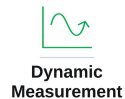


RUGGED 3-CHANNEL STRAIN GAUGE AMPLIFIER

Type: **KRYPTON-3xSTG**

- 3 CHANNELS, 24 BIT
- 20 kS/s PER CHANNEL
- FULL, HALF, QUARTER BRIDGE
- IP67 · -40 ... +85 °C



ORDER CODE

Order code	Type	Connectors
EMDA	KRYPTON-3xSTG	3 x DSUB-9 female

The LEMO version KRYPTON-3xSTG-L2B10f is available on request. DSI adapters, mating connectors and EtherCAT cables are accessories.



OVERVIEW

Data acquisition brought to the sensor instead of the sensor to the rack: 3 universal bridge channels in an aluminium block machined from solid, sealed and rated IP67 from -40 to +85 °C. Each channel takes a full, half or quarter bridge — completion for 120 Ω and 350 Ω is built in, and so is the 100 kΩ shunt for the calibration check — or a voltage in the ranges ±10 V · ±1 V · ±100 mV · ±10 mV, digitised with 24 bit at up to 20 kS/s per channel. One hybrid cable carries data, power and synchronisation: EtherCAT at 100 Mbit/s, up to 100 m to the next unit, up to 64 units in a chain, all sampled to within less than one sample of each other. TEDS is read automatically, and DSI adapters extend the same channel to IEPE, thermocouple, RTD, LVDT and charge.

MEASUREMENT	SYSTEM AND ENVIRONMENT
• 3 universal channels: full, half or quarter bridge, or voltage • 24-bit oversampled SAR with 41 kHz anti-aliasing filter • Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 s/s, software-selectable • Ranges ±10 V · ±1 V · ±100 mV · ±10 mV · ±0.03 % of reading • Bridge ranges 2 ... 1000 mV/V, freely programmable • Internal completion for 120 Ω and 350 Ω half and quarter bridges • 100 kΩ shunt on board for the calibration check • Excitation 0 ... 15 V, freely programmable, 45 mA limit	• EtherCAT at 100 Mbit/s — one cable for data, power and sync • Up to 100 m between units, daisy-chainable • 64 units or more in one chain (power injectors may be required) • Synchronised to within less than one sample • IP67 · machined from solid aluminium, sealed and rubber-banded • -40 °C to +85 °C · humidity 5 to 100 % RH • Shock 100 g, 6 ms half-sine · random vibration to MIL-STD-202G • TEDS read automatically · DSI adapters for IEPE, TC, RTD, LVDT, charge

TECHNICAL DATA

ANALOG INPUT

Input type	voltage · full, half and quarter bridge strain
Number of channels	3
ADC type	24-bit oversampled SAR with 41 kHz anti-aliasing filter
Sampling rate	simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s, software-selectable
Voltage ranges	$\pm 10\text{ V}$ · $\pm 1\text{ V}$ · $\pm 100\text{ mV}$ · $\pm 10\text{ mV}$
Input accuracy	$\pm 0.03\%$ of reading · $\pm 0.02\%$ of range · $\pm 0.1\text{ mV}$
Input coupling · impedance	DC · $10\text{ M}\Omega$
Overvoltage protection	In+ to In-: 50 V continuous, 200 V peak (10 ms)

SIGNAL AND PRECISION

Gain drift	typ. 10 ppm/K, max 40 ppm/K
Offset drift	typ. $0.3\text{ }\mu\text{V/K}$ + 5 ppm/K
Gain linearity	< 0.02 %
Bandwidth (-3 dB)	0.49 fs
Alias-free bandwidth	DC to 0.453 fs
Alias rejection	-100 dB, all sample rates
Oversampling	32
Delay through ADC	37 / fs

BRIDGE AND EXCITATION

Bridge connection	full · half · quarter bridge (3-wire)
Bridge ranges	2 ... 1000 mV/V, freely programmable
Internal completion	half and quarter bridge, 120 Ω and 350 Ω
Completion accuracy	0.05 % · TCR 2 ppm/K (others on request)
Internal shunt	100 k Ω (others on request) · 0.1 % · TCR 10 ppm/K
Excitation voltage	freely programmable, 16-bit DAC · preset 0, 1, 2.5, 5, 10, 15 V DC
Excitation accuracy · drift	$\pm 0.05\%$ $\pm 2\text{ mV}$ · $\pm 50\text{ ppm/K}$ $\pm 100\text{ }\mu\text{V/K}$
Load stability 10 ... 90 %	< 0.01 %
Current limit · protection	45 mA, 400 mW max · continuous short to ground
Input short, offset adjust	software-selectable

