**DIC 20 - Line/ICP® input (Code 3511)**
2-channel input module for direct signals and ICP® sensors

**Input**
- Input signal: analog signals or ICP® sensors
- Signal ranges: -30 dB (31.6 mV rms ) to +20 dB (10 V rms ) in 9 ranges
- Coupling: DC, AC or ICP®
- ICP® current: 4 mA constant current supply
- Input impedance: 1 MOhm
- Sampling frequency (fS): 300 Hz - 50 kHz
- Analog to digital conversion: 18-bit Delta-Sigma, 16 bits recorded
- Dynamic range: > +90 dB, typical
- Distortion: < -90 dB, typical
- Cross-talk: < -90 dB, typical
- Phase between channels: < 0.2°
- Cut-off frequency: f/2.0, f/2.4 or f/3.0
- Signal bandwidth DC mode: from DC to cut-off frequency
- Signal bandwidth AC mode: from 2 Hz to cut-off frequency
- Signal bandwidth ICP® mode: ±0.01 dB (0 Hz to 22.5 kHz)
- Pass-band ripple: ±0.1 % or ± 1 mV
- AC accuracy: ±0.1 % or ± 1 mV
- DC accuracy: ±0.1 % or ± 1 mV
- Low-pass analog filter (optional, LPF 20): 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz and 5 kHz, selectable
- High-pass analog filter (optional, HPF 20): 22 Hz, 300 Hz, A-filter, selectable
- Connectors: 2 x BNC

**Special signal modules**
- EBU 20 - AES/EBU input and output (professional format) (Code 3515)
  2-channel record or replay module for AES/EBU digital signals
- RPM 20 - Pulse input and output (Code 3530)
  2-channel record or replay module for RPM signals
- CAN 10 - Bus input and output (Code 3531)
  1-channel record module for CAN-bus data

**Analog modules**
- DIC 20 - Line/ICP® input (Code 3511)
- DIC 21 - Line/ICP® input (Code 3527)
- MIC 20 - Microphone input (Code 3512)
- SGC 21 - Strain gauge module (Code 3529)
- DIC 61 - Line/ICP® input (Code 3526)
- CHG 20 - Charge input (Code 3513)
- OUT 20 - Analog output (Code 3517)
- HSI 10 - High-speed input (Code 3533)
- EBU 20 - AES/EBU input and output (professional format) (Code 3515)
- RPM 20 - Pulse input and output (Code 3530)
- CAN 10 - Bus input and output (Code 3531)

**Analog output modules**
- OUT 20 - Analog output (Code 3517)
  2-channel analog output module to replay recorded analog signals (up to 50 kHz)

**High-speed modules**
- HSI 10 - High-speed input (Code 3533)
  1-channel high-speed input module

**Interface modules for SQlab III**
(Code 3511 - 3533)
**DIC 21 - Line/ICP® input (Code 3527)**

2-channel input module for direct signals and ICP® sensors

**Input**
- Input signal: analog signals or ICP® sensors
- Signal ranges: -30 dB (31.6 mV<sub>ref</sub>) to +31 dB (100 V<sub>ref</sub>) in 17 ranges
- Coupling: DC, AC or ICP®
- ICP® current: 4 mA constant current supply
- Input impedance: 1 MOhm
- Sampling frequency (f<sub>S</sub>): 300 Hz - 100 kHz
- Analog to digital conversion: 24-bit Delta-Sigma, 16 bits recorded
- Adjustable offset compensation: ±50 V in 0.01 V steps
- Offset compensation is only available in input ranges >1 V<sub>ref</sub>
- Dynamic range: > +80 dB, typical
- Distortion: < -80 dB, typical
- Cross-talk: < -80 dB, typical
- Phase between channels: < 0.2°
- Input filter: digital FIR filter with linear phase
- Cut-off frequency: f<sub>S</sub>/2.1, f<sub>S</sub>/2.4 or f<sub>S</sub>/3.0
- Signal bandwidth DC mode: from DC to cut-off frequency
- Signal bandwidth AC mode: from 1 Hz to cut-off frequency
- Pass-band ripple: ±0.01 dB (0 Hz to 22.67 kHz)
- ±0.04 dB (0 Hz to 45.35 kHz)
- AC accuracy: ±0.1 % or ±1 mV
- DC accuracy: ±0.1 % or ±1 mV
- Connectors: 2 x BNC

