRYPTON EtherCAT® devices to SIRIUS USB device, IRIG-B-DC or GPS |
| Sync junction           | Module used to inject IRIG-B-DC sync signal from USB device to EtherCAT® line                                 |
| KRYPTON CPU             | Rugged data logger                                                                                            |



# KRYPTON® 1 WATERPROOF SPECS

|                               | AO     | DI                                | DO                         | ACC                        | STG                                       | LV                          | HV                             | TH-HV                             | CNT                                   |
|-------------------------------|--------|-----------------------------------|----------------------------|----------------------------|-------------------------------------------|-----------------------------|--------------------------------|-----------------------------------|---------------------------------------|
| Connector                     | BNC    | DSUB15HD Male                     | DSUB15HD Female            | BNC                        | DB9                                       | BNC                         | Banana jack                    | K-type Thermocouple<br>LEMO REDEL | LEMO T-type<br>7pin female            |
| Number of channels per module | 1      | 4                                 | 4                          | 1                          | 1                                         | 1                           | 1                              | 1                                 | 1                                     |
| Data rate per channel         | X      | 40 kS/s                           | X                          | 40 kS/s                    | 40 kS/s                                   | 40 kS/s                     | 40 kS/s                        | 100 S/s                           | 20 kS/s                               |
| Resolution                    | 18 bit | Digital                           | Digital                    | 24-bit                     | 24-bit                                    | 24-bit                      | 24-bit                         | 24-bit                            | 100 MHz timebase<br>5 ppm, 20 ppm max |
| Bandwidth                     | X      | X                                 | X                          | 0.49 fs                    | 0.49 fs                                   | 0.49 fs                     | 0.49 fs                        | 0.49 fs                           | 10 MHz                                |
| Voltage ranges                | X      | Digital (Low: < 1 V, High: > 2 V) | X                          | ±10 V, ±5 V, ±1 V, ±200 mV | ±50 V, ±10 V, ±1 V, ±100 mV               | ±50 V, ±10 V, ±1 V, ±100 mV | ±1000 V                        | Thermocouple                      | TTL (Low: <0.8 V, High > 2 V)         |
| Input coupling                |        |                                   |                            | DC, AC 0.1 Hz, 1 Hz        | DC, AC 1 Hz                               | DC, AC 1 Hz                 | DC                             |                                   |                                       |
| Sensor excitation             | ±10 V  | X                                 | X                          | IEPE 4 mA, 8 mA            | Unipolar 0 - 24 V<br>Bipolar 0 - 12 V     | X                           | X                              | X                                 | 5 V (100 mA max.), 12 V (90 mA max.)  |
| Bridge connection             | X      | X                                 | X                          | X                          | Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire          | X                           | X                              | X                                 | X                                     |
| Programmable shunt            | X      | X                                 | X                          | X                          | 100 kΩ                                    | X                           | X                              | X                                 | X                                     |
| IEPE input                    | X      | X                                 | X                          | ✓                          | DSI-ACC                                   | X                           | X                              | X                                 | X                                     |
| Resistance                    | X      | X                                 | X                          | X                          | ✓                                         | X                           | X                              | X                                 | X                                     |
| Temperature (PTx)             | X      | X                                 | X                          | X                          | DSI-RTD                                   | X                           | X                              | X                                 | X                                     |
| Thermocouple                  | X      | X                                 | X                          | X                          | DSI-TH                                    | X                           | X                              | K-type                            | X                                     |
| Current                       | X      | X                                 | X                          | X                          | 20mA (internal shunt), DSI-5A, ext. shunt | ext. shunt                  | X                              | X                                 | X                                     |
| Potentiometer                 | X      | X                                 | X                          | X                          | ✓                                         | X                           | X                              | X                                 | X                                     |
| LVDT                          | X      | X                                 | X                          | X                          | DSI-LVDT                                  | X                           | X                              | X                                 | X                                     |
| Charge                        | X      | X                                 | X                          | X                          | DSI-CHG                                   | X                           | X                              | X                                 | X                                     |
| TEDS                          | X      | X                                 | X                          | ✓                          | ✓                                         | X                           | X                              | X                                 | X                                     |
| Isolation                     | None   | Galvanic isolation CH, GND        | Galvanic isolation CH, GND | 125 Vrms Isolation CH, GND | 125 Vrms Isolation CH, GND                | 125 Vrms Isolation CH, GND  | CAT III 600 V<br>CAT II 1000 V | CAT III 600 V<br>CAT II 1000 V    | None                                  |
| Power consumption             | 2 W    | 1.5 W                             | 2 W                        | 2 W                        | 3 W                                       | 1.5 W                       | 1 W                            | 1.3 W                             | 1.2 W                                 |

## AMPLIFIER SPECS

|            |                                     |
|------------|-------------------------------------|
| 4xDI, 4xDO | Four channel digital I/O amplifier  |
| 1xAO       | Analog output                       |
| 1xCNT      | Single channel SuperCounter® module |
| 1xLV       | Isolated low voltage module         |

|         |                                              |
|---------|----------------------------------------------|
| 1xSTG   | Isolated universal and strain amplifier      |
| 1xACC   | Isolated IEPE accelerometer amplifier        |
| 1xHV    | Isolated high voltage module                 |
| 1xTH-HV | Isolated thermocouple module (CATIII 1000 V) |