INTERFACE AND POWER

Interface	EtherCAT · 100 Mbit/s full duplex
Connection	LEMO 1T hybrid cable — data, power and sync in one cable, daisy-chainable
Max. cable length	100 m between units
Max. units per chain	64 or more (power injectors may be required)
Throughput per chain	6 ... 10 MB/s, depending on the configuration
Sync accuracy	below one sample
Power supply	9 ... 48 V DC
Power consumption	3.5 W · 4.8 W with 120 Ω bridges at 5 V excitation

PERFORMANCE PER VOLTAGE RANGE

Voltage range	$\pm 10\text{ V}$ · $\pm 1\text{ V}$ · $\pm 100\text{ mV}$ · $\pm 10\text{ mV}$
Typ. dynamic range at 10 kS/s	-139 · -139 · -129 · -110 dB
Typ. noise floor at 10 kS/s	-106 · -105 · -97 · -78 dB
Typ. CMR at 400 Hz / 1 kHz	86/84 · 96/95 · 112/102 · 112/102 dB



ENVIRONMENT AND MECHANICS

Operating temperature	-40 °C ... +85 °C
Storage temperature	-40 °C ... +85 °C
Humidity	5 ... 100 % RH
Protection class	IP67
Shock	100 g, 6 ms half-sine to SIST EN 60068-2-27:2009 · 100 x pos./neg. per axis, 600 x total
Vibration	random to MIL-STD-202G method 214A, condition II-D · 13.9 g RMS, 41.7 g peak · 8 h per axis, 24 h total
Housing	aluminium, machined from solid, sealed
Weight	740 g
Dimensions	213 x 39 x 56 mm · 213 x 39 x 58.2 mm with connectors

SENSORS AND CONNECTION

Input connector	3 x DSUB-9 female, one per channel
TEDS	read automatically · standard and through DSI adapters
IEPE · charge	with the DSI-ACC and DSI-CHG adapters
Thermocouple · RTD	with the DSI-TH and DSI-RTD adapters
LVDT	with the DSI-LVDT adapter
Potentiometer	directly
Current	with an external shunt or a DSI adapter
Software	DewesoftX included · licence embedded in the device



ACCESSORIES: DSI ADAPTERS, POWER AND CABLE

DSI-ACC	IEPE and ICP sensors · 4 mA / 21 V, high-pass 0.8 Hz · versions with 0.16 Hz, with 20 mA, and DSIw-ACC in an IP67 housing
DSI-CHG	charge · DSI-CHG-50 up to 50 000 pC, AC 0.07 Hz, 100 kHz · DSI-CHG-DC 1 ... 500 kpC, drift < 0.1 pC/s, expressly supported by the STG amplifiers
DSI-TH	thermocouples · DSI-TH-UNI for K, J, T, R, S, N, E, B and C with cold junction compensation to 0.5 °C · single types as DSI-TH-K, -J, -T, -E, -C
DSI-RTD	PT100, PT200, PT500, PT1000 and PT2000 · 2-, 3- and 4-wire · Binder 710 mating connector included
DSI-LVDT	LVDT sensors · excitation 4 ... 10 kHz, phase adjustment by trimmer · output 1 V = 1000 mV/V
Current adapters	DSI-20mA with a 50 Ω internal shunt, 0.01 % · DSI-5A with 10 m Ω , 0.1 % · DSIi-10A and DSIi-20A isolated, < 0.5 %
Every DSI adapter	TEDS chip to IEEE 1451.4, detected automatically · aluminium DSUB-9 housing with screw locking · IP20, the DSIw types IP67
Power supply	PS-120-L1T8m 24 V DC, 5 A, 120 W · PS-200-L1T8m 24 V DC, 8.3 A, 200 W · 8-pole LEMO male, connected to the OUT socket
EtherCAT cable	DS-EtherCAT, 8-pole LEMO L1T8m to L1T8f · data, power and sync between the modules

Some DSI adapters are restricted to certain host amplifiers — the manufacturer's accessories manual lists the exceptions.