**MIC 20 - Microphone input (Code 3512)**

2-channel input module for microphones

**Input**
- Input signal: microphone signals
- Signal ranges: -30 dB (31.6 mV<sub>ref</sub>) to +20 dB (10 V<sub>ref</sub>), in 9 ranges
- Coupling: AC (-3 dB at 2 Hz)
- Input impedance: 1 MOhm, single-ended
- Sampling frequency (f<sub>S</sub>): 300 Hz - 50 kHz
- Analog to digital conversion: 18-bit Delta-Sigma, 16 bit recorded
- Dynamic range (SNR): > +90 dB, typical
- Distortion: < -90 dB, typical
- Cross-talk: < -90 dB, typical
- Phase between input channels: < 0.2°
- Cut-off frequency: f<sub>S</sub>/2.0, f<sub>S</sub>/2.4 or f<sub>S</sub>/3.0
- Polarization power supply: 0 V or 200 V regulated
- Pre-amplifier power supply: ±28 V or ±60 V
- Absolute noise floor: 2 µV<sub>ref</sub>, typical
- AC accuracy: ±0.1 % or ±1 mV
- DC accuracy: ±0.1 % or ±1 mV
- High-pass analog filter (optional, HPF 20): 22 Hz, 300 Hz, A-filter, selectable
- Connectors: 2 x 7-pin LEMO 1 B

**SGC 21 - Strain gauge module (Code 3529)**

2-channel input module for strain gages

**Input**
- Input signal: strain gage
- Sensitivity: ±1 mV<sub>p</sub> to ±10 V<sub>p</sub> in 9 ranges
- Coupling: DC
- Sampling frequency (f<sub>S</sub>): 300 Hz - 50 kHz
- Cut-off frequency: f<sub>S</sub>/2.1, f<sub>S</sub>/2.4 or f<sub>S</sub>/3.0
- Bridge type: Half, full or quarter bridge
- Bridge resistor: 120 Ohm, minimum
- Bridge supply voltage: Programmable from 0.5 V to 10 V in steps of 0.1 V
- 14-bit D/A converter
- Auto-offset capability: with external resistor possible
- Low-pass analog filter (optional, LPF 22): 100 Hz, 200 Hz, 500 Hz, selectable
- Connectors: 25-pin D-Sub
DIC 61 - Line/ ICP® input (Code 3526)

6-channel input module for direct signals and ICP® sensors

**Input**

- Input signal: analog signals or ICP® sensors
- Signal ranges: -30 dB (31.6 mV rms), to +20 dB (10 V rms), in 14 ranges
- Coupling: DC, AC or ICP®
- Input impedance: 1 MOhm
- Sampling frequency (f_s): 300 Hz - 100 kHz
- Analog to digital conversion: 24-bit Delta-Sigma, 16 bits recorded
- Dynamic range (SNR): > +80 dB, typical
- Distortion: < -80 dB, typical
- Cross-talk: < -80 dB, typical
- Phase between channels: < 0.2°
- Input filter: digital FIR filter with linear phase
- Cut-off frequency: f_s/2.1, f_s/2.4 or f_s/3.0
- Signal bandwidth DC mode: from DC to cut-off frequency
- Signal bandwidth AC mode: from 2/2 Hz to cut-off frequency
- Signal bandwidth ICP® mode: from 2/2 Hz to cut-off frequency
- Pass-band ripple: ±0.01 dB (0 Hz to 22.67 kHz)
  ±0.04 dB (0 Hz to 45.35 kHz)
- AC accuracy: ±0.1 % or ±1 mV
- DC accuracy: ±0.1 % or ±1 mV
- Connectors: 25-pin D-Sub

[Including: CDB II.1 (Code 3556), Cable 6 x BNC > D-sub XX-pin for DIC 61 (Input), 1 m (3.28 ft)]

CHG 20 - Charge input (Code 3513)

2-channel input module for charge sensors

- Input signal: charge sensor
- Sensitivity: 1 pC to 10000 pC in 9 ranges
- Coupling: AC (-3 dB at 2 Hz)
- Sampling frequency (f_s): 300 Hz - 50 kHz
- Cut-off frequency: f_s/2.0, f_s/2.4 or f_s/3.0
- Low-pass analog filter (optional, LPF 21): 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz and 5 kHz, selectable
- Connectors: 2 x Micro dot (10 - 32 UNF)