COMPLIANCE AND CERTIFICATION



RoHS Directive 2011/65/EU — no intentional use of restricted or prohibited hazardous substances

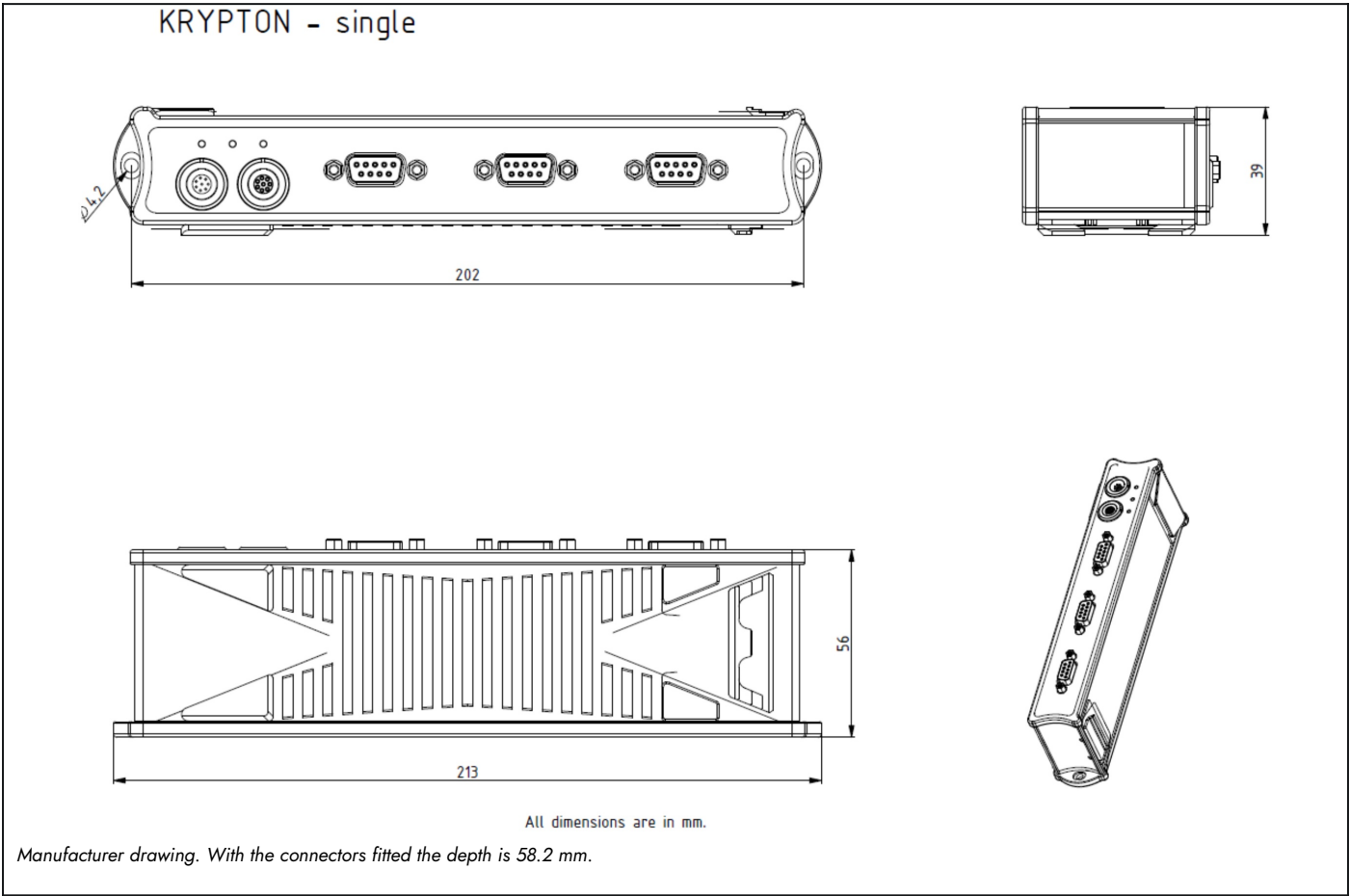


REACH Regulation (EC) No 1907/2006

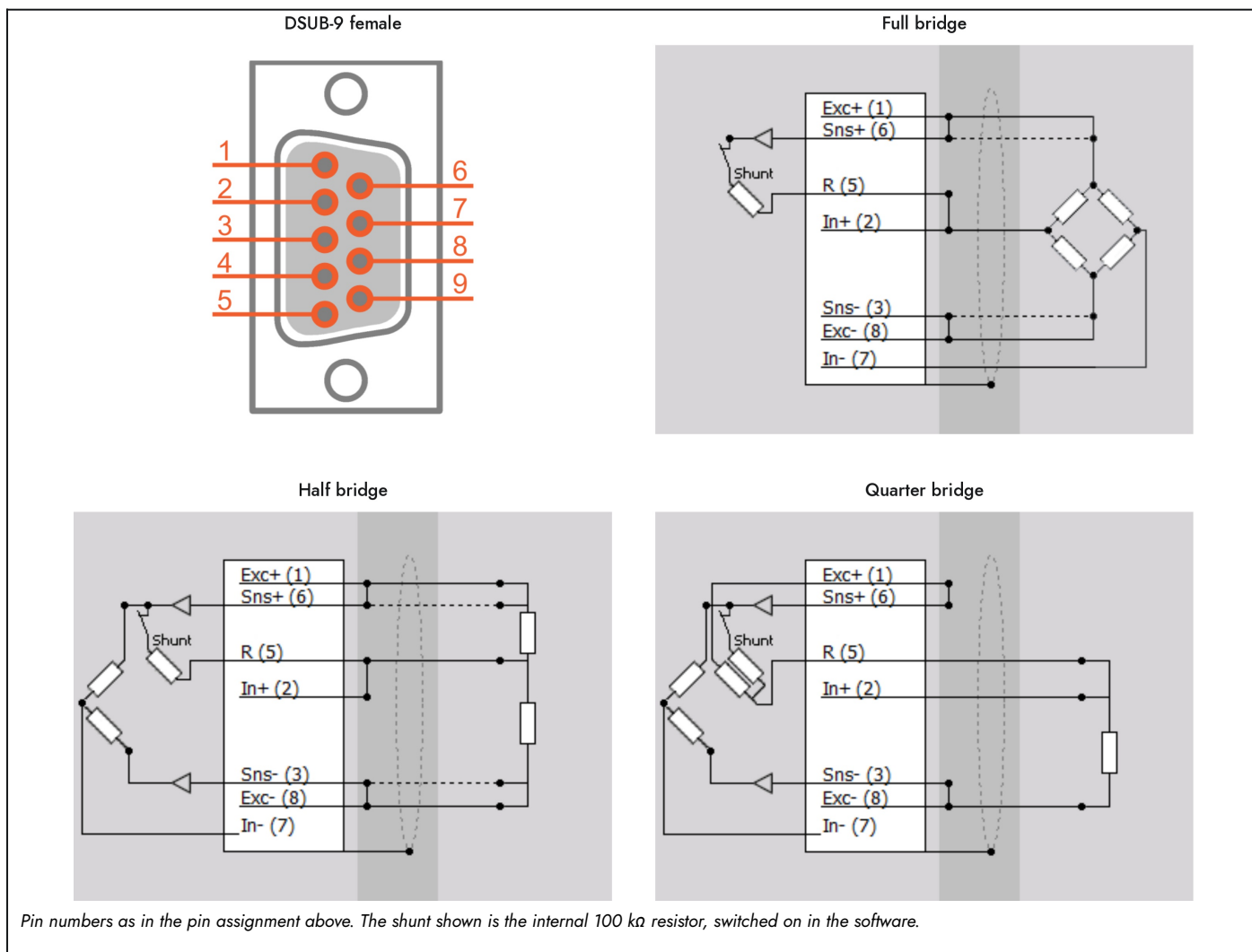
CALIBRATION AND DISPOSAL

Delivery	each device is calibrated before delivery
Reports	detailed calibration reports on request · retained for at least one year after delivery
Interval	annual calibration is the usual standard across industries
Disposal	WEEE Directive 2012/19/EU — collected separately at the end of service life, not as unsorted municipal waste · the housing is aluminium and selected components are suitable for recycling

DIMENSIONS (mm)



CONNECTOR AND BRIDGE CONNECTION



PIN ASSIGNMENT, DSUB-9 FEMALE

Pin	Name	Function
1	Exc+	Excitation +
2	In+	Input +
3	Sns-	Sense -
4	GND	Ground
5	R+	$\frac{1}{4}$ bridge / shunt
6	Sns+	Sense +
7	In-	Input -
8	Exc-	Excitation -
9	TEDS	TEDS