OUT 20 - Analog output (Code 3517)

2-channel analog output module to replay recorded analog signals (up to 50 kHz f_s)

- Output signal: Single-ended analog voltage
- Signal range: 1 V_p, 1 V_p, 3.16 V_p, 3.16 V_p, 5 V_p
- Impedance: 75 Ohm
- Output load: > 10 kOhm
- Output resolution: 16 bit
- Dynamic range: > +90 dB, typical
- Distortion: < -90 dB, typical
- Cross-talk: < -90 dB, typical
- Connectors: 2 x BNC

HSI 10 - High-speed input (Code 3533)

1-channel high-speed input module

- Input signal: high-frequency analog signals
- Signal range: 0.1 V_p, 0.2 V_p, 0.5 V_p, 1 V_p, 2 V_p, 5 V_p
- Coupling: DC or AC (-3 dB at 2 Hz)
- Input impedance: 100 kOhm, single-ended or symmetrical
- Sampling frequency (f_s): 53 kHz - 420 kHz
- Analog to digital conversion: 24-bit Delta-Sigma, 16 bits recorded
- Dynamic range (SNR): > +80 dB, typical
- Distortion: < -80 dB, typical
- Cross-talk: < -80 dB, typical
- Phase between channels: < 1°
- Cut-off frequency: f_s/2.1, f_s/2.4 or f_s/3.0
- Absolute noise floor: 10 µV rms, typical
- AC accuracy: ±0.1 %
- DC accuracy: ±0.2 % or ±1 mV
- Connectors: BNC for single-ended
EBU 20 - AES/EBU input and output (professional format) (Code 3515)
2-channel record or replay module for AES/EBU digital signals

**Input**
- Input signal: AES/EBU standard digital data, 16 MSB recorded
- Signal level: RS-422
- Coupling: galvanically isolated (transformer-coupled)
- Input termination: 100 Ohm or 20 kOhm, switchable
- Connector: 25-pin D-sub type female

**Output**
- Output signal: AES/EBU standard digital data, 16 MSB replayed
- Signal level: RS-422
- Input synchronization: empty AES/EBU frame supported on the outputs for synchronization of the input signal
- Connector: 25-pin D-sub type female

[Including: CDX II.1 (Code 3551), Cable D-sub 25-pin → 2 x XLR 3-pin for EBU 20 (Input/Output), 1 m (3.28 ft)]

RPM 20 - Pulse input and output (Code 3530)
2-channel record or replay module for RPM signals

**Input**
- Input signal: pulses
- Coupling: galvanically isolated via optical coupling
- Signal range: max. ±40 V
- Input pulse threshold: 100 mV, 250 mV, 500 mV, 1 V, 2.5 V, 5 V and 10 V
- Hysteresis: ±10 % of the threshold level
- Input frequency: max. 100 kHz
- Impedance: 100 kOhm
- Sampling frequency: max. 840 kbit/s
- Measured RPM range: 60 - 12,000 RPM
- Accuracy: better than 1 RPM
- Phase error: < 1°
- Connectors: 2 x BNC

**Output**
- Output signal: pulses as recorded
- Output level: TTL
- Impedance: 75 Ohm
- Connectors: 2 x BNC

CAN 10 - Bus input and output (Code 3531)
1 channel record module for CAN-bus data

**Input**
- Input signal: CAN-bus data
- Bus frame identifier: CAN 2.0A, CAN 2.0B (11 or 29 bit)
- Galvanic isolation: via optocoupler
- Impedance: min. 50 k, switchable
- Maximum bus bit rate: 1 MBPS, bitrate selectable by user
- Recorded information: message time, identifier field (selectable), control field, data field, CRC field, acknowledge field
- Error detection: bit, bit stuffing, CRC, form, acknowledge
- Message time accuracy: 1 ms
- Message time resolution: 1 μs
- Input connector: 9 pin D-sub, male termination resistor 124 Ohm

**Accessories (not included)**
- SCU T6 (Code 3390)
  Signal Conditioning Unit for Thermo elements, 6 channels for DIC 20, DIC 61
- LPF 20 (Code 3520)
  Low-Pass Filter for DIC 20
- HPF 20 (Code 3521)
  High-Pass Filter for DIC 20 / MIC 20
- LPF 21 (Code 3522)
  Low-Pass Filter for CHG 20
- LPF 22
  Low-Pass Filter for SGC 